



**REGULAR MEETING
OF THE CITY COUNCIL**

May 25, 2021

ADDISON TREEHOUSE

**14681 MIDWAY RD. SUITE 200, ADDISON, TX 75001
6:00 PM EXECUTIVE SESSION &
REGULAR MEETING**

Notice is hereby given that the Addison City Council will conduct its REGULARLY SCHEDULED MEETING on Tuesday, May 25, 2021 at the Addison TreeHouse with a quorum of the City Council physically present. Limited seating for members of the public will be available using CDC recommended social distancing measures. The Town will utilize telephone or videoconference public meetings to facilitate public participation to mitigate the spread of COVID-19 by avoiding meetings that bring people into a group setting. Telephonic or videoconferencing capabilities will be utilized to allow individuals to address the Council. Email comments may also be submitted to: iparker@addisontx.gov by 3:00 pm the day of the meeting. Members of the public are entitled to participate remotely via Toll-Free Dial-in Number: 877.853.5247; Meeting ID: 409.327.0683 Participant ID: #. For more detailed instructions on how to participate in this meeting visit our Agenda Page. The meeting will be live streamed on Addison's website at: www.addisontexas.net.

Call Meeting to Order

Pledge of Allegiance

EXECUTIVE SESSION

Closed (Executive) Session of the Addison City Council pursuant to:

Section 551.074, Tex. Gov. Code, to deliberate the appointment, employment, evaluation, reassignment, duties, discipline or dismissal of a public officer or employee, pertaining to:

- City Attorney

Reconvene in to Regular Session: In accordance with Texas Government Code, Chapter 551, the City Council will reconvene into Regular Session to consider action, if any, on matters discussed in Executive Session.

REGULAR MEETING

Announcements and Acknowledgments Regarding Town and Council Events and Activities

Discussion of Meetings / Events

Public Comment

The City Council invites citizens to address the City Council on any matter, including items on the agenda, except public hearings that are included on the agenda. Comments related to public hearings will be heard when the specific hearing starts. Citizen comments are limited to three (3) minutes, unless otherwise required by law. To address the Council, please fill out a City Council Appearance Card and submit it to a staff member prior to the Public Comment item on the agenda. The Council is not permitted to take any action or discuss any item not listed on the agenda. The Council may choose to place the item on a future agenda.

Consent Agenda

All items listed under the Consent Agenda are considered routine by the City Council and will be enacted by one motion with no individual consideration. If individual consideration of an item is requested, it will be pulled from the Consent Agenda and discussed separately.

1. Consider Action on the **Minutes from the April 27, 2021 Council Work Session and Regular Meeting.**

2. Consider Action on the Minutes from the May 11, 2021 Regular Council Meeting.
3. Consider Action on a Resolution Authorizing Acceptance of Coronavirus Response and Relief Supplemental Appropriation Act (CRRSAA) Airport Coronavirus Response Grant Program (AGRCP) Grant from the Texas Department of Transportation in the Estimated Amount of \$57,000 and Authorize the City Manager to Execute the Documents Necessary to Accept the Grant.
4. Consider Action on a Resolution Approving a Sale and Assignment of Ground Leasehold Between Concourse Plaza II, LTD. and 16051 Addison, LLC for Commercial Office and Aeronautical use on Property Located at 16051 Addison Road Together with Consent to Leasehold Mortgage; and Authorizing the City Manager to Execute the Consent of Landlord as Required by the Ground Lease.
5. Consider Action on the Second Quarter Update from the Finance Committee to the City Council for the Period from January 2021 to March 2021.
6. Consider Action on a Resolution Approving a Contract Between the Town of Addison and Rey-Mar Construction for the Kellway Lift Station Bypass Project and Authorizing the City Manager to Execute a Contract in an Amount Not to Exceed \$777,100.

Regular Items

7. Present, Discuss, and Consider Action on a Resolution Approving and Adopting the City-Wide Trails Master Plan and Providing an Effective Date.
8. Hold a Public Hearing, Present, Discuss, and Consider Action on an Ordinance Changing the Zoning on Property Located at 5290 Belt Line Road, Suite 112B, Which Property is Currently Zoned PD, Planned Development, Through Ordinance O19-22, by Approving a Special Use Permit for a New Restaurant. Case 1826-SUP/Jeni's Splendid Ice Creams.

9. Hold a Public Hearing, Present, Discuss, and Consider Action on an **Ordinance Changing the Zoning on Property Addressed as 4141 Spring Valley Road and 14101 Midway Road, Currently Zoned Residential-1 (R-1) and Planned Development (PD), Through Ordinance 084-092, with a Special Use Permit for a Private School, by Approving a Special Use Permit for Seven Portable School Buildings.** Case 1827-SUP/Greenhill School Temporary Classrooms.
10. Present and Discuss the **Finance Department Quarterly Financial Report of the Town of Addison for the Fiscal Year 2021 Second Quarter Ended March 31, 2021.**

Adjourn Meeting

NOTE: The City Council reserves the right to meet in Executive Session closed to the public at any time in the course of this meeting to discuss matters listed on the agenda, as authorized by the Texas Open Meetings Act, Texas Government Code, Chapter 551, including §551.071 (private consultation with the attorney for the City); §551.072 (purchase, exchange, lease or value of real property); §551.074 (personnel or to hear complaints against personnel); §551.076 (deployment, or specific occasions for implementation of security personnel or devices); and §551.087 (economic development negotiations). Any decision held on such matters will be taken or conducted in Open Session following the conclusion of the Executive Session.

THE TOWN OF ADDISON IS ACCESSIBLE TO PERSONS WITH DISABILITIES. PLEASE CALL (972) 450-7017 AT LEAST 48 HOURS IN ADVANCE IF YOU NEED ASSISTANCE.

POSTED BY: _____

Irma G. Parker, City Secretary

DATE POSTED: Thursday, May 20, 2021

TIME POSTED: 5:00 pm

DATE REMOVED FROM BULLETIN BOARD: _____

REMOVED BY: _____

Council Meeting

1.

Meeting Date: 05/25/2021

Department: City Secretary

AGENDA CAPTION:

Consider Action on the **Minutes from the April 27, 2021 Council Work Session and Regular Meeting.**

BACKGROUND:

The minutes for the April 27, 2021 Council Work Session and Regular Meeting have been prepared for consideration.

RECOMMENDATION:

Administration recommends approval.

Attachments

Minutes - April 27, 2021

D R A F T

OFFICIAL ACTIONS OF THE ADDISON CITY COUNCIL

April 27, 2021

**Executive Session, Work Session & Regular Meeting
5:30 p.m.**

**Addison TreeHouse
14681 Midway Rd., Addison, TX 75001**

The Addison City Council conducted its Regular Council Meeting on Tuesday, April 27, 2021 at the Addison TreeHouse with a quorum of the City Council physically present. Limited seating for members of the public was available using CDC recommended social distancing measures. The Town utilized telephone and videoconferencing to facilitate participation in the meeting. Interested parties were able to make public comments and address the Council via emailed comments submitted to the City Secretary at iparker@addisontx.gov by 3:00 pm on the meeting day. Members of the public were also entitled to participate remotely via Toll-Free Dial-in Number: 877.853.5247; Meeting ID: 409.327.0683 Participant ID: #. Detailed instructions on how to participate in this meeting were available on the Town's website on the Agenda Page. The meeting was live streamed on Addison's website at www.addisontexas.net

Present: Mayor Joe Chow; Mayor Pro Tempore Lori Ward; Deputy Mayor Pro Tempore Guillermo Quintanilla; Council Member Ivan Hughes; Council Member Tom Braun; Council Member Paul Walden; Council Member Marlin Willesen.

Call Meeting to Order: Mayor Chow called the meeting to order.

Pledge of Allegiance: Mayor Chow led the Pledge of Allegiance

EXECUTIVE SESSION

Closed (Executive) Session of the Addison City Council pursuant to: Section 551.087, Texas Government Code, to discuss or deliberate regarding commercial or financial information that the City Council has received from a business prospect or business prospects that the City Council seeks to have locate, stay, or expand in or near the territory of the Town of Addison and with which the City Council is conducting economic development negotiations, and/or to deliberate the offer of a financial or other incentive to such business prospect or business prospects:

-
- Project Colorado
-

Section 551.072, Tex. Gov. Code, to deliberate the purchase, exchange, lease, or value of real property if deliberation in an open meeting would have a detrimental effect on the position of the governmental body in negotiations with a third person, pertaining to:

- DART Interlocal Agreement – Ground Lease

Mayor Chow closed the Open Session to convene the City Council into Closed Executive Session at 5:43 p.m.

Reconvene into Regular Session: In accordance with Texas Government Code, Chapter 551, the City Council will reconvene into Regular Session to consider action, if any, on matters discussed in Executive Session.

Mayor Chow reconvened the City Council into Open Session at 6:45 p.m. No action was taken as a result of Executive Session.

WORK SESSION

1. Present and Discuss a Completion Plan for the Unified Development Code Project.

Ken Schmidt, Director of Development Services, presented this item. He reviewed that in Fiscal Year 2018, the City Council's Strategic Plan included a milestone to review Town ordinances and regulations to modernize them and facilitate redevelopment. The Town engaged Clarion Associates in June 2018 to review the Town's current development regulations and appointed an Advisory Committee. An overview of the status of this project was provided.

Mr. Schmidt advised that the drafting process for the consolidated Unified Development Code (UDC) project resulted in four phases: (1) Zoning Districts and Uses; (2) Development and Design Standards; (3) Administration and Procedures; and (4) Signs and Communication Facilities.

Mr. Schmidt advised that the first two phases were completed during 2019 and 2020 and the UDC Advisory Committee and Town staff were involved with the process. Due to the COVID-19 pandemic, public meetings were suspended in 2020. Additionally, Addison's Director of Development Services position became vacant and work on the UDC project was delayed. Mr. Schmidt advised that staff would like to resume this project.

Mr. Schmidt advised that staff is recommending a project schedule that will result in final completion of the project in June 2022. He noted that two additional consulting trips are recommended to support the facilitation of two additional Advisory Committee meetings. The meetings will allow additional time to work through regulatory issues such as landscaping, parking, building design and residential transition standards. The anticipated financial impact of this request is \$16,000. Mr. Schmidt added that staff has contacted the previously appointed

commission members and 10 of the 12 members would like to stay involved in the process. Staff is requesting direction on whether to fill the remaining two positions or continue with 10 members.

The consensus of Council was to move forward as proposed and to keep only the 10 interested members who were previously appointed.

2. Present and Discuss the Council Calendar for May through July 2021.

City Secretary Irma Parker reviewed the meeting schedule included in the Council packet for May through July 2021. There were no conflicts for Council Members. City Manager Wes Pierson noted that Taste Addison is scheduled for June 4th and 5th, and Kaboom Town is scheduled for July 3rd.

REGULAR MEETING

Announcements and Acknowledgements regarding Town and Council Events and Activities

Discussion of Events/Meetings

Public Comment: *The City Council invites citizens to address the City Council on any matter, including items on the agenda, except public hearings that are included on the agenda. Comments related to public hearings will be heard when the specific hearing starts. Citizen comments are limited to **three (3) minutes**, unless otherwise required by law. To address the Council, please fill out a **City Council Appearance Card** and submit it to a staff member prior to the Public Comment item on the agenda. The Council is not permitted to take any action or discuss any item not listed on the agenda. The Council may choose to place the item on a future agenda.*

City Secretary Parker advised that no citizens had requested to address the City Council via telephonic means.

Consent Agenda: *All items listed under the Consent Agenda are considered routine by the City Council and will be enacted by one motion with no individual consideration. If individual consideration of an item is requested, it will be pulled from the Consent Agenda and discussed separately.*

- 3. Consider Action to Approve the Minutes from the April 13, 2021 Regular Council Meeting.**
- 4. Consider Action on an Ordinance Amending Appendix A (Zoning), Article XIII (Nonconforming Uses) of the Code of Ordinances of the Town of Addison, Texas to Add Section 11 – Nonconformity Due to Outside Action.**
- 5. Consider Action on a Resolution Appointing a Voting Member and Alternative Representative of the Advisory Committee for the Trinity River Authority's Central Wastewater Treatment System.**

6. **Consider Action on a Resolution Denying Oncor Electric Delivery Company LLC's Application for Approval of a Distribution Cost Recovery Factor.**
7. **Consider Action on a Resolution Authorizing the City Manager to Execute the Assignment and Assumption of the Economic Development Incentive Agreement for Village on the Parkway from 5100 Belt Line Road Investors LLC to VOP Partners, LLC.**

Mayor Chow asked if there were any requests to remove an item from the Consent Agenda for separate discussion. There were none.

MOTION: Mayor Pro Tempore Ward moved to approve Consent Agenda Items 3, 4, 5, 6, and 7 as submitted. Council Member Hughes seconded the motion. Motion carried unanimously.

Resolution No. R21-020: Appoint Voting Member and Alternative to the Trinity River Authority's Central Wastewater Treatment System Advisory Committee

Resolution No. R21-021: Deny Oncor Electric Delivery Company LLC's Application for Approval of a Distribution Cost Recovery Factor

Resolution No. R21-022: Assignment and Assumption of the Economic Development Incentive Agreement for Village on the Parkway from 5100 Belt Line Road Investors LLC to VOP Partners, LLC

Ordinance No. O21-O16: Amend Code of Ordinance Appendix A (Zoning), Article XIII, by Adding Section 11- Nonconformity Due to Outside Action

Regular Items

8. **Present, Discuss, and Consider Action on a Resolution Approving a Software License, Hardware, and Services Agreement Between the Town of Addison and STS360 for Optical Camera Network Replacement/Expansion and Authorizing the City Manager to Execute the Agreement in an Amount Not to Exceed \$1,102,648.54.**

Hamid Khaleghipour, Executive Director of Business Performance and Innovation, presented this item. He reviewed that in 2012 a \$2 million bond package was approved for the design and installation of a secure city-wide wireless network infrastructure to provide video, data, and voice applications for first responders and the protection of certain infrastructure areas. He reviewed the actions that have taken place since that time and advised that in October 2018 the Council approved a phased-in strategy for a License Plate Recognition (LPR) and Optical Camera Pilot Project. The pilot project included installation of twenty (20) LPR cameras at eight (8) intersections and neighborhoods, and seven (7) optical cameras and the location of those were reviewed. Chief of Police Paul Spencer reported success of the program in August 2020.

Mr. Khaleghipour advised that a Request for Proposal (RFP) for Optical Camera network replacement and expansion was issued in October 2020 with seven (7) proposals received. The highest ranked proposal was received from STS360. They will install a total of two hundred and eighty-one (281) cameras. One hundred and eleven (111) cameras will be at the new locations

listed below for the expansion of the Optical Cameras. One hundred and seventy (170) optical cameras will replace the existing camera systems at Town facilities. The existing camera systems were installed almost eight (8) years ago and they are budgeted to be replaced in the Fiscal Year 2021 Information Technology Replacement Fund.

The following locations were selected by staff based on the Phased Implementation Strategy that was presented to the Council on July 10, 2018 to install Optical Cameras in the Town parks, trails, and facilities. These recommended locations will complement the existing Optical Camera network, and it aligns with and supports the crime mitigation strategy to support and enhance the public safety efforts protecting the Town's residents and businesses. A map of the following locations was provided:

- Addison Circle Park
- Spruill Park
- Celestial Park
- Community Garden
- Les Lacs Linear Park
- White Rock Creek Trail
- Belt Way Trail (Future location)
- Town Park
- Dog Run by Town Park
- Vitruvian Park Bridge
- Vitruvian Park Amphitheater
- Redding Trail Dog Park
- Addison Grove
- Addison Airport
- Winnwood Park
- Bosque Park
- Oaks North Neighborhood
- Quorum Park

Mr. Khaleghipour reviewed that the total cost of the system implementation including, hardware, software, licenses, five (5) years of comprehensive onsite support and maintenance, seven (7) year hardware warranty for the outdoor cameras, ten (10) year hardware warranty for the indoor cameras, and electrical and installation services, is \$1,102,648.54. The sources of funding for this project are:

- \$400,000 contribution from the Fiscal Year 2021 Information Technology Replacement Fund for replacement of the existing camera systems.
- \$200,000 contribution from the Fiscal Year 2021 Airport Fund.
- \$502,648.54 contribution from the 2012 Bond Fund balance.

Several Council Members spoke in favor of the project. The records retention policy for video recordings was reviewed. Councilmember Hughes inquired when the neighborhood installations will begin. STS360 representative John Hoffman advised that essentially the project will start right away but some equipment must be ordered. Neighborhood installation should be completed in approximately 30 days. In response to a question by Mayor Pro Tempore Ward, City Manager Pierson advised that the Town utilizes an asset tracking database for equipment that will be updated once installation occurs.

MOTION: Council Member Hughes moved to approve. Mayor Pro Tempore Ward seconded the motion.

Resolution No. R21-023: Agreement with STS360 for Optical Camera Network Replacement Expansion

9. Present, Discuss, and Consider Action on a Resolution Approving an Enterprise Service Agreement Between the Town of Addison and Vigilant Solutions, LLC. for Services Related to the License Plate Recognition Network Expansion and Authorizing the City Manager to Execute the Agreement in an Amount Not to Exceed \$762,043.50.

Hamid Khaleghipour, Executive Director of Business Performance and Innovation, presented this item. He advised in May of 2012, Addison voters approved \$2,000,000 in General Obligation bonds for the design and installation of a secure city-wide wireless network infrastructure to provide video, data, and voice applications for first responders and the protection of certain infrastructure areas.

On October 23, 2018, Council approved a phased implementation strategy for a License Plate Recognition (LPR) and Optical Camera Pilot Project in an amount not to exceed \$600,000 to install twenty (20) LPR cameras at eight (8) intersections and neighborhood entrances at the following locations:

- Oaks North Drive and Belt Line Road
- Belt Line Road and Winnwood Road
- Celestial Road and Montfort Drive
- Proton Drive and Midway Road
- Beltway Drive and Marsh Lane
- Surveyor Boulevard and Belt Line Road
- Beltway Drive and Midway Road
- Palladium Drive and Montfort Drive

Seven (7) Optical Cameras were installed at the following locations:

- White Rock Creek (2 cameras): One at each entrance
- Easement Park (5 cameras): Fire Station 2, Dog park, Bush Elementary School, and Marsh Lane entrance

On August 25, 2020, Chief Paul Spencer provided an update to Council on the Pilot Program including lessons learned and the successes achieved to date. Consequently, Council directed staff to expand the Pilot Project.

Since the LPR technology is in its infancy and there are only a handful of vendors offering LPR systems nation-wide, staff decided not to release an RFP. Instead, staff contacted two leading LPR vendors to evaluate their technologies for 3 months. At the end of the trial period staff decided to continue using Vigilant Technology for the expansion of the LPR system. Staff's decision was based on their findings comparing these systems, the effectiveness of Vigilant Technology and a commercial database search feature that is offered only by Vigilant system.

There are twenty-three (23) locations recommended by Chief Spencer for the expansion of the License Plate Recognition network city-wide. Vigilant will install a total of sixty (60) LPR cameras at these locations. The recommended locations were selected based on the data collected during the Pilot Project. These recommended locations will complement the existing LPR network, and it aligns with and supports the crime mitigation strategy to support and enhance the public safety efforts protecting the Town's residents and businesses. A map of the following expansion locations was provided:

- Marsh Lane and Arapaho Road
- Marsh Lane and Belt Line Road
- Spring Valley Road and Vitruvian Way
- Ponte Avenue and Vitruvian Way
- Arapaho Road and Spectrum Drive
- Arapaho Road and Quorum Drive
- Inwood Road and Landmark Place
- Quorum Drive and Belt Line Road
- Quorum Drive and Airport Parkway
- Northbound Dallas Parkway Service Road by Wholefoods.
- Montfort Drive South
- Southbound Dallas Parkway Service Road by Addison Walk entrance
- Montfort Drive and Belt Line Road
- Apartment Complex Westgrove Drive and Sojour Drive
- Business Avenue and Belt Line Road
- Town Center and Marsh Lane
- Commercial Drive and Belt Line Road
- Centurion Way and Midway Road
- Runyon Road and Belt Line Road
- Belt Line Road and Beltway Drive
- Arapaho South of Airport
- Quorum Drive and Dallas Parkway
- Lake Forest Drive entrance

The total cost of the system implementation, including hardware, software, licenses and database access, ongoing support and maintenance, electrical and installation services, and the extended warranty and support for four (4) additional years is \$762,043.50. The funding for this project is available in the 2012 Bond Fund balance.

This project is anticipated to take six (6) months to complete. Mr. Khaleghipour introduced representatives from Vigilant present during the meeting.

Deputy Mayor Pro Tempore Quintanilla asked City Manager Pierson to paraphrase information on Proposition 5 of the 2012 bond election. Mr. Pierson explained that if voters approve a bond initiative, then the Town is obligated to expend the funds as presented in the ballot wording. That wording can either be limiting or flexible as to how the Town can expend the funds.

Council Member Willesen asked Chief Spencer if use of the commercial database search feature will be used proactively in the future. Chief Spencer advised that this database is used regularly and is a valuable tool for investigative purposes. He added that it is now being used proactively and the information will continue to be used strategically.

Mayor Pro Tempore Ward advised that perhaps this tool will be beneficial to the police officers and help to retain them. Council Member Braun inquired whether most of the Town will be

covered by the cameras. Chief Spencer responded that the known “hot spots” were used to help determine installation locations. Mr. Pierson added that twenty (20) of the units are mobile units and can be relocated if needed.

MOTION: Council Member Braun moved to approve. Deputy Mayor Pro Tempore Quintanilla seconded the motion. Motion carried.

Resolution No. R21-024: Agreement with Vigilant Solutions, LLC. for Services Related to the License Plate Recognition Network Expansion

10. Present and Discuss Updates on Taste Addison 2021.

Jasmine Lee, Director of Special Events, presented this item. She advised that Taste Addison is scheduled for June 4th, 6 p.m. to midnight, and June 5th, 2 p.m. to midnight. General admission ticket prices are the same as in 2019, \$15 for ages 13+, and \$5 for ages 6-12. Children 5 and under are free. Ms. Lee advised there is a Friday Night Bites package available at \$30, and with any Addison hotel booking admission is free.

Ms. Lee provided information on the planned activities, musical entertainment for Friday and Saturday was reviewed. Ms. Lee advised that 26 restaurants are participating, and the Tasting Room is available for Friday Night Bites passholders only.

Ms. Lee reviewed the protocols established by the CDC for large events as follows:

- Redesigned layout to facilitate 6’ distance between groups
- Reduced daily capacity
- Social circles painted at both stages, plus hundreds of tables for dining
- Minimizing touch points, including admissions and digital ticketing
- Carnival replaced by large seating area with dining, wine sampling and Main Stage viewing screen
- Over 30 hand sanitizer stations, plus enhanced venue cleaning
- Face coverings required for attendees ages 10+ when not seated or inside of a marked social circle

VIP Changes for 2021 were reviewed. Single day admission is being offered in order to manage daily capacity limits of no more than 6,000 people. There will not be a VIP tent this year. Ms. Lee advised that the list of participating restaurants will be online and that the tickets go on sale Monday.

11. Present, Discuss and Consider Action on an Ordinance to Amend the Town’s Annual Budget for the Fiscal Year Ending September 30, 2021 to Provide Funding for Conducting and Implementing a Compensation Market Study, Self-Contained Breathing Apparatus, Holiday in the Park, Signal Pole Replacements, Cardiac Monitors, Midway Road Reconstruction, and Prior Year Encumbrances.

Steven Glickman, Chief Financial Officer, presented this item. He advised this item is for approval of a mid-year budget amendment and reviewed the budget amendment process.

Mr. Glickman reviewed the following:

- During the Fiscal Year 2021 budget process, Council gave direction to conduct a market study, which was budgeted in the Year 2020, but not conducted due to the pandemic. An amendment is needed for cost of conducting the study in the amount of \$25,000 to the Self-Funded Projects Fund. On February 9, 2021 Council approved the results of that market study which includes increased appropriation in the General Fund in the amount of \$545,000 for the remainder of Fiscal Year 2021.
- Additionally, Council gave direction on October 27, 2020 to conduct a holiday event that was not budgeted due to the pandemic and closure of the Conference Centre. The appropriation requested for this event is \$50,000.
- Council accepted the Assistance to Firefighters Grant for Fiscal Year 2019 on August 25, 2020 and approved a resolution to purchase Self-Contained Breathing Apparatus' on September 22, 2020. The expenditures were not part of the Fiscal Year 2021 original budget, therefore, amendments of \$3,766 and \$86,668 are needed from the General Fund and Capital Equipment Replacement Fund, respectively.
- In the General Fund additional Sales Tax of \$598,766 offsets the increased appropriations.

In addition:

- Residual bond funds in the 2013 General Obligation Bond Fund are requested to be utilized for traffic signal pole replacements in the amount of \$61,000 and to fund a portion of the Midway Road Reconstruction project in the amount of \$147,000;
- An amendment is needed in the 2014 General Obligation Bond Fund for a prior year encumbrance for the Belt Line 1.5 project in the amount of \$170,000;
- An amendment is needed in the 2018 Certificates of Obligation Bond Fund for a prior year encumbrance for the Customs Facility project in the amount of \$1,350,000;
- An amendment is needed in the Self-Funded Projects Fund for prior year encumbrances for Trails Master Plan (\$66,242), Addison Athletic Club Design (\$33,750), Cityworks software implementation (\$25,306), and Sojourn Drive Design (\$7,500);
- An amendment is needed for the purchase of two Lifepak 15 Cardiac Monitors, approved by Council on December 8, 2020, in the amount of \$98,400 utilizing Texas Ambulance Services Supplemental Payment Program funds that were received in October 2020;
- An amendment is needed in the Capital Equipment Replacement Fund for prior year encumbrances related to one police vehicle that was not delivered prior to October 1, 2020 and the outfitting of police vehicles that did not occur until after October 1, 2020 in the total amount of \$135,000.

Mr. Glickman presented a chart illustrating the total impact on budgeted expenditures for each fund totaling \$2,804,632; the impact of budget revenues is \$598,766; and the impact on fund balances is (\$2,205,866).

Deputy Mayor Pro Tempore Quintanilla requested an explanation of the fund balance percentages listed in the ordinance's Exhibit A. Mr. Glickman reviewed that the adopted budget for the General Fund balance was 46.6 percent, however some revenues were better than expected so it is actually 49.4 percent. Mr. Pierson added that in 2021 the Town did not draw down the fund balance for one-time expenditures to due to uncertainty.

MOTION: Council Member Walden moved to approve the budget amendment ordinance. Council Member Hughes seconded the motion. Motion carried.

Ordinance No. 021-17: Ordinance to Amend the Town's Annual Budget for the Fiscal Year Ending September 30, 2021

12. Present, Discuss and Consider Action on a Resolution Creating the Sam's Club Special Area Study Advisory Committee and Appointing Members.

Ken Schmidt, Director of Development Services, reviewed that at the March 23, 2021 Council meeting, staff was directed to engage a consulting service to complete a Sam's Club Special Area Study and issue a call for volunteers to serve on an Advisory Committee. The call for volunteers was issued in the Town's newsletter, and on the Town's social media outlets and website. Applications were received from 29 residents. Four business owners have expressed an interest in participating as well. A map was provided that included the expanded area for the Study.

Mr. Schmidt advised that Council could adopt a resolution naming two appointments per Council member and up to 7 business property owners. A list of business property owners was provided. Councilmember Willesen suggested business operators could possibly be included as well. Mr. Schmidt added that during the community meetings other people will have opportunities to provide input.

The committee will be comprised of the following individuals:

FIRST NAME	LAST NAME	APPOINTED BY
Al	Cioffi	Council Member Marlin Willesen
Austen	Spoons	Council Member Marlin Willesen
Eileen	Resnik	Mayor Joe Chow
Judy	Lindloff	Council Member Ivan Hughes
Kathie	Wood	Council Member Tom Braun
Lorrie	Semler	Mayor Joe Chow
Marvin	Perez	Council Member Tom Braun
Nancy	Craig	Council Member Ivan Hughes
Nancy	Williams	Council Member Paul Walden
Peter	Jessiman	Council Member Paul Walden
Ron	Whitehead	Mayor Pro-Tempore Lori Ward
Steve	Loras	Mayor Pro-Tempore Lori Ward
Susan	Halpern	Deputy Mayor Pro-Tempore Guillermo Quintanilla

Council Member Braun suggested contacting the new owner of the Crown Plaza Hotel. Council Member Walden suggested the remaining two positions be appointed from the southern area to provide input on future land use and development patterns for the Study Area. The Council directed Town staff to identify and appoint ownership representatives for property and business owners

situated within the Study Area, prioritizing three appointments to be ownership representatives located within the southern segment of the Study Area with an emphasis for engagement of the Crown Plaza and Midway Office Park ownership groups. The additional business and property owners' representatives shall include the following:

PROPERTY/BUSINESS NAME	REPRESENTATIVE ENTITY NAME	APPOINTED BY
Midway Square	VVI, Inc.	City Staff under Council direction
Starbucks/Nate's Seafood	Piedmont Midway Partners, LP	City Staff under Council direction
Office in the Park	14671 – 14683 Midway Rd, LP	City Staff under Council direction
Former Motel 8 Site	Dillon Investments, LLC	City Staff under Council direction
Crowne Plaza/Midway Office Park	TBD	City Staff under Council direction
Crown Plaza/Midway Office Park	TBD	City Staff under Council direction
Crown Plaza/Midway Office Park	TBD	City Staff under Council direction

MOTION: Mayor Pro Tempore Ward moved to approve as discussed. Council Member Walden seconded the motion. Motion passed unanimously.

Resolution No. 021-25: Advisory Committee Appointments for Sam's Club Special Area Study

13. Present, Discuss and Consider Action on a Resolution Approving a Professional Services Agreement Between the Town of Addison and Strategic Community Solutions LLC, for Consultant Services Related to Completion of the Sam's Club Special Area Study and Authorizing the City Manager to Execute the Agreement in an Amount Not to Exceed \$132,891.

Ken Schmidt, Director of Development Services, presented this item. He advised that at the March 23, 2021 City Council meeting, staff conducted a work session with the Council to receive direction on the status and proposed completion options for the Sam's Club Special Area Study. Staff recommended that the Town engage available consultant team members from the 2015 Sam's Club Special Area Study, Strategic Community Solutions LLC. He added that the project manager is Karen Walz, and Kimley-Horn will be engaged to assist. The Town's previous experience with Strategic Community Solutions LLC was reviewed.

Mr. Schmidt advised that staff has worked with Strategic Community Solutions LLC to develop a scope of services as follows:

- Stakeholder and Public Engagement.
- Strategic Assessment, Site, and Market Analysis Update.
- Development Concept Refinement and Public Review Process.
- Final Plan Development and Public Review Process.

Mr. Schmidt reviewed the project schedule and advised that the Study will be considered by the Planning and Zoning Commission and the Council in the October-November 2021 timeframe. He advised that the recommended scope of services reflects a project cost of \$132,891, which includes a broader public engagement plan.

MOTION: Council Member Walden moved to approve. Deputy Mayor Pro Tempore Quintanilla seconded the motion. Motion passed unanimously.

Resolution No. R21-026: Professional Services Agreement with Strategic Community Solutions LLC, for Consultant Services Related to Completion of the Sam's Club Special Area Study

Adjourn Meeting

There being no further business to come before the Council, Mayor Chow adjourned the meeting.

TOWN OF ADDISON, TEXAS

Joe Chow, Mayor

ATTEST:

Irma G. Parker, City Secretary

Council Meeting

2.

Meeting Date: 05/25/2021

Department: City Secretary

AGENDA CAPTION:

Consider Action on the **Minutes from the May 11, 2021 Regular Council Meeting.**

BACKGROUND:

The minutes for the May 11, 2021 Council Regular Meeting have been prepared for consideration.

RECOMMENDATION:

Administration recommends approval.

Attachments

Minutes - May 11, 2021

DRAFT

OFFICIAL ACTIONS OF THE ADDISON CITY COUNCIL

May 11, 2021

**Addison TreeHouse
14681 Midway Rd., Addison, TX 75001
5:30 p.m. Regular Meeting**

The Addison City Council conducted its Regular Council Meeting on Tuesday, May 11, 2021 at the Addison TreeHouse with a quorum of the City Council physically present. Limited seating for members of the public was available using CDC recommended social distancing measures. The Town utilized telephone and videoconferencing to facilitate participation in the meeting. Interested parties were able to make public comments and address the Council via emailed comments submitted to the City Secretary at iparker@addisontx.gov by 3:00 pm on the meeting day. Members of the public were also entitled to participate remotely via Toll-Free Dial-in Number: 877.853.5247; Meeting ID: 409.327.0683 Participant ID: #. Detailed instructions on how to participate in this meeting were available on the Town's website on the Agenda Page. The meeting was live streamed on Addison's website at www.addisontexas.net

Present: Mayor Joe Chow; Mayor Pro-Tempore Lori Ward; Deputy Mayor Pro-Tempore Guillermo Quintanilla; Council Member Ivan Hughes; Council Member Tom Braun; Council Member Paul Walden; Council Member Marlin Willesen; Council Member-Elect Kathryn Wheeler

Call Meeting to Order: Mayor Chow called the meeting to order.

Pledge of Allegiance: Mayor Chow led the Pledge of Allegiance.

REGULAR MEETING

Announcements and Acknowledgments Regarding Town and Council Events and Activities

Discussion of Meetings / Events

Public Comment: *The City Council invites citizens to address the City Council on any matter, including items on the agenda, except public hearings that are included on the agenda. Comments related to public hearings will be*

heard when the specific hearing starts. Citizen comments are limited to three (3) minutes, unless otherwise required by law. To address the Council, please fill out a City Council Appearance Card and submit it to a staff member prior to the Public Comment item on the agenda. The Council is not permitted to take any action or discuss any item not listed on the agenda. The Council may choose to place the item on a future agenda.

Regular Items

1. Present, Discuss, and Consider Action on an Ordinance Canvassing the Returns of the May 1, 2021 General Election for the Mayor and Three (3) Council Members.

City Secretary Parker presented an ordinance summarizing the returns and declaring the results of the Saturday May 1, 2021 General Election to elect three council members. The summary of results of the City Council election is shown as follows:

CANDIDATE	VOTES
Randy Smith	495
Lori Ward	689
Tom Braun	746
Kathryn Wheeler	647
Alan Then	495
Lilly Anyanwu	224

Elected to office for a two-year term as Council Member was Lori Ward, Tom Braun, and Kathryn Wheeler.

On March 9, Ms. Parker presented a Certification of Unopposed Candidate for the office of Mayor. Under these circumstances, the City Council is authorized to declare the candidate elected to office and the election for that office is cancelled. Ordinance No. O21-09 was presented and approved by the City Council which formally declared Joe Chow elected to office.

MOTION: Council Member Hughes moved to approve as submitted. Council Member Walden seconded the motion. Motion carried unanimously.

1. Presentation to Outgoing Council Member Ivan Hughes.

Mayor Chow read a Proclamation declaring Tuesday, May 11, 2021 as Ivan Hughes Day in the Town of Addison in recognition of his service. A going away gift was presented to Mr. Hughes. Council Members and the City Manager thanked Council Member Hughes for his many contributions and service.

2. Administer the Oath of Office to the Mayor and Three (3) Council Members Elected at the May 1, 2021 General Election.

City Secretary Parker administered the Oath of Office to Mayor Joe Chow. Mayor Joe Chow

administered the Oath of Office to Council Members Lori Ward, Tom Braun, and Kathryn Wheeler.

3. Present Certificates of Election to the Mayor and Three (3) Council Members Elected at the May 1, 2021 General Election.

Mayor Chow presented a Certificate of Election to Council Members Lori Ward, Tom Braun, and Kathryn Wheeler. Mayor Pro-Tempore Ward presented the Certificate of Election to Mayor Chow.

4. Present, Discuss, and Consider Action on Nominations and Appointment of the Mayor Pro-Tempore and Deputy MayorPro-Tempore.

The Home Rule Charter requires that a Mayor Pro-Tempore and a Deputy Mayor Pro-Tempore be appointed to serve in the absence or disability of the Mayor and Mayor Pro-Tempore. Historically, this appointment has been the Mayor's choice to nominate these positions and recommend approval by the City Council.

MOTION: Mayor Chow moved to appoint Guillermo Quintanilla to serve as Mayor Pro-Tempore and Paul Walden to serve as Deputy Mayor Pro-Tempore. Lori Ward seconded the motion. Motion carried unanimously.

Adjourn Meeting

There being no further business to come before the City Council, Mayor Chow adjourned the meeting.

TOWN OF ADDISON, TEXAS

Joe Chow, Mayor

ATTEST:

Irma G. Parker, City Secretary

Council Meeting

3.

Meeting Date: 05/25/2021

Department: Airport

Pillars: Excellence in Transportation Systems

AGENDA CAPTION:

Consider Action on a **Resolution Authorizing Acceptance of Coronavirus Response and Relief Supplemental Appropriation Act (CRRSAA) Airport Coronavirus Response Grant Program (AGRCP) Grant from the Texas Department of Transportation in the Estimated Amount of \$57,000 and Authorize the City Manager to Execute the Documents Necessary to Accept the Grant.**

BACKGROUND:

The Coronavirus Response and Relief Supplemental Appropriation Act (CRRSAA) includes almost \$2 billion in funds to be awarded to eligible U.S. airports to prevent, prepare for, and respond to the COVID-19 public health emergency. To distribute these funds, the Federal Aviation Administration (FAA) established the Airport Coronavirus Response Grant Program (ACRGP). FAA determined the ACRGP funding for General Aviation Airports based on a formula for each classification of airport category (National, Regional, Local, and Basic). Addison is a National category general aviation (GA) airport and as such has been allocated an ACRGP Grant in the amount of \$57,000. The ACRGP Grant has no matching funds requirement, the grant amount is 100% federally funded.

The Texas Department of Transportation (TxDOT) requested the federal funds on behalf of all eligible Texas GA airports. The next step for TxDOT was to get approval authority on the state level to administer the funds to eligible GA Airports in Texas. This approval was granted at the April meeting of the Texas Transportation Commission.

TxDOT will provide a TxDOT-specific request form (application) for ACRGP grant funding and will notify eligible airports when the form is available online. TxDOT has been authorized to issue grants by the approval of the Texas Transportation Commission.

RECOMMENDATION:

Administration recommends approval.

Resolution - Coronavirus Response and Relief Supplemental Appropriation Act
Grant Acceptance

Texas Coronavirus Response and Relief Supplemental Appropriation Act Grant
Allocations

Federal Aviation Administration Airport Coronavirus Response Grant Program
FAQs

RESOLUTION NO. R21-__

A RESOLUTION OF THE CITY COUNCIL OF THE TOWN OF ADDISON, TEXAS AUTHORIZING ACCEPTANCE OF A CORONAVIRUS RESPONSE AND RELIEF SUPPLEMENTAL APPROPRIATION (CRRSA) ACT AIRPORT CORONAVIRUS RESPONSE GRANT PROGRAM (ACRGP) GRANT FROM THE TEXAS DEPARTMENT OF TRANSPORTATION IN THE ESTIMATED AMOUNT OF \$57,000 TO PREVENT, PREPARE FOR AND RESPOND TO THE IMPACTS OF THE COVID-19 PUBLIC HEALTH EMERGENCY ON AIRPORT OPERATIONS; AUTHORIZING THE EXECUTION OF DOCUMENTS RELATIVE TO THE ACCEPTANCE OF SUCH GRANT AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, on December 27, 2020, the President signed the Consolidated Appropriations Act, 2021, of which Division M of that Act is the Coronavirus Response and Relief Supplemental Appropriation Act, 2021 (CRRSA), in which Title IV of CRRSA provides approximately \$2 billion in economic relief to airports to prevent, prepare for, and respond to the COVID-19 public health emergency; and

WHEREAS, the U.S. Department of Transportation has made Coronavirus Response and Relief Supplemental Appropriations (CRRSA) Act Airport Coronavirus Response Grant Program (ACRGP) Grants available to general aviation airports, through the Texas Department of Transportation; and

WHEREAS, the Texas Department of Transportation acts as agent for the U.S. Department of Transportation for the purposes of applying for, receiving, and disbursing all aviation grant funds and for the administration of contracts necessary for the implementation of these improvements; and

WHEREAS, the Town of Addison, Texas has received an offer of financial assistance in the form of a 100% grant of approximately \$57,000 from the Texas Department of Transportation; and

WHEREAS, funds can be used for costs related to operational expenses, which are those expenses necessary to operate, maintain, and manage an airport including expenses such as payroll, utilities, service contracts, cleaning, sanitization, janitorial services, combating the spread of pathogens at the airport, debt service payments, and items generally having a limited useful life, including personal protective equipment and cleaning supplies.

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE TOWN OF ADDISON, TEXAS:

SECTION 1. The recitals set forth above are true and correct and are incorporated as if fully set forth herein.

SECTION 2. The City Manager or his designee is hereby authorized to accept a Coronavirus Response and Relief Supplemental Appropriations (CRRSA) Act Airport

Coronavirus Response Grant Program (ACRGP) Grant from the Texas Department of Transportation in the estimated amount of \$57,000 to prevent, prepare for, and respond to the impacts of the COVID-19 public health emergency on airport operations. The grant reimburses the Addison Airport for 100% of qualifying expenses and requires no matching funds. The City Manager is hereby authorized to administer to all matters relating to such grant and to execute all necessary documents relative to the acceptance of such grant.

SECTION 3. This Resolution shall take effect from and after its date of adoption.

DULY RESOLVED AND ADOPTED by the City Council of the Town of Addison, Texas, on this the 25th day of MAY 2021.

TOWN OF ADDISON, TEXAS

Joe Chow, Mayor

ATTEST:

APPROVED AS TO FORM:

Irma Parker, City Secretary

City Attorney

State	LOCID	Airport Name	City	Svc Lvl	Hub	Role	Primary Airports				CARES Funds	Non-Primary Airports			Concessions Relief		Grand Total
							Primary Entitlements	Cargo Entitlements	Enplanements Allocation	Primary Airports Subtotal	CARES Unallocated Funds	Non-Primary Allocation	Non-Primary FCT	Non-Primary Airports Subtotal	Enplanements Allocation	Admin (up to)	Total
TN	DKX	Knoxville Downtown Island	Knoxville	R		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TN	3M7	Lafayette Municipal	Lafayette	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	2M2	Lawrenceburg-Lawrence County	Lawrenceburg	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	M54	Lebanon Municipal	Lebanon	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TN	LUG	Ellington	Lewisburg	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	PVE	Beech River Regional	Lexington-Parsons	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	M15	James Tucker Airport	Linden	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TN	8A3	Livingston Municipal	Livingston	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	MNV	Monroe County	Madisonville	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	RNC	Warren County Memorial	McMinnville	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	MEM	Memphis International	Memphis	P	S		\$ 5,348,442	\$ 8,248,042	\$ 65,690	\$ 13,662,175	\$ 721,920	\$ -	\$ -	\$ -	\$ 496,550	\$ 9,931	\$ 14,880,645
TN	M01	General Dewitt Spain	Memphis	R		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TN	NQA	Millington-Memphis	Millington	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ 34,162	\$ 57,162	\$ -	\$ -	\$ 57,162
TN	2M8	Charles W Baker	Millington	R		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	MOR	Moore-Murrell	Morristown	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TN	6A4	Johnson County	Mountain City	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	MBT	Murfreesboro Municipal	Murfreesboro	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TN	BNA	Nashville International	Nashville	P	M		\$ 11,965,654	\$ 99,396	\$ 253,181	\$ 12,318,231	\$ 2,782,399	\$ -	\$ -	\$ -	\$ 1,913,784	\$ 38,275	\$ 17,014,414
TN	JWN	John C Tune	Nashville	R		National	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,000	\$ -	\$ 57,000	\$ -	\$ -	\$ 57,000
TN	SCX	Scott Municipal	Oneida	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	PHT	Henry County	Paris	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	1M5	Portland Municipal	Portland	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	GZS	Abernathy Field	Pulaski	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	RKW	Rockwood Municipal	Rockwood	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	RVN	Hawkins County	Rogersville	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TN	SNH	Savannah-Hardin County	Savannah	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TN	SZY	Robert Sibley	Selmer	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	GKT	Gatlinburg-Pigeon Forge	Sevierville	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TN	UOS	Franklin County	Sewanee	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TN	SYI	Bomar Field-Shelbyville Municipal	Shelbyville	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	0A3	Smithville Municipal	Smithville	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	MQY	Smyrna	Smyrna	R		National	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,000	\$ 34,162	\$ 91,162	\$ -	\$ -	\$ 91,162
TN	FYE	Fayette County	Somerville	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	SRB	Upper Cumberland Regional	Sparta	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	M91	Springfield Robertson County	Springfield	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	3A2	New Tazewell Municipal	Tazewell	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	TGC	Gibson County	Trenton	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	THA	Tulahoma Regional Airport/Wm Northern Fli	Tulahoma	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TN	UCY	Everett-Stewart Regional	Union City	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TN	OM5	Humphreys County	Waverly	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TN	BGF	Winchester Municipal	Winchester	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	ABI	Abilene Regional	Abilene	P	N		\$ 1,110,855	\$ -	\$ 2,318	\$ 1,113,173	\$ 25,475	\$ -	\$ -	\$ -	\$ 17,522	\$ 350	\$ 1,156,170
TX	ALI	Alice International	Alice	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	E38	Alpine-Casparis Municipal	Alpine	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	AMA	Rick Husband Amarillo International	Amarillo	P	N		\$ 2,616,245	\$ -	\$ 10,005	\$ 2,626,250	\$ 109,956	\$ -	\$ -	\$ -	\$ 75,630	\$ 1,512	\$ 2,811,836
TX	T00	Chambers County	Anahuac	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	E11	Andrews County	Andrews	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	LBX	Texas Gulf Coast Regional	Angleton/Lake Jack R			Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	GKY	Arlington Municipal	Arlington	R		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ 34,162	\$ 57,162	\$ -	\$ -	\$ 57,162
TX	T60	Stonewall County	Aspermont	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	F44	Athens Municipal	Athens	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	ATA	Hall-Miller Municipal	Atlanta	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	AUS	Austin-Bergstrom International	Austin	P	M		\$ 11,537,410	\$ 183,730	\$ 241,047	\$ 11,962,188	\$ 2,649,052	\$ -	\$ -	\$ -	\$ 1,822,066	\$ 36,441	\$ 16,433,306
TX	HYI	San Marcos Regional	Austin	R		National	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,000	\$ 34,162	\$ 91,162	\$ -	\$ -	\$ 91,162
TX	BYY	Bay City Regional	Bay City	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	BMT	Beaumont Municipal	Beaumont	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	BPT	Jack Brooks Regional	Beaumont/Port Art	P	N		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	BEA	Beeville Municipal	Beeville	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	BPG	Big Spring McMahon-Wrinkle	Big Spring	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	F00	Jones Field	Bonham	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	BGD	Hutchinson County	Borger	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000

State	LOCID	Airport Name	City	Svc Lvl	Hub	Role	Primary Airports				CARES Funds	Non-Primary Airports			Concessions Relief		Grand Total
							Primary Entitlements	Cargo Entitlements	Enplanements Allocation	Primary Airports Subtotal	CARES Unallocated Funds	Non-Primary Allocation	Non-Primary FCT	Non-Primary Airports Subtotal	Enplanements Allocation	Admin (up to)	Total
TX	0F2	Bowie Municipal	Bowie	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	BBD	Curtis Field	Brady	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	BKD	Stephens County	Breckenridge	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	11R	Brenham Municipal	Brenham	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	XBP	Bridgeport Municipal	Bridgeport	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	BFE	Terry County	Brownfield	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	BRO	Brownsville/South Padre Island International	Brownsville	P	N		\$ 1,452,916	\$ -	\$ 3,667	\$ 1,456,583	\$ 40,295	\$ -	\$ -	\$ -	\$ 27,716	\$ 554	\$ 1,524,594
TX	BWD	Brownwood Regional	Brownwood	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	CFD	Coulter Field	Bryan	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	BMQ	Burnet Municipal Kate Craddock Field	Burnet	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	7F3	Caddo Mills Municipal	Caddo Mills	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	T35	Cameron Municipal Airpark	Cameron	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	HHF	Hemphill County	Canadian	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	CZT	Dimmit County	Carrizo Springs	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	4F2	Panola County-Sharpe Field	Carthage	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	CVB	Castroville Municipal	Castroville	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	F17	Center Municipal	Center	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	LBR	Clarksville/Red River County-J D Trissell Field	Clarksville	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	CPT	Cleburne Regional	Cleburne	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	6R3	Cleveland Municipal	Cleveland	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	7F7	Clifton Municipal/Isenhower Field	Clifton	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	COM	Coleman Municipal	Coleman	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	CLL	Easterwood Field	College Station	P	N		\$ 1,131,853	\$ -	\$ 2,375	\$ 1,134,228	\$ 26,104	\$ -	\$ -	\$ -	\$ 17,955	\$ 359	\$ 1,178,287
TX	MKN	Comanche County-City	Comanche	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	2F7	Commerce Municipal	Commerce	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	CRP	Corpus Christi International	Corpus Christi	P	N		\$ 2,486,167	\$ -	\$ 9,297	\$ 2,495,463	\$ 102,167	\$ -	\$ -	\$ -	\$ 70,272	\$ 1,405	\$ 2,667,902
TX	CRS	C David Campbell Field-Corsicana Municipal	Corsicana	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	COT	Cotulla-La Salle County	Cotulla	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	DKR	Houston County	Crockett	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	T71	Cuero Municipal	Cuero	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	DHT	Dalhart Municipal	Dalhart	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	DAL	Dallas Love Field	Dallas	P	M		\$ 11,110,506	\$ -	\$ 228,952	\$ 11,339,458	\$ 2,516,122	\$ -	\$ -	\$ -	\$ 1,730,634	\$ 34,612	\$ 15,586,214
TX	TKI	McKinney National	Dallas	R		National	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,000	\$ 34,162	\$ 91,162	\$ -	\$ -	\$ 91,162
TX	RBD	Dallas Executive	Dallas	R		National	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,000	\$ 34,162	\$ 91,162	\$ -	\$ -	\$ 91,162
TX	ADS	Addison	Dallas	R		National	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,000	\$ -	\$ 57,000	\$ -	\$ -	\$ 57,000
TX	49T	Dallas CBD Vertiport	Dallas	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	DFW	Dallas-Fort Worth International	Dallas-Fort Worth	P	L		\$ 38,808,573	\$ 1,606,224	\$ 1,013,743	\$ 41,428,540	\$ 11,140,792	\$ -	\$ -	\$ -	\$ 7,662,838	\$ 153,256	\$ 60,232,170
TX	LUD	Decatur Municipal	Decatur	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	DRT	Del Rio International	Del Rio	P	N		\$ 1,000,000	\$ -	\$ 636	\$ 1,000,636	\$ 6,987	\$ -	\$ -	\$ -	\$ 4,806	\$ 96	\$ 1,012,429
TX	DTO	Denton Enterprise	Denton	R		National	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,000	\$ 34,162	\$ 91,162	\$ -	\$ -	\$ 91,162
TX	23R	Devine Municipal	Devine	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	T55	Dimmitt Municipal	Dimmitt	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	DUX	Moore County	Dumas	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	ELA	Eagle Lake	Eagle Lake	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	5T9	Maverick County Memorial International	Eagle Pass	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	ETN	Eastland Municipal	Eastland	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	EBG	South Texas International at Edinburg	Edinburg	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	26R	Jackson County	Edna	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	ELP	El Paso International	El Paso	P	S		\$ 4,775,770	\$ 213,868	\$ 49,464	\$ 5,039,102	\$ 543,601	\$ -	\$ -	\$ -	\$ 373,898	\$ 7,477	\$ 5,956,601
TX	F41	Ennis Municipal	Ennis	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	E35	Fabens	Fabens	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	BKS	Brooks County	Falfurrias	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	41F	Floydata Municipal	Floydata	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	GRK	Robert Gray AAF	Fort Hood/Killeen	P	N		\$ 1,698,476	\$ -	\$ 5,005	\$ 1,703,481	\$ 54,999	\$ -	\$ -	\$ -	\$ 37,830	\$ 756	\$ 1,796,310
TX	FST	Fort Stockton-Pecos County	Fort Stockton	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	AFW	Fort Worth Alliance	Fort Worth	R		National	\$ -	\$ 343,934	\$ -	\$ 343,934	\$ -	\$ 57,000	\$ -	\$ 57,000	\$ -	\$ -	\$ 400,934
TX	FWS	Fort Worth Spinks	Fort Worth	R		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ 34,162	\$ 57,162	\$ -	\$ -	\$ 57,162
TX	FTW	Fort Worth Meacham International	Fort Worth	R		National	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,000	\$ -	\$ 57,000	\$ -	\$ -	\$ 57,000
TX	T82	Gillespie County	Fredericksburg	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	GLE	Gainesville Municipal	Gainesville	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	GLS	Scholes International at Galveston	Galveston	R		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ 34,162	\$ 57,162	\$ -	\$ -	\$ 57,162

State	LOCID	Airport Name	City	Svc Lvl	Hub	Role	Primary Airports				CARES Funds	Non-Primary Airports			Concessions Relief		Grand Total
							Primary Entitlements	Cargo Entitlements	Enplanements Allocation	Primary Airports Subtotal	CARES Unallocated Funds	Non-Primary Allocation	Non-Primary FCT	Non-Primary Airports Subtotal	Enplanements Allocation	Admin (up to)	Total
TX	T57	Garland/DFW Heloplex	Garland	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	GOP	Gatesville Municipal	Gatesville	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	GTU	Georgetown Municipal	Georgetown	R		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ 34,162	\$ 57,162	\$ -	\$ -	\$ 57,162
TX	GYB	Giddings-Lee County	Giddings	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	JXI	Fox Stephens Field - Gilmer Municipal	Gilmer	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	07F	Gladewater Municipal	Gladewater	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	RPH	Graham Municipal	Graham	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	GDJ	Granbury Regional	Granbury	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	GPM	Grand Prairie Municipal	Grand Prairie	R		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ 34,162	\$ 57,162	\$ -	\$ -	\$ 57,162
TX	GVT	Majors	Greenville	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	E19	Gruver Municipal	Gruver	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	MNZ	Hamilton Municipal	Hamilton	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	HRL	Valley International	Harlingen	P	N		\$ 2,523,981	\$ 123,682	\$ 9,503	\$ 2,657,165	\$ 104,432	\$ -	\$ -	\$ -	\$ 71,830	\$ 1,436	\$ 2,833,427
TX	15F	Haskell Municipal	Haskell	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	LHB	Hearne Municipal	Hearne	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	HBV	Jim Hogg County	Hebbronville	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	RFI	Rusk County	Henderson	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	HRX	Hereford Municipal	Hereford	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	INJ	Hillsboro Municipal	Hillsboro	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	HDO	South Texas Regional at Hondo	Hondo	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	IAH	George Bush Intercontinental/Houston	Houston	P	L		\$ 24,935,309	\$ 814,029	\$ 620,661	\$ 26,369,999	\$ 6,820,912	\$ -	\$ -	\$ -	\$ 4,691,547	\$ 93,830	\$ 37,882,458
TX	HOU	William P Hobby	Houston	P	M		\$ 10,099,614	\$ -	\$ 200,309	\$ 10,299,923	\$ 2,201,348	\$ -	\$ -	\$ -	\$ 1,514,127	\$ 30,282	\$ 14,015,398
TX	SGR	Sugar Land Regional	Houston	R		National	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,000	\$ 34,162	\$ 91,162	\$ -	\$ -	\$ 91,162
TX	CXO	Conroe-North Houston Regional	Houston	R		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ 34,162	\$ 57,162	\$ -	\$ -	\$ 57,162
TX	efd	Ellington	Houston	R		National	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,000	\$ -	\$ 57,000	\$ -	\$ -	\$ 57,000
TX	DWH	David Wayne Hooks Memorial	Houston	R		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	LVJ	Pearland Regional	Houston	R		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	AXH	Houston-Southwest	Houston	R		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	IWS	West Houston	Houston	R		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	UTS	Huntsville Municipal	Huntsville	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	TFP	McC Campbell-Porter	Ingleside	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	21F	Jacksboro Municipal	Jacksboro	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	JSO	Cherokee County	Jacksonville	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	JAS	Jasper County-Bell Field	Jasper	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	JCT	Kimble County	Junction	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	2R9	Kenedy Regional	Kenedy	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	ERV	Kerrville Municipal/Louis Schreiner Field	Kerrville	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	ILE	Skylark Field	Killeen	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	IKG	Kleberg County	Kingsville	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	45R	Hawthorne Field	Kountze/Silsbee	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	3T5	Fayette Regional Air Center	La Grange	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	T41	La Porte Municipal	La Porte	R		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	RYW	Lago Vista Tx - Rusty Allen	Lago Vista	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	LUV	Lamesa Municipal	Lamesa	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	LZZ	Lampasas	Lampasas	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	LNC	Lancaster Regional	Lancaster	R		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	LRD	Laredo International	Laredo	P	N		\$ 1,206,847	\$ 173,043	\$ 2,580	\$ 1,382,470	\$ 28,349	\$ -	\$ -	\$ -	\$ 19,499	\$ 389	\$ 1,430,318
TX	LLN	Levelland Municipal	Levelland	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	T78	Liberty Municipal	Liberty	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	LIU	Littlefield Taylor Brown Municipal	Littlefield	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	00R	Livingston Municipal	Livingston	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	AQO	Llano Municipal	Llano	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	50R	Lockhart Municipal	Lockhart	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	GGG	East Texas Regional	Longview	P	N		\$ 1,000,000	\$ -	\$ 770	\$ 1,000,770	\$ 8,457	\$ -	\$ -	\$ -	\$ 5,817	\$ 116	\$ 1,015,044
TX	LBB	Lubbock Preston Smith International	Lubbock	P	S		\$ 3,406,235	\$ 146,208	\$ 14,739	\$ 3,567,182	\$ 161,975	\$ -	\$ -	\$ -	\$ 111,409	\$ 2,228	\$ 3,840,566
TX	LFK	Angelina County	Lufkin	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	MRF	Marfa Municipal	Marfa	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	ASL	Harrison County	Marshall	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	MFE	McAllen Miller International	McAllen	P	N		\$ 2,976,657	\$ -	\$ 11,969	\$ 2,988,626	\$ 131,538	\$ -	\$ -	\$ -	\$ 90,474	\$ 1,809	\$ 3,210,638
TX	F21	Memphis Municipal	Memphis	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	HQZ	Mesquite Metro	Mesquite	R		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ 34,162	\$ 57,162	\$ -	\$ -	\$ 57,162

State	LOCID	Airport Name	City	Svc Lvl	Hub	Role	Primary Airports				CARES Funds	Non-Primary Airports			Concessions Relief		Grand Total
							Primary Entitlements	Cargo Entitlements	Enplanements Allocation	Primary Airports Subtotal	CARES Unallocated Funds	Non-Primary Allocation	Non-Primary FCT	Non-Primary Airports Subtotal	Enplanements Allocation	Admin (up to)	Total
TX	LXY	Mexia-Limestone County	Mexia	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	MAF	Midland International Air And Space Port	Midland	P	S		\$ 3,604,097	\$ -	\$ 19,051	\$ 3,623,148	\$ 209,367	\$ -	\$ -	\$ -	\$ 144,007	\$ 2,880	\$ 3,976,522
TX	MDD	Midland Airpark	Midland	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	JWY	Mid-Way Regional	Midlothian/Waxahatchie	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	MWL	Mineral Wells	Mineral Wells	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	E01	Roy Hurd Memorial	Monahans	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	F85	Cochran County	Morton	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	OSA	Mount Pleasant Regional	Mount Pleasant	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	F53	Franklin County	Mount Vernon	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	2T1	Muleshoe Municipal	Muleshoe	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	OCH	Nacogdoches A L Mangham Jr Regional	Nacogdoches	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	BAZ	New Braunfels Regional	New Braunfels	GA		National	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,000	\$ 34,162	\$ 91,162	\$ -	\$ -	\$ 91,162
TX	ODO	Odessa-Schlemeyer Field	Odessa	GA		National	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,000	\$ -	\$ 57,000	\$ -	\$ -	\$ 57,000
TX	ONY	Olney Municipal	Olney	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	ORG	Orange County	Orange	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	OZA	Ozona Municipal	Ozona	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	PSX	Palacios Municipal	Palacios	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	PSN	Palestine Municipal	Palestine	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	PPA	Perry Lefors Field	Pampa	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	PRX	Cox Field	Paris	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	PEQ	Pecos Municipal	Pecos	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	PYX	Perryton Ochiltree County	Perryton	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	PVW	Hale County	Plainview	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	PEZ	Pleasanton Municipal	Pleasanton	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	PIL	Port Isabel-Cameron County	Port Isabel	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	PKV	Calhoun County	Port Lavaca	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	5F1	Post-Garza County Municipal	Post	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	F01	Quanah Municipal	Quanah	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	RFG	Rooke Field	Refugio	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	RBO	Nueces County	Robstown	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	RKP	Aransas County	Rockport	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	F46	Ralph M Hall/Rockwall Municipal	Rockwall	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	SJT	San Angelo Regional/Mathis Field	San Angelo	P	N		\$ 1,000,000	\$ -	\$ 1,881	\$ 1,001,881	\$ 20,673	\$ -	\$ -	\$ -	\$ 14,219	\$ 284	\$ 1,036,773
TX	SAT	San Antonio International	San Antonio	P	M		\$ 8,052,980	\$ 325,412	\$ 142,320	\$ 8,520,712	\$ 1,564,064	\$ -	\$ -	\$ -	\$ 1,075,791	\$ 21,515	\$ 11,160,567
TX	SKF	Kelly Field	San Antonio	GA		Regional	\$ -	\$ 40,440	\$ -	\$ 40,440	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 63,440
TX	SSF	Stinson Municipal	San Antonio	R		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ 34,162	\$ 57,162	\$ -	\$ -	\$ 57,162
TX	GNC	Gaines County	Seminole	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	60F	Seymour Municipal	Seymour	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	GYI	North Texas Regional/Perrin Field	Sherman/Denison	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ 34,162	\$ 57,162	\$ -	\$ -	\$ 57,162
TX	F49	Slaton Municipal	Slaton	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	84R	Smithville Crawford Municipal	Smithville	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	SNK	Winston Field	Snyder	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	E42	Major Samuel B Cornelius Field	Spearman	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	F56	Arledge Field	Stamford	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	SEP	Stephenville Clark Regional	Stephenville	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	SLR	Sulphur Springs Municipal	Sulphur Springs	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	SWW	Avenger Field	Sweetwater	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	T74	Taylor Municipal	Taylor	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	TPL	Draughon-Miller Central Texas Regional	Temple	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	TRL	Terrell Municipal	Terrell	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	I06	City of Tulia/Swisher County Municipal	Tulia	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	TYR	Tyler Pounds Regional	Tyler	P	N		\$ 1,000,000	\$ -	\$ 1,695	\$ 1,001,695	\$ 18,623	\$ -	\$ -	\$ -	\$ 12,809	\$ 256	\$ 1,033,127
TX	UVA	Garner Field	Uvalde	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	VHN	Culberson County	Van Horn	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	E52	Oldham County	Vega	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	F05	Wilbarger County	Vernon	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	VCT	Victoria Regional	Victoria	CS		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ 34,162	\$ 57,162	\$ -	\$ -	\$ 57,162
TX	CNW	TSTC Waco	Waco	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ 34,162	\$ 47,162	\$ -	\$ -	\$ 47,162
TX	PWG	McGregor Executive	Waco	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	ACT	Waco Regional	Waco	P	N		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	F06	Marian Airpark	Wellington	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

State	LOCID	Airport Name	City	Svc Lvl	Hub	Role	Primary Airports				CARES Funds	Non-Primary Airports			Concessions Relief		Grand Total
							Primary Entitlements	Cargo Entitlements	Enplanements Allocation	Primary Airports Subtotal	CARES Unallocated Funds	Non-Primary Allocation	Non-Primary FCT	Non-Primary Airports Subtotal	Enplanements Allocation	Admin (up to)	Total
TX	TXW	Mid Valley	Weslaco	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	ARM	Wharton Regional	Wharton	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
TX	SPS	Sheppard AFB/Wichita Falls Municipal	Wichita Falls	P	N		\$ 1,000,000	\$ -	\$ 1,145	\$ 1,001,145	\$ 12,585	\$ -	\$ -	\$ -	\$ 8,656	\$ 173	\$ 1,022,386
TX	CWC	Kickapoo Dntown	Wichita Falls	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
TX	INK	Winkler County	Wink	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
TX	T90	Chambers County-Winnie Stowell	Winnie/Stowell	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
TX	F51	Winnsboro Municipal	Winnsboro	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	U52	Beaver Municipal	Beaver	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	BDG	Blanding Municipal	Blanding	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	BMC	Brigham City Regional	Brigham City	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
UT	BCE	Bryce Canyon	Bryce Canyon	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	CDC	Cedar City Regional	Cedar City	P	N		\$ 1,000,000	\$ -	\$ 687	\$ 1,000,687	\$ 7,552	\$ -	\$ -	\$ -	\$ 5,194	\$ 103	\$ 1,013,433
UT	DTA	Delta Municipal	Delta	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	U69	Duchesne Municipal	Duchesne	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
UT	1L7	Escalante Municipal	Escalante	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	U34	Green River Municipal	Green River	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	U96	Cal Black Memorial	Halls Crossing	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	HVE	Hanksville	Hanksville	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	HCR	Heber Valley	Heber	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
UT	1L8	General Dick Stout Field	Hurricane	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
UT	KNB	Kanab Municipal	Kanab	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
UT	38U	Wayne Wonderland	Loa	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	LGU	Logan-Cache	Logan	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
UT	41U	Manti-Ephraim	Manti	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	MLF	Milford Municipal/Ben and Judy Briscoe Field	Milford	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
UT	CNY	Canyonlands Field	Moab	P	N		\$ 1,000,000	\$ -	\$ 468	\$ 1,000,468	\$ 5,145	\$ -	\$ -	\$ -	\$ 3,539	\$ 70	\$ 1,009,152
UT	U64	Monticello	Monticello	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	U14	Nephi Municipal	Nephi	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
UT	OGD	Ogden-Hinckley	Ogden	P	N		\$ 1,000,000	\$ -	\$ 458	\$ 1,000,458	\$ 5,033	\$ -	\$ -	\$ -	\$ 3,462	\$ 69	\$ 1,008,953
UT	U55	Panguitch Municipal	Panguitch	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	1L9	Parowan	Parowan	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	PUC	Carbon County Regional/Buck Davis Field	Price	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	PVU	Provo Municipal	Provo	P	N		\$ 1,353,451	\$ -	\$ 3,125	\$ 1,356,575	\$ 34,339	\$ -	\$ -	\$ -	\$ 23,619	\$ 472	\$ 1,414,533
UT	RIF	Richfield Municipal	Richfield	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	74V	Roosevelt Municipal	Roosevelt	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
UT	SLC	Salt Lake City International	Salt Lake City	P	L		\$ 15,870,841	\$ 407,249	\$ 363,830	\$ 16,641,920	\$ 3,998,403	\$ -	\$ -	\$ -	\$ 2,750,174	\$ 55,003	\$ 23,390,497
UT	U42	South Valley Regional	Salt Lake City	R		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
UT	SPK	Spanish Fork Airport Springville-Woodhouse	Spanish Fork	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
UT	SGU	St George Regional	St. George	P	N		\$ 1,311,944	\$ -	\$ 2,898	\$ 1,314,843	\$ 31,853	\$ -	\$ -	\$ -	\$ 21,909	\$ 438	\$ 1,368,605
UT	TVY	Bolinder Field-Tooele Valley	Tooele	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
UT	VEL	Vernal Regional	Vernal	P	N		\$ 1,000,000	\$ -	\$ 359	\$ 1,000,359	\$ 3,941	\$ -	\$ -	\$ -	\$ 2,711	\$ 54	\$ 1,007,011
UT	ENV	Wendover	Wendover	GA		National	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,000	\$ -	\$ 57,000	\$ -	\$ -	\$ 57,000
VA	VJI	Virginia Highlands	Abingdon	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
VA	DCA	Ronald Reagan Washington National	Arlington	P	L		\$ 14,625,454	\$ -	\$ 328,543	\$ 14,953,997	\$ 3,610,612	\$ -	\$ -	\$ -	\$ 2,483,444	\$ 49,668	\$ 21,048,053
VA	BCB	Virginia Tech/Montgomery Executive	Blacksburg	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
VA	OV4	Brookneal/Campbell County	Brookneal	GA		Unclassified	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
VA	CHO	Charlottesville-Albemarle	Charlottesville	P	N		\$ 2,797,194	\$ -	\$ 10,991	\$ 2,808,186	\$ 120,792	\$ -	\$ -	\$ -	\$ 83,083	\$ 1,661	\$ 3,012,061
VA	CJR	Culpeper Regional	Culpeper	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
VA	DAN	Danville Regional	Danville	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
VA	PSK	New River Valley	Dublin	GA		Regional	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23,000	\$ -	\$ 23,000	\$ -	\$ -	\$ 23,000
VA	IAD	Washington Dulles International	Dulles	P	L		\$ 14,914,117	\$ 160,555	\$ 336,722	\$ 15,411,394	\$ 3,700,496	\$ -	\$ -	\$ -	\$ 2,545,268	\$ 50,905	\$ 21,657,158
VA	EMV	Emporia-Greensville Regional	Emporia	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
VA	FVX	Farmville Regional	Farmville	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
VA	FKN	Franklin Regional	Franklin	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
VA	FRR	Front Royal-Warren County	Front Royal	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
VA	HLX	Twin County	Galax Hillsville	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
VA	HSP	Ingalls Field	Hot Springs	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
VA	OVG	Lee County	Jonesville	GA		Basic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 9,000	\$ -	\$ 9,000	\$ -	\$ -	\$ 9,000
VA	JYO	Leesburg Executive	Leesburg	R		National	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 57,000	\$ -	\$ 57,000	\$ -	\$ -	\$ 57,000
VA	LKU	Louisa County/Freeman Field	Louisa	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000
VA	LUA	Luray Caverns	Luray	GA		Local	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,000	\$ -	\$ 13,000	\$ -	\$ -	\$ 13,000



Federal Aviation Administration

Airport Coronavirus Response Grant Program Frequently Asked Questions

This document answers frequently asked questions (FAQs) stakeholders may have related to the approximately \$2 billion in grants for airports under the Coronavirus Response and Relief Supplemental Appropriation Act, 2021 (CRRSA).

The Federal Aviation Administration (FAA) has additional information for airport sponsors concerning COVID-19 available at www.faa.gov/airports.

The guidance here is not legally binding in its own right and FAA will not rely on it as a separate basis for affirmative enforcement action or other administrative penalty. Conformity with this guidance, as distinct from existing statutes, regulations, and grant assurances, is voluntary only, and nonconformity will not affect existing rights and obligations.

In addition to these grants, FAA is administering approximately \$10 billion in grants for airports under the Coronavirus Aid, Relief, and Economic Security (CARES) Act. For information on CARES Act funding, please visit https://www.faa.gov/airports/cares_act/.

For questions related to either the CARES or CRRSA programs, please email CARESAirports@faa.gov.

These FAQs will be updated periodically.

Subjects Addressed Below

General Questions	2
Questions of Allocation of Funds	4
Questions on Use of Funds	6
Questions on Grant Application and Agreement	10
Questions on Invoicing and Payments	14
Questions on Grant Closeout	16
Questions on Environmental Review.....	17
Questions on Administration under the State Block Grant Program.....	18
Questions on Funding for Airports in the FAA Contract Tower Program	20
Questions on Funding for Concession Relief	21
Questions on Workforce Retention.....	22

General Questions

Q1: How does the Coronavirus Response and Relief Supplemental Appropriation Act benefit airports and airport concessions?

A: On December 27, 2020, the President signed the Consolidated Appropriations Act, 2021. Division M of that Act is the Coronavirus Response and Relief Supplemental Appropriation Act, 2021 (CRRSA). Title IV of CRRSA provides approximately \$2 billion in economic relief to airports to prevent, prepare for, and respond to the COVID-19 public health emergency, including relief from rent and minimum annual guarantees (MAG) for eligible airport concessions at primary airports.

Q2: Where is this funding coming from?

A: The funds are coming directly from the U.S. Treasury's General Fund to prevent, prepare for, and respond to the impacts of the COVID-19 public health emergency. FAA's Office of Airports will administer these grant funds to airport sponsors.

Q3: Who is eligible to receive funding under CRRSA?

A: CRRSA funds are available to most sponsors as defined in section 47102 of title 49, United States Code (U.S.C.); that is, airport sponsors meeting statutory and policy requirements under this section and identified in the FAA's current National Plan of Integrated Airport Systems (NPIAS).

A portion of the funds available under CRRSA is for the Small Community Air Service Development Program (SCASDP), which is administered by the Office of the Secretary of Transportation (OST). More information about SCASDP can be found at <https://www.transportation.gov/policy/aviation-policy/small-community-rural-air-service/SCASDP>.

Q4: Are any airport sponsors not eligible to receive funding under CRRSA?

A: CRRSA prohibits funding for any airport that was allocated more than four times its annual operating expenses under the CARES Act (Public Law 116-136). FAA used airports' reported fiscal year (FY) 2018 operating expenses. This prohibition affects 31 airports, and their CRRSA allocation will be zero when FAA announces award allocations.

Q5: What is the period of availability for FAA to obligate CRRSA funding?

A: Funds are available until September 30, 2021, and must be obligated by that date. FAA intends to award grants and obligate these funds on an expedited basis.

Q6: Are airport sponsors in the Republic of the Marshall Islands, Federated States of Micronesia, Republic of Palau, and Wake Island eligible for the Airport Coronavirus Response Grant Program?

A: No. CRRSA states only sponsors of airports in categories defined in 49 U.S.C. 47102 are eligible. Eligible airports are included in the NPIAS. Airports in the Republic of the Marshall Islands, Federated States of Micronesia, Republic of Palau, and Wake Island are not included in the NPIAS. While these airport sponsors may be eligible for some AIP discretionary funding, they are not eligible under CRRSA.

Q7: Are airports in U.S. territories eligible for the Airport Coronavirus Response Grant Program?

A: Yes. CRRSA states only sponsors of airports in categories defined in 49 U.S.C. 47102 are eligible. Eligible airports are included in the NPIAS. Airports in U.S. territories (American Samoa, Northern Mariana Islands, Puerto Rico, the U.S. Virgin Islands, and Guam) are included in the NPIAS.

Q8: Can an airport sponsor use the Airport Coronavirus Response Grant Program and funding from other Federal programs to pay for expenses related to the COVID-19 public health emergency?

A: A sponsor may use Airport Coronavirus Response Grant Program grants for airport operating expenses that arise due to the COVID-19 public health emergency. FAA recognizes that several sources of COVID-19 relief funds may be available to airport sponsors. Airport sponsors may use other sources of funding consistent with the terms of those programs. However, an airport sponsor may not invoice under its grant for expenses that have been reimbursed under another program.

Questions on Allocation of Funds

Q-F1: How will this funding be allocated to airport sponsors?

A: CRRSA divides the \$2 billion funding into four groups by formula that result in specific allocations to each eligible airport. The grants for these four groups are not discretionary. The four groups (not including SCASDP, which is administered by OST) are:

- **Primary Commercial Service Airports and Certain Cargo Airports** share not less than \$1.75 billion based first on the statutory Airport Improvement Program (AIP) primary and cargo entitlement formulas. However, the \$26-million limit under 49 U.S.C. 47114(c)(1)(C)(iii) and reduction for imposing passenger facility charges under 49 U.S.C. 47114(f) do not apply to these allocations. After allocating based on the statutory entitlement formulas, the remainder is then allocated based on the number of enplanements the airport had in calendar year (CY) 2019, which is the most recent calendar year of available enplanement data, as a percentage of total 2019 enplanements for all primary airports. Sponsors may use these funds for costs related to operations, personnel, cleaning, sanitization, janitorial services, combating the spread of pathogens at the airport, and debt service payments.
- **Non-Primary Commercial Service and General Aviation Airports** share not less than \$45 million (less the amount allocated for non-primary airports participating in the FAA Contract Tower Program) allocated based on the categories (National, Regional, Local, and Basic) published in [the most current NPIAS](#), reflecting the percentage of the aggregate published eligible development costs for each such category, and then dividing the allocated funds evenly among the eligible airports in each category, rounded up to the nearest thousand. Sponsors may use these funds for costs related to operations, personnel, cleaning, sanitization, janitorial services, combating the spread of pathogens at the airport, and debt service payments.
- **Non-Primary Airports Participating in the FAA Contract Tower Program** share not less than \$5 million of the \$45 million available to non-primary airports. These funds are divided equally among eligible airports. Sponsors may use these funds to cover lawful expenses to support FAA contract tower operations. More information on the FAA Contract Tower Program is available at https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/mission_support/faq_contract_tower_program/.
- **Primary Commercial Service Airports** share not less than \$200 million allocated based on the number of enplanements the airport had in CY 2019 as a percentage of total CY 2019 enplanements for all primary airports. Sponsors may use these funds to provide relief from rent and minimum annual guarantees (MAG) to on-airport car rental, on-airport parking, and in-terminal airport concessions.

Q-F2: How will FAA handle unallocated funds remaining under the CARES Act?

A: There are some remaining funds under the CARES Act that FAA did not allocate. Additionally, a limited amount of allocated CARES Act funds were declined by eligible airport sponsors. CRRSA requires these funds to be allocated to primary airports based on CY 2019 enplanements as described in Q-F1. FAA intends to announce the final total of unallocated CARES Act funds and the re-allocation totals in the near future. FAA will work with airport sponsors to make these additional funds available for expenditure.

Q-F3: How did FAA use the NPIAS airport categorization to determine CRRSA allocations for non-primary airport sponsors?

A: Under CRRSA, not less than \$45 million was allocated to non-primary airports based on the categories in the [National Plan of Integrated Airport Systems \(NPIAS\) 2021-2025](#), issued September 30, 2020, updated to reflect current status for FY 2021. [FAA Order 5090.5, Formulation of the NPIAS and ACIP](#) defines the criteria for each category or role.

Q-F4: Why do airports with a NPIAS category of Unclassified not receive an allocation under CRRSA?

A: CRRSA allocates funds for non-primary airports based on the percentage of the aggregate published eligible development costs for each category that is then divided evenly among eligible airports in each category. As documented in the NPIAS 2021-2025, consistent with their role in the national airport system, unclassified airports have no development needs identified through 2025.

Q-F5: Do airport sponsors have to contribute a local match for the Airport Coronavirus Response Grant Program?

A: No. Grants under the Airport Coronavirus Response Grant Program are available at a 100% Federal share.

Q-F6: Will FY 2021 AIP or Supplemental Discretionary grants be made at a 100% share?

A: No. CRRSA did not provide funding to increase the Federal share on FY 2021 AIP or Supplemental Discretionary grants.

Questions on Use of Funds

Q-U1: How can an airport sponsor use Airport Coronavirus Response Grant Program funds?

A: An airport sponsor may use these funds for costs related to operations, personnel, cleaning, sanitization, janitorial services, combating the spread of pathogens at the airport, and debt service payments. Grant recipients should follow FAA's [Policy and Procedures Concerning the Use of Airport Revenues \("Revenue Use Policy"\)](#), 64 Federal Register 7696 (64 FR 7696), as amended by [79 Federal Register 66282 \(79 FR 66282\)](#). The Revenue Use Policy document provides guidance regarding permitted and prohibited uses of airport revenue. In addition, while CRRSA limits the use of funds to certain stated eligible costs, it states that funds may not be used for any purpose not directly related to the airport. Grant recipients also should review the [Information for Airport Sponsors Considering COVID-19 Restrictions or Accommodations](#) for clarifying COVID-19 revenue use guidance.

Q-U2: Can Airport Coronavirus Response Grant Program funds be used to reimburse operational expenses?

A: Yes. FAA will reimburse sponsors for operational expenses directly related to the airport incurred on or after January 20, 2020. Operational expenses are those expenses necessary to operate, maintain, and manage an airport. They include expenses such as payroll, utilities, service contracts, and items generally having a limited useful life, including personal protective equipment and cleaning supplies.

Q-U3: Can Airport Coronavirus Response Grant Program funds be used to reimburse debt service payments?

A: Yes. FAA will reimburse sponsors for debt service payments directly related to the airport that are due on or after December 27, 2020, which is the date of enactment of CRRSA.

Q-U4: Can Airport Coronavirus Response Grant Program funds be used to reimburse monthly payments into a debt service reserve fund?

A: Yes. FAA will reimburse sponsors for monthly payments into a debt service reserve fund (also called a debt service sinking fund or similar name), which are directly related to the airport, that are due on or after December 27, 2020, which is the date of enactment of CRRSA. The airport sponsor must ensure that these payments are restricted to only debt service payments. The airport sponsor will submit a detailed invoice summary with its payment request. All documentation of the payment and disbursements must be retained for three years after the grant is closed as required by 2 CFR § 200.334.

Q-U5: Can Airport Coronavirus Response Grant Program funds be used for new airport development on the airport?

A: Yes. However, there are limitations on the type of development for which the funding can be used. Any development-related costs must be associated with combating the spread of pathogens at the airport. Examples of eligible development would be replacing or upgrading a heating, ventilation, and air conditioning (HVAC) system; reconfiguring the terminal to accommodate increased social distancing; or reconfiguring terminal space or other facilities to accommodate health screening. A sponsor seeking to use the funds for new airport development or construction should contact its local Airports District Office or Airports Regional Office. That office will ensure that such development is consistent with requirements for airport development. The Airports District Office or Airports Regional Office also will assist the airport sponsor with executing a Development Addendum for its intended project.

Q-U6: Can Airport Coronavirus Response Grant Program funds be used to prepay long-term contracts (for example, shuttle-bus operators, janitorial services, security services, fire and police services)?

A: Yes, provided the prepayment is a *bona fide* transaction where the airport sponsor receives the benefit of the prepaid services and receives some value in exchange for committing in advance.

Q-U7: Can Airport Coronavirus Response Grant Program funds be deposited in the airport sponsor's general reserve account (or invest them for future use)?

A: No. FAA would not be able to ensure a potential future use is a use consistent with CRRSA requirements.

Q-U8: Is there a limit on using Airport Coronavirus Response Grant Program funds for operational expenses?

A: No. An airport sponsor may use all of its awarded funds for allowable airport operational expenses or debt service payments.

Q-U9: Can Airport Coronavirus Response Grant Program funds be used to reimburse for a cost associated with an aeronautical service or product provided by the airport sponsor?

A: Yes, in certain circumstances. Airport Coronavirus Response Grant Program funds are available to reimburse the costs associated with aeronautical products or services offered by the airport sponsor but only when the sponsor certifies it is the only provider of the same product or service at the airport. These services include aviation fuels, equipment, parts, supplies, and facilities for aircraft storage or maintenance. Costs associated with flight training or aviation training are not eligible for reimbursement.

Q-U10: Can Airport Coronavirus Response Grant Program funds be used to reimburse depreciation?

A: No. Depreciation is not an allowable expense under the Airport Coronavirus Response Grant Program. Although depreciation is an allowable operating expense by both the 2 CFR part 200 and the Revenue Use Policy, it does not impact cash flow because the cash or donation was considered at the acquisition of the asset, and the asset could have been financed by long-term debt, Federal grants, current funds, or donation.

Q-U11: Can the Airport Coronavirus Response Grant Program funds be used to reimburse charitable contributions or sponsorships?

A: No. Charitable contributions and sponsorships are not an allowable expense. All reimbursements made under the Airport Coronavirus Response Grant Program must comply with 2 CFR part 200, “Uniform Administrative, Cost Principles, and Audit Requirements for Federal Awards.” Section 200.434, “Contributions and Donations” states that contributions and donations, including cash, property, and services, are unallowable.

Q-U12: Can Airport Coronavirus Response Grant Program funds be used to reimburse economic development efforts?

A: No. Under CRRSA, funds are available for costs related to operations, personnel, cleaning, sanitization, janitorial services, combating the spread of pathogens at the airport, and debt service payments. Economic development does not fall into these categories of eligible costs.

Q-U13: Can Airport Coronavirus Response Grant Program funds be used to reimburse smaller invoices for items such as groceries for snack rooms or meals for airport personnel?

A: As long as the purchases are for purposes eligible under CRRSA (as described in Q-U1) and comply with 2 CFR part 200, including the requirement to document the costs adequately, small purchases are eligible for reimbursement. However, it can be difficult to document that these items are directly related to airport use. Larger invoices directly related to airport use are easier to review and approve.

Q-U14: Can Airport Coronavirus Response Grant Program funds be used to reimburse debt service payments that are backed by an approved PFC and paid with PFC funds?

A: No. If PFC funds are available, the PFC funds must be used on any approved PFC project. Airport Coronavirus Response Grant Program funds are not available to be deposited into PFC accounts. In accordance with 14 CFR § 158.39, public agencies cannot hold excess PFC funds in reserve for a future use. In addition, the requirements of 14 CFR part 158 apply for any new projects or changes in scope to existing projects.

Q-U15: Can Airport Coronavirus Response Grant Program funds be used to reimburse debt service payments that are backed by an approved PFC?

A: Yes. The airport sponsor may supplement with other airport revenue and submit a request for payment under its grant. The invoice summary should show the amount of debt service paid with PFC collections and the amount paid with non-PFC funds. The airport sponsor can submit a request for payment under its grant at the same time it submits an amendment to an approved PFC, which decreases the total collection or deletes an approved project, to its local Airports District Office or Airports Regional Office.

Q-U16: Can Airport Coronavirus Response Grant Program funds be used to reimburse the defeasement of debt backed by an approved PFC?

A: Yes. The airport sponsor can defease the debt with non-PFC funds and submit a request for payment under its grant. However, the airport sponsor must amend its PFC approval, in accordance with the requirements of 14 CFR § 158.37, to reflect the change. A PFC amendment that decreases the total PFC revenue or deletes an approved project does not require airline consultation nor a public comment period. An airport sponsor can submit a request for payment under its grant at the same time it submits an amendment to an approved PFC to its local Airports District Office or Airports Regional Office.

Questions on Grant Application and Agreement

Q-GA1: Is a grant application required to receive the Airport Coronavirus Response Grant Program funds?

A: Yes. After Airport Coronavirus Response Grant Program awards are announced, FAA personnel will reach out to each airport sponsor to provide an opportunity to submit a grant application. An airport sponsor may contact its Airports District Office or Airports Regional Office if it seeks specific guidance on its grant application.

Q-GA2: When will grant applications be available and how long after filing a complete application should an airport sponsor expect to receive a grant?

A: FAA will provide this application to airport sponsors through the local Airports District Office or Airports Regional Office shortly after Airport Coronavirus Response Grant Program awards are announced. FAA anticipates providing a grant agreement for execution within days of receiving a complete application.

Q-GA3: Will FAA use a standard grant application form or one specifically designed for this program?

A: FAA will use the SF-424, *Application for Federal Assistance*.

Q-GA4: Is there a deadline for submitting an application for an Airport Coronavirus Response Grant Program grant?

A: Yes. The deadline to apply for a grant is June 30, 2021. After that date, FAA will reallocate any unobligated funds to primary airports based on CY 2019 enplanements as indicated under CRRSA. (See Q-F1)

Q-GA5: If an airport sponsor owns or operates multiple airports, may Airport Coronavirus Response Grant Program funds be pooled?

A: No. An airport sponsor will need to apply for a separate grant for each airport under its control.

Q-GA6: Is there a deadline by which funds must be used?

A: Yes. The budget period for the Airport Coronavirus Response Grant Program is four years. Pursuant to 2 CFR § 200.403(h), a sponsor may charge to the grant only allowable costs incurred during the budget period.

Q-GA7: Will FAA use a standard AIP grant agreement or one specifically designed for the Airport Coronavirus Response Grant Program?

A: FAA will provide a simplified Grant Agreement shortly after it receives an application. This simplified agreement includes the requirements under CRRSA and makes funds immediately available for expenses, other than airport development, including payroll, debt service, utility expenses, service contracts, and supplies.

Q-GA8: Does an Airport Coronavirus Response Grant Program grant agreement require an airport sponsor to obligate itself to the standard set of FAA Airport Sponsor Grant Assurances?

A: Generally, no. If an airport sponsor uses its grant for operational expenses or debt service payments, the standard FAA Airport Sponsor Grant Assurances do not apply. These grants remain subject to audit, reporting, records retention, and other requirements under 2 CFR part 200 like other Federal grant funding. Some laws outside of 49 U.S.C. chapter 471 also apply, such as 49 U.S.C. 40103(e), which prohibits the grant of an exclusive right to conduct any type of aeronautical activity at an airport, and Title VI of the Civil Rights Act, which prohibits discrimination on the basis of race, color, or national origin. If an airport sponsor uses its grant for new airport development, additional requirements apply (see Q-U5). Additionally, grant funds may be used only for the capital and operating expense of the airport. Examples of expenditures that FAA has found to be allowable are provided in the [FAA Revenue Use Policy](#), as clarified by [Information for Airport Sponsors Considering COVID-19 Restrictions or Accommodations](#). CRRSA does not, however, void assurances made in prior grant agreements; therefore, a sponsor's pre-existing grant assurances and Federal obligations continue to apply.

Q-GA9: How long do the grant assurances remain in effect for an Airport Coronavirus Response Grant Program grant agreement?

A: The grant assurances remain in effect for four years from the date of acceptance of the grant offer, which is consistent with the budget period.

Q-GA10: How does an airport sponsor use Airport Coronavirus Response Grant Program funds for airport development?

A: Funding eligibility under CRRSA for airport development is limited (as discussed in Q-U5). However, an airport sponsor seeking to use its grant funds for eligible near-term airport development may amend its initial Grant Agreement and execute a Development Addendum. This process ensures that a sponsor understands the additional reviews and requirements involved (as discussed in Q-U5). An airport sponsor should be able to complete airport development projects within the four-year budget period of its initial grant. An airport sponsor should not delay or forgo expenditure of grant funds for ongoing airport operational expenses and debt service payments, which are the primary purposes of funds under CRRSA.

Q-GA11: Should an airport sponsor request its full Airport Coronavirus Response Grant Program award amount even if it intends to use a portion of those funds for airport development?

A: Yes. An airport sponsor should include the full award amount in its grant application. All funds then would be available immediately for operational expenses or debt service payments. An airport sponsor can later request a Development Addendum and use some of those funds for airport development.

Q-GA12: What information is required for a Development Addendum?

A: An airport sponsor seeking to use its grant funds for airport development should be prepared to provide its local Airports District Office or Airports Regional Office with the following information:

- Application form (Application for Federal Assistance, SF-424) for the proposed development project;
- A description of project;
- Estimated costs; and
- Timeline for completion.

An airport sponsor should also complete the following steps for the airport development project:

- Complete any standards, airspace, and environmental reviews or approvals including airport geometry assessments, if applicable;
- Complete any other approvals required for the development with the FAA and other agencies;
- Ensure the proposed development is consistent with the approved Airport Layout Plan (ALP) and depicted on the ALP;
- Initiate safety-risk and construction phasing reviews, if applicable; and
- Bid the project to determine the amount to be amended from the initial Grant Agreement and added to the Development Addendum.

FAA recognizes that some proposed development projects have completed many or all of these steps, and those projects may be most suitable for a Development Addendum. Grant agreements for these proposed development projects will include additional requirements as described in Q-U5.

Q-GA13: Is a Development Addendum required for maintenance on existing airport facilities (e.g., a terminal building)?

A: Replacing components of a facility in-kind (dimension and material), in the same footprint, does not require a Development Addendum. Projects may include replacing roofing, carpet, or lighting. However, FAA would issue a Development Addendum if an existing facility is improved or expanded provided that project is eligible under CRRSA.

Q-GA14: Do prevailing wage requirements apply to contract expenses reimbursed with Airport Coronavirus Response Grant Program funds?

A: Grants under the Airport Coronavirus Response Grant Program are subject to the requirements of 49 U.S.C. 47112(b). Therefore, any contract for more than \$2,000 involving labor for airport construction or repair, carried out under a Grant Agreement or Development Addendum, requires contractors to pay labor minimum wage rates as determined by the Secretary of Labor under 40 U.S.C. 3141–3144, 3146, and 3147.

Q-GA15: Does FAA's Buy American requirement apply to the Airport Coronavirus Response Grant Program?

A: Yes. Grants under the Airport Coronavirus Response Grant Program are subject to the requirements of 49 U.S.C. 50101, and grant agreements and addendums include Buy American requirements for all projects. The Buy American provision does not apply to operational expenses (as defined in Question Q-U2) and debt service payments.

Q-GA16: Are there annual financial reporting requirements associated with the Airport Coronavirus Response Grant Program?

A: Yes. In accordance with 2 CFR § 200.328, an airport sponsor must submit annually an SF-425, Federal Financial Report, for each open Grant Agreement or Development Addendum. This report is due by December 31 of each year. An airport sponsor with a Development Addendum must also submit annually an SF-271, Outlay Report and Request for Reimbursement for Construction Program by December 31 of each year.

Questions on Invoicing and Payments

Q-11: How will an airport sponsor submit payment requests for Airport Coronavirus Response Grants?

A: FAA will use the existing U.S. Department of Transportation Delphi eInvoicing system for payment requests. FAA will review payment requests manually. An airport sponsor may submit only a detailed invoice summary with its payment request. The invoice summary should include the:

- Grant Number
- Airport Name
- Airport City
- Airport Location Identifier
- Services Rendered Dates
- Invoice Paid Date
- Vendor Name
- Billed Amount
- Payment Request Amount
- Short summary of expenses billed, including, for example:
 - Payroll
 - Utilities (electric, water, phone)
 - Service contracts (include type of work)
 - Goods Purchase (include a list of all items purchased)
 - Debt Service Payment (identify whether this is a semi-annual bond payment or monthly payment into a debt service reserve fund)
 - Other (explanation of costs and how they are eligible and related to the airport)

The invoice summary should include enough detail to permit FAA to verify compliance with the FAA's Revenue Use Policy. Sponsors must be prepared to submit any invoices, upon request, during the review process as well as retain those invoices and other supporting documentation for three years after the grant is closed as required by 2 CFR § 200.334.

Q-I2: If, during review of a request for payment, FAA requires additional documentation to confirm the eligibility of a particular expense, what documentation could be requested?

A: Examples of underlying payment request documentation are:

- Invoices (demonstrating that the goods or services provided directly relate to the airport);
- Bills (demonstrating that the goods or services provided directly relate to the airport);
- Payroll reports from the payroll system of record;
- General ledger reports and subsidiary ledger reports for services provided by the sponsor;
- Current and approved indirect cost rate agreement; or
- Most recently approved local or statewide cost allocation plan.

Q-I3: Can an airport sponsor request 100 percent of the available Airport Coronavirus Response Grant Program funds and use the funds to pay expenses over the next several months?

A: No. An airport sponsor must submit payment requests for incurred expenses only. Requesting funds for reimbursement prior to incurring the invoiced expense is not consistent with the [FAA's Payment Policy](#) and will result in an improper payment that may have to be repaid.

Questions on Grant Closeout

Q-C1: What are the procedures for closing out an Airport Coronavirus Response Grant for non-development expenses?

A: An airport sponsor will submit a comprehensive narrative report via the U.S. Department of Transportation Delphi eInvoicing system. The narrative report will: (a) summarize the non-development expenses covered under the grant and the associated amounts; (b) certify all expenses were incurred in accordance with the [FAA's Revenue Use Policy](#) and [2 CFR part 200](#); (c) certify that any equipment or services were procured in a manner consistent with the terms of the grant; (d) certify that operational expenses were incurred on or after January 20, 2020; (e) certify that debt service payments were due on or after December 27, 2020; and (f) submit a completed Standard Form 425, Federal Financial Report. Approval of the final payment request will follow a review of the airport sponsor's closeout report. A [sample Airport Coronavirus Response Grant Program closeout report](#) is available.

Q-C2: Will an airport sponsor be notified that its Airport Coronavirus Response Grant is closed?

A: An airport sponsor will receive a grant closeout letter from FAA stating the grant has been closed. After the grant is closed, it remains subject to audit. The airport sponsor must retain grant documentation for three years after the grant is closed as required by 2 CFR § 200.334.

Questions on Environmental Review

Q-E1: Are there any environmental review requirements associated with non-construction grants for airport operating expenses and debt service payments?

A: No. These types of grants have no potential to impact the environment, and therefore are not major federal actions subject to NEPA review.

Q-E2: Are there any environmental review requirements associated with projects funded under a Development Addendum?

A: Yes. FAA will conduct environmental review as necessary consistent with the requirements of the Council on Environmental Quality (CEQ) regulations in 40 CFR parts 1500 through 1508 and the FAA's NEPA implementation procedures. An airport sponsor should contact its Airports District Office or Airports Regional Office to determine the appropriate scope and level of environmental analysis.

Questions on Administration under the State Block Grant Program

Q-SB1: What is the State Block Grant Program (SBGP)?

A: In 1987, Congress authorized FAA to use State block grants to provide AIP funds to airport sponsors. Through the State Block Grant Program (SBGP), FAA provides funds directly to States that participate in the program. In turn, SBGP participants fund and oversee AIP projects to non-primary commercial service, reliever, and general aviation airports. The program currently includes the following 10 States: Georgia, Illinois, Michigan, Missouri, New Hampshire, North Carolina, Pennsylvania, Tennessee, Texas, and Wisconsin.

Q-SB2: How will FAA Administer CRRSA funding for States participating in the SBGP?

A: The FAA Airport Improvement Program Branch (APP-520) will utilize its existing relationships with the States participating in the SBGP for administration of the Airport Coronavirus Response Grant Program. These participants have relationships with airport sponsors within their States and currently provide grant management and internal controls. Leveraging this infrastructure will facilitate efficient and expedient distribution of funds.

Q-SB3: Will FAA Regional and Airport District Offices remain the points-of-contact for the Airport Coronavirus Response Grant Program?

A: Yes. States participating in the SBGP should continue to work with their local Airports District Office or Airports Regional Office throughout implementation and administration.

Q-SB4: Do Airport Coronavirus Response Grant Program funding allocations work differently for the SBGP?

A: No. FAA will calculate each airport sponsor's allocation based on formulas in CRRSA. FAA will announce these award amounts along with all awards under the Airport Coronavirus Response Grant Program.

Q-SB5: How much CRRSA funding may States participating in the SBGP distribute?

A: CRRSA provides for specific allocations to each airport sponsor. FAA will aggregate the amounts announced for each airport sponsor into one State award.

Q-SB6: How may States participating in the SBGP allocate the Airport Coronavirus Response Grant Program funds?

A: States participating the SBGP must make sub-awards to each airport sponsor based on that sponsor's allocation under CRRSA. FAA expects States to make these sub-awards on an expedited basis, and for airport sponsors to spend funds quickly, to reduce the adverse impacts of the current public health emergency. States must follow 2 CFR part 200 requirements for grant awards and sub-awards. Funds not expended within the four-year budget period are subject to recovery by FAA.

Q-SB7: What application and grant agreement will be used for sub-grants?

A: States participating in the SBGP will use a streamlined application and grant agreement process similar to what FAA is using for all grants under the Airport Coronavirus Response Grant Program. FAA will provide States with template documents after these grants are announced.

Q-SB8: What if my State legislature needs to approve the acceptance of CRRSA funding?

A: FAA recommends that States participating in the SBGP use their usual State processes to approve, accept, and administer Federal funds.

Q-SB9: Can grants under the Airport Coronavirus Response Grant Program be sub-awarded to airport sponsors that had previously opted out of the SBGP?

A: No. States participating in the SBGP do not have to make sub-awards to airport sponsors that opted out in FY 2021 or do not participate in the SBGP. FAA will administer grants for those airport sponsors.

Q-SB10: What are the reporting requirements for the Airport Coronavirus Response Grant Program?

A: States participating in the SBGP will continue the current practice of providing sub-award reporting information on grants to FAA upon request.

Q-SB11: Will grants under the Airport Coronavirus Response Grant Program require end-of-fiscal-year reporting like other AIP funding?

A: Yes. Airport Coronavirus Response Grant Program funds will be included in the Annual Report of Federal Funding at the end of FY 2021.

Q-SB12: How will payment requests be submitted for the Airport Coronavirus Response Grant Program?

A: FAA will use the existing U.S. Department of Transportation Delphi eInvoicing system for payment requests. States participating in the SBGP will continue the current practice of retaining all underlying payment request documentation and complete records.

Q-SB13: Will FAA audit the Airport Coronavirus Response Grant Program administered by States participating in the SBGP?

A: Yes. FAA will include audits of grants under the Airport Coronavirus Response Grant Program in its annual audit process.

Q-SB14: What documentation is needed for SBGP Airport Coronavirus Response Grant Program drawdown requests?

A: States participating in the SBGP should provide the same documentation outlined in Q-I1 and Q-I2. States participating in the SBGP must ensure invoices contain only eligible items under CRRSA, as detailed throughout this document.

Questions on Funding for Airports in the FAA Contract Tower Program

Q-CT1: What is the FAA Contract Tower Program?

A: Contract towers are air traffic control towers that are staffed by employees of private companies rather than by FAA employees. The FAA Contract Tower (FCT) Program was established in 1982 to allow the agency to contract out the operation of certain towers. FAA admits airports into this program after an eligibility review. More information about the FCT Program is available at https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/mission_support/faq_contract_tower_program/.

Q-CT2: How can airport sponsors that participate in the FAA Contract Tower Program use the funds they receive?

A: Under CRRSA, airport sponsors of non-primary airports that participate in the FAA Contract Tower Program may use these funds to cover any lawful costs associated with supporting their FAA contract tower operations (such as payroll, utilities, service contracts, and items generally having a limited useful life, including personal protective equipment and cleaning supplies).

Q-CT3: Can airport sponsors that participate in the FAA Contract Tower Program use other CRRSA funds for costs related to contract tower operations?

A: Yes. Airport sponsors may use other CRRSA funding to support contract tower operations, personnel, cleaning, sanitization, janitorial services, combating the spread of pathogens, and debt service payments. However, they cannot use the funding received specifically for contract towers for any other purpose.

Questions on Funding for Concession Relief

Q-CR1: How does an airport sponsor claim its allocation available to provide relief to airport concessions?

A: An airport sponsor seeking to use CRRSA funds to provide relief from rent and minimum annual guarantees (MAG) obligations to eligible airport concessions may apply for that allocation in an application for an Airport Coronavirus Response Grant Program grant agreement. FAA will issue additional guidance concerning claiming and using these funds in the near future.

Q-CR2: How do airport sponsors provide relief to airport concessions?

A: If an airport sponsor accepts its CRRSA allocation for concession relief, the sponsor must provide relief from rent and MAG to on-airport car rental, on-airport parking, and in-terminal airport concessions (as defined in 49 CFR part 23) from December 27, 2020, the date CRRSA was enacted, until the sponsor has provided relief equaling the total allocation amount less its administration expenses.

Q-CR3: What if State laws, local laws, or applicable trust indentures prohibit an airport sponsor from providing relief from rent and MAG to airport concessions?

A: If an airport sponsor is prohibited from providing relief from rent and MAG, it should decline the allocated funds before executing an Airport Coronavirus Response Grant Program grant agreement.

Q-CR4: How does an airport sponsor allocate concession relief funds among its concessions?

A: An airport sponsor must provide this relief to each airport concession in an amount that reflects each eligible airport concession's proportional share of the total amount of rent and MAG of all eligible airport concessions at the airport.

Q-CR5: Are there other requirements for an airport sponsor providing relief to its concessions?

A: Airport sponsors must prioritize relief from rent and MAG to minority-owned businesses to the extent permissible under CRRSA.

Q-CR6: Can an airport sponsor recover its administrative expenses for providing rent or MAG relief to airport concessions?

A: Yes. An airport sponsor may retain up to 2 percent of its allocation for relief administration.

Q-CR7: Are there requirements for an airport concession to obtain rent or MAG relief from an airport sponsor?

A: Yes. An airport concession must certify to the airport sponsor that it has not received a second draw or assistance for a covered loan under section 7(a)(37) of the Small Business Act (15 U.S.C. 636(a)(37)) that has been applied toward rent or MAG. Additionally, an airport concession receiving relief from an airport sponsor may not apply for a covered loan under 15 U.S.C. 636(a)(37).

Questions on Workforce Retention

Q-WF1: Are there specific workforce retention requirements for accepting Airport Coronavirus Response Grant Program funds?

A: Yes. A sponsor of a small, medium, or large hub airport must continue to employ, through February 15, 2021, at least 90% of the number of individuals employed (after making adjustments for retirements or voluntary employee separations) as of March 27, 2020. This requirement is an extension of the workforce retention requirement under the CARES Act. Airport sponsors must certify compliance with the CARES Act and CRRSA workforce retention requirements at the time of grant execution. The workforce retention requirement does not apply to non-hub or non-primary airports.

Q-WF2: When do small, medium, and large hub airport sponsors report their respective compliance with the employee retention requirement?

A: Provided an airport sponsor is current with its workforce retention reporting under the CARES Act, it must report only employment totals as of February 15, 2021, by no later than March 1, 2021.

Q-WF3: Where should CRRSA workforce retention reports be submitted?

A: CRRSA workforce retention reports should be submitted to CARESAirports@faa.gov. Please include “Workforce Retention Report” and your airport’s city, State, and airport location identifier in the email subject line.

Q-WF4: What information must be included in a workforce retention report and certification?

A: That report and certification should include the number of full-time equivalent (FTE) employees working at the airport as of March 27, 2020, as the baseline comparison. Airport sponsors do not need to count contractors providing services other than airport management, tenants, or concessionaires. Airport sponsors may make adjustments for employees who perform duties at both the airport and other facilities operated by the airport sponsor. Airport sponsors also may make adjustments for retirements or voluntary employee separations when calculating the workforce retention percentage. If an airport sponsor has unique circumstances (such as using seasonal employees or contractors for airport management or operations), it should report that information in as much detail as possible in the initial report so any subsequent retention reporting can be substantiated.

Q-WF5: What format is required for CRRSA workforce retention reports?

A: There is no particular format for reporting baseline and quarterly workforce retention counts. Airport sponsor personnel with appropriate knowledge or authority, such as the human resources director, chief financial officer, or payroll officer should validate the information.

Q-WF6: Are payroll records or any other documentation required for workforce retention reports?

A: Airport sponsors do not need to submit payroll records. However, airport sponsors must retain all supporting documentation for three years after the grant is closed as required by 2 CFR § 200.334.

Q-WF7: Are waivers from the CRRSA workforce retention requirement available?

A: The Secretary of Transportation may waive the workforce retention requirement if the Secretary determines that the sponsor is experiencing economic hardship as a direct result of the requirement, or that the requirement reduces aviation safety or security. To request a waiver of the CRRSA workforce retention requirement, an airport sponsor should send a waiver request to CARESAirports@faa.gov no less than 30 days before the quarterly report due date. The waiver request should come from a person authorized to sign AIP grants and include how the workforce retention requirement causes a direct economic hardship on the airport or reduces aviation safety or security. The airport sponsor should include any additional documentation that supports its request. FAA will respond expeditiously.

Q-WF8: What are the consequences for failing to meet workforce retention reporting requirements?

A: If a sponsor of a small, medium, or large hub airport does not meet the workforce retention reporting requirements under either the CARES Act or CRRSA, reimbursements for grants under the Airport Coronavirus Response Grant Program may be suspended. FAA will continue to work with the sponsor to meet these reporting requirements, but continued non-compliance may result in termination of the grant and recovery of reimbursements.

Council Meeting

4.

Meeting Date: 05/25/2021

Department: Airport

Pillars: Excellence in Transportation Systems

AGENDA CAPTION:

Consider Action on a **Resolution Approving a Sale and Assignment of Ground Leasehold Between Concourse Plaza II, LTD. and 16051 Addison, LLC for Commercial Office and Aeronautical use on Property Located at 16051 Addison Road Together with Consent to Leasehold Mortgage; and Authorizing the City Manager to Execute the Consent of Landlord as Required by the Ground Lease.**

BACKGROUND:

Concourse Plaza II, LTD. (Assignor) requests the Town of Addison give its consent to the proposed sale and assignment of 16051 Addison Road at Addison Airport from Concourse Plaza II, LTD. to 16051 Addison, LLC. (Assignee). The transaction is subject to the Town's consent to the creation of a leasehold mortgage for the purpose to finance the acquisition of the property by the Assignee.

The Ground Lease was first entered into in October of 1983 with Brunnell Properties, Inc. who subsequently sold and assigned their leasehold interest to Concourse Plaza, LTD. in December of 1983. Built in 1984, the building improvements consist of a 43,000 square foot, three-story multi-tenant office building with five executive hangars attached on the back side (west facing) of the building. In 2018 the Town executed a Second Amendment to Ground Lease, which among other things, extended the ground lease term 30-years in consideration of the Tenant completing \$1.5M in capital repairs and improvements. In 2019, a Third Amendment to Ground Lease was entered into extending the ground lease term an additional 6-years, or to September 30, 2060, in consideration of an additional \$500,000 in capital repairs and improvements completed by the Tenant.

16051 Addison, LLC is a single-purpose entity created for the purpose of taking title to the building improvements and to hold the leasehold interests at 16051 Addison Road. 16051 Addison, LLC is wholly owned and managed by Rampart Realty Holdings, LLC. Christopher Frain, of Littleton, Co., is the majority owner and manager for each of the two entities.

16051 Addison, LLC intends to sublease the office and hangar space as a

multi-tenant office building. This includes leasing 25,000 square feet to their parent company, Tyton Holdings, Inc., a private investment and equity firm which is relocating their corporate headquarters from Littleton, Colorado to Addison. Tyton will also base their two corporate aircraft on the premises.

RECOMMENDATION:

Administration recommends approval.

Attachments

Resolution - Concourse Plaza II Ground Lease

Recommendation Memo

Location Map

RESOLUTION NO. _____

A RESOLUTION APPROVING A SALE AND ASSIGNMENT OF GROUND LEASE BETWEEN CONCOURSE PLAZA II, LTD. AND 16051 ADDISON, LLC FOR COMMERCIAL OFFICE AND AERONAUTICAL USE ON PROPERTY LOCATED AT 16051 ADDISON ROAD TOGETHER WITH CONSENT TO LEASEHOLD MORTGAGE AND AUTHORIZING THE CITY MANAGER TO EXECUTE THE CONSENT OF LANDLORD AS REQUIRED BY THE GROUND LEASE AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, Concourse Plaza II, LTD. is the tenant under a Ground Lease dated October 11, 1983, for the property located at 16051 Addison Road owned by the Town of Addison (the "Ground Lease"); and

WHEREAS, Concourse Plaza II, LTD. desires to assign all of its rights, duties and obligations under the Ground Lease to 16051 Addison LLC.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE TOWN OF ADDISON, TEXAS:

SECTION 1. The recitals set forth above are true and correct and are incorporated as if fully set forth herein.

SECTION 2. The Assignment of Ground Lease between Concourse Plaza II, LTD. and 16051 Addison LLC for commercial office and aeronautical use on property located at 16051 Addison Road, a copy of which is attached to this Resolution as **Exhibit A** and Estoppel Letter with Landlord's Consent, a copy of which is attached as **Exhibit B** is hereby approved and the City Manager is authorized to execute the Consent of Landlord for each as required by the Ground Lease.

SECTION 3. This Resolution shall take effect from and after its date of adoption.

DULY RESOLVED AND ADOPTED by the City Council of the Town of Addison, Texas, this the **25th** day of **MAY 2021**.

TOWN OF ADDISON, TEXAS

Joe Chow, Mayor

ATTEST:

APPROVED AS TO FORM:

By: _____
Irma Parker, City Secretary

By: _____
City Attorney

EXHIBIT A

STATE OF TEXAS §
§
COUNTY OF DALLAS § ASSIGNMENT OF GROUND LEASE

This Assignment of Ground Lease (the "Assignment") is entered into and effective as of _____ 2021, at Addison, Texas, by and between Concourse Plaza II, LTD, a Texas limited partnership (herein referred to as "Assignor") and 16051 Addison, LLC, a Texas limited liability company (herein referred to as "Assignee").

WHEREAS, a Ground Lease (with Addendum To Ground Lease) was first made and entered into October 11, 1983 between the City of Addison, Texas (the same being the Town of Addison, Texas, and sometimes referred to herein as the "City") and Addison Airport of Texas, Inc. ("AATI") as Landlord, and Bunnell Properties, Inc., a Texas corporation, as Tenant, by the terms of which Landlord leased to Tenant a certain 1.661 acre tract of land at Addison Airport (which tract of land is referred to in the Ground Lease and herein as the "Demised Premises" or "demised premises") as recorded in the Official Public Records of Dallas County, Texas ("OPR") in Book 83252, Page 7439 (Instrument #198302521079) (the "Ground Lease" or "Lease", which said real property is commonly referred to as 16051 Addison Road at Addison Airport within the Town Addison, Texas, and owned by the City, and

WHEREAS, the Ground Lease provides that upon the expiration or termination of that certain agreement referred to and defined in the Ground Lease as the "Base Lease" (and being an Agreement for Operation of the Addison Airport between the City and AATI), the City is entitled to all the rights, benefits and remedies, and will perform the duties, covenants, and obligations, of the Landlord under the Ground lease; and

WHEREAS, the said Base Lease has expired and the City alone is the Landlord under the Ground Lease; and

WHEREAS, by that Assignment of Lease dated December 1, 1983 and recorded in the OPR in Book 83252, Page 7456 (Instrument #198302521080), the Ground Lease was assigned from Bunnell Properties, Inc., as assignor, to Concourse Plaza, LTD., a Texas limited partnership, as assignee; and

WHEREAS, the said Ground Lease was then modified by that Settlement and First Amendment to Lease Agreement dated April 22, 1997 as recorded in Book 97214, Page 2291 (instrument #199702140412) of the OPR with a corrected document recorded in Book 97247, Page 3370 (Instrument #19907024170809) of the Official Public Records of Dallas County, Texas on December 22, 1997, wherein, among other things, the Demised Premises was modified to include 78,506 square feet of land as described in Exhibit C to the Agreement (the same being as shown in the Boundary Survey prepared by Shimek, Jacobs & Finklea, LLP dated February 19, 1997

WHEREAS, by that Assignment of Lease entered and made effective December 31, 1997 as recorded as Book 98063, Page 3557 (Instrument #199800090587) in the OPR, the Ground Lease was assigned from Concourse Plaza, LTD, as assignor, to Concourse Plaza II, LTD, a Texas limited partnership, as assignee; and

WHEREAS, said Ground Lease was then modified by that Second Amendment to Ground Lease dated and made effective August 14, 2018, so evidenced by that Memorandum of Lease of same date recorded in the OPR as Instrument #201800245457; whereby, among other things, the Term was extended to expire on September 30, 2054; and

WHEREAS, said Ground Lease was then modified by that Third Amendment to Ground Lease dated and made effective September 8, 2020, so evidenced by that Memorandum of Lease of same date recorded in the OPR as Instrument #202000287922; whereby, among other things, the Term was extended to expire on September 30, 2060; and

WHEREAS, by virtue of such conveyances and assignments, Concourse Plaza II, LTD is the Tenant under the Ground Lease (and is hereinafter referred to as "Tenant"); and

WHEREAS, a true and correct copy of the Ground Lease as amended and modified as described hereinabove is attached hereto as **Exhibit "A"**.

NOW, THEREFORE, for and in consideration of the mutual promises, covenants, and conditions contained herein, the sufficiency of which is hereby acknowledged, the parties hereto, each intending to be legally bound, agree as follows:

AGREEMENT

1. Assignor hereby assigns, bargains, sells, and conveys to Assignee, effective as of the date above, all of Assignor's right, title, duties, responsibilities, and interest in and to the Ground Lease, TO HAVE AND TO HOLD the same, for the remaining term thereof, and Assignor does hereby bind itself and its successors and assigns to warrant and forever defend the same unto Assignee against every person or persons lawfully claiming a part thereof, by, through, or under Assignor, but not otherwise.

2. Prior to the effective date of this Assignment, Assignee agrees to pay an Assignment Fee in the amount of Five Hundred Dollars and no/100 (\$500.00) to Landlord.

3. Assignee hereby agrees to and shall be bound by and comply with all the terms, provisions, duties, conditions, and obligations of tenant under the Ground Lease. For purposes of notice under the Ground Lease, the address of Assignee is:

8361 N. Rampart Range Road, Suite B 208
Littleton, Colorado 80125

4. Nothing in this Assignment shall be construed or be deemed to modify, alter, amend, or change any term or condition of the Ground Lease, except as set forth herein.

5. The above and foregoing premises and recitals to this Assignment are incorporated and made part of this Assignment, and Assignor and Assignee both warrant and represent that such premises and statements, and all other provisions of this Assignment, are true and correct, and that in giving consent, Landlord (as defined in the Consent of Landlord attached hereto) is entitled to rely upon such representations and statements.

6. This Assignment is subject to the consent and filing requirements of the Town of Addison, Texas.

7. Assignor acknowledges that in addition to any other remedies provided in the Ground Lease or by law, Landlord may at its own option, collect directly from the Assignee all rents becoming due under such assignment and apply such rent against any sums due to Landlord.

8. The undersigned representatives of the Assignor and Assignee have the necessary authority to execute this Assignment on behalf of each of the respective parties hereto, and Assignor and Assignee certify one to the other that any necessary resolutions or other act extending such authority have been duly passed and are now in full force and effect.

IN WITNESS WHEREOF, Assignor and Assignee have executed and delivered this Assignment on the day and the year first set forth above.

Assignor: _____
CONCOURSE PLAZA II, LTD.
a Texas limited partnership

By: Harkinson Investment Corporation
a Texas corporation, General Partner

By: _____

Printed Name: William J. Harkinson

Title: President

Assignee: _____
16051 ADDISON, LLC
a Texas limited liability company

By: _____

Printed Name: Christopher Frain

Title: Manager

ACKNOWLEDGMENT

STATE OF TEXAS §
COUNTY OF DALLAS §

BEFORE ME, the undersigned authority, on this day personally appeared William J. Harkinson, the President of Harkinson Investment Corporation, a Texas corporation the general partner of Concourse Plaza II, Ltd., a Texas limited partnership known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that (he) executed the same for the purposes and consideration therein stated and as the act and deed of said corporation acting as general partner for said limited partnership.

GIVEN under my hand and seal of office this _____ day of _____, 2021.

[SEAL]

Notary Public, State of Texas

STATE OF TEXAS §
COUNTY OF DALLAS §

BEFORE ME, the undersigned authority, on this day personally appeared Christopher Fan, as Manager of 16051 Addison, LLC, a Texas limited liability company known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that (he, she) executed the same for the purposes and consideration therein stated and as the act and deed of said limited liability company.

GIVEN under my hand and seal of office this _____ day of _____, 20____.

[SEAL]

Notary Public, State of Texas

CONSENT OF LANDLORD

The Town of Addison, Texas ("Landlord") is the Landlord in the Ground Lease described in the Assignment of Ground Lease (the "Assignment") entered and effective as of _____ 20____, at Addison, Texas, by and between Concourse Plaza II, LTD, a Texas limited partnership, a Texas limited partnership ("Assignor") and 16051 Addison, LLC, a Texas limited liability company ("Assignee").

In executing this Consent of Landlord, Landlord is relying upon the warranty and representations made in the foregoing Assignment by both Assignor and Assignee, and in relying upon the same Landlord hereby consents to the foregoing Assignment from Assignor to Assignee. Landlord hereby releases Assignor of its obligations under the Ground Lease and hereinafter Assignee shall be solely responsible for the covenants, obligations, duties and responsibilities of Tenant under or in connection with the Ground Lease. In addition, notwithstanding any provisions of this Consent of Landlord or the above and foregoing Assignment to the contrary, this Consent shall not operate as a waiver of any prohibition against further assignment, transfer, conveyance, pledge, change of control, or subletting of the Ground Lease or the premises described therein without Landlord's prior written consent.

This Consent shall be and remain valid only if and provided that, by no later than 6:00 o'clock p.m. on July 31, 2021:

(i) the Assignment has been executed and notarized by both Assignor and Assignee,

(ii) all other matters in connection with the transfer, sale, and/or conveyance by Assignor to Assignee of the Assignor's interest in the Ground Lease have been fully consummated and completed and the transaction closed as reasonably determined by Landlord (such matters including, without limitation, the full execution and finalization of this Assignment and any other documentation so required by Landlord relating to this transaction) and delivered to Landlord c/o Mr. Bill Dyer, Addison Airport Real Estate Manager, at 16051 Addison Road, Suite 220, Addison, Texas 75001. Otherwise, and failing compliance with and satisfaction of each all of paragraphs (i) and (ii) above, this Consent shall be null and void *ab initio* as if it had never been given and executed.

Signed this _____ day _____, 2021.

LANDLORD:

TOWN OF ADDISON, TEXAS

By: _____
Wesley S. Pierson, City Manager

EXHIBIT "A"

STATE OF TEXAS §
 § **THIRD AMENDMENT TO GROUND LEASE**
 COUNTY OF DALLAS §

This Third Amendment to Ground Lease (hereinafter referred to as the "Third Amendment") is made effective as of October 1, 2020, (the "Effective Date") at Addison, Texas, by and between the Town of Addison, Texas, a home-rule municipality (hereinafter sometimes referred to as the "Landlord" or the "City"), and Concourse Plaza II, LTD., a Texas limited liability company ("Tenant") (Landlord and Tenant are sometimes referred to as the "parties" or "party").

WHEREAS, a Ground Lease (with Addendum To Ground Lease) was first made and entered into October 11, 1983 between the City of Addison, Texas (the same being the Town of Addison, Texas, and sometimes referred to herein as the "City") and Addison Airport of Texas, Inc. ("AATT") as Landlord, and Bunnell Properties, Inc., a Texas corporation, as Tenant, by the terms of which Landlord leased to Tenant a certain 1.661 acre tract of land at Addison Airport (which tract of land is referred to in the Ground Lease and herein as the "Demised Premises" or "demised premises") as recorded in the Official Public Records of Dallas County, Texas ("OPR") in Book 83252, Page 7439 (Instrument #198302521079) (the "Ground Lease" or "Lease", a true and correct copy as amended and modified as described herein is attached hereto as Exhibit "A"), which said real property is commonly referred to as 16051 Addison Road at Addison Airport within the Town Addison, Texas, and owned by the City, and

WHEREAS, the Ground Lease provides that upon the expiration or termination of that certain agreement referred to and defined in the Ground Lease as the "Base Lease" (and being an Agreement for Operation of the Addison Airport between the City and AATT), the City is entitled to all of the rights, benefits and remedies, and will perform the duties, covenants, and obligations, of the Landlord under the Ground lease; and

WHEREAS, the said Base Lease has expired and the City alone is the Landlord under the Ground Lease; and

WHEREAS, by that Assignment of Lease dated December 1, 1983 and recorded in the OPR in Book 83252, Page 7456 (Instrument #198302521080), the Ground Lease was assigned from Bunnell Properties, Inc., as assignor, to Concourse Plaza, LTD., a Texas limited partnership, as assignee; and

WHEREAS, the said Ground Lease was then modified by that Settlement and First Amendment to Lease Agreement dated April 22, 1997 as recorded in Book 97214, Page 2291 (instrument #199702140412) of the OPR with a corrected document recorded in Book 97247, Page 3370 (Instrument #19907024170809) of the Official Public Records of Dallas County, Texas on December 22, 1997, wherein, among other things, the Demised Premises was modified to include 78,506 square feet of land as described in Exhibit C to the Agreement (the same being as shown in the Boundary Survey prepared by Shimek, Jacobs & Finklea, LLP dated February 19, 1997, which a true and correct copy is attached hereto as Exhibit "B"); and

WHEREAS, by that Assignment of Lease entered into and made effective December 31, 1997 as recorded as Book 98063, Page 3557 (Instrument #199800090587) in the OPR, the Ground Lease was assigned from Concourse Plaza, LTD, as assignor, to Concourse Plaza II, LTD, a Texas limited partnership, as assignee; and

WHEREAS, said Ground Lease was then modified by that Second Amendment to Ground Lease dated and made effective August 14, 2018, so evidenced by that Memorandum of Lease of same date recorded in the OPR as Instrument #201800245457; whereby, among other things, the Term was extended to expire on September 30, 2054; and

WHEREAS, by virtue of such conveyances and assignments, Concourse Plaza II, LTD is the Tenant under the Ground Lease (and is hereinafter referred to as "Tenant"); and

WHEREAS, Tenant has achieved Construction Completion of the Second Amendment Building Improvements to Landlord's satisfaction pursuant to Section 6.B of the Second Amendment in excess of the stipulated Second Amendment Capital Improvement Costs of One Million Five Hundred and No/100 Dollars (\$1,500,000.00) evidenced by that certain signed and witnessed Application and Certification For Payment #9 dated March 2, 2020 ("Second Amendment Construction Costs Evidence") with the actual total contract sum paid in the amount of \$1,992,270.03; and

WHEREAS, in consideration of the actual construction costs incurred by Tenant exceeding the stipulated Second Amendment Capital Improvement Costs, and in connection therewith, Landlord and Tenant desire to amend the Ground Lease in the manner set forth below.

NOW, THEREFORE, for and in consideration of the above and foregoing premises, the sum of Ten and No/100 Dollars (\$10.00), and other good and valuable consideration, the sufficiency of which is hereby acknowledged, the Town of Addison, Texas and Concourse Plaza II, LTD., a Texas limited liability company, do hereby agree as follows:

Section 1. Incorporation of Premises. The above and foregoing recitals are true and correct and are incorporated herein and made a part hereof.

Section 2. Amendments and Modifications to Ground Lease. The Ground Lease, as described in the above and foregoing recitals, is hereby amended and modified as follows:

A. Amendment to Section 3, Term. Section 3, Term of the Ground Lease is hereby amended as follows:

3. Term: The initial term hereof, which commenced October 1, 1984 and is due to expire September 30, 2054 as modified by the Second Amendment, is hereby extended an additional seventy-two (72) full calendar months so that it shall now expire on September 30, 2060.

Section 3. No Other Amendments. Except to the extent modified or amended herein, all other terms and obligations of the Ground Lease shall remain unchanged and in full force and effect.

Third Amendment to Ground Lease 0950-5101 – Page 2 of 10

Section 4. Applicable Law; Venue. In the event of any action under this Third Amendment, exclusive venue for all causes of action shall be instituted and maintained in Dallas County, Texas. The parties agree that the laws of the State of Texas shall govern and apply to the interpretation, validity and enforcement of this Third Amendment; and, with respect to any conflict of law provisions, the parties agree that such conflict of law provisions shall not affect the application of the law of the State of Texas (without reference to its conflict of law provisions) to the governing, interpretation, validity and enforcement of this Third Amendment. All obligations of the parties created by this Third Amendment are performable in Dallas County, Texas.

Section 5. No Third-Party Beneficiaries. This Third Amendment and each of its provisions are solely for the benefit of the parties hereto and are not intended to and shall not create or grant any rights, contractual or otherwise, to any third person or entity.

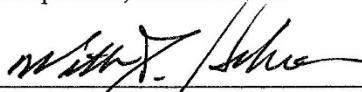
Section 6. Authority to Execute. The undersigned officers and/or agents of the parties hereto are the properly authorized officials and have the necessary authority to execute this Third Amendment on behalf of the parties hereto, and each party hereby certifies to the other that any necessary resolutions or other act extending such authority have been duly passed and are now in full force and effect.

8th IN WITNESS WHEREOF, the undersigned parties execute this Agreement this September day of September, 2020.

TENANT:

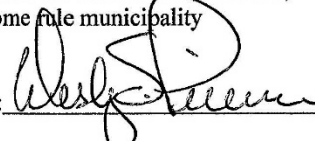
CONCOURSE PLAZA II, LTD.,
a Texas limited partnership

By: Harkinson Investment Corporation
a Texas corporation, General Partner

By: 
William J. Harkinson, President

LANDLORD:

TOWN OF ADDISON, TEXAS,
a home rule municipality

By: 
Wesley S. Pierson, City Manager

Resolution No. 20-R063

September 8, 2020

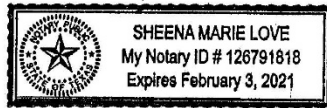
ACKNOWLEDGMENT

STATE OF TEXAS §
 §
COUNTY OF DALLAS §

BEFORE ME, the undersigned authority, on this day personally appeared William J. Harkinson, President of Harkinson Investment Corporation, General Partner of Concourse Plaza II, LTD, a Texas limited partnership, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein stated.

GIVEN under my hand and seal of office this 24th day of August, 2020.

[SEAL]



Sheena M. Love
Notary Public, State of Texas

STATE OF TEXAS §
 §
COUNTY OF DALLAS §

BEFORE ME, the undersigned authority, on this day personally appeared Wesley S. Pierson, city manager of the Town of Addison, a home-rule municipality, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein stated.

GIVEN under my hand and seal of office this 9th day of September, 2020.

[SEAL]

Irma G. Parker
Notary Public, State of Texas

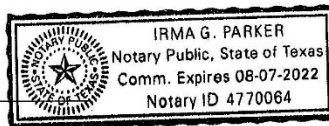


EXHIBIT "A"

COPY OF GROUND LEASE AS AMENDED AND MODIFIED

EXHIBIT "B"

PROPERTY SURVEY AND LEGAL DESCRIPTION
OF DEMISED PREMISES

*FIELD NOTE DESCRIPTION
CONCOURSE PLAZA LAND LEASE
ADDISON MUNICIPAL AIRPORT*

BEING a tract of land situated in the E. Cook Survey, Abstract No. 326, Dallas County, Texas and located on Addison Municipal Airport, Addison, Texas and being more particularly described as follows:

BEGINNING at a point for a corner, said point being the intersection of the west right-of-way line of Addison Road and the south right-of-way line of Keller Springs Road as evidenced by a 1/2-inch iron rod;

THENCE departing the west right-of-way line of said Addison Road, a distance of 2.29 feet to a 5/8-inch iron rod found in the south right-of-way of Keller Springs Road and continuing S 69°35'33" W along the south right-of-way of said Keller Springs Road, 108.70 feet for a total distance of 110.99 feet to a point for a corner as evidence by an 'X' in concrete;

THENCE S 64°05'33" W, along the south right-of-way of said Keller Springs Road, a distance of 78.03 feet to a point for a corner;

THENCE S 22°07'10" E, a distance of 64.73 feet to a point for a corner;

THENCE S 20°33'10" E, a distance of 43.25 feet to a point for a corner;

THENCE S 13°45'43" E, a distance of 204.27 feet to a point for a corner;

THENCE S 1°20'34" W, a distance of 130.52 feet to a point for a corner;

THENCE N 89°36'51" E, a distance of 145.35 feet to a point for a corner, said point being in the west right-of-way line of said Addison Road and in the east line of Addison Municipal Airport, as evidence by a 1/2-inch iron rod found;

THENCE N 0°22'50" W along the west right-of-way line of said Addison Road and the east line of Addison Municipal Airport, a distance of 298.44 feet to a point in a curve to the left as evidence by a 1/2-inch iron rod, said curve to the left having a central angle of 15°17'42", a radius of 788.51 feet and chord bearing, distance of N 14°58'43" W, 209.87;

THENCE along said curve to the left of said west right-of-way line and the east line of said Addison Municipal Airport, a distance of 210.49 feet to the POINT OF BEGINNING and containing 78,506 square feet of land.

OPEN
HANGER

EXHIBIT "C"

MEMORANDUM OF LEASE

This Memorandum of Lease is dated as of September 8, 2020, and executed by and between the Town of Addison, Texas ("Landlord" or "City") and Concourse Plaza II, LTD. ("Tenant").

WHEREAS, a Ground Lease (with Addendum To Ground Lease) was first made and entered into October 11, 1983 between the City of Addison, Texas (the same being the Town of Addison, Texas and sometimes referred to herein as the "City") and Addison Airport of Texas, Inc. ("AATI"), as Landlord, and Bunnell Properties, Inc., a Texas corporation, as tenant, by the terms of which Landlord leased to tenant a certain 1.661 acre tract of land at Addison Airport (which tract of land is referred to in the Ground Lease herein as the "Demised Premises" or "demised premises") as recorded in the Official Public Records of Dallas County, Texas in Book 83252, Page 7439 (Instrument #198302521079) of which certain real property now commonly referred to as 16051 Addison Road at Addison Airport within the Town of Addison, Texas and owned by the City (which the demised is more specifically described in Exhibit "A" attached hereto and incorporated herein by reference); and;

WHEREAS, the Ground Lease provides that, upon the expiration or termination of that certain agreement referred to and defined in the Ground Lease as the "Base Lease" (and being an Agreement for Operation of the Addison Airport between the City and AATI), the City is entitled to all of the rights, benefits and remedies, and will perform the duties, covenants, and obligations, of the Landlord under the Ground lease; and

WHEREAS, the said Base Lease has expired and the City alone is the Landlord under the Lease; and

WHEREAS, by that Assignment of Lease dated December 1 1983 and recorded in the Official Public Records of Dallas County, Texas in Book 83252, Page 7456 (Instrument #198302521080), the Ground Lease was assigned from Bunnell Properties, Inc., as assignor, to Concourse Plaza, LTD., a Texas limited partnership, as assignee; and

WHEREAS, the said Ground Lease was then modified by that Settlement and First Amendment to Lease Agreement dated April 22, 1997 as recorded in Book 97214, Page 2291 (instrument #199702120412) of the Official Public Records of Dallas County, Texas, with a corrected document recorded in Book 97247, Page 3370 (Instrument #19907024170809) of the Official Public Records of Dallas County, Texas on December 22, 1997, and

WHEREAS, by that Assignment of Lease entered into and made effective December 31, 1997 as recorded as Book 98063, Page 3557 (Instrument #199800090587) in the Official Public Records of Dallas County, Texas, the Ground Lease was assigned from Concourse Plaza, LTD, as assignor, to Concourse Plaza II, LTD, a Texas limited partnership, as assignee, and

First Amendment to Ground Lease 0960-8602 – Page 3 of 10

WHEREAS, said Ground Lease was then modified by that Second Amendment to Ground Lease dated and made effective August 14, 2018, so evidenced by that Memorandum of Lease of same date recorded in the OPR as Instrument #201800245457; whereby, among other things, the Term was extended to expire on September 30, 2054; and

NOW LET IT BE KNOWN, the said Ground Lease is further amended by that Third Amendment to Ground Lease, entered into on September 8, 2020 and made effective October 1, 2020, which, among other things, extends the Term so the Ground Lease shall expire on September 30, 2060 unless otherwise earlier terminated or extended.

This Memorandum of Lease is solely for recording and notice purposes and shall not be construed to alter, modify, expand, diminish or supplement the provisions of the Ground Lease, as amended. In the event of any inconsistency between the provisions of this Memorandum of Lease and the provisions of the Ground Lease (as amended), the provisions of the Ground Lease, as amended, shall govern. Reference should be made to the Ground Lease (and all amendments thereto) for the full description of the rights and duties of Landlord and Tenant thereunder, and this Memorandum of Lease shall in no way affect the terms and conditions of the Ground Lease (including all amendments thereto) or the interpretation of the rights and duties of Landlord and Tenant thereunder.

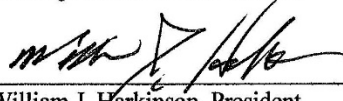
Upon the expiration or earlier termination of the Ground Lease, Landlord and Tenant agree that they shall execute and record a termination of this Memorandum of Lease.

IN WITNESS WHEREOF, the undersigned parties execute this Agreement this 8th day of September, 2020.

TENANT:

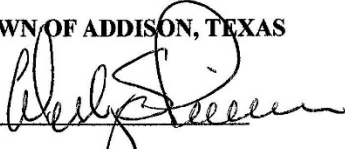
CONCOURSE PLAZA II, LTD.
a Texas limited partnership

By: Harkinson Investment Corporation
a Texas corporation, General Partner

By: 
William J. Harkinson, President

LANDLORD:

TOWN OF ADDISON, TEXAS

By: 
Wesley S. Pierson, City Manager

Resolution No. 20-R063

September 8, 2020

ACKNOWLEDGMENT

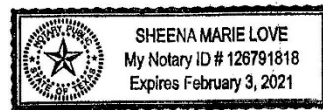
STATE OF TEXAS §
COUNTY OF DALLAS §

BEFORE ME, the undersigned authority, on this day personally appeared William J. Harkinson, President of Harkinson Investment Corporation, General Partner of Concourse Plaza II, LTD, a Texas limited partnership, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein stated.

GIVEN under my hand and seal of office this 24th day of August, 2020.

[SEAL]


Notary Public, State of Texas

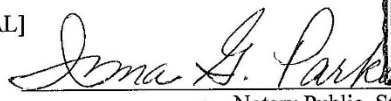


STATE OF TEXAS §
COUNTY OF DALLAS §

BEFORE ME, the undersigned authority, on this day personally appeared Wesley S. Pierson, city manager of the Town of Addison, a home-rule municipality, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein stated.

GIVEN under my hand and seal of office this 9th day of September, 2020.

[SEAL]


Notary Public, State of Texas

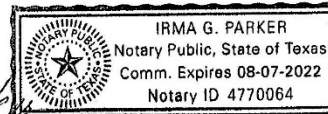


EXHIBIT A
to Memorandum of Lease

LEGAL DESCRIPTION OF DEMISED PREMISES

*FIELD NGTE DESCRIPTION
CONCOURSE PLAZA LAND LEASE
ADDISON MUNICIPAL AIRPORT*

BEING a tract of land situated in the E. Cook Survey, Abstract No. 326, Dallas County, Texas and located on Addison Municipal Airport, Addison, Texas and being more particularly described as follows:

BEGINNING at a point for a corner, said point being the intersection of the west right-of-way line of Addison Road and the south right-of-way line of Keller Springs Road as evidenced by a 1/2-inch iron rod;

THENCE departing the west right-of-way line of said Addison Road, a distance of 2.29 feet to a 5/8-inch iron rod found in the south right-of-way of Keller Springs Road and continuing S 69°35'33" W along the south right-of-way of said Keller Springs Road, 108.70 feet for a total distance of 110.99 feet to a point for a corner as evidence by an "X" in concrete;

THENCE S 64°05'33" W, along the south right-of-way of said Keller Springs Road, a distance of 78.03 feet to a point for a corner;

THENCE S 22°07'10" E, a distance of 64.73 feet to a point for a corner;

THENCE S 20°33'10" E, a distance of 43.25 feet to a point for a corner;

THENCE S 13°45'43" E, a distance of 204.27 feet to a point for a corner;

THENCE S 1°20'34" W, a distance of 130.52 feet to a point for a corner;

THENCE N 89°36'51" E, a distance of 145.35 feet to a point for a corner, said point being in the west right-of-way line of said Addison Road and in the east line of Addison Municipal Airport, as evidence by a 1/2-inch iron rod found;

THENCE N 0°22'50" W along the west right-of-way line of said Addison Road and the east line of Addison Municipal Airport, a distance of 298.44 feet to a point in a curve to the left as evidence by a 1/2-inch iron rod, said curve to the left having a central angle of 15°17'42", a radius of 788.51 feet and chord bearing, distance of N 14°58'43" W, 209.87;

THENCE along said curve to the left of said west right-of-way line and the east line of said Addison Municipal Airport, a distance of 210.49 feet to the POINT OF BEGINNING and containing 78,506 square feet of land.

OPEN
HANGER

1 11

STATE OF TEXAS

§

COUNTY OF DALLAS

§

SECOND AMENDMENT TO GROUND LEASE

This Second Amendment to Ground Lease (hereinafter referred to as the "Second Amendment") is entered into and made effective as of August 14, 2018, (the "Effective Date") at Addison, Texas, by and between the Town of Addison, Texas, a home-rule municipality (hereinafter sometimes referred to as the "Landlord" or the "City"), and Concourse Plaza II, LTD., a Texas limited liability company ("Tenant") (Landlord and Tenant are sometimes referred to as the "parties" or "party").

WHEREAS, a Ground Lease (with Addendum To Ground Lease) was first made and entered into October 11, 1983 between the City of Addison, Texas (the same being the Town of Addison, Texas, and sometimes referred to herein as the "City") and Addison Airport of Texas, Inc. ("AATI") as Landlord, and Bunnell Properties, Inc., a Texas corporation, as Tenant, by the terms of which Landlord leased to Tenant a certain 1.661 acre tract of land at Addison Airport (which tract of land is referred to in the Ground Lease and herein as the "Demised Premises" or "demised premises") as recorded in the Official Public Records of Dallas County, Texas in Book 83252, Page 7439 (Instrument #198302521079) (the "Ground Lease" or "Lease", a true and correct copy as amended and modified as described herein is attached hereto as Exhibit "A"), which said real property is commonly referred to as 16051 Addison Road at Addison Airport within the Town Addison, Texas, and owned by the City, and

WHEREAS, the Ground Lease provides that upon the expiration or termination of that certain agreement referred to and defined in the Ground Lease as the "Base Lease" (and being an Agreement for Operation of the Addison Airport between the City and AATI), the City is entitled to all of the rights, benefits and remedies, and will perform the duties, covenants, and obligations, of the Landlord under the Ground lease; and

WHEREAS, the said Base Lease has expired and the City alone is the Landlord under the Ground Lease; and

WHEREAS, by that Assignment of Lease dated December 1, 1983 and recorded in the Official Public Records of Dallas County, Texas in Book 83252, Page 7456 (Instrument #198302521080), the Ground Lease was assigned from Bunnell Properties, Inc., as assignor, to Concourse Plaza, LTD., a Texas limited partnership, as assignee; and

WHEREAS, the said Ground Lease was then modified by that Settlement and First Amendment to Lease Agreement dated April 22, 1997 as recorded in Book 97214, Page 2291 (instrument #199702140412) of the Official Public Records of Dallas County, Texas, with a corrected document recorded in Book 97247, Page 3370 (Instrument #19907024170809) of the Official Public Records of Dallas County, Texas on December 22, 1997, wherein, among other things, the Demised Premises was modified to include 78,506 square feet of land as described in Exhibit C to the Agreement (the same being as shown in the Boundary Survey prepared by Shimek, Jacobs & Finklea, LLP dated February 19, 1997, which a true and correct copy is attached hereto as Exhibit "B"); and

Second Amendment to Ground Lease 0950-5101 – Page 1 of 46

WHEREAS, by that Assignment of Lease entered into and made effective December 31, 1997 as recorded as Book 98063, Page 3557 (Instrument #199800090587) in the Official Public Records of Dallas County, Texas, the Ground Lease was assigned from Concourse Plaza, LTD, as assignor, to Concourse Plaza II, LTD, a Texas limited partnership, as assignee; and

WHEREAS, by virtue of such conveyances and assignments, Concourse Plaza II, LTD is the Tenant under the Ground Lease (and is hereinafter referred to as "Tenant"); and

WHEREAS, Tenant has proposed to construct certain additional improvements on the Demised Premises as described herein, and in connection therewith and as consideration therefore, Landlord and Tenant desire to amend the Ground Lease in the manner set forth below, contingent upon the final completion of such additional improvements and the approval thereof by Landlord.

NOW, THEREFORE, for and in consideration of the above and foregoing premises, the sum of Ten and No/100 Dollars (\$10.00), and other good and valuable consideration, the sufficiency of which is hereby acknowledged, the Town of Addison, Texas and Concourse Plaza II, LTD., a Texas limited liability company, do hereby agree as follows:

Section 1. Incorporation of Premises. The above and foregoing recitals are true and correct and are incorporated herein and made a part hereof.

Section 2. Amendments and Modifications to Ground Lease. The Ground Lease, as described in the above and foregoing recitals, is hereby amended and modified as follows:

A. Amendment to Section 3, Term. Section 3, Term of the Ground Lease is hereby amended as follows:

3. Term: The initial term hereof, which commenced October 1, 1984 and is due to expire four hundred eighty (480) months thereafter, is hereby extended an additional three hundred and sixty (360) full calendar months so that it shall now expire on September 30, 2054.

B. Amendment to Section 4, Rental: Section 4, Rental of the Ground Lease is hereby amended in its entirety as follows:

4. Rental: Subject to adjustment as herein provided, Tenant agrees to pay to Landlord, without offset or deduction, rent for the Demised Premises an amount equal to the product of the gross square feet of the Demised Premises as determined by the Property Survey times \$.65 per gross square foot (e.g. $\$0.65 \times 78,506$ gross square feet = \$51,028.90), which amount shall be paid by Tenant in twelve (12) equal monthly installments, in advance, on or before the first day of each calendar month (the "Base Rent", which shall be adjusted as set forth in Section 5 hereinbelow). The first monthly payment or installment of Base Rent, in the amount of Four Thousand Two Hundred Fifty-two Dollars and 41/100 (\$4,252.41) is due and payable on or before the first day of the month following the Effective Date of this Second Amendment. Thereafter, another payment or installment of the Base Rent,

subject to adjustment as set forth below, shall be due and payable on the first day of each calendar month during the Term hereof.

C. Amendment to Section 5, Adjustment of Rental: Section 5, Adjustment of Rental of the Ground Lease is amended in its entirety to read as follows:

5. Adjustment of Rental: Commencing on the second anniversary of the Effective date of the Second Amendment, and every biennial anniversary thereafter (hereinafter referred to as the "Adjustment Date"), the Annual Rent due under Section 4, as amended herein, shall be adjusted as follows:

(1.) Annual Rent shall be adjusted to reflect changes in the Consumers' Price Index - All Items for Dallas, Texas Metropolitan Area (hereinafter referred to as the "Consumer Price Index"), as quoted in the publication *Consumer Price Index for All Urban Consumers (CPI-U)* for the Dallas-Fort Worth, Texas area which is issued by the U.S. Department of Labor, Bureau of Labor Statistics. The basic index ("Basic Index") is the Consumer Price Index existing on the Effective Date of the Second Amendment. The current index ("Current Index") is the Consumer Price Index published and in effect as of the first day of the calendar month preceding the then applicable Adjustment Date.

(2.) Beginning with the first full month following the then applicable Adjustment Date, the Annual Rent shall be adjusted so that it equals the product of the Annual Rent amount during the first year of the Second Amendment (such amount being \$51,028.90) multiplied by a fraction, the numerator of which is the Current Index and the denominator of which is the Basic Index, but in no event shall such Annual Rent ever be decreased below the Annual Rent set forth in Section 4, as amended (such Annual Rent being \$51,028.90). Without offset or deduction, Annual Rent shall be paid in advance in monthly installments on or before the first day of each calendar month, determined by dividing the Annual Rental amount by twelve (12), with the first such installment due on or before the first day of the first calendar month following the Adjustment Date.

(3.) In the event that the Consumer Price Index is unavailable for whatever reason for the computations set forth hereinabove, another index approximating the Consumer Price Index as closely as feasible (as reasonably determined by Landlord) shall be substituted therefor.

D. Amendment to Section 6, Use of the Demised Premises and Construction of Improvements: Section 6, Use of Demised Premises and Construction of Improvements of the Ground Lease is hereby amended in its entirety to read as follows:

6. Use of Demised Premises and Construction of Improvements:

A. Use of the Demised Premises:

(1.) The Demised Premises shall be used and occupied by Tenant only for the following purposes: sale of aircraft and aircraft parts; aircraft maintenance and repair, aircraft storage; aircraft training, aircraft charter and aircraft rentals; and

(2.) The permitted use of the Demised Premises as set forth in the Addendum To Ground Lease dated October 11, 1983; and

(3.) That portion of the Demised Premises designed and constructed for the purpose of aircraft storage may be used only for the purpose of storing aircraft and the temporary storage of the aircraft owner/operator's motor vehicle (ie, car, truck, motorcycle) while the aircraft owner/operator is using the aircraft in accordance with the FAA Policy on the Non-Aeronautical Use of Airport Hangars as may be amended from time to time. Such equipment and parts reasonably necessary for the operation of the owner/operators aircraft may also be stored in the aircraft hangar provided the storage of such equipment and parts do not hinder or impede the movement of the aircraft in and out of the hangar or impede access to the aircraft or other aeronautical contents kept in the hangar. Stored aircraft must be airworthy and in good working order at all times except for periods necessary for routine maintenance, repairs, upgrades and/or similar such work required to keep the aircraft in good working order. For the purposes herein, an aircraft is regarded airworthy and in good working order if the aircraft has a valid FAA registration, it is insurable and, at a minimum, appears to be well kept and in good, working condition. The aircraft hangars on the Demised Premises may not be used for any other purposes without the prior written consent of Landlord; and

(4.) The Demised Premises shall not be used for any purpose or activity that (i) constitutes a violation of any federal, state, or local laws, ordinances, orders, directives, charters, rules, regulations, standards or policies); (ii) in Landlord's opinion, creates or would create a nuisance or waste, or unreasonably disturb, annoy or interfere with other tenants or users of the Airport; or (iii) increases insurance costs for Landlord; and

(5.) Tenant shall not at any time leave the Demised Premises vacant, but shall in good faith continuously throughout the term of this Lease conduct and carry on in the entire Demised Premises the type of operations or use for which the Demised Premises are leased, except during periods in which the Demised Premises may not be occupied as a result of fire or other casualty, or during any commercially reasonable period necessary for releasing or making repairs and alterations, all such repairs and alterations to be diligently pursued to completion; and

(6.) Tenant acknowledges that Landlord is bound by the terms and conditions of any and all Federal Aviation Administration, Texas Department of Transportation, and other grant agreements, grant assurances and regulations regarding the Airport, and the terms of any grant, loan, regulation, or agreement under Section 22.055 of the Texas Transportation Code, as amended or superseded, whether now existing or made in the future. Tenant agrees not to knowingly take any action and refrain from taking any action in relation to the Demised Premises that would cause Landlord to be in violation of such regulations or standards; and

(7.) The Tenant for itself, its personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree, to the extent the Demised Premises are used for commercial purposes that (i) no person shall be excluded from participation in, denied the benefits of or be otherwise subjected to

discrimination in the use of said facilities on the basis of race, creed, color, national origin, sex, age or handicap; (ii) in the construction of any improvements on, over or under the Demised Premises and the furnishing of services thereon, no person shall be excluded from participation in, denied the benefits of or be otherwise subjected to discrimination in the use of said facilities on the basis of race, creed, color, national origin, sex, age or handicap; and (iii) the Tenant shall use the Demised Premises in compliance with all other requirements imposed by or pursuant to Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Non-discrimination in Federally-assisted programs of the Department of Transportation-Effectuation of Title VI of the Civil Rights Act of 1964 and as said Regulations may be amended; and

(8.) Tenant agrees to the extent the Demised Premises is used for commercial purposes, Tenant agrees to furnish all services on a fair, equal, and non-unjustly discriminatory basis to all users thereof and to charge fair, reasonable, and not unjustly discriminatory prices for such services, provided that the Tenant may be allowed to make reasonable and non-discriminatory discounts, rebates or other similar types of price reductions to volume purchasers.

B. Construction of Improvements:

(1.) In connection with the use and occupancy of the Demised Premises by Tenant, Tenant shall cause to be constructed on the Demised Premises buildings and other improvements (together, the "Building Improvements"), at Tenant's sole cost, expense and risk (except as may be otherwise agreed to by Landlord and Tenant), in accordance with plans and specifications which shall be submitted to and subject to the approval of Landlord. The term "Building Improvements" shall mean those real property and structural improvements that have been made and exist on the Demised Premises as of the Effective Date of this Second Amendment ("Existing Building Improvements") and any other buildings or improvements made to, or installed, located or placed upon, the Demised Premises any time during the Term as may be extended or modified. Except as provided for in this Agreement, and except for Tenant finish out improvements constructed in the normal course of office space leasing, Tenant may not construct, locate, install, place or erect any other improvements upon the Demised Premises without the prior written consent of Landlord.

(2.) Except with regard to Existing Building Improvements, the Building Improvements (including any modifications or changes to the Existing Building Improvements) shall be constructed on the Demised Premises in accordance with plans and specifications prepared by an architect and/or engineer selected and retained by Tenant (the "Design Plan"), which shall be submitted to Landlord for Landlord's consideration of approval (which approval, if any, shall be in writing. Any architect or engineer shall be duly licensed to practice architecture or engineering, respectively, in the State of Texas. Such construction shall be performed in a first-class, workmanlike manner and in compliance with all applicable building codes, standards and ordinances, as set out in more detail below. Tenant agrees to promptly pay and discharge all costs, expenses, claims for damages (including incidental, special, and consequential damages) or injury (including, without limitation, claims for personal injury or death, or property damage or destruction, or economic loss), liens and any and all other liabilities and obligations which arise in

connection with such construction or violation of this Lease with respect thereto, and **TENANT SHALL DEFEND, INDEMNIFY, AND HOLD HARMLESS LANDLORD AND MANAGER IN ACCORDANCE WITH SECTION 21., SUBSECTION B. ("TENANT'S INDEMNITY OBLIGATION") OF THIS LEASE.** It is expressly understood and agreed that Tenant's construction of the Building Improvements shall include the finish-out of such building and improvements in accordance with the plans and specifications for the finish-out of the Building Improvements as submitted by Tenant to Landlord and approved in writing by Landlord.

After commencement of construction, Tenant shall complete construction of any Building Improvements with reasonable diligence, without material deviation from the Design Plan, and any deviation from the Design Plan shall be subject to the review and reasonable approval of Landlord.

(3.) Landlord's approval of the Design Plan or any other plans and specifications does not impose on Landlord any responsibility whatsoever, including, without limitation, any responsibility for the conformance of the plans and specifications with any governmental regulations, building codes, and the like, for which Tenant and its contractors shall have full and complete responsibility.

(4.) Tenant agrees that any construction or modification of the Building Improvements or any other improvements (authorized to be constructed in writing by Landlord) on the Demised Premises shall comply with all standards, codes, and rules adopted by Landlord or Manager, including, but not limited to, any rules relating to construction and maintenance standards and specifications, shall further comply with the Town of Addison, Texas building and related codes and zoning requirements, and will meet or exceed all applicable state and federal standards (including, without limitation, Title III of the Americans With Disabilities Act of 1990, ("ADA Act") any state laws governing handicapped access or architectural barriers, and all rules, regulations, and guidelines promulgated under such laws, as amended from time to time). Tenant recognizes that such construction/maintenance standards and specifications, Town of Addison building and related codes and zoning requirements, and all applicable state and federal standards (including, without limitation, Title III of the Americans With Disabilities Act of 1990, any state laws governing handicapped access or architectural barriers, and all rules, regulations, and guidelines promulgated under such laws, as amended from time to time) may be modified or amended from time to time and that compliance will be measured by such standards in effect at the time of a particular construction or modification of improvements after the initial construction of the Building Improvements pursuant to the approved Design Plan.

(5.) With respect to Title III of the Americans With Disabilities Act of 1990, Tenant acknowledges and agrees it shall remain fully responsible and obligated over the Term to construct, alter and maintain the Building Improvements in accordance with the prevailing ADA Act. Furthermore, Tenant shall ensure no person or groups of persons shall, on the grounds of race, color, sex, religion, national origin, age, disability, retaliation or genetic information, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under the ADA Act. Tenant shall give Landlord written notice within ten (10) days of Tenant having knowledge or written

notice of any ADA Act violation or claim of violation from any governmental entity with authority on such matters or from any third party.

(6.) Tenant will properly and timely submit to the Federal Aviation Administration (FAA), the Texas Department of Transportation (FAA Form 7460-1 or its equivalent), TxDOT Airport Construction Emission Inventory, when and as required, and such other forms and information as may be required by the FAA, TxDOT, or any other governmental entity or agency having jurisdiction over Addison Airport.

(7.) Tenant further agrees that Landlord shall be authorized at all times during any project of construction to enter upon the Demised Premises, and all parts thereof, in order to observe the performance of such construction and Tenant agrees to provide Landlord a construction schedule setting out the time of commencement, final completion and completion of significant elements of the construction, which schedule shall be delivered to Landlord prior to the start of any construction project on the Demised Premises.

(8.) “Substantial Completion of the Building Improvements” or “Substantial Completion” shall be (unless provided for elsewhere in this Second Amendment to Ground Lease) deemed to have occurred upon the issuance by the Town of Addison, Texas, of a certificate of temporary or final occupancy for any portion of the Building Improvements, if required. “Final Completion” of the construction of the Building Improvements shall be deemed to occur upon the issuance by Tenant’s architect who designed the Building Improvements of such documentation as may be necessary to establish the final completion (closeout) of the construction of the Building Improvements and the delivery by Tenant to Landlord comprehensive As-Built drawings and documentation reviewed by Tenant’s architect reflecting all approved changes and modifications to the originally approved Design Plan.

(9.) Notwithstanding the foregoing, within the first thirty-six (36) full calendar months following the Effective Date of the Second Amendment to Ground Lease (the “Second Amendment Improvement Period”), Tenant shall construct or cause to be constructed and completed at Tenant’s sole cost and expense those certain capital repairs and improvements to the Demised Premises itemized and set forth in Exhibit “C” attached hereto and incorporated herein for all purposes (the “Second Amendment Capital Improvements”) in accordance with this Section 6; and

(a.) Tenant agrees that it will contribute no less than One Million Five Hundred and No/100 Dollars (\$1,500,000.00) towards the “hard construction cost” of the construction of the Second Amendment Capital Improvements (“Second Amendment Capital Improvement Costs”). For the purposes herein the term “hard construction costs” is meant to include only those costs directly related to the physical construction of a building actually incurred and do not typically include, but not limited to, architecture and engineering fees, inspection and accounting fees, developer fees, permitting costs and legal services. Tenant shall provide, upon request of Landlord, reasonable evidence of the actual cost and expenses contributed by Tenant towards the Second Amendment Capital Improvements upon their completion (e.g. paid invoices, construction payment applications approved by a licensed architect or engineer, etc.) (“Second Amendment Construction Costs Evidence”); and

(b.) For the purpose of this Section 6.B.(9), the Second Amendment Capital Improvements shall be deemed to be completed upon: (i) the issuance by the Town of Addison a Certificate of Occupancy (if issuance is required) with evidence of same delivered to Landlord; and (ii) Tenant's delivery of its Second Amendment Construction Costs Evidence to Landlord; and (iii) Landlord's physical inspection and acceptance of same by Landlord's designated agent or representative. Landlord's inspection and/or acceptance shall not be unreasonably delayed upon Tenant's written notice of completion of construction and request for Landlord's inspection ("Construction Completion").

(10.) Failure of Tenant to observe and comply with the requirements of this Section, subject to notice and cure as provided in Section 22, shall be an Event of Default under the Ground Lease.

E. Amendment to Section 7, Acceptance of Demised Premises: Section 7, Acceptance of Demised Premises of the Ground Lease is amended in its entirety to read as follows:

7. Acceptance of Demised Premises. TENANT ACKNOWLEDGES THAT TENANT HAS FULLY INSPECTED THE DEMISED PREMISES AND ACCEPTS THE DEMISED PREMISES AND THAT THE DEMISED PREMISES ARE LEASED TO TENANT "AS IS, WHERE IS, AND WITH ALL FAULTS AND PATENT AND LATENT DEFECTS", AND LANDLORD HAS NOT MADE, DOES NOT MAKE, AND SPECIFICALLY DISCLAIMS, ANY REPRESENTATION, PROMISE, COVENANT, AGREEMENT, GUARANTY OR WARRANTY OF ANY KIND OR CHARACTER, EXPRESS OR IMPLIED, OR ARISING BY OPERATION OF LAW, AS TO THE QUANTITY, QUALITY, CONDITION, SUITABILITY, HABITABILITY, OR FITNESS OF THE PROPERTY INCLUDING WITHOUT LIMITATION THE DEMISED PREMISES AND THE IMPROVEMENTS THEREON, FOR ANY PURPOSE WHATSOEVER, INCLUDING, WITHOUT LIMITATION, ANY REPRESENTATION REGARDING SOIL CONDITIONS, AVAILABILITY OF UTILITIES [SUBJECT TO SECTION 16], DRAINAGE, ZONING LAWS, ENVIRONMENTAL LAWS, OR ANY OTHER FEDERAL, STATE OR LOCAL STATUTES, CODES, REGULATIONS OR ORDINANCES. TENANT ALSO ACKNOWLEDGES AND AGREES THAT TENANT'S INSPECTION AND INVESTIGATION OF THE DEMISED PREMISES HAVE BEEN (OR WILL BE) ADEQUATE TO ENABLE TENANT TO MAKE TENANT'S OWN DETERMINATION WITH RESPECT TO THE SUITABILITY OR FITNESS OF THE PROPERTY, INCLUDING, WITHOUT LIMITATION, WITH RESPECT TO SOIL CONDITIONS, AVAILABILITY OF UTILITIES [SUBJECT TO SECTION 16], DRAINAGE, ZONING LAWS, ENVIRONMENTAL LAWS, AND ANY OTHER FEDERAL, STATE OR LOCAL STATUTES, CODES, REGULATIONS OR ORDINANCES. TENANT ACKNOWLEDGES THAT THE DISCLAIMERS, AGREEMENTS AND OTHER

STATEMENTS SET FORTH IN THIS PARAGRAPH ARE AN INTEGRAL PORTION OF THIS LEASE AND THAT LANDLORD WOULD NOT AGREE TO LEASE THE DEMISED PREMISES TO TENANT AS SET FORTH HEREIN WITHOUT THE DISCLAIMERS, AGREEMENTS AND OTHER STATEMENTS SET FORTH IN THIS PARAGRAPH. TENANT FURTHER ACKNOWLEDGES THAT TENANT IS NOT IN A DISPARATE BARGAINING POSITION WITH RESPECT TO LANDLORD. TENANT ACKNOWLEDGES AND AGREES FURTHER THAT THIS LEASE IS SUBJECT TO ANY AND ALL CURRENTLY EXISTING TITLE EXCEPTIONS OR OTHER MATTERS OF RECORD OR ANY MATTER OR ITEM VISIBLE OR APPARENT FROM AN INSPECTION AFFECTING THE DEMISED PREMISES. TENANT WAIVES ANY EXPRESS OR IMPLIED WARRANTIES OF SUITABILITY, HABITABILITY, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND FURTHER WAIVES ALL CLAIMS BASED ON ANY DEFECT IN THE DEMISED PREMISES WHETHER OR NOT SUCH DEFECT COULD HAVE BEEN DISCOVERED BY TENANT'S REASONABLE INSPECTION. TENANT, AT ITS COST, SHALL BE ENTITLED TO PERFORM A PHASE I ENVIRONMENTAL STUDY, PROVIDING A COPY THEREOF TO LANDLORD, ALL AS MAY BE SPECIFIED IN MORE DETAIL IN SECTION 21.1. BELOW. WITHOUT LIMITING THE FOREGOING, THERE IS NO WARRANTY, EXPRESS OR IMPLIED, OF SUITABILITY, MERCHANTABILITY, HABITABILITY, OR FITNESS FOR ANY PARTICULAR PURPOSE GIVEN IN CONNECTION WITH THIS LEASE.

F. Amendment to Section 8, Securing Governmental Approvals and Compliance with Law: Section 8, Securing Governmental Approvals and Compliance with Law of the Ground Lease is amended in its entirety to read as follows:

8. Securing Governmental Approvals and Compliance with Law.

A. Tenant, at Tenant's sole cost and expense, shall obtain any and all governmental licenses, permits and approvals necessary for the construction of improvements and for the use and occupancy of the Demised Premises. This Ground Lease is subject to, and Tenant shall comply at all times with all laws, ordinances, rules, regulations, directives, permits, or standards of any governmental authority, entity, or agency (including, without limitation, the Town of Addison, Texas, the State of Texas, the Federal Aviation Administration, the Texas Department of Transportation, the United States Environmental Protection Agency, and the Texas Commission on Environmental Quality) applicable or related to, whether directly or indirectly the use and occupancy of the Demised Premises and whether in existence or hereafter enacted, adopted or imposed. Tenant shall promptly comply with all governmental orders and directives for the correction, prevention and abatement of nuisances in or upon, or connected with, the Demised Premises, all at Tenant's sole cost and expense, and shall comply with and be subject to (and this Ground Lease is made and entered into subject to) any and all

grant agreements or grant assurances now existing or as hereafter agreed to, adopted or imposed.

Tenant agrees that any new construction or modification of existing improvements on the Demised Premises will comply with all standards and rules published by the Landlord or by the Airport Manager (as of the Effective Date hereof, the Airport Manager is as set forth in the Recitals above; however, the Airport Manager may be changed or modified by the City, and for purposes of this Ground Lease the Airport Manager shall also mean any person or entity authorized by the City to manage and/or operate the Airport), including but not limited to the Airport's published "Construction/Maintenance Standards and Specifications," the Town of Addison building and related codes and zoning requirements or any other laws, ordinances, permits, rules, regulations, or policies of the Town of Addison, Texas, and will meet or exceed all applicable state and federal standards, permits, laws, rules, or regulations. Tenant recognizes the referenced Construction/Maintenance Standards and Specifications, Town of Addison building and related codes and zoning requirements and other laws, ordinances, permits, rules, regulations or policies, and all applicable state and federal standards, laws, rules, or regulations may be modified or amended from time to time and that compliance will be measured by such standards in effect at the time of a particular construction or modification of improvements after the initial construction of the Building Improvements pursuant to the Design Plan.

B. Tenant shall comply with all noise abatement standards at the Airport at all times, shall notify any employee, guest or invitee of Tenant, including any aircraft operator, using any portion of the Demised Premises, of such standards and shall ensure compliance with such standards by such third party.

G. **Amendment to Section 9, Assignment, Subletting and Mortgaging of Leasehold Estate.** Section 9, Assignment, Subletting and Mortgaging of Leasehold Estate is hereby amended in its entirety to read as follows:

9. Assignment, Subletting and Mortgaging of Leasehold Estate:

A. Without the prior written consent of Landlord, Tenant shall have no power to and shall not, either voluntarily or involuntarily, by operation of law or otherwise, (i) assign, sell, pledge, encumber, mortgage, license, transfer, or otherwise convey (each being referred to herein as "assign" or "assignment" and any person or entity to whom an assignment is made being an "assignee") this Lease, or any interest, rights, duties, liabilities, or obligations of Tenant hereunder, or any part of the Demised Premises, (except to a leasehold mortgagee as hereinbelow provided and in accordance with and subject to all of the terms and conditions of this Lease) or (ii) sublet the whole or any part of the Demised Premises, and any such assignment and any subletting shall be null and void and may be deemed by Landlord (in Landlord's sole discretion) a default under Section 22 of this Lease.

B. Notwithstanding the foregoing, Landlord hereby acknowledges and consents to Tenant's subletting of the Leased Premises for the purposes permitted under this Lease, provided that each sublease is evidenced by written agreement (to be made available for Landlord's review

and inspection upon Landlord's written request within 3 business days), signed and executed by Tenant and sublessee and fairly states:

- (i) each sublessee agrees to be bound by the terms and provisions of this Ground Lease, including, without limitation, the provisions of Section 6 pertaining to the use of the Demised Premises, and in the event of any conflict between the terms of the Ground Lease and the terms of the sublease, the terms of the Ground Lease shall control;
- (ii) no such subletting shall constitute a novation.
- (iii) in the event of occurrence of an event of default while the Demised Premises are assigned or sublet, Landlord, in addition to any other rights or remedies provided herein or by law, in equity, or otherwise, may at Landlord's option, collect directly from such assignee or subtenant all rents becoming due under such subletting and apply such rent against any sums due to Landlord hereunder;
- (iv) sublessee shall be obligated to obtain Landlord's consent to any action as to which Tenant is obligated to obtain such consent under the Ground Lease;
- (v) any such sublease is to automatically terminate upon termination of the Ground Lease notwithstanding any other provision of the sublease to the contrary;
- (vi) Landlord shall have no responsibility or obligation for the performance by Tenant of its obligations under the sublease;
- (vii) neither this consent, the exercise by Landlord of its rights hereunder, nor the sublease or any other instrument shall give sublessee any rights directly or indirectly against Landlord or create or impose any obligation, duty, responsibility, or liability of Landlord in favor of or for the benefit of sublessee.

Furthermore, Tenant agrees that in no way does any sublease release Tenant from any of its covenants, agreements, liabilities and duties under the Ground lease; that this consent does not constitute approval by Landlord of the terms of any such sublease; that nothing herein contained shall be deemed a waiver or release of any of the Landlord's rights under the Ground Lease; that Tenant shall remain fully liable for the performance of each and every term, provision, covenant, duty and obligation of the Tenant under the Ground Lease, including, without limitation, the duty to make any and all payments of rent; that any violation of any terms and conditions of the Ground Lease by a sublessee will constitute a default under the Ground Lease.

Subleases in effect on the Effective Date of this Second Amendment shall not be required to be amended to specifically comply with the terms of this Section 9.A.B.

C. If consent by Landlord to an assignment is required hereunder, Tenant shall request, in writing, Landlord's consent to a proposed assignment and such request must include: (i) the name of the proposed assignee; (ii) the nature and character of the assignee's business; (iii) all material terms of the proposed assignment; and (iv) audited financial statements or other evidence of the proposed assignee's creditworthiness and ability to assume Tenant's obligations.

For the purposes hereof and any applicable law, and without limitation as to other grounds for Landlord withholding consent, Landlord may, in Landlord's sole discretion, withhold its consent when any one or more of the following apply:

- (i) the proposed assignee is of a character or of a reputation or is engaged in a business, which is not consistent with the master or strategic plan of Addison Airport as determined by Landlord;
- (ii) the proposed assignee has not demonstrated sufficient financial responsibility or creditworthiness to the satisfaction of Landlord in light of the duties, obligations, and responsibilities of the Tenant under this Lease at the time when the consent is requested;
- (iii) the proposed assignee's intended use of the Leased Premises is inconsistent with the Lease;
- (iv) the proposed assignment would cause Landlord to be in violation of another lease or agreement to which Landlord is a party or to which Landlord or the Addison Airport is subject (including, without limitation, any grant agreements or grant assurances of the Federal Aviation Administration or any other governmental entity or agency);
- (v) if at any time consent is requested or at any time prior to the granting of consent, Tenant is in default under the Lease or would be in default under the Lease but for the pendency of a grace or cure period; or
- (vi) the proposed assignee does not intend to occupy the entire Demised Premises as described in the Lease and conduct its business there from for a substantial portion of the then remaining term of the Lease.

An assignment will be deemed to occur if the person or persons who own or have control of more than 50% of Tenant on the Effective Date of this Second Amendment to Ground Lease cease to own or have control of more than 50% of Tenant at any time during the Term; provided that any such person shall have the unencumbered right to make from time to time gifts, sales or other transfers, upon death and/or *inter vivos*, of part or all of his or its ownership interest in the Tenant to a Permitted Transferee. A "Permitted Transferee" for purposes of this Lease, shall mean: (i) a person who is a parent or descendant of the transferor; (ii) a trust, the primary beneficiaries of which are relatives of the transferor as described in (i) above; (iii) an entity, the voting or financial control of which is owned by the transferor and/or his relatives as described in (i) above; and (iv) a trust, the primary beneficiary of which is such transferor; and such transfer shall not be considered an event deemed to be an "assignment" hereunder. Tenant shall provide to Landlord from time to time, as requested by Landlord and in a form acceptable to Landlord, a written certification as to the ownership and/or control of Tenant. For purposes hereof, "control" means the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of an entity, whether through ownership of voting securities or partnership interests, by contract, or otherwise.

Any assignment or subletting shall be expressly subject to all the terms and provisions of this Lease, including, without limitation, the provisions of Section 6 pertaining to the use of the Demised Premises. Tenant shall not assign this Lease or any right, duty, liability, or obligation

of Tenant hereunder, or sublet the Demised Premises or any portion of the Demised Premises, without first obtaining a written agreement from each such assignee or sublessee whereby each such assignee or sublessee agrees to and shall be bound by and comply with all of the terms and provisions of this Lease (and Tenant shall provide a copy of such written agreement to Landlord). No assignment or subletting shall constitute a novation. In the event of the occurrence of an event of default while the Demised Premises are assigned or sublet, Landlord, in addition to any other remedies provided herein or by law, in equity, or otherwise, may at Landlord's option, collect directly from such assignee or subtenant all rents becoming due under such assignment or subletting and apply such rent against any sums due to Landlord hereunder. No direct collection by Landlord from any such assignee, transferee, pledgee, or person or entity to whom this Lease is otherwise conveyed or to such subtenant shall release Tenant from the payment or performance of Tenant's obligations hereunder.

Upon written request, Tenant shall promptly provide to Landlord the names and addresses of any subtenants and the make, model, aircraft type and "N" number of any aircraft stored, located or generally regarded to be "based" on or in the Demised Premises.

D. Tenant shall have the right to mortgage the leasehold estate of Tenant created hereby in order to secure a mortgage loan for the purpose of (i) obtaining funds for the construction of the improvements described in Section 6, or (ii) for other construction upon the Demised Premises approved from time to time by Landlord in writing, or (iii) for other purposes which may be approved from time to time by Landlord in writing. In the event that Tenant, pursuant to mortgages or deeds of trust, mortgages the leasehold estate of Tenant created hereby, the leasehold mortgagee shall in no event become personally liable to perform the obligations of Tenant under this Lease unless and until said mortgagee becomes the owner of the leasehold estate pursuant to foreclosure, transfer in lieu of foreclosure, or otherwise, and thereafter said leasehold mortgagee shall remain liable for such obligations only so long as such mortgagee remains the owner of the leasehold estate. Notwithstanding the foregoing, it is specifically understood and agreed that no such mortgaging by Tenant and/or any actions taken pursuant to the terms of such mortgage shall ever relieve Tenant of Tenant's obligation to pay the rental due hereunder and otherwise fully perform the terms and conditions of this Lease.

E. Landlord further agrees to execute and deliver to any proposed leasehold mortgagee of Tenant an "Estoppel Agreement" wherein Landlord agrees that Landlord will (i) recognize such mortgagee and its successors and assigns after foreclosure, or transfer in lieu of foreclosure, as Tenant hereunder, and (ii) continue to perform all of Landlord's obligations hereunder so long as such mortgagee or its successors and assigns performs all of the obligations of Tenant hereunder; provided, however, that notwithstanding the foregoing or any other provision of this Lease, such mortgagee or its successors and assigns after foreclosure or transfer in lieu of foreclosure shall not and does not have the right and shall not and does not have the power to assign, sell, transfer, pledge, encumber, mortgage, license, or otherwise convey this Lease, or any right, interest, obligation, or liability hereunder, or any part of the Demised Premises, or sublet the whole or any part of the Demised Premises without the prior written approval of the Landlord except to the extent the Tenant has such privilege existing under the Lease, and any such assignment, sale, transfer, pledge, encumbrance, mortgage, license, or other conveyance and any such subletting without the prior written consent of Landlord shall be null and void and may be

deemed a default under Section 22.B. of this Lease, it being the intent of this provision that such mortgagee shall have no greater right than Tenant to assign, sell, transfer, pledge, encumber, mortgage, license, or otherwise convey this Lease (or any right, interest, obligation, or liability hereunder), or to sublet the Demised Premises (or any portion thereof), or to use the Demised Premises. Landlord also agrees to consider the execution and delivery to such proposed leasehold mortgagee any other documents (including but not limited to the creation and stewardship of an escrow reserve account held by the leasehold mortgagee for the benefit of Landlord in a form approved by the Landlord) which such proposed leasehold mortgagee may reasonably request concerning the mortgaging by Tenant of the leasehold estate created hereby; provided, however, that Landlord shall never be required to subordinate Landlord's interest in the Demised Premises to the mortgagee of such proposed leasehold mortgage.

H. Amendment to Section 10, Property Taxes and Assessments: Section 10, Property Taxes and Assessments of the Ground Lease is amended in its entirety to read as follows:

10. Property Taxes and Assessments. Tenant shall pay, before they become delinquent, any and all property taxes or assessments, and any other governmental charges, fees or expenses (collectively, the "Taxes"), levied or assessed on any improvements on the Demised Premises, the personal property and fixtures on the Demised Premises and, if applicable, upon the leasehold estate of Tenant created hereby. Upon the request of Landlord, Tenant shall from time to time furnish to Landlord "paid receipts" or other written evidence that all such taxes have been paid by Tenant. In the event Tenant fails to pay any such taxes, assessments, or charges prior to delinquency, Landlord shall have the right to pay (but not the obligation) or may cause all taxes, assessments, or charges to be paid and the reasonable costs thereof expended by Landlord plus interest thereon as provided in Section 37 of this Lease shall be paid by Tenant on demand.

If any buildings or other improvements located upon the Demised Premises are determined to be subject to property taxation by the Dallas Central Appraisal District (or any successor entity or agency thereto or other agency with the authority to make such determination) ("DCAD"), Subject to the payment of any outstanding taxes, Tenant may, in accordance with law, protest, appeal or institute other formal proceedings to effect a reduction of real estate taxes and assessments with respect to real estate taxes and assessments levied against the improvements on the Demised Premises and/or the Tenant's leasehold interest in the Ground Lease for any tax fiscal year that ends after the Commencement Date of the Ground Lease. Such protest, appeal or other proceedings may be conducted only in the name of Tenant. To this end and at Tenant's expense, Tenant shall give Landlord written notice of any such protest or appeal and resolution thereof. Notwithstanding the foregoing, Tenant shall not contest the determination that the buildings and/or improvements are subject to taxation. If a final (non-appealable) determination is rendered by DCAD or a court of appropriate and competent jurisdiction that any such buildings or other improvements are not subject to property taxation, the rent (as the same may be adjusted) for the year in which such final determination becomes effective shall be increased by an amount equal to the property tax revenue from such buildings and improvements that Tenant would have paid to the Town of Addison, Texas in that year but for such final determination (and such initial increased amount shall be paid to Landlord on or before December 31 of such year, unless otherwise agreed to by Landlord); thereafter, the

rent (as the same may be adjusted) as so increased shall continue, subject to adjustment as set forth in this Lease.

I. Amendment to Section 11, Maintenance and Repair of Demised Premises:

Section 11, Maintenance and Repair of Demised Premises of the Ground Lease is amended in its entirety to read as follows:

11. Maintenance and Repair of Demised Premises:

A. Tenant shall, throughout the Term hereof, maintain in good repair and in a first class condition (in accordance with any construction and/or maintenance standards and specifications established by the City or Airport Manager from time to time and all applicable ordinances, codes, rules and regulations of or adopted by the Town of Addison, Texas) all the Demised Premises and all buildings, improvements, fixtures, equipment and personal property (excluding aircraft stored in the Building Improvements) on the Demised Premises and keep them free from waste or nuisance and at the expiration or termination of this Ground Lease deliver up the Demised Premises clean and free of trash and in good repair and condition (in accordance with any construction and/or maintenance standards and specifications established by the City or Airport Manager from time to time and all applicable ordinances, codes, rules and regulations of or adopted by the Town of Addison, Texas), with all fixtures and equipment situated in the Demised Premises in good working order with reasonable wear and tear excepted. Tenant shall reimburse Landlord for and indemnify Landlord against all damages which Landlord incurs from Tenant's delay in vacating the Demised Premises.

B. Notwithstanding the foregoing, set forth as "Lease Addendum #1" attached hereto and incorporated herein by reference are "Tenant's Leasehold Minimum Maintenance and Repair Standards and Practices," which are intended as maintenance and repair standards and practices Landlord expects of Tenant. Tenant (and any of its successors or assigns) hereby agrees to meet or exceed the Tenant's Leasehold Minimum Maintenance and Repair Standards and Practices throughout the Term. Notwithstanding the foregoing, as provided in Section 18 below, Landlord reserves the right, in its sole discretion, to introduce and adopt other regulations deemed appropriate and necessary by Landlord for the purpose, among other things, protection of the property of Landlord. In the event Landlord should formally adopt similar leasehold maintenance and repair standards governing such practices of all ground leaseholds at Addison Airport ("Replacement Maintenance Standards"), such encompassing regulations and practices shall supersede and replace Lease Addendum #1 in its entirety upon the effective date of such Replacement Maintenance Standards for the duration of the Term.

J. Amendment to Section 13, Insurance: Section 13, Insurance of the Ground Lease is amended in its entirety to read as follows:

13. Insurance.

A. At all times in connection with this Ground Lease and during the Term hereof, Tenant shall purchase and maintain at Tenant's sole cost and expense, from a company or

companies lawfully authorized to do business in the State of Texas, such insurance coverages relating to the Demised Premises as follows:

(i) Insurance against loss or damage to improvements by fire, lightning, and all other risks from time to time included under standard extended coverage policies, and sprinkler, vandalism and malicious mischief, all in amounts sufficient to prevent Landlord or Tenant from becoming co-insurers of any loss under the applicable policies but in any event in amounts not less than one hundred percent (100%) of the full insurable value of the Demised Premises and any and all improvements thereon. The term "full insurable value" as used herein means actual replacement value at the time of such loss. Upon request, such replacement value shall be determined by a qualified appraiser, a copy of whose findings shall be submitted to Landlord, and, thereafter, proper adjustment in the limits of insurance coverage shall be effected.

(ii) Commercial General Liability insurance at minimum combined single limits of \$1,000,000 per occurrence and \$1,000,000 general aggregate for bodily injury, death or property damage or destruction occurring on, in or about the Demised Premises, which coverage shall include products/completed operations (\$1,000,000 products/completed operations aggregate). Coverage for products/completed operations must be maintained for at least two (2) years after construction work has been completed. Coverage must include contractual liability.

(iii) Statutory limits of Workers Compensation insurance including Employer's Liability coverage at limits of not less than \$1,000,000.00 each accident; \$1,000,000.00 by disease; \$1,000,000.00 by disease each employee.

(iv) If applicable, boiler and pressure vessel insurance on all steam boilers and air compressors, parts thereof and appurtenances attached or connected thereto, which by reason of their use or existence are capable of bursting, erupting, collapsing, imploding or exploding, in the minimum amount of \$500,000.00 for damage to or destruction of property resulting from such perils.

(v) In connection with the design and construction of any improvements on the Demised Premises, architects, engineers, and constructions managers, including design/build contractors used by Tenant, shall carry professional liability insurance at minimum limits of \$250,000.00. This coverage must be maintained for at least two (2) years after the improvements are completed and if coverage is written on a claims-made basis, a policy retroactive-date equivalent to the inception date of this Ground Lease (or earlier) must be maintained.

(vi) Hangarkeepers Legal Liability insurance at limits of \$1,000,000.00 per-occurrence is required if Tenant is engaged in maintenance, repair, or servicing of aircraft belonging to a third party or if Tenant is otherwise involved in any operation in which Tenant has care, custody, or control of an aircraft that belongs to a third party.

(vii) Aircraft Liability insurance against third-party bodily injury or death and property damage or destruction at minimum limits required by regulatory agencies having

jurisdiction at the Airport and that are acceptable to Landlord, but in any event not less than \$1,000,000.00 each occurrence (applies to the ownership, operation or use of aircraft by Tenant or any subtenant). Policy shall include non-owned aircraft liability with a minimum of \$1,000,000 per occurrence and medical expense coverage with a limit of \$5,000 for any one person.

(viii) Business Automobile Liability insurance for all Tenant-owned and non-owned vehicles being operated on the Airport with a minimum combined single limit of \$1,000,000 for bodily injury and property damage.

(ix) If Tenant is fueling aircraft at the Airport pursuant to a fueling permit or license issued by the City, Tenant shall maintain a minimum of \$1,000,000 in Pollution Liability insurance coverage.

(x) Such other insurance in such amounts and against such other insurable hazards, which at the time are commonly obtained within the aeronautical industry for similar types of building improvements and other improvements that may be located on the Demised Premises and Tenant's permitted use of the Demised Premises.

B. Tenant shall cause all such policies of insurance to comply with the following and be specifically endorsed as follows:

(i) The Town of Addison, Texas, and the Airport Manager and their respective past and present officials, officers, employees and agents shall be named as additional insureds, or loss payees as the case may be, except with respect to the professional liability policies and workers compensation insurance;

(ii) All insurance policies which name the Town of Addison, Texas, and the Airport Manager (and their respective past and present officials, officers, employees and agents) as additional insureds must be endorsed to read as primary coverage and non-contributory regardless of the application of other insurance;

(iii) A waiver of subrogation in favor of the Town of Addison, Texas, and the Airport Manager (and their respective past and present officials, officers, employees and agents) shall be contained in each policy required herein;

(iv) All insurance policies shall be endorsed to the effect that the Town of Addison, Texas, and the Airport Manager will receive at least sixty (60) days' written notice prior to cancellation or non-renewal of the insurance. If such insurance is canceled for non-payment of premium, such notice shall be ten (10) days.);

(v) All insurance policies shall be endorsed to require the insurer to immediately notify the Town of Addison, Texas, and the Airport Manager of any material change in the insurance coverages;

(vi) All liability policies shall contain no cross liability exclusions or insured versus insured restrictions applicable to the claims of the Town of Addison or the Airport Manager;

(vii) Tenant may maintain reasonable and customary deductibles, subject to approval by Landlord; and

(viii) Insurance must be purchased from insurers that are financially acceptable to Landlord and licensed to do business in the State of Texas.

C. All insurance certificates must be written on forms filed with and approved by the Texas Department of Insurance. Certificates of insurance, satisfactory to Landlord, evidencing all coverage above shall be prepared and executed by the insurance company or its authorized agent, promptly delivered to Landlord and updated as may be appropriate, and shall:

(i) List each insurance coverage described and required herein. Such certificates will also include a copy of the endorsements necessary to meet the requirements and instructions contained herein; and

(ii) Specifically set forth the notice-of-cancellation or termination provisions to the Town of Addison and the Airport Manager.

D. In connection with any construction on the Demised Premises:

(i) During any period of construction, a Builder's Risk Completed Value policy with an all-risks endorsement in an amount equal to the greater of the full-completed value or the amount of the construction contract including any amendments or change orders thereto. The policy shall provide "All-Risk" Builder's Risk Insurance (extended to include the perils of wind, collapse, vandalism/malicious mischief, and theft, including theft of materials whether or not attached to any structure). The deductible shall not exceed \$10,000.00, except in the event of a hail and/or windstorm, the deductible shall not exceed one percent (1%) of the insured amount, so long as the one percent (1%) in the event of a hail and/or windstorm is a condition of Tenant's policy.

(ii) Tenant shall obtain and keep in full force and effect at its sole cost and expense a Performance Bond and a Payment Bond guaranteeing, respectively, the faithful performance of all construction work and the payment of all obligations arising during the construction (including, without limitation, the payment of all persons performing labor or providing materials under or in connection with the Building Improvements), in the penal sum of one-hundred percent (100%) of the construction costs. Tenant shall pay or cause to be paid the premiums for such bonds. Bonds shall be issued by a surety company satisfactory to Landlord, licensed by the State of Texas to act as a Surety, and listed on the current U.S. Treasury Listing of Approved Sureties. All forms shall be made on a form complying with the requirements of the laws of the State of Texas and satisfactory to Landlord.

Such bonds shall be in conformance with the provisions of Chapter 2253, Tex. Gov. Code and any successor statute thereto. Tenant and Landlord shall be named as joint obligees of all such bonds. Alternatively, and at Tenant's election, Tenant shall cause to be issued in favor of Landlord, and kept in full force and effect at all times during any period of construction, an irrevocable, stand-by letter of credit to secure the faithful performance of all construction work and the payment of all obligations arising during the construction (including, without limitation, the payment of all persons performing labor or providing materials under or in connection with the Building Improvements), in the amount of one hundred percent (100%) of the construction costs. Such stand-by letter of credit to be drawn upon by site draft conditioned only upon the certification of the Landlord that an event of default has occurred under this Ground Lease with respect to the construction of the Building Improvements. Upon written approval by Landlord with no less than ten (10) days' written notice to Landlord from Tenant, Tenant shall have the right to reduce the amount of the stand-by letter of credit on a no more frequently than calendar monthly basis by an amount equal to the construction costs incurred and paid by Tenant during the immediately preceding month or greater period of time as demonstrated by the Construction Value Evidence submitted to Landlord.

(iii) After the final completion of the Building Improvements contemplated by this Lease, in the event Tenant subsequently commences additional construction or improvements to the Demised Premises in an amount equal to or greater than Five Hundred Thousand Dollars (\$500,000.00), then Tenant shall provide Landlord a Payment Bond and Performance Bond or Letter of Credit in the same manner as articulated in this Section 13.D(ii) prior to the commencement of the additional construction or improvements.

(iv) Notwithstanding the foregoing, if Tenant's construction improvements are to be funded from a leasehold mortgage's loan proceeds and the leasehold mortgagee is holding, at the time, a valid real property lien pursuant to the terms of this Ground Lease (as amended and modified), Tenant may request Landlord for its consideration and consent to allow the leasehold mortgagee to establish and to hold and administer a special, federally insured escrow account ("Construction Escrow Account") for the purpose of funding such construction improvements in lieu of a Performance Bond and a Payment Bond payment or bank issued stand-by letter of credit to ensure Tenant's faithful performance of all construction work and the payment of all obligations arising during the construction (including, without limitation, the payment of all persons performing labor or providing materials under or in connection with the Building Improvements), with an originating balance of no less than one hundred percent (100%) of the construction costs ("Escrowed Funds") based upon an opinion of probable construction costs provided by the Tenant and approved by the Landlord prior to the commencement of construction. This special Construction Escrow Account may be established for the Landlord's and leasehold mortgagee's benefit under this Section 13.D by way of the execution and acknowledgement by the parties of a separate written agreement ("Construction Escrow Account Agreement"). Without waiving any rights and remedies available

to the Landlord under the Ground Lease, by law, or otherwise, this Construction Escrow Account Agreement shall provide for, among other things:

1. The Escrowed Funds are to be held in trust at all times by the leasehold mortgagee in a separate, special federally insured escrow account on behalf of Landlord; and

2. A portion of the Escrowed Funds may be disbursed by the leasehold mortgagee to Tenant (or as Tenant may direct) as may be requested in writing by Tenant from time to time as construction progresses ("Tenant's Construction Draw"), provided, however, that Tenant's written requests are (i) first submitted to Landlord and to the Bank, (ii) are accompanied by the information set forth below, and (iii) are approved by both Landlord and the leasehold mortgagee in writing. The information that must be submitted together with each Tenant's Construction Draw is:

(a) a certificate of a supervising licensed architect or engineer acceptable to Landlord, describing in reasonable detail the work and material in question and the cost thereof, stating that the same were in accordance with the approved scope of construction and constitute a complete part thereof, and that no part of Tenant's Construction Draw has theretofore been reimbursed, and specifying the additional amount, if any, necessary to complete said construction; and

(b) documentation in a form satisfactory to Landlord that there exist no mechanics', materialmen's or similar liens for labor or materials except such, if any, as are discharged by the payment of Tenant's Construction Draw requested; and

(c) any other information supporting the expense of repairs and restoration work for which Tenant has requested disbursement, including any report from a building or other inspector retained by or on behalf of the leasehold mortgagee to observe or inspect the work, the leasehold mortgagee will provide a true and correct copy of such information to Landlord in connection with Tenant's Construction Draw.

3. Within five (5) business days from the date of receipt and review by Landlord of the information described above, if the same is acceptable to Landlord, the Landlord will give the leasehold mortgagee its written notice of acceptance and consent to the leasehold mortgagee's release of a sum not to exceed the Tenant's Construction Draw request to Tenant or as may be directed by Tenant.

(a) Upon Landlord's satisfaction of the completion of all construction made to the Demised Premises subject to the Construction Escrow Account Agreement, including without limitation receipt by Landlord of evidence satisfactory to Landlord that the cost of construction has been paid in full (including but not limited to affidavits of bills paid) and that there are no mechanic's, materialmen's or similar liens for labor or materials furnished in connection therewith, the remaining escrowed loan proceeds, if any, shall be released Tenant or as Tenant may direct.

(b) In consideration of Landlord's cooperation herewith, the leasehold mortgagee shall not disburse or otherwise discharge any portion of the Escrowed Funds without obtaining the Landlord's prior written consent. Further, the leasehold mortgagee shall provide written notice to Landlord of any and all requests for a distribution or discharge of the Escrowed Funds within three (3) days of the receipt of a request for the same by Tenant and will provide to the Landlord, within ten (10) days of written request, information regarding the escrow account as the Landlord may request from time to time.

E. Landlord reserves the right to review the insurance requirements contained herein and to reasonably adjust coverages and limits when deemed necessary and prudent by Landlord.

K. Amendment to Section 14 Casualty Damage or Destruction: Section 14.C, Casualty Damage or Destruction of the Ground Lease is hereby amended in its entirety as follows:

C. All insurance proceeds, if any, payable on account of such damage to or destruction of the buildings, structures and equipment on the demised premises shall be held by Landlord. Landlord shall be protected in acting upon any certificate believed by Landlord to be genuine and to have been executed by the property party and shall receive such certificate as conclusive evidence of any fact or as to any matter therein set forth. Such certificate shall be full warranty, authority and protection to Landlord in acting thereon, and Landlord shall be under no duty to take any action other than as set forth in this paragraph 14.

Notwithstanding the foregoing, if a leasehold mortgagee is holding a valid real property lien on Tenant's ground leasehold interests at the time of the casualty damage or destruction event pursuant to the terms of this Ground Lease (as amended and modified), Tenant may request Landlord for its consideration and consent to either allow the leasehold mortgagee to establish, hold and administer a special, federally insured escrow account ("Insurance Escrow Account") for the purpose of receiving, holding and dispersing all Net Insurance Proceeds (as defined below) payable on account, if any, as a direct or indirect consequence of such casualty damage and/or destruction event in lieu of Landlord holding and dispersing any such insurance proceeds ("Escrowed Funds") as provided for above or allow the leasehold mortgagee to administer the Net Insurance Proceeds. This special Insurance Escrow Account may be established for the Landlord's and leasehold mortgagee's benefit under this Section 14.C by way of the execution and acknowledgement by the parties of a separate written agreement ("Insurance Escrow Account Agreement"). Without waiving any rights and remedies available to the Landlord under the Ground Lease, by law, or otherwise, this Insurance Escrow Account Agreement shall provide, among other things:

(i) The insurance proceeds payable on account of damage to the improvements on the Demised Premises as a result of a casualty damage or destruction event less the costs, fees and expenses (including, without limitation, adjuster's and attorney's

fees and expenses) incurred by Landlord and Tenant to collect them ("Net Insurance Proceeds"); and

(ii) The Escrowed Funds are the Net Insurance Proceeds to be held in trust at all times by the leasehold mortgagee in a separate, special federally insured escrow account on behalf of Landlord or held in an escrow account maintained by the leasehold mortgagee; and

(iii) A portion of the Escrowed Funds may be disbursed by the leasehold mortgagee to Tenant (or as Tenant may direct) as may be requested in writing by Tenant from time to time as the casualty or destruction repair and restoration progresses ("Tenant's Construction Draw"), provided, however, that Tenant's written requests are first submitted to Landlord and to the Bank, are accompanied by the information set forth below, and are approved in writing by both Landlord and the leasehold mortgagee. The information that must be submitted together with each Tenant's Construction Draw is:

1. a certificate of a supervising licensed architect or engineer acceptable to Landlord, describing in reasonable detail the work and material in question and the cost thereof, stating that the same were in accordance with the approved scope of the casualty repairs and restoration constitute a complete part thereof, and that no part of Tenant's Construction Draw has theretofore been reimbursed, and specifying the additional amount, if any, necessary to complete said construction; and
2. documentation in a form satisfactory to Landlord that there exist no mechanics', materialmen's or similar liens for labor or materials except such, if any, as are discharged by the payment of Tenant's Construction Draw requested; and
3. any other information supporting the expense of repairs and restoration work for which Tenant has requested disbursement, including any report from a building or other inspector retained by or on behalf of the leasehold mortgagee to observe or inspect the work, the leasehold mortgagee will provide a true and correct copy of such information to Landlord in connection with Tenant's Construction Draw.

(iv) Within five (5) business days from the date of receipt and review by Landlord of the information described above, if the same is acceptable to Landlord, the Landlord will give the leasehold mortgagee its written notice of acceptance and consent to the leasehold mortgagee's release of a sum not to exceed the Tenant's Construction Draw request to Tenant or as may be directed by Tenant.

1. Upon Landlord's satisfaction of all casualty repairs and restoration made to the Demised Premises subject to the Insurance Escrow Account Agreement, including without limitation receipt by Landlord of evidence satisfactory to Landlord that the cost of all repairs and restoration has been paid in full and that there are no mechanic's, materialmen's or similar liens for labor or materials furnished in connection therewith, the remaining escrowed loan proceeds, if any, shall be released Tenant or as Tenant may direct.

2. In consideration of Landlord's cooperation herewith, the leasehold mortgagee agrees not to disburse or otherwise discharge any portion of the Escrowed Funds without obtaining the Landlord's prior written consent. Further, the leasehold mortgagee will promptly provide to the Town information regarding the escrow account as the Town may request.

L. Amendment to Section 18, Rules and Regulations: Section 18, Rules and Regulations of the Ground Lease is amended in its entirety to read as follows:

18. Rules and Regulations. Landlord has adopted *Addison Airport Minimum Standards and Requirements for Commercial Aeronautical Service Providers* (also commonly referred to as the "Minimum Standards" or "Airport Minimum Standards") and *Addison Airport Rules and Regulations* (also commonly referred to as the "Rules and Regulations" or "Airport Rules and Regulations"), which shall govern Tenant in the use of the Demised Premises and all Common Facilities (as defined in the Ground Lease), copies of which have been furnished to Tenant. The Minimum Standards and Rules and Regulations are incorporated by reference as if written verbatim herein, and Tenant agrees to comply fully at all times with these governing documents. Landlord, at its sole discretion, shall have the right to amend, modify and alter these Minimum Standards and Rules and Regulations from time to time in a reasonable manner or may introduce other regulations as it deems necessary for the purpose of assuring the safety, welfare, convenience and protection of property of Landlord, Tenant and all other tenants and customers of the Airport.

M. Amendment to Section 21 Indemnity and Exculpation and Release: Section 21, Indemnity and Exculpation and Release of the Ground Lease is amended in its entirety to read as follows:

21. Indemnity and Exculpation and Release:

A. Exculpation. The Town of Addison, Texas and all other Addison Persons and the Manager Persons (for purposes of this subparagraph A, as the terms "Addison Persons" and "Manager Persons" are defined in subparagraph B below), shall not be liable to Tenant or to any Tenant Persons (for purposes of this subparagraph A, as the term "Tenant Persons" is defined in subparagraph B below), or to any other person whomsoever, for any death or injury to persons or damage to or destruction of property or any other harm on or about the Premises or any adjacent area owned by Landlord caused by or resulting from any act or omission of Tenant or any Tenant Persons or any other person entering the Premises under express or implied invitation of Tenant or any Tenant Persons, or arising out of the use or occupation of the Premises by Tenant or by any Tenant Persons, in the performance of Tenant's obligations hereunder.

B. Tenant's Indemnity Obligation. TENANT AGREES TO AND SHALL FULLY DEFEND (WITH COUNSEL REASONABLY ACCEPTABLE TO LANDLORD), INDEMNIFY AND HOLD HARMLESS (I) THE TOWN OF ADDISON, TEXAS, AND THE ELECTED OFFICIALS, THE OFFICERS, EMPLOYEES, AGENTS, REPRESENTATIVES, AND VOLUNTEERS OF THE TOWN OF ADDISON, TEXAS, INDIVIDUALLY OR COLLECTIVELY, IN BOTH THEIR OFFICIAL AND

PRIVATE CAPACITIES (THE TOWN OF ADDISON, TEXAS, AND THE ELECTED OFFICIALS, THE OFFICERS, EMPLOYEES, REPRESENTATIVES, AND VOLUNTEERS OF THE TOWN OF ADDISON, TEXAS EACH BEING AN "ADDISON PERSON" AND COLLECTIVELY THE "ADDISON PERSONS") AND (II) AIRPORT MANAGER AND AIRPORT MANAGER'S OWNERS, OFFICERS, EMPLOYEES AND AGENTS (AIRPORT MANAGER AND AIRPORT MANAGER'S OWNERS, OFFICERS, EMPLOYEES AND AGENTS EACH BEING A "MANAGER PERSON" AND COLLECTIVELY THE "MANAGER PERSONS"), FROM AND AGAINST ANY AND ALL CLAIMS, ACTIONS, PROCEEDINGS, CAUSES OF ACTION, DEMANDS, LOSSES, LIENS, HARM, DAMAGES, PENALTIES, FINES, LIABILITIES, EXPENSES, LAWSUITS, JUDGMENTS, COSTS, AND FEES (INCLUDING REASONABLE ATTORNEY FEES AND COURT COSTS) OF ANY KIND AND NATURE WHATSOEVER MADE UPON, INCURRED BY, SUFFERED BY, OR ASSERTED AGAINST ANY ADDISON PERSON OR ANY MANAGER PERSON OR THE PREMISES, WHETHER DIRECTLY OR INDIRECTLY, (COLLECTIVELY FOR PURPOSES OF THIS SUBPARAGRAPH B, "DAMAGES"), THAT RESULT FROM, RELATE TO, OR ARISE OUT OF, IN WHOLE OR IN PART, (I) ANY CONDITION OF THE PREMISES CAUSED IN WHOLE OR IN PART BY TENANT OR BY ANY OF TENANT'S OWNERS, DIRECTORS, SHAREHOLDERS, PARTNERS, MANAGERS, OFFICERS, EMPLOYEES, AGENTS, REPRESENTATIVES, ENGINEERS, CONSULTANTS, CONTRACTORS, SUBCONTRACTORS, TENANTS, LICENSEES, INVITEES, PATRONS, CONCESSIONAIRES, OR ANY OTHER PERSON OR ENTITY FOR WHOM TENANT IS LEGALLY RESPONSIBLE, AND THEIR RESPECTIVE OWNERS, DIRECTORS, SHAREHOLDERS, PARTNERS, OFFICERS, MANAGERS, EMPLOYEES, AGENTS, REPRESENTATIVES, ENGINEERS, CONSULTANTS, CONTRACTORS, SUBCONTRACTORS, TENANTS, LICENSEES, INVITEES, PATRONS, AND CONCESSIONAIRES, OR ANY OTHER PERSON ACTING BY OR UNDER THE AUTHORITY OR WITH THE PERMISSION OF TENANT, TENANT'S TENANTS, OR ANY OTHER PERSON ENTERING THE PREMISES UNDER EXPRESS OR IMPLIED INVITATION OF TENANT DURING THE LEASE TERM (COLLECTIVELY, "TENANT PERSONS"), (II) ANY CONSTRUCTION ON OR REPAIR TO THE PREMISES, OR THE PREMISES BECOMING OUT OF REPAIR DUE TO THE FAULT OF TENANT OR ANY TENANT PERSONS, FOR ANY REASON INCLUDING BY FAILURE OF EQUIPMENT, PIPES, OR WIRING, OR BROKEN GLASS, OR BY THE BACKING UP OF DRAINS, OR BY GAS, WATER, STEAM, ELECTRICITY OR OIL LEAKING, ESCAPING OR FLOWING INTO THE PREMISES, REGARDLESS OF THE SOURCE, OR BY DAMPNESS OR BY FIRE, EXPLOSION, FALLING PLASTER OR CEILING, (III) REPRESENTATIONS OR WARRANTIES BY TENANT UNDER THIS LEASE, AND/OR (IV) ANY ACT OR OMISSION OF TENANT OR ANY TENANT PERSONS UNDER, IN CONNECTION WITH, OR IN THE PERFORMANCE OF, THIS LEASE. SUCH DEFENSE, INDEMNITY, AND HOLD HARMLESS OBLIGATION SHALL AND DOES INCLUDE DAMAGES ALLEGED OR FOUND TO HAVE BEEN CAUSED, IN WHOLE OR IN PART, BY THE NEGLIGENCE OR GROSS NEGLIGENCE OF THE TOWN OF ADDISON, TEXAS, ANY OTHER ADDISON PERSON, THE AIRPORT MANAGER, OR ANY OTHER MANAGER PERSON, OR BY ANY ACT OR OMISSION BY THE TOWN OF ADDISON, TEXAS, ANY OTHER ADDISON PERSON, THE AIRPORT MANAGER, OR ANY OTHER MANAGER PERSON THAT WOULD GIVE RISE TO STRICT LIABILITY OF ANY KIND. HOWEVER, TENANT'S LIABILITY UNDER THIS CLAUSE SHALL BE REDUCED BY THAT PORTION OF THE TOTAL AMOUNT OF THE DAMAGES (EXCLUDING DEFENSE FEES AND COSTS) EQUAL TO THE ADDISON PERSON OR ADDISON PERSONS', OR MANAGER PERSON OR MANAGER PERSONS', (AS THE CASE MAY BE) PROPORTIONATE SHARE OF THE NEGLIGENCE, OR CONDUCT THAT WOULD GIVE RISE TO STRICT LIABILITY OF ANY KIND, THAT CAUSED THE LOSS. LIKEWISE, TENANT'S LIABILITY

FOR ANY ADDISON PERSON'S OR ANY MANAGER PERSON'S DEFENSE COSTS AND ATTORNEYS' FEES SHALL BE REDUCED BY THAT PORTION OF THE DEFENSE COSTS AND ATTORNEYS' FEES EQUAL TO ADDISON PERSON OR ADDISON PERSONS', OR MANAGER PERSON OR MANAGER PERSONS', (AS THE CASE MAY BE) PROPORTIONATE SHARE OF THE NEGLIGENCE, OR CONDUCT THAT WOULD GIVE RISE TO STRICT LIABILITY OF ANY KIND, THAT CAUSED THE LOSS.

TENANT SHALL PROMPTLY ADVISE LANDLORD IN WRITING OF ANY CLAIM OR DEMAND AGAINST THE TOWN OF ADDISON, ANY OTHER ADDISON PERSON, ANY MANAGER PERSON, OR TENANT OR ANY TENANT PERSON RELATED TO OR ARISING OUT OF TENANT'S ACTIVITIES UNDER THIS LEASE AND SHALL SEE TO THE INVESTIGATION AND DEFENSE OF SUCH CLAIM OR DEMAND AT TENANT'S SOLE COST AND EXPENSE. THE ADDISON PERSONS AND MANAGER PERSONS, AS THE CASE MAY BE, SHALL HAVE THE RIGHT, AT THE ADDISON PERSONS' OR MANAGER PERSONS' (AS THE CASE MAY BE) OPTION AND AT THEIR OWN EXPENSE, TO PARTICIPATE IN SUCH DEFENSE WITHOUT RELIEVING TENANT OF ANY OF ITS OBLIGATIONS HEREUNDER.

C. Release. TENANT HEREBY RELEASES THE TOWN OF ADDISON, TEXAS AND ALL OTHER ADDISON PERSONS (AS THE TERM "ADDISON PERSONS" IS DEFINED IN SUBPARAGRAPH B. OF THIS PARAGRAPH 21) AND AIRPORT MANAGER AND ALL OTHER MANAGER PERSONS (AS THE TERM "MANAGER PERSONS" IS DEFINED IN SUBPARAGRAPH B. OF THIS PARAGRAPH 21) FROM, AND AGREES THAT THE TOWN OF ADDISON, TEXAS AND ALL OTHER ADDISON PERSONS, AND AIRPORT MANAGER AND ALL OTHER MANAGER PERSONS, SHALL NOT BE LIABLE TO TENANT OR ANY TENANT PERSONS (AS THE TERM "TENANT PERSONS" IS DEFINED IN SUBPARAGRAPH B. OF THIS PARAGRAPH 21) FOR (I) ANY DEATH OR INJURY TO ANY PERSON OR PERSONS OR DAMAGE TO OR DESTRUCTION OF PROPERTY OF ANY KIND RESULTING FROM THE PREMISES BECOMING OUT OF REPAIR OR BY DEFECT IN OR FAILURE OF EQUIPMENT, PIPES, OR WIRING, OR BROKEN GLASS, OR BY THE BACKING UP OF DRAINS, OR BY GAS, WATER, STEAM, ELECTRICITY OR OIL LEAKING, ESCAPING OR FLOWING INTO THE PREMISES, REGARDLESS OF THE SOURCE, OR BY DAMPNES OR BY FIRE, EXPLOSION, FALLING PLASTER OR CEILING OR FOR ANY OTHER REASON WHATSOEVER, AND FOR (II) ANY LOSS OR DAMAGE THAT MAY BE OCCASIONED BY OR THROUGH THE ACTS OR OMISSIONS OF OTHER TENANTS OF LANDLORD OR CAUSED BY OPERATIONS IN CONSTRUCTION OF ANY PRIVATE, PUBLIC OR QUASI-PUBLIC WORK.

D. THE PROVISIONS OF THIS SECTION 21 SHALL SURVIVE THE EXPIRATION OR TERMINATION OF THIS GROUND LEASE.

N. Addition of Section 21.1, Environmental Compliance, Section 21.1, Environmental Compliance is hereby added to the Ground Lease and shall read as follows:

Section 21.1. Environmental Compliance.

A. No Storage or Disposal: Tenant shall not install, store, use, treat transport, discharge or dispose (or permit or acquiesce in the installation, storage, use, treatment, transportation, discharge or disposal by Tenant, its directors, officers, shareholders, members, partners, agents, employees, invitees, contractors, subcontractors, independent

contractors, or subtenants) on the Demised Premises or any portion of the Common Facilities, any: (a) asbestos in any form; (b) urea formaldehyde foam insulation; (c) transformers or other equipment which contain dielectric fluid containing levels of polychlorinated biphenyls in excess of 50 parts per million; or (d) any other chemical, material, air pollutant, toxic pollutant, waste, or substance which is regulated as toxic or hazardous or exposure to which is prohibited, limited or regulated by the Resource Conservation Recovery Act (42 U.S.C. §6901, et seq., as amended or superseded), the Comprehensive and Environmental Response Compensation and Liability Act (42 U.S.C. §9601, et seq, as amended or superseded), the Hazardous Materials Transportation Act, the Toxic Substances Control Act, the Clean Air Act, and/or the Clean Water Act, or any other federal, state, county, regional, local or other governmental authority laws, rules, orders, standards, policies, or regulations, or which, even if not so regulated may or could pose a hazard to the health and safety of the occupants of the Demised Premises and/or any portions of the Common Facilities, and which is either: (i) in amounts in excess of that permitted or deemed safe under any applicable law, rule, order, standard, policy, or regulation or (ii) in any manner prohibited or deemed unsafe under applicable law, rule, order, standard, policy, or regulation. (The substances referred to in (a), (b), (c) or (d) are collectively referred to hereinafter as "Hazardous Materials").

B. Cleanup Laws: Tenant shall, at Tenant's own expense, comply with any presently existing or hereafter enacted laws relating to Hazardous Materials (collectively, "Cleanup Laws"); provided, however that Tenant shall not be responsible for correcting any violation of the Cleanup Laws under this Section that existed prior to the Effective Date. In furtherance and not in limitation of the foregoing, Tenant shall, at Tenant's own expense, make all submissions to, provide all information to, and comply with all requirements of the appropriate governmental authority (the "Authority") under the Cleanup Laws. Should any Authority require that a cleanup plan be prepared and that a cleanup be undertaken because of the existence of Hazardous Materials which were installed, stored, used, treated, transported, disposed of or discharged on the Demised Premises and/or any portion of the Common Facilities, by Tenant, its directors, shareholders, members, partners, officers, agents, employees, invitees, independent contractors, contractors, subcontractors, licensees, subtenants, any other person entering the Demised Premises under express or implied invitation of Tenant, or any person directly or indirectly employed by or acting under Tenant, during the Term of this Lease, Tenant shall, at Tenant's own expense, prepare and submit the required plans and financial assurances and carry out the approved plans in accordance with such Cleanup Laws and to Landlord's satisfaction. At no expense to Landlord, Tenant shall promptly provide all information requested by Landlord for preparation of affidavits or other documents required by Landlord to determine the applicability of the Cleanup Laws to the Demised Premises and/or any portion of the Common Facilities, as the case may be, and shall sign the affidavits promptly when requested to do so by Landlord.

TENANT'S FURTHER INDEMNITY OBLIGATION. TENANT SHALL INDEMNIFY, DEFEND, SAVE AND HOLD HARMLESS LANDLORD AND ALL OTHER LANDLORD PERSONS, AND AIRPORT MANAGER AND ALL OTHER MANAGER PERSONS, FROM AND AGAINST, AND REIMBURSE LANDLORD AND ALL OTHER LANDLORD PERSONS, AND AIRPORT MANAGER AND ALL OTHER MANAGER PERSONS, FOR, ANY AND ALL OBLIGATIONS, DAMAGES,

INJUNCTIONS, FINES, PENALTIES, DEMANDS, CLAIMS, COSTS, FEES, CHARGES, EXPENSES, ACTIONS, CAUSES OF ACTION, JUDGMENTS, LIABILITIES, SUITS, PROCEEDINGS AND LOSSES OF WHATEVER KIND OR NATURE (INCLUDING, WITHOUT LIMITATION, ATTORNEYS' FEES AND COURT COSTS), AND ALL CLEANUP OR REMOVAL COSTS (COLLECTIVELY FOR PURPOSES OF THIS SUBSECTION, "DAMAGES") AND ALL ACTIONS OF ANY KIND ARISING OUT OF OR IN ANY WAY CONNECTED WITH, (I) THE GENERATION, INSTALLATION, STORAGE, USE, TREATMENT, TRANSPORTING, DISPOSAL OR DISCHARGE OF HAZARDOUS MATERIALS IN OR ON THE DEMISED PREMISES AND/OR ANY PORTION OF THE AIRPORT, INCLUDING THE COMMON FACILITIES, OR ANY PROPERTY ADJACENT TO THE AIRPORT, BY TENANT OR ANY TENANT PERSONS, AND (II) ALL FINES, SUITS, PROCEDURES, CLAIMS AND ACTIONS OF ANY KIND ARISING OUT OF TENANT'S FAILURE TO PROVIDE ALL INFORMATION, MAKE ALL SUBMISSIONS AND TAKE ALL STEPS REQUIRED BY THE AUTHORITY UNDER THE CLEANUP LAWS OR ANY OTHER ENVIRONMENTAL LAW, RULE, STANDARD, REGULATION, OR POLICY. SUCH DEFENSE, INDEMNITY, AND HOLD HARMLESS OBLIGATION SHALL AND DOES INCLUDE DAMAGES ALLEGED OR FOUND TO HAVE BEEN CAUSED, IN WHOLE OR IN PART, BY THE NEGLIGENCE [BUT NOT THE GROSS NEGLIGENCE OR WILLFUL MISCONDUCT] OF THE LANDLORD, ANY OTHER LANDLORD PERSON, AIRPORT MANAGER, OR ANY OTHER MANAGER PERSON, OR BY ANY ACT OR OMISSION OF LANDLORD, ANY OTHER LANDLORD PERSON, AIRPORT MANAGER, OR ANY OTHER MANAGER PERSON THAT MAY GIVE RISE TO STRICT LIABILITY OF ANY KIND. HOWEVER, TO THE EXTENT GROSS NEGLIGENCE AND/OR WILLFUL MISCONDUCT ARE ALLEGED SIMULTANEOUSLY WITH CLAIMS REQUIRING DEFENSE AND INDEMNITY HEREIN, TENANT SHALL DEFEND ALL CLAIMS ALLEGED AGAINST THE LANDLORD, AND ANY OTHER LANDLORD PERSON, AND AIRPORT MANAGER, AND ANY OTHER MANAGER PERSON. TENANT'S LIABILITY UNDER THIS INDEMNITY OBLIGATION SHALL BE REDUCED BY THAT PORTION OF THE TOTAL AMOUNT OF THE DAMAGES (EXCLUDING DEFENSE FEES AND COSTS) EQUAL TO THE INDEMNIFIED PERSON'S OR INDEMNIFIED PERSONS' PROPORTIONATE SHARE OF THE NEGLIGENCE, OR CONDUCT THAT WOULD GIVE RISE TO STRICT LIABILITY OF ANY KIND, THAT CAUSED THE LOSS. LIKEWISE, TENANT'S LIABILITY FOR INDEMNIFIED PERSON'S OR INDEMNIFIED PERSONS' DEFENSE COSTS AND ATTORNEYS' FEES SHALL BE REDUCED BY A PORTION OF THE DEFENSE COSTS AND ATTORNEYS' FEES EQUAL TO THE INDEMNIFIED PERSON'S OR INDEMNIFIED PERSONS' PROPORTIONATE SHARE OF THE NEGLIGENCE, OR CONDUCT THAT WOULD GIVE RISE TO STRICT LIABILITY OF ANY KIND, THAT CAUSED THE LOSS.

In addition to and not in limitation of Landlord's other rights and remedies, Tenant's failure to abide by the terms of this Section shall be restrainable by injunction.

C. Environmental Notices: Tenant shall promptly supply Landlord with copies of any notices, correspondence and submissions made by Tenant to or received by Tenant from any governmental authorities of the United States Environmental Protection Agency, the United States Occupational Safety and Health Administration, the FAA, TxDOT, or any other local, state or federal authority that requires submission of any information concerning environmental matters or Hazardous Materials.

D. Prior to the Commencement Date of this Lease, the Tenant, at Tenant's sole cost and expense, shall be entitled to conduct a Phase I Environmental Site Assessment ("ESA")

with respect to the Demised Premises. If the Phase I ESA indicates the likely presence of Hazardous Materials on the Demised Premises, Tenant shall be entitled to conduct a Phase II ESA at Tenant's sole cost and expense. If the Phase II ESA indicates the presence of Hazardous Materials on the Demised Premises, Tenant shall be entitled, as its sole remedy, to disaffirm this Lease, in which case this Lease shall become null and void and no further obligation shall be borne by either party hereto. A copy of a Phase I ESA and Phase II ESA, if any, shall be delivered promptly to Landlord upon completion.

E. Survival: Tenant's defense and indemnity and hold harmless obligation and Tenant's liability pursuant to the terms of this Sections 6 and 21 shall survive the expiration or earlier termination of this Lease. Tenant shall not install, store, use, treat, transport, discharge or dispose (or permit, allow, or acquiesce in the installation, storage, use, treatment, transportation, discharge or disposal by Tenant's owners, directors, shareholders, partners, managers, officers, employees, agents, representatives, engineers, consultants, contractors, subcontractors, tenants, licensees, invitees, patrons, concessionaires, or any other person or entity for whom Tenant is legally responsible, and/or their respective owners, directors, shareholders, partners, officers, managers, employees, agents, representatives, engineers, consultants, contractors, subcontractors, tenants, licensees, invitees, patrons, and concessionaires) on the Demised Premises or any portion of the common facilities (described in Section 17) any: (a) asbestos in any form; (b) urea formaldehyde foam insulation; (c) transformers or other equipment which contain dielectric fluid containing levels of polychlorinated biphenyls in excess of 50 parts per million; or (d) any other chemical, material, air pollutant, toxic pollutant, waste, or substance which is regulated as toxic or hazardous or exposure to which is prohibited, limited or regulated by the Resource Conservation Recovery Act (42 U.S.C. §6901, et seq., as amended or superseded), the Comprehensive and Environmental Response Compensation and Liability Act (42 U.S.C. §9601, et seq. as amended or superseded), the Hazardous Materials Transportation Act, the Toxic Substances Control Act, the Clean Air Act, and/or the Clean Water Act or any other federal, state, county, regional, local or other governmental authority law, rule, regulation, order, standard, permit, directive or policy, or which, even if not so regulated may or could pose a hazard to the health and safety of the occupants of the Demised Premises and/or any portions of the common facilities, and which is either: (i) in amounts in excess of that permitted or deemed safe under any applicable law, rule, regulation, order, standard, permit, directive or policy, or (ii) in any manner prohibited or deemed unsafe under applicable law, rule, regulation, order, standard, permit, directive or policy. (The substances referred to in (a), (b), (c) or (d) herein are collectively referred to hereinafter as "Hazardous Materials").

O. Amendment to Section 22B., Default by Tenant. Section 23.B., Default by Tenant of the Ground Lease is hereby amended in its entirety to read as follows:

B. Failure of Tenant to comply with any term, condition or covenant of this Lease (other than the payment of rent or other sum of money, or the payment of taxes, utilities or insurance premiums, or other payments Tenant is to make under this Lease, as set forth in Subsection A. of this Section 23) and such failure shall not be cured within either (i) a specific cure period provided for in this Lease applicable to such failure or (ii) if not otherwise specified, thirty (30) days after written notice thereof to Tenant; provided, then such thirty (30) day period shall be extended for an additional reasonable period of time so long as Tenant

has provided Landlord written notice of the curative measures Tenant proposes to undertake, commenced to cure such failure within the initial thirty (30) day period and is diligently pursuing such cure.

P. Amendment to Section 26, Title to Improvements. Section 26 Title to Improvements (ii) is hereby amended to read as follows:

Section 26. Title to Improvements:

... (ii) with a minimum of twelve months advance written notice to Tenant, Landlord may at its sole discretion, instruct Tenant to either: (a) deliver to Landlord the Demised Premises clean and free of trash and in good repair and condition in accordance with Addendum 2 (entitled *Tenant's Leasehold Minimum Maintenance and Repair Standards and Practices* attached hereto and incorporated herein by reference) together with all fixtures and equipment situated in the Demised Premises with ordinary wear and tear excepted; or (b) prior to the expiration or early termination of the Term, demolish and remove or cause to be removed from the Demised Premises all building improvements together with any fixtures or equipment remaining and restore the Demised Premises to reasonably the same condition it was found immediately prior to Tenant's taking possession of the Demised Premises as of the Effective Date. Such demolition and removal shall be performed at Tenant's sole cost and risk in accordance with all prevailing ordinances, codes, rules and regulations governing same.

Q. Amendment to Section 45, Notices. Section 45, Notices of the Ground Lease is amended in its entirety to read as follows:

45. Notices: Any notice or document required to be delivered or given hereunder in writing shall be delivered or given (i) in person, (ii) by United States mail, postage prepaid, registered or certified mail, return receipt requested, or (iii) by Federal Express Corporation or other nationally recognized carrier to be delivered on the next business day. Such notice or document shall be deemed to be delivered or given, whether actually received or not, (a) when received if delivered or given in person, (b) if sent by United States mail, three (3) business days after being deposited in the United States mail as set forth above, and (c) on the next business day after the day the notice or document is provided to Federal Express Corporation or other nationally recognized carrier to be delivered as set forth above. Addresses for the delivery or giving of any such notice or document are as follows:

TO LANDLORD:

Town of Addison, Texas
c/o City Manager
5300 Belt Line Road
Dallas, Texas 75254
Email: wpierson@addisontx.gov

TO TENANT:

Concourse Plaza II, LTD.
c/o Mr. Jeff Harkinson
Harkinson Investment Corporation
4650 Belt Line Rd., Suite 400
Dallas, Texas 75001
Email: jharkinson@harkcorp.com

and

Town of Addison, Texas
c/o Addison Airport Manager
16051 Addison Road, Suite 220
Addison, Texas 75001
Attn: Real Estate Manager
Email: bill.dyer@addisonairport.net

Addison Wilson III, Esq.
3838 Oak Lawn Ave., Suite 810
Dallas, TX 75219
Email: awilson@dfwlawoffice.org

Section 3. No Other Amendments. Except to the extent modified or amended herein, all other terms and obligations of the Ground Lease shall remain unchanged and in full force and effect.

Section 4. Applicable Law; Venue. In the event of any action under this Second Amendment, exclusive venue for all causes of action shall be instituted and maintained in Dallas County, Texas. The parties agree that the laws of the State of Texas shall govern and apply to the interpretation, validity and enforcement of this Second Amendment; and, with respect to any conflict of law provisions, the parties agree that such conflict of law provisions shall not affect the application of the law of the State of Texas (without reference to its conflict of law provisions) to the governing, interpretation, validity and enforcement of this Second Amendment. All obligations of the parties created by this Second Amendment are performable in Dallas County, Texas.

Section 5. No Third-Party Beneficiaries. This Second Amendment and each of its provisions are solely for the benefit of the parties hereto and are not intended to and shall not create or grant any rights, contractual or otherwise, to any third person or entity.

Section 6. Authority to Execute. The undersigned officers and/or agents of the parties hereto are the properly authorized officials and have the necessary authority to execute this Second Amendment on behalf of the parties hereto, and each party hereby certifies to the other that any necessary resolutions or other act extending such authority have been duly passed and are now in full force and effect.

IN WITNESS WHEREOF, the undersigned parties execute this Agreement this 14th day of August, 2018.

TENANT:

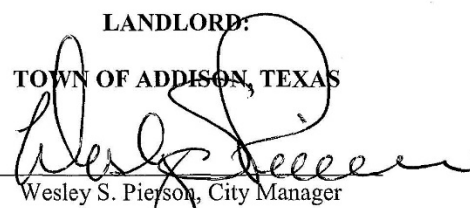
CONCOURSE PLAZA II, LTD.

By: 

Name: William J. Harkinson, President
Harkinson Investment Corporation, General Partner
Date: August 2, 2018

LANDLORD:

TOWN OF ADDISON, TEXAS

By: 
Wesley S. Pierson, City Manager

Second Amendment to Ground Lease 0950-5101 – Page 30 of 46

ACKNOWLEDGMENT

STATE OF TEXAS §
 §
COUNTY OF DALLAS §

BEFORE ME, the undersigned authority, on this day personally appeared William J. Harkinson, President of Concourse Plaza II, LTD, a Texas limited liability company, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein stated.

GIVEN under my hand and seal of office this 2nd day of August, 2018.

[SEAL]

Sheena M. Love
Notary Public, State of Texas

STATE OF TEXAS §
 §
COUNTY OF DALLAS §

BEFORE ME, the undersigned authority, on this day personally appeared Wesley S. Pierson, city manager of the Town of Addison, a home-rule municipality, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein stated.

GIVEN under my hand and seal of office this 27th day of August, 2018.

[SEAL]

Irma G. Parker
Notary Public, State of Texas

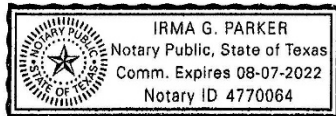


EXHIBIT "A"

COPY OF GROUND LEASE AS AMENDED AND MODIFIED

THE STATE OF TEXAS
COUNTY OF DALLAS

GROUND LEASE

This Ground Lease (hereinafter referred to as the "Lease") is made and entered into as of October 11, 19 83, by and among the City of Addison, Texas, a municipal corporation (hereinafter sometimes referred to as the "City"), Addison Airport of Texas, Inc., a Texas Corporation (hereinafter sometimes referred to as "AATI") and Bunnell Properties, Inc., a Texas corporation (hereinafter referred to as "Tenant").

WITNESSETH:

WHEREAS, AATI leases that certain real property (hereinafter referred to as the "demised premises") described in attached Exhibit A from the City pursuant to that certain instrument captioned Agreement for Operation of the Addison Airport (hereinafter referred to as the "Base Lease") between the City and Addison Airport, Inc. (predecessor at AATI); and

WHEREAS, the demised premises are situated at Addison Airport (hereinafter referred to as the "Airport") in Dallas County, Texas, the Airport being delineated in a plat attached hereto as Exhibit B; and

WHEREAS, the City and AATI hereby lease and demise the demised premises to Tenant, and Tenant hereby leases and takes the demised premises from the City and AATI, upon the terms and conditions set forth herein;

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS:

1. **Base Lease:** All of the terms and conditions of the Base Lease are incorporated into this Lease by reference as if written verbatim herein, and Tenant by Tenant's execution hereof acknowledges that AATI has furnished Tenant with a copy of the Base Lease. Tenant agrees to fully comply at all times and in all respects with the terms and conditions of the Base Lease insofar as the same relate to the demised premises and/or the use and operation thereof, except that Tenant shall not be responsible for the payment of any rental due under the Base Lease which shall be paid by AATI.

2. **Definition of Landlord and Effect of Default under the Base Lease:** The term "Landlord" as hereinafter used in this Lease shall mean either AATI or the City. So long as the Base Lease is in effect, AATI shall be entitled to all of the rights, benefits and remedies of the Landlord under this Lease, and shall perform all of the duties, covenants and obligations of the Landlord under this Lease. Upon the expiration or termination of the Base Lease, the City shall be entitled to all of the rights, benefits and remedies of the Landlord under this Lease, and shall perform all of the duties, covenants and obligations of the Landlord under this Lease. The City agrees that (i) until such time as the City notifies Tenant to the contrary in writing, Tenant is fully authorized to make all payments due under this Lease to AATI, and (ii) that default by AATI under the Base Lease shall have no effect on this Lease so long as Tenant pays and performs its duties, covenants and obligations under this Lease.

3. **Term:** The term hereof shall commence on the earlier of October 1, 19 84, or the first day of the first calendar month after Tenant completes the construction hereinafter described and opens for business at the demised premises (the applicable date being hereinafter referred to as the "Commencement Date"), and shall end four hundred eighty (480) months thereafter; provided, however, that any entry upon the demised premises by Tenant prior to the Commencement Date shall be subject to all of the terms and conditions hereof except that rental shall not accrue.

4. **Rental:** Subject to adjustment as hereinbelow provided, Tenant agrees to pay to Landlord, without offset or deduction, rent for the demised premises at the rate of SIXTEEN HUNDRED SEVENTY-SIX AND 07/100----- per month in advance. The first of such monthly installment shall be due and payable on or before the Commencement Date, and a like installment shall be due and payable on or before the first day of each calendar month thereafter during the term hereof.

5. **Adjustment of Rental:** Commencing on the second anniversary of the Commencement Date and on every bi-annual anniversary thereafter (hereinafter referred to as the "Adjustment Date"), the monthly rental due under paragraph 4 shall be adjusted as follows:

(i) A comparison shall be made between the Consumers' price Index-All Items for the Dallas, Texas Metropolitan Area (hereinafter referred to as the "Price Index") as it existed on the Commencement Date and as it exists on the first day of the calendar month preceding the then applicable Adjustment Date.

(ii) The monthly rental for the two (2) year period beginning with and following the then applicable Adjustment Date shall be either increased or decreased, as the case may be, by the percentage of increase or decrease in the Price Index between the Commencement Date and the then applicable Adjustment Date, but in no event shall such monthly rental ever be decreased below the monthly rental set forth in paragraph 4.

(iii) In the event that the Price Index is unavailable for whatever reason for the computations set forth hereinabove, another index approximating the Price Index as closely as feasible shall be substituted therefor.

6. **Use of Demised Premises and Construction of Improvements.** The demised premises shall be used and occupied by Tenant only for the following purposes: sale of aircraft and aircraft parts; aircraft maintenance and repair; aircraft storage; aircraft training; aircraft charter; and aircraft rentals; and not otherwise without the prior written consent of Landlord.

In connection with such use and occupancy, Tenant intends to construct upon the demised premises the improvements depicted in the plans and specifications.

These improvements consist of a combination office/airplane hangar facility containing approximately 42,600 square feet of office space and five airplane hangars, the preliminary plans for which have been prepared by Bogard Architects, Inc. Construction prints to be approved by Addison Municipal Airport prior to the start of construction.

All construction shall be strictly in accordance with such plans and specifications, and such construction shall be performed in a first class, workmanlike manner. Tenant agrees to promptly pay and discharge all costs, expenses, claims for damages, liens and any and all other liabilities and obligations which arise in connection with such construction.

7. **Acceptance of Demised Premises.** Tenant acknowledges that Tenant has fully inspected the demised premises and accepts the demised premises as suitable for the purpose for which the same are leased in their present condition.

8. **Securing Governmental Approvals and Compliance with Law.** Tenant at Tenant's sole cost and expense shall obtain any and all governmental licenses, permits and approvals necessary for the construction of improvements and for the use and occupancy of the demised premises. Tenant shall comply at all times with all governmental laws, ordinances and regulations applicable to the use of the demised premises, and shall promptly comply with all governmental orders and directives for the correction, prevention and abatement of nuisances in or upon, or connected with the demised premises, all at Tenant's sole cost and expense.

9. **Assignment, Subletting and Mortgaging of Leasehold Estate:**

A. Without the prior written consent of Landlord, Tenant may not assign this Lease or any rights of Tenant hereunder (except to a leasehold mortgage as hereinbelow provided) or sublet the whole or any part of the demised premises. Any assignment or subletting shall be expressly subject to all the terms and provisions of this Lease, including the provisions of paragraph 6 pertaining to the use of the demised premises. In the event of any assignment or subletting, Tenant shall not assign Tenant's rights hereunder or sublet the demised premises without first obtaining a written agreement from each such assignee or sublessee whereby each such assignee or sublessee agrees to be bound by the terms and provisions of this Lease. No such assignment or subletting shall constitute a novation. In the event of the occurrence of an event of default while the demised premises are assigned or sublet, Landlord, in addition to any other remedies provided herein or by law, may at Landlord's option, collect directly from such assignee or subtenant all rents becoming due under such assignment or subletting and apply such rent against any sums due to Landlord hereunder. No direct collection by Landlord from any such assignee or subtenant shall release Tenant from the payment or performance of Tenant's obligations hereunder.

B. Tenant shall have the right to mortgage the leasehold estate of Tenant created hereby in order to secure a mortgage loan for the purpose of obtaining funds for the construction of the improvements described in paragraph 6 or for other construction upon the demised premises approved from time to time by Landlord in writing. In the event that Tenant pursuant to mortgages or deeds of trust mortgages the leasehold estate of Tenant created hereby, the leasehold mortgagee shall in no event become personally liable to perform the obligations of Tenant under this Lease unless and until said mortgagee become the owner of the leasehold estate pursuant to foreclosure, transfer in lieu of foreclosure, or otherwise, and thereafter said leasehold mortgagee shall remain liable for such obligations only so long as such mortgagee remains the owner of the leasehold estate. Notwithstanding the foregoing, it is specifically understood and agreed that no such mortgaging by Tenant and/or any actions taken pursuant to the terms of such mortgage shall ever relieve Tenant of Tenant's obligation to pay the rental due hereunder and otherwise fully perform the terms and conditions of this Lease.

C. All mortgages and deeds of trust whereby Tenant mortgages the leasehold estate of Tenant created hereby shall contain provisions (i) requiring the leasehold mortgagee to give Landlord fifteen (15) days written notice prior to accelerating the debt of Tenant to such mortgagee and/or initiating foreclosure proceedings under said mortgages or deeds of trust, and (ii) allowing Landlord during such fifteen (15) day notice period to cure Tenant's default and prevent said acceleration and/or foreclosure proceedings, and thereafter at Landlord's option to assume Tenant's position under said mortgages or deeds of trust.

D. Landlord agrees, if and so long as the leasehold estate of Tenant is encumbered by a leasehold mortgage and written notice to such effect has been given to Landlord, to give the holder of such leasehold mortgagee at such address or addresses as may be specified in such written notice to Landlord for the giving of notices to the leasehold mortgagee, or as otherwise may be specified by the leasehold mortgagee to Landlord in writing, written notice of any default hereunder by Tenant, simultaneously with the giving of such notice to Tenant, and the holder of any such leasehold mortgage shall have the right, for a period of fifteen (15) days after its receipt of such notice or within any longer period of time specified in such notice, to take such action or to make payment as may be necessary or appropriate to cure any such default so specified, it being the intention of the parties hereto that Landlord shall not exercise Landlord's right to terminate this Lease without first giving any such leasehold mortgagee the notice provided for herein and affording any such leasehold mortgagee the right to cure such default as provided for herein.

E. Landlord further agrees to execute and deliver to any proposed leasehold mortgagee of Tenant a "Non-Disturbance Agreement" wherein Landlord agrees that Landlord will (i) recognize such mortgagee and its successors and assigns after foreclosure, or transfer in lieu of foreclosure, as Tenant hereunder, and (ii) continue to perform all of Landlord's obligations hereunder so long as such mortgagee or its successors and assigns performs all of the obligations of Tenant hereunder. Landlord also agrees to execute and deliver to such proposed leasehold mortgagee any other documents which such proposed leasehold mortgagee may reasonably request concerning the mortgaging by Tenant of the leasehold estate created hereby; provided, however, that Landlord shall never be required to subordinate Landlord's interest in the demised premises to the mortgage of such proposed leasehold mortgagee.

10. **Property Taxes and Assessments:** Tenant shall pay any and all property taxes or assessments levied or assessed on the improvements on the demised premises, the personal property and fixtures on the demised premises, and, if applicable, upon the leasehold estate of Tenant created hereby. Upon the request of Landlord, Tenant shall from time to time furnish to Landlord's "paid receipts" or other written evidence that all such taxes have been paid by Tenant.

11. **Maintenance and Repair of Demised Premises:**

A. Tenant shall, throughout the term hereof, maintain in good repair and condition all the demised premises and all fixtures, equipment and personal property on the demised premises and keep them free from waste or nuisance and, at the expiration or termination of this Lease, deliver up the demised premises clean and free of trash and in good repair and condition, with all fixtures and equipment situated in the demised premises in working order, reasonable wear and tear excepted.

B. In the event Tenant shall fail to so maintain the demised premises and the fixtures, equipment and personal property situated thereon, Landlord shall have the right (but not the obligation) to cause all repairs or other maintenance to be made and the reasonable costs therefor expended by Landlord plus interest thereon as provided in paragraph 37 shall be paid by Tenant on demand.

12. **Alterations, Additions and Improvement.** After completion of the improvements described in paragraph 6, Tenant shall not create any openings in the roof or exterior walls, or make any alterations, additions or improvements to the demised premises without the prior written consent of Landlord. Consent for non-structural alterations, additions or improvements shall not be unreasonably withheld by Landlord. Tenant shall have the right to erect or install shelves, bins, machinery, air conditioning or heating equipment and trade fixtures, provided that Tenant complies with all applicable governmental laws, ordinances and regulations.

All alterations, additions and improvements in and to the demised premises shall be performed in a first class, workmanlike manner, and Tenant shall promptly pay and discharge all costs, expenses, claims for damages, liens and any and all other liabilities and obligations which arise in connection therewith.

13. **Insurance.** Tenant shall during the term hereof maintain at Tenant's sole cost and expense insurance relating to the demised premises as follows:

(i) Insurance against loss or damage to improvements by fire, lightning, and other risks from time to time included under standard extended coverage policies, and sprinkler, vandalism and malicious mischief, all in amounts sufficient to prevent Landlord or Tenant from becoming co-insurers of any loss under the applicable policies but in any event in amounts not less than eighty percent (80%) of the full insurable value of the demised premises. The term "full insurable value" as used herein means actual replacement value at the time of such loss. Upon request, such replacement value shall be determined by a qualified appraiser, a copy of whose findings shall be submitted to Landlord, and, therefore, proper adjustment in the limits of insurance coverage shall be effected.

(ii) General public liability insurance against claims for bodily injury, death or property damage occurring on, in or about the demised premises, such insurance to afford protection to Landlord of not less than \$500,000.00 with respect to any one person, \$1,000,000.00 with respect to any one accident and not less than \$200,000.00 with respect to property damage.

(iii) Workmen's compensation insurance covering all persons employed by Tenant in connection with any work done on or about the demised premises with respect to which claims for death or bodily injury could be asserted against Landlord or the demised premises, or in lieu of such workmen's compensation insurance, a program of self-insurance complying with the rules, regulations and requirements of the appropriate state agency of the State of Texas.

(iv) If applicable, boiler and pressure vessel insurance on all steam boilers, parts thereof and appurtenances attached or connected thereto which by reason of their use or existence are capable of bursting, erupting, collapsing, imploding or exploding, in the minimum amount of \$100,000.00 for damage to property resulting from such perils.

(v) Such other insurance on improvements in such amounts and against such other insurable hazard which at the time are commonly obtained in the case of property similar to such improvements.

(vi) Hangar keeper's liability insurance providing for coverage in the following limits: \$200,000.00 per aircraft and \$400,000.00 per occurrence on property damage to aircraft in the care, custody or control of Tenant.

(vii) During any period of construction, a Builder's Risk Completed Value policy with an all risks endorsement.

All such policies of insurance (i) shall be issued by insurance companies acceptable to Landlord, (ii) shall name Landlord as an additional insured or loss payee, as the case may be, and (iii) shall provide for at least ten (10) days written notice to Landlord prior to cancellation or modification. Tenant shall provide Landlord with duplicate originals of all insurance policies required by this paragraph.

14. **Casualty Damage or Destruction:**

A. In case of any damage to or destruction of the buildings, structures and equipment on the demised premises, or any part thereof, Tenant will promptly give written notice thereof to Landlord, generally describing the nature and extent of such damage and/or destruction.

B. In case of any damage to or destruction of the buildings, structures and equipment on the demised premises, or any part thereof, Tenant, whether or not the insurance proceeds, if any, payable on account of such damage and/or destruction shall be sufficient for such purpose, at Tenant's sole cost, risk and expense will promptly commence and complete the restoration, repair and replacement of said buildings, structures and equipment as nearly as possible to their value, condition and character immediately prior to such damage and/or destruction, with such alterations in and additions thereto as may be approved in writing by Landlord (hereinafter sometimes referred to as the "Restoration").

C. All insurance proceeds, if any, payable on account of such damage to or destruction of the buildings, structures and equipment on the demised premises shall be held by Landlord. Landlord shall be protected in acting upon any certificate believed by Landlord to be genuine and to have been executed by the proper party and shall receive such certificate as conclusive evidence of any fact or as to any matter therein set forth. Such certificate shall be full warranty, authority and protection to Landlord in acting thereon, and Landlord shall be under no duty to take any action other than as set forth in this paragraph 14.

D. Insurance proceeds received by Landlord on account of any damage to or destruction of the buildings, structures and equipment on the demised premises, or any part thereof (less the costs, fees and expenses incurred by Landlord and Tenant in the collection thereof, including, without limitation, adjuster's and attorney's fees and expenses) shall be applied as follows:

(i) Net insurance proceeds as above defined shall be paid to Tenant or as Tenant may direct from time to time as Restoration progresses to pay (or reimburse Tenant for) the cost of Restoration, upon written request of Tenant to Landlord accompanied by (a) certificate of a supervising architect or engineer approved by Landlord, describing in reasonable detail the work and material in question and the cost thereof, stating that the same were necessary or appropriate to the Restoration and constitute a complete part thereof, and that no part of the cost thereof has theretofore been reimbursed, and specifying the additional amount, if any, necessary to complete the Restoration, and (b) an opinion of counsel satisfactory to Landlord that there exist no mechanics', materialmen's or similar liens for labor or materials except such, if any, as are discharged by the payment of the amount requested.

(ii) Upon receipt by Landlord of evidence of the character required by the foregoing clauses (i)(a) and (b) that Restoration has been completed and the cost thereof paid in full, and that there are no mechanics', materialmen's or similar liens for labor or materials supplied in connection therewith, the balance, if any, of such proceeds shall be paid to Tenant or as Tenant may direct.

E. In the event that Tenant does not promptly commence Restoration, or after commencement Tenant does not diligently proceed to the completion of same, Landlord shall have the right to commence or complete Restoration after Landlord has given Tenant thirty (30) days prior written notice requesting the commencement of Restoration or that Tenant diligently proceeds to the completion of same if Tenant during such thirty (30) day period does not so commence or proceed to diligently complete Restoration. In such event, Landlord shall retain the insurance proceeds, and Tenant shall pay any deficiency if such proceeds are not sufficient for Restoration.

15. Condemnation:

A. If during the term hereof, any part of the demised premises shall be acquired or condemned by eminent domain for any public or quasi-public use or purpose, or are sold to a condemning authority under threat of condemnation, and after such taking by or sale to said condemning authority the remainder of the demised premises is not susceptible to efficient and economic occupation and operation by Tenant, this Lease shall automatically terminate as of the date that said condemning authority takes possession of the demised premises, and Landlord shall refund to Tenant any prepaid but unaccrued rental less any sum then owing by Tenant to Landlord.

B. If after such taking by or sale to said condemning authority the remainder of the demised premises is susceptible to efficient and economic occupation and operation by Tenant, this Lease shall not terminate but the rental due hereunder shall be adjusted so that Tenant shall be required to pay for the remainder of the term hereof the sum obtained by multiplying each monthly rental installment due hereunder, as adjusted from time to time pursuant to paragraph 5, by a fraction, the numerator of which shall be the number of square feet remaining in the demised premises after the taking by or sale to said condemning authority and denominator of which shall be the square footage originally contained in the demised premises. The rental adjustment called for herein shall not commence until said condemning authority actually takes possession of the condemned portion of the demised premises.

C. If this Lease is not terminated pursuant to Section A, Tenant shall promptly restore the improvements on the demised premises, and the condemnation proceeds to which Landlord and Tenant are entitled shall be awarded and paid first to cover the costs and expenses for restoring the remaining portion of the demised premises to a condition susceptible to efficient and economic occupation and operation by Tenant, and any remaining proceeds to which Landlord and Tenant are entitled shall be awarded and paid to Landlord and Tenant, as their interest may appear. If this Lease is terminated pursuant to Section A, condemnation proceeds to which Landlord and Tenant are entitled shall be awarded and paid to Landlord and Tenant as their interests may appear.

16. Utilities. Tenant shall be responsible at Tenant's sole cost and expense for obtaining all utility connections at or for the demised premises and Tenant shall pay all charges for water, electricity, gas, sewer, telephone or any other utility connections, tap-in fees and services furnished to the demised premises during the term hereof. Landlord shall in no event be liable or responsible for any cessation or interruption in any such utility services.

17. Common Facilities. Tenant and Tenant's employees, agents, servants, customers and other invitees shall have the non-exclusive right to use all common facilities, improvements, equipment and services which may now exist or which may hereafter be provided by Landlord for the accommodation and convenience of Landlord's customers and tenants, including landing and takeoff facilities, means of ingress and egress to the demised premises, other airport installations, and all other reasonable services which may be provided without charge from time to time by Landlord in operating the Airport. All such common facilities shall at all times be under the exclusive control and management of Landlord and may be rearranged, modified, changed or terminated from time to time at Landlord's sole discretion.

18. Rules and Regulations. Landlord has adopted Rules and Regulations (hereinafter referred to as the "Rules and Regulations") which shall govern Tenant in the use of the demised premises and all common facilities, a copy of which has been furnished to Tenant. The Rules and Regulations are incorporated by reference as if written verbatim herein, and Tenant agrees to comply fully at all times with the Rules and Regulations. Landlord shall have the right to amend, notify and alter the Rules and Regulations from time to time in a reasonable manner for the purpose of assuring the safety, welfare and convenience of Landlord, Tenant and all other Tenants and customers of the Airport.

19. Signs and Equipment. After first securing Landlord's approval which will not be unreasonably withheld, Tenant shall have the right from time to time to install and operate advertising signs and radio, communications, meteorological, aerial navigation and other equipment and facilities in or on the demised premises that may be reasonably necessary for the operation of Tenant's business.

20. Landlord's Right of Entry. Landlord and Landlord's authorized representatives shall have the right, during the normal business hours, to enter the demised premises (i) to inspect the general condition and state of repair thereof, (ii) to make repairs permitted under this Lease, (iii) to show the demised premises to any prospective tenant or purchaser or (iv) for any other reasonable and lawful purpose.

During the final one hundred eighty (180) days of the term hereof, Landlord and Landlord's authorized representatives shall have the right to erect and maintain on or about the demised premises customary signs advertising the demised premises for lease or for sale.

21. Indemnity and Exculpation:

A. Landlord shall not be liable to Tenant or to Tenant's employees, agents, servants, customers, invitees, or to any other person whatsoever, for any injury to persons or damage to property on or about the demised premises or any adjacent area owned by Landlord caused by the negligence or misconduct of Tenant, Tenant's employees, servants, customers, invitees, subtenants, licensees or concessionaires or any other person entering the demised premises under express or implied invitation of Tenant, or arising out of the use of the demised premises by Tenant and the conduct of Tenant's business thereon, or arising out of any breach or default by Tenant in the performance of Tenant's obligations hereunder; and Tenant hereby agrees to indemnify Landlord and hold Landlord harmless from any loss, expense or claims arising out of such damage or injury.

B. Landlord and Landlord's agents and employees shall not be liable to Tenant for any injury to persons or damage to property resulting from the demised premises becoming out of repair or by defect in or failure of equipment, pipes, or wiring, or broken glass, or by the backing up of drains, or by gas, water, steam, electricity or oil leaking, escaping or flowing into the demised premises, regardless of the source, or dampness or by fire, explosion, falling plaster or ceiling or for any other reason whatsoever. Landlord shall not be liable to Tenant for any loss or damage that may be occasioned by or through the acts or omissions of other tenants of Landlord or caused by operations in construction of any private, public or quasi-public work, or of any other persons whatsoever, excepting only duly authorized agents and employees of Landlord.

22. Default by Tenant. The following events shall be deemed to be events of default by Tenant under this Lease:

A. Failure of Tenant to pay any installment of rent or any other sum payable to Landlord hereunder on the date that same is due and such failure shall continue for a period of ten (10) days.

B. Failure of Tenant to comply with any term, condition or covenant of this Lease, other than the payment of rent or other sum of money, and such failure shall not be cured within thirty (30) days after written notice thereof to Tenant.

C. Insolvency, the making of a transfer in fraud of creditors, or the making of an assignment for the benefit of creditors by Tenant or any guarantor of Tenant's obligations.

D. Filing of a petition under any section or chapter of the National Bankruptcy Act, as amended, or under any similar law or statute of the United States or any State thereof by Tenant or any guarantor of Tenant's obligations, or adjudication as a bankrupt or insolvent in proceedings filed against Tenant or such guarantor.

E. Appointment of a receiver or trustee for all or substantially all of the assets of Tenant or any guarantor of Tenant's obligations.

F. Abandonment by Tenant of any substantial portion of the demised premises or cessation of use of the demised premises for the purpose leased.

23. Remedies of Landlord. Upon the occurrence of any of the events of default listed in paragraph 22, Landlord shall have the option to pursue any one or more of the following remedies without the notice or demand whatsoever:

A. Terminate this Lease, in which event Tenant shall immediately surrender the demised premises to Landlord. If Tenant fails to so surrender the demised premises, Landlord may, without prejudice to any other remedy which Landlord may have for possession of the demised premises or arrearages in rent, enter upon and take possession of the demised premises and expel or remove Tenant and any other person who may be occupying the demised premises or any part thereof, without being liable for prosecution or any claim for damages therefor. Tenant shall pay to Landlord on demand the amount of all loss and damages which Landlord may suffer by reason of such termination, whether through inability to relet the demised premises on satisfactory terms or otherwise.

B. Terminate this Lease, in which event Tenant shall immediately surrender the demised premises to Landlord. If Tenant fails to so surrender the demised premises, Landlord may, without prejudice to any other remedy which Landlord may have for possession of the demised premises or arrearages in rent, enter upon and take possession of the demised premises and expel or remove Tenant and any other person who may be occupying the demised premises or any part thereof, without being liable for prosecution or any claim for damages therefor. Tenant shall pay to Landlord on the date of such termination damages in any amount equal to the excess, if any, of the total amount of all monthly rental and other amounts to be paid by Tenant to Landlord hereunder for the period which would otherwise have constituted the unexpired portion of the term of this Lease over the then fair market rental value of the demised premises for such unexpired portion of the term of this Lease.

C. Enter upon and take possession of the demised premises without terminating this Lease and without being liable for prosecution or for any claim for damages therefor, and expel or remove Tenant and any other person who may be occupying the demised premises or any part thereof. Landlord may relet the demised premises and receive the rent therefor. Tenant agrees to pay to Landlord the

rent and from time to time any deficiency that may arise by reason of any such letting. In determining the amount of such deficiency, brokerage commissions, attorneys' fees, remodeling expenses and other costs of letting shall be subtracted from the amount of rent received under such letting.

D. Enter upon the demised premises without terminating this Lease and without being liable for prosecution or for any claim for damages therefor, and do whatever Tenant is obligated to do under the terms of this Lease. Tenant agrees to pay Landlord on demand for expenses which Landlord may incur in thus effecting compliance with Tenant's obligations under this Lease, together with interest thereon at the rate of ten percent (10%) per annum from the date expended until paid. Landlord shall not be liable for any damages resulting to Tenant from such action, whether caused by negligence of Landlord or otherwise.

Pursuit of any of the foregoing remedies shall not preclude pursuit of any of the other remedies herein provided or any other remedies provided by law, nor shall pursuit of any remedy herein provided constitute a forfeiture or waiver of any rent due to Landlord hereunder or of any damages accruing to Landlord by reason of the violation of any of the terms, conditions and covenants herein contained.

24. **Default by Landlord.** No default by Landlord hereunder shall constitute an eviction or disturbance of Tenant's use and possession of the demised premises or render Landlord liable for damages or entitle Tenant to be relieved from any of Tenant's obligations hereunder (including the obligation to pay rent) or grant Tenant any right of deduction, abatement, set-off or recoupment or entitle Tenant to take any action whatsoever with regard to the demised premises or Landlord until thirty (30) days after Tenant has given Landlord written notice specifically setting forth such default by Landlord, and Landlord has failed to cure such default within said thirty (30) day period, or in the event such default cannot be cured within said thirty (30) day period then within an additional reasonable period of time so long as Landlord has commenced curative action within said thirty (30) day period and thereafter is diligently attempting to cure such default. In the event that Landlord fails to cure such default within said thirty (30) day period, or within said additional reasonable period of time, Tenant shall have the right to:

(i) Proceed to cure such default and deduct the cost of curing same plus interest thereon at the rate of ten percent (10%) per annum from the next succeeding rental installment(s) due by Tenant to Landlord hereunder; or

(ii) Proceed to cure such default and bring suit against Landlord for the cost of curing same plus interest thereon at the rate of ten percent (10%) per annum.

If any mortgagee of Landlord has given Tenant its address for notices and specifically requests such notice, Tenant agrees to give the notice required hereinabove to such mortgagee at the time Tenant gives same to Landlord, and to accept curative action, if any, undertaken by such mortgagee as if such curative action had been taken by Landlord.

25. **Waiver of Subrogation.** Each party hereto waives any and every claim which arises or may arise in such party's favor against the other party hereto during the term of this Lease for any and all loss of, or damage to, any of such party's property located within or upon, or constituting a part of, the demised premises, which loss or damage is covered by valid and collectible fire and extended coverage insurance policies, to the extent that such loss or damage is recoverable under such insurance policies. Such mutual waivers shall be in addition to, and not in limitation or derogation of, any other waiver or release contained in this Lease with respect to any loss of, or damage to, property of the parties hereto. Inasmuch as such mutual waivers will preclude the assignment of any aforesaid claim by way of subrogation or otherwise to an insurance company (or any other person), each party hereby agrees immediately to give to each insurance company which has issued to such party policies of fire and extended coverage insurance, written notice of the terms of such mutual waivers, and to cause such insurance policies to be properly endorsed, if necessary, to prevent the invalidation of such insurance coverages by reason of such waivers.

26. **Title to Improvements.** Any and all improvements on the demised premises shall become the property of Landlord upon the expiration or termination of this Lease; provided, however: (i) if Tenant is not then in default hereunder, Tenant shall have the right to remove all personal property and trade fixtures owned by Tenant from the demised premises, but Tenant shall be required to repair any damage to the demised premises caused by such removal in a good and workmanlike manner and at Tenant's sole cost and expense; and (ii) Landlord may elect to require Tenant to remove all improvements from the demised premises and restore the demised premises to the condition in which the same existed on the date hereof, in which event Tenant shall promptly perform such removal and restoration in a good and workmanlike manner and at Tenant's sole cost and expense.

27. **Mechanics' and Materialmen's Liens.** Tenant agrees to indemnify and hold Landlord harmless of and from all liability arising out of the filing of any mechanics' or materialmen's liens against the demised premises by reason of any act or omission of Tenant or anyone claiming under Tenant, and Landlord, at Landlord's option, may satisfy such liens and collect the amount expended from Tenant together with interest thereon as provided in paragraph 37 as additional rent; provided, however, that Landlord shall not so satisfy such liens until fifteen (15) days after written notification to Tenant of Landlord's intention to do so and Tenant's failure during such fifteen (15) day period to bond such liens or escrow funds with appropriate parties to protect Landlord's interest in the demised premises.

28. **Title.** Tenant accepts the demised premises subject to: (i) the Base Lease; (ii) the Rules and Regulations; (iii) easements and rights-of-way and (iv) zoning ordinances and other ordinances, laws, statutes or regulations now in effect or hereafter promulgated by any governmental authority having jurisdiction over the demised premises.

29. **Quiet Enjoyment and Subordination.** Landlord covenants, represents and warrants that Landlord has full right and power to execute and perform this Lease and to grant the estate demised herein, and that Tenant, upon payment of the rents herein reserved, and performance of the terms, conditions, covenants and agreements herein contained, shall peaceably and quietly have, hold and enjoy the demised premises during the full term of this Lease; provided, however, that Tenant accepts this Lease subject and subordinate to any recorded mortgage, deed of trust or other lien presently existing upon the demised premises. Landlord further is hereby irrevocably vested with full power and authority by Tenant to subordinate Tenant's interest hereunder to any mortgage, deed of trust or other lien now existing or hereafter placed on the demised premises or to declare this Lease prior and superior to any mortgage, deed of trust or other lien now existing or hereafter placed on the demised premises; provided, however, any such subordination shall be upon the express conditions that (i) this Lease shall be recognized by the mortgagee and that all of the rights of Tenant shall remain in full force and effect during the full term of this Lease on condition that Tenant attorn to the mortgagee, its successors and assigns, and perform all of the covenants and conditions required by the terms of this lease, and (ii) in the event of foreclosure or any enforcement of any such mortgage, the rights of Tenant hereunder shall expressly survive and this Lease shall in all respects continue in full force and effect so long as Tenant shall fully perform all Tenant's obligations hereunder and attorn to the purchaser. Tenant also agrees upon demand to execute further instruments declaring this Lease prior and superior to any mortgage, deed of trust or other lien and specifically providing that this Lease shall survive the foreclosure of such mortgage, deed of trust or other lien.

30. **Rent on Net Return Basis.** Except for the rental due under the Base Lease during the time that AATI is the Landlord hereunder, it is intended that the rent provided for in this Lease shall be an absolutely net return to Landlord for the term of this Lease, free of any loss, expenses or charges with respect to the demised premises, including, without limitation, maintenance, repairs, replacement, insurance, taxes and assessments, and this Lease shall be construed in accordance with and to effectuate such intention.

31. **Holding Over.** Should Tenant, or any of Tenant's successors in interest fail to surrender the demised premises, or any part thereof, on the expiration of the term of this Lease, such holding over shall constitute a tenancy from month to month only terminable at any time by either Landlord or Tenant after thirty (30) days prior written notice to the other, at a monthly rental equal to two hundred percent (200%) of the rent paid for the last month of the term of this Lease.

32. **Waiver of Default.** No waiver by the parties hereto of any default or breach of any term, condition or covenant of this Lease shall be deemed to be a waiver of any subsequent default or breach of the same or any other term, condition or covenant contained herein.

33. **Release of Landlord Upon Transfer.** All of Landlord's personal liability for the performance of the terms and provisions of this Lease (except for any liability accruing prior to such transfer) shall terminate upon a transfer of the demised premises by Landlord, provided that the obligations of Landlord under this Lease are covenants running with the land and shall be binding upon the transferee of Landlord's interest in this Lease and the demised premises.

34. **Attorneys' Fees.** If, on account of any breach or default by Landlord or Tenant of their respective obligations under this Lease, it shall become necessary for the other to employ an attorney to enforce or defend any of such party's rights or remedies hereunder, and should such party prevail, such party shall be entitled to collect reasonable attorneys' fees incurred in such connection from the other party.

35. **Financial Information.** Tenant agrees that Tenant will from time to time upon the written request of Landlord during the term of this Lease furnish to Landlord such credit and banking references as Landlord may reasonably request.

36. **Estoppel Certificates.** Tenant agrees that from time to time, upon not less than ten (10) days' prior written request by Landlord, Tenant will deliver to Landlord a statement in writing certifying that:

A. This Lease is unmodified and in full force and effect (or if there have been modifications, that this Lease as modified is in full force and effect and stating the modifications).

B. The dates to which rent and other charges have been paid.

C. Landlord is not in default under any term or provision of this Lease or if in default the nature thereof in detail in accordance with an exhibit attached thereto.

D. If requested by Landlord, Tenant will not pay rent for more than one (1) month in advance and that this Lease will not be amended without notice to Landlord's mortgagee and that the same will not be terminated without the same notice required by the Lease to be

furnished to Landlord also being furnished to Landlord's mortgagee and Landlord's mortgagee fails to cure such default within the curative period allowed Landlord under this Lease.

Landlord agrees that from time to time, upon not less than ten (10) days' prior written request by Tenant, Landlord will deliver to Tenant a statement in writing certifying that:

A. This Lease is unmodified and in full force and effect (or if there have been modifications, that the Lease as modified is in full force and effect and stating the modifications).

B. The dates to which rent and other charges have been paid.

C. Tenant is not in default under any term or provision of this Lease or if in default the nature thereof in detail in accordance with an exhibit attached thereto.

37. **Interest on Tenant's Obligations and Manner of Payment.** All monetary obligations of Tenant to Landlord under this Lease remaining unpaid ten (10) days after the due date of the same (if no due date has been established under other provisions hereof, the "due date" shall be the date upon which Landlord demands payment from Tenant in writing) shall bear interest at the rate of ten percent (10%) per annum from and after said tenth (10th) day until paid. If more than twice during the term of the Lease Tenant's personal or corporate check is not paid by the bank on which it is drawn for whatever reason, Landlord may require by giving written notice to Tenant that the payment of all future monetary obligations of Tenant under this Lease are to be made on or before the due date by cash, cashier's check, certified check or money order, and the delivery of Tenant's personal or corporate check will no longer constitute payment of such monetary obligations. Any acceptance by Landlord of a personal or corporate check after such notice shall not be deemed or construed as a waiver or estoppel of Landlord to require other payments as required by said notice.

38. **Independent Contractor.** It is understood and agreed that in leasing and operating the demised premises, Tenant is acting as an independent contractor and is not acting as agent, partner, joint venturer or employee of Landlord.

39. **Force Majeure.** In the event performance by Landlord of any term, condition or covenant in this Lease is delayed or prevented by any Act of God, strike, lockout, shortage of material or labor, restriction by any governmental authority, civil riot, flood, or any other cause not within the control of Landlord, the period for performance of such term, condition or covenant shall be extended for a period equal to the period Landlord is so delayed or hindered.

40. **Exhibits.** All exhibits, attachments, annexed instruments and addenda referred to herein shall be considered a part hereof for all purposes with the same force and effect as if copied verbatim herein.

41. **Use of Language.** Words of any gender used in this Lease shall be held and construed to include any other gender, and words in the singular shall be held to include the plural, unless the context otherwise requires.

42. **Captions.** The captions or headings or paragraphs in this Lease are inserted for convenience only, and shall not be considered in construing the provisions hereof if any question of intent should arise.

43. **Successors.** The terms, conditions and covenants contained in this Lease shall apply to, inure to the benefit of, and be binding upon the parties hereto and their respective successors in interest and legal representatives except as otherwise herein expressly provided. All rights, powers, privileges, immunities and duties of Landlord under this Lease, including, but not limited to, any notices required or permitted to be delivered by Landlord to Tenant hereunder, may, at Landlord's option, be exercised or performed by Landlord's agent or attorney.

44. **Severability.** If any provision in this Lease should be held to be invalid or unenforceable, the validity and enforceability of the remaining provisions of this Lease shall not be affected thereby.

45. **Notices.** Any notice or document required or permitted to be delivered hereunder may be delivered in person or shall be deemed to be delivered, whether actually received or not, when deposited in the United States mail, postage prepaid, registered or certified mail, return receipt requested, addressed to the parties at the addresses indicated below, or at such other addresses as may have theretofore been specified by written notice delivered in accordance herewith.

LANDLORD:

TENANT:

Addison Airport of Texas, Inc.
P. O. Box 34067
Dallas, Texas 75234

Bunnell Properties, Inc.
14951 Dallas Parkway, Suite 900
Dallas, Texas 75240

City of Addison, Texas

980-7704

P. O. Box 194

Addison, Texas 75001

46. **Fees or Commissions.** Each party hereto hereby covenants and agrees with the other that such party shall be solely responsible for the payment of any brokers', agents' or finders' fees or commissions agreed to by such party arising from the execution of this Lease or the performance of the terms and provisions contained herein, and such party agrees to indemnify and hold the other party harmless from the payment of any such fees or commissions.

47. **Counterparts.** This Lease may be executed in multiple counterparts, each of which shall be deemed an original, and all of which shall constitute but one and the same instrument.

48. **Governing Law and Venue.** This Lease and all of the transactions contemplated herein shall be governed by and construed in accordance with the laws of the State of Texas, and Landlord and Tenant both irrevocably agree that venue for any dispute concerning this Lease or any of the transactions contemplated herein shall be in any court of competent jurisdiction in Dallas County, Texas.

49. **Entire Agreement and Amendments.** This Lease, consisting of forty-nine (49) paragraphs and Exhibits A through B attached hereto, embodies the entire agreement between Landlord and Tenant and supersedes all prior agreements and understandings, whether written or oral, and all contemporaneous oral agreements and understandings relating to the subject matter hereof. Except as otherwise specifically provided herein, no agreement hereafter made shall be effective to change, modify, discharge or effect an abandonment of this Lease, in whole or in part, unless such agreement is in writing and signed by or in behalf of the party against whom enforcement of the change, modification, discharge or abandonment is sought.

EXECUTED as of the day month and year first above written.

* * * *

The additional provisions contained
in the Addendum attached hereto
are hereby incorporated herein
for all purposes.

* * * *

LANDLORD:

ADDISON AIRPORT OF TEXAS, INC.

By: 

Its: President

CITY OF ADDISON, TEXAS

By: 

Its: _____

TENANT: Bunnell Properties, Inc.

By: 

Its: President

5

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared Henry Stuart
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11 day of October, 1983.

Deborah L. James
Notary Public
Dallas
County, Texas

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared James Liddley
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purpose and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 29th day of November, 1983.

James Sharp
Notary Public
Dallas
County, Texas



STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared David Bunnell
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11 day of October, 1983.

Deborah L. James
Notary Public
Dallas
County, Texas

ADDENDUM TO GROUND LEASE,
dated October 11, 1983,
by and among
the City of Addison, Texas,
Addison Airport of Texas, Inc.
and Bunnell Properties, Inc.

This Addendum is attached to and made a part of the foregoing and above referenced Lease for all purposes. In the event of conflict or inconsistency between the printed portion of this Lease and this Addendum, the terms of this Addendum shall control.

A. The words "general office uses" are added to the list of the purposes for which Tenant may use and occupy the demised premises contained in paragraph 6 of the printed portion of this Lease.

B. To induce Landlord to allow use and occupancy of the demised premises for general office purposes, Tenant agrees to give preference to prospective office tenants whose businesses are aeronautically related (hereinafter referred to as "preferred tenant") conditioned upon (i) availability of space, (ii) willingness of the preferred tenant to pay market rental rates, (iii) the preferred tenant's credit standing favorably comparing to those of other prospective tenants, and (iv) willingness of the preferred tenant to enter into a term of agreement comparable to those offered by other prospective tenants.

C. Landlord agrees to remove the electrical lines and poles presently running along the western boundary of the demised premises.

D. Tenant shall have the option to terminate this Lease by delivering written notice of such election to Landlord before April 30, 1984, if Tenant has been unable to obtain revenue bond financing for the improvements which Tenant proposes to construct on the demised premises. If Tenant does not timely deliver such written notice of election to terminate, all rights of Tenant to terminate this Lease pursuant to the foregoing shall lapse and be null and void.

1824S



ASSIGNMENT OF LEASE

THIS AGREEMENT is made as of this the 1st day of December, 1983, at Addison, Texas, between BUNNELL PROPERTIES, INC., a Texas corporation, hereinafter called "Assignor", and CONCOURSE PLAZA, LTD., a Texas limited partnership, hereinafter called "Assignee".

WHEREAS, a lease executed on October 11, 1983, between CITY OF ADDISON and ADDISON AIRPORT OF TEXAS, INC., as the Lessor, and the Assignor, as the Lessee, by the terms of which certain real property located on the Addison Airport was leased to the Assignor as Lessee upon the terms and conditions provided therein; and

WHEREAS, the Assignor now desires to assign the Lease to the Assignee, and the Assignee desires to accept an assignment thereof;

NOW, THEREFORE, for and in consideration of the sum of Ten and No/100 Dollars (\$10.00), receipt of which is hereby acknowledged, and the agreement of the Assignee, hereinafter set forth, the Assignor hereby assigns and transfers to the Assignee, its successors and assigns, all of its right, title and interest in and to the Lease hereinbefore described, a copy of which is attached hereto as Exhibit "A", and the Assignee hereby agrees to and does accept the assignment, and in addition expressly assumes and agrees to keep, perform and fulfill all the terms, covenants, conditions and obligations required to be kept, performed and fulfilled by the Assignor as the Lessee thereunder, including the making of all payments due to or payable on behalf of the Lessor under said Lease when due and payable.

This Agreement shall be binding on and inure to the benefit of the parties hereto, their heirs, executors, administrators, successors in interest, and assigns.

EXECUTED as of the day and year first above written.

ASSIGNOR:

Bunnell Properties, Inc.

By: 

ASSIGNEE:

Concourse Plaza, Ltd.

By: Bunnell Properties, Inc., Managing
General Partner

By: 

CONSENT OF LESSOR

The undersigned is the Lessor under the Lease described in the foregoing Assignment and hereby consents to the assignment of the Lease to the Assignee, waiving none of their rights thereunder as to the Lessee or the Assignee.

LESSOR:

CITY OF ADDISON

By: 

ADDISON AIRPORT OF TEXAS, INC.

By: 

STATE OF TEXAS §
COUNTY OF DALLAS §

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared David A. Bunnell, known to me to be the person and officer whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same on behalf of Bunnell Properties, Inc., a Texas corporation, for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this 27th day of December, 1983.

Kay F. Robertson Rudick
Notary Public

My Commission Expires:

3-7-84



KAY F. ROBERTSON RUDICK
Notary Public, State of Texas
My Comm. Expires Mar. 7, 1984

STATE OF TEXAS §
COUNTY OF DALLAS §

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared David A. Bunnell, known to me to be the person and officer whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same on behalf of Bunnell Properties, Inc., a Texas corporation, as managing general partner of Concourse Plaza, Ltd., a Texas limited partnership, for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this 27th day of December, 1983.

Kay F. Robertson Rudick
Notary Public

My Commission Expires:

3-7-84



KAY F. ROBERTSON RUDICK
Notary Public, State of Texas
My Comm. Expires Mar. 7, 1984

THE STATE OF TEXAS
COUNTY OF DALLAS

GROUND LEASE

This Ground Lease (hereinafter referred to as the "Lease") is made and entered into as of October 11, 1983, by and among the City of Addison, Texas, a municipal corporation (hereinafter sometimes referred to as the "City"), Addison Airport of Texas, Inc., a Texas Corporation (hereinafter sometimes referred to as "AATI") and Bunnell Properties, Inc., a Texas corporation (hereinafter referred to as "Tenant").

WITNESSETH:

WHEREAS, AATI leases that certain real property (hereinafter referred to as the "demised premises") described in attached Exhibit A from the City pursuant to that certain instrument captioned Agreement for Operation of the Addison Airport (hereinafter referred to as the "Base Lease") between the City and Addison Airport, Inc. (predecessor at AATI); and

WHEREAS, the demised premises are situated at Addison Airport (hereinafter referred to as the "Airport") in Dallas County, Texas, the Airport being delineated in a plat attached hereto as Exhibit B; and

WHEREAS, the City and AATI hereby lease and demise the demised premises to Tenant, and Tenant hereby leases and takes the demised premises from the City and AATI, upon the terms and conditions set forth herein;

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS:

1. **Base Lease:** All of the terms and conditions of the Base Lease are incorporated into this Lease by reference as if written verbatim herein, and Tenant by Tenant's execution hereof acknowledges that AATI has furnished Tenant with a copy of the Base Lease. Tenant agrees to fully comply at all times and in all respects with the terms and conditions of the Base Lease insofar as the same relate to the demised premises and/or the use and operation thereof, except that Tenant shall not be responsible for the payment of any rental due under the Base Lease which shall be paid by AATI.

2. **Definition of Landlord and Effect of Default under the Base Lease:** The term "Landlord" as hereinafter used in this Lease shall mean either AATI or the City. So long as the Base Lease is in effect, AATI shall be entitled to all of the rights, benefits and remedies of the Landlord under this Lease, and shall perform all of the duties, covenants and obligations of the Landlord under this Lease. Upon the expiration or termination of the Base Lease, the City shall be entitled to all of the rights, benefits and remedies of the Landlord under this Lease, and shall perform all of the duties, covenants and obligations of the Landlord under this Lease. The City agrees that (i) until such time as the City notifies Tenant to the contrary in writing, Tenant is fully authorized to make all payments due under this Lease to AATI, and (ii) that default by AATI under the Base Lease shall have no effect on this Lease so long as Tenant pays and performs its duties, covenants and obligations under this Lease.

3. **Term:** This term hereof shall commence on the earlier of October 1, 1984, or the first day of the first calendar month after Tenant completes the construction hereinbelow described and opens for business at the demised premises (the applicable date being hereinafter referred to as the "Commencement Date"), and shall end four hundred eighty (480) months thereafter; provided, however, that any entry upon the demised premises by Tenant prior to the Commencement Date shall be subject to all of the terms and conditions hereof except that rental shall not accrue.

4. **Rental:** Subject to adjustment as hereinbelow provided, Tenant agrees to pay to Landlord, without offset or deduction, rent for the demised premises at the rate of SIXTEEN HUNDRED SEVENTY-SIX AND 07/100----- per month in advance. The first of such monthly installment shall be due and payable on or before the Commencement Date, and a like installment shall be due and payable on or before the first day of each calendar month thereafter during the term hereof.

5. **Adjustment of Rental:** Commencing on the second anniversary of the Commencement Date and on every bi-annual anniversary thereafter (hereinafter referred to as the "Adjustment Date"), the monthly rental due under paragraph 4 shall be adjusted as follows:

(i) A comparison shall be made between the Consumers' price Index-All Items for the Dallas, Texas Metropolitan Area (hereinafter referred to as the "Price Index") as it existed on the Commencement Date and as it exists on the first day of the calendar month preceding the then applicable Adjustment Date.

(ii) The monthly rental for the two (2) year period beginning with and following the then applicable Adjustment Date shall be either increased or decreased, as the case may be, by the percentage of increase or decrease in the Price Index between the Commencement Date and the then applicable Adjustment Date, but in no event shall such monthly rental ever be decreased below the monthly rental set forth in paragraph 4.

(iii) In the event that the Price Index is unavailable for whatever reason for the computations set forth hereinabove, another index approximating the Price Index as closely as feasible shall be substituted therefor.

6. **Use of Demised Premises and Construction of Improvements.** The demised premises shall be used and occupied by Tenant only for the following purposes: sale of aircraft and aircraft parts; aircraft maintenance and repair; aircraft storage; aircraft training; aircraft charter; and aircraft rentals; and not otherwise without the prior written consent of Landlord.

In connection with such use and occupancy, Tenant intends to construct upon the demised premises the improvements depicted in the plans and specifications.

These improvements consist of a combination office/airplane hangar facility containing approximately 42,600 square feet of office space and five airplane hangars, the preliminary plans for which have been prepared by Bogard Architects, Inc. Construction prints to be approved by Addison Municipal Airport prior to the start of construction.

All construction shall be strictly in accordance with such plans and specifications, and such construction shall be performed in a first class, workmanlike manner. Tenant agrees to promptly pay and discharge all costs, expenses, claims for damages, liens and any and all other liabilities and obligations which arise in connection with such construction.

7. **Acceptance of Demised Premises.** Tenant acknowledges that Tenant has fully inspected the demised premises and accepts the demised premises as suitable for the purpose for which the same are leased in their present condition.

8. **Securing Governmental Approvals and Compliance with Law.** Tenant at Tenant's sole cost and expense shall obtain any and all governmental licenses, permits and approvals necessary for the construction of improvements and for the use and occupancy of the demised premises. Tenant shall comply at all times with all governmental laws, ordinances and regulations applicable to the use of the demised premises, and shall promptly comply with all governmental orders and directives for the correction, prevention and abatement of nuisances in or upon, or connected with the demised premises, all at Tenant's sole cost and expense.

9. **Assignment, Subletting and Mortgaging of Leasehold Estate:**

A. Without the prior written consent of Landlord, Tenant may not assign this Lease or any rights of Tenant hereunder (except to a leasehold mortgagee as hereinbelow provided) or sublet the whole or any part of the demised premises. Any assignment or subletting shall be expressly subject to all the terms and provisions of this Lease, including the provisions of paragraph 6 pertaining to the use of the demised premises. In the event of any assignment or subletting, Tenant shall not assign Tenant's rights hereunder or sublet the demised premises without first obtaining a written agreement from each such assignee or sublessee whereby each such assignee or sublessee agrees to be bound by the terms and provisions of this Lease. No such assignment or subletting shall constitute a novation. In the event of the occurrence of an event of default while the demised premises are assigned or sublet, Landlord, in addition to any other remedies provided herein or by law, may at Landlord's option, collect directly from such assignee or subtenant all rents becoming due under such assignment or subletting and apply such rent against any sums due to Landlord hereunder. No direct collection by Landlord from any such assignee or subtenant shall release Tenant from the payment or performance of Tenant's obligations hereunder.

B. Tenant shall have the right to mortgage the leasehold estate of Tenant created hereby in order to secure a mortgage loan for the purpose of obtaining funds for the construction of the improvements described in paragraph 6 or for other construction upon the demised premises approved from time to time by Landlord in writing. In the event that Tenant pursuant to mortgages or deeds of trust mortgages the leasehold estate of Tenant created hereby, the leasehold mortgagee shall in no event become personally liable to perform the obligations of Tenant under this Lease unless and until said mortgagee become the owner of the leasehold estate pursuant to foreclosure, transfer in lieu of foreclosure, or otherwise, and thereafter said leasehold mortgagee shall remain liable for such obligations only so long as such mortgagee remains the owner of the leasehold estate. Notwithstanding the foregoing, it is specifically understood and agreed that no such mortgaging by Tenant and/or any actions taken pursuant to the terms of such mortgage shall ever relieve Tenant of Tenant's obligation to pay the rental due hereunder and otherwise fully perform the terms and conditions of this Lease.

All mortgages or deeds of trust whereby Tenant mortgages the leasehold estate of Tenant created hereby shall contain provisions giving the leasehold mortgagee to give Landlord fifteen (15) days written notice prior to accelerating the debt of Tenant to such mortgagee and/or initiating foreclosure proceedings under said mortgages or deeds of trust, and (ii) allowing Landlord during such fifteen day period to cure Tenant's default and prevent said acceleration and/or foreclosure proceedings, and thereafter at Landlord's expense assume Tenant's position under said mortgages or deeds of trust.

D. Landlord agrees, if and so long as the leasehold estate of Tenant is encumbered by a leasehold mortgage and written notice to such effect has been given to Landlord, to give the holder of such leasehold mortgage at such address or addresses as may be specified in such written notice to Landlord for the giving of notices to the leasehold mortgagee, or as otherwise may be specified by the leasehold mortgagee to Landlord in writing, written notice of any default hereunder by Tenant, simultaneously with the giving of such notice to Tenant, and the holder of any such leasehold mortgage shall have the right, for a period of fifteen (15) days after its receipt of such notice or within any longer period of time specified in such notice, to take such action or to make payment as may be necessary or appropriate to cure any such default so specified, it being the intention of the parties hereto that Landlord shall not exercise Landlord's right to terminate this Lease without first giving any such leasehold mortgagee the notice provided for herein and affording any such leasehold mortgagee the right to cure such default as provided for herein.

E. Landlord further agrees to execute and deliver to any proposed leasehold mortgagee of Tenant a "Non-Disturbance Agreement" wherein Landlord agrees that Landlord will (i) recognize such mortgagee and its successors and assigns after foreclosure, or transfer in lieu of foreclosure, as Tenant hereunder, and (ii) continue to perform all of Landlord's obligations hereunder so long as such mortgagee or its successors and assigns performs all of the obligations of Tenant hereunder. Landlord also agrees to execute and deliver to such proposed leasehold mortgagee any other documents which such proposed leasehold mortgagee may reasonably request concerning the mortgaging by Tenant of the leasehold estate created hereby; provided, however, that Landlord shall never be required to subordinate Landlord's interest in the demised premises to the mortgage of such proposed leasehold mortgagee.

10. Property Taxes and Assessments: Tenant shall pay any and all property taxes or assessments levied or assessed on the improvements on the demised premises, the personal property and fixtures on the demised premises, and, if applicable, upon the leasehold estate of Tenant created hereby. Upon the request of Landlord, Tenant shall from time to time furnish to Landlord's "paid receipts" or other written evidence that all such taxes have been paid by Tenant.

11. Maintenance and Repair of Demised Premises:

A. Tenant shall, throughout the term hereof, maintain in good repair and condition all the demised premises and all fixtures, equipment and personal property on the demised premises and keep them free from waste or nuisance and, at the expiration or termination of this Lease, deliver up the demised premises clean and free of trash and in good repair and condition, with all fixtures and equipment situated in the demised premises in working order, reasonable wear and tear excepted.

B. In the event Tenant shall fail to so maintain the demised premises and the fixtures, equipment and personal property situated thereon, Landlord shall have the right (but not the obligation) to cause all repairs or other maintenance to be made and the reasonable costs therefor expended by Landlord plus interest thereon as provided in paragraph 37 shall be paid by Tenant on demand.

12. Alterations, Additions and Improvement. After completion of the improvements described in paragraph 6, Tenant shall not create any openings in the roof or exterior walls, or make any alterations, additions or improvements to the demised premises without the prior written consent of Landlord. Consent for non-structural alterations, additions or improvements shall not be unreasonably withheld by Landlord. Tenant shall have the right to erect or install shelves, bins, machinery, air conditioning or heating equipment and trade fixtures, provided that Tenant complies with all applicable governmental laws, ordinances and regulations.

All alterations, additions and improvements in and to the demised premises shall be performed in a first class, workmanlike manner, and Tenant shall promptly pay and discharge all costs, expenses, claims for damages, liens and any and all other liabilities and obligations which arise in connection therewith.

13. Insurance. Tenant shall during the term hereof maintain at Tenant's sole cost and expense insurance relating to the demised premises as follows:

(i) Insurance against loss or damage to improvements by fire, lightning, and other risks from time to time included under standard extended coverage policies, and sprinkler, vandalism and malicious mischief, all in amounts sufficient to prevent Landlord or Tenant from becoming co-insurers of any loss under the applicable policies but in any event in amounts not less than eighty percent (80%) of the full insurable value of the demised premises. The term "full insurable value" as used herein means actual replacement value at the time of such loss. Upon request, such replacement value shall be determined by a qualified appraiser, a copy of whose findings shall be submitted to Landlord, and, therefore, proper adjustment in the limits of insurance coverage shall be effected.

(ii) General public liability insurance against claims for bodily injury, death or property damage occurring on, in or about the demised premises, such insurance to afford protection to Landlord of not less than \$500,000.00 with respect to any one person, \$1,000,000.00 with respect to any one accident and not less than \$200,000.00 with respect to property damage.

(iii) Workmen's compensation insurance covering all persons employed by Tenant in connection with any work done on or about the demised premises with respect to which claims for death or bodily injury could be asserted against Landlord or the demised premises, or in lieu of such workmen's compensation insurance, a program of self-insurance complying with the rules, regulations and requirements of the appropriate state agency of the State of Texas.

(iv) If applicable, boiler and pressure vessel insurance on all steam boilers, parts thereof and appurtenances attached or connected thereto which by reason of their use or existence are capable of bursting, erupting, collapsing, imploding or exploding, in the minimum amount of \$100,000.00 for damage to property resulting from such perils.

(v) Such other insurance on improvements in such amounts and against such other insurable hazard which at the time are commonly obtained in the case of property similar to such improvements.

(vi) Hangar keeper's liability insurance providing for coverage in the following limits: \$200,000.00 per aircraft and \$400,000.00 per occurrence on property damage to aircraft in the care, custody or control of Tenant.

(vii) During any period of construction, a Builder's Risk Completed Value policy with an all risks endorsement.

All such policies of insurance (i) shall be issued by insurance companies acceptable to Landlord, (ii) shall name Landlord as an additional insured or loss payee, as the case may be, and (iii) shall provide for at least ten (10) days written notice to Landlord prior to cancellation or modification. Tenant shall provide Landlord with duplicate originals of all insurance policies required by this paragraph.

14. Casualty Damage or Destruction:

A. In case of any damage to or destruction of the buildings, structures and equipment on the demised premises, or any part thereof, Tenant will promptly give written notice thereof to Landlord, generally describing the nature and extent of such damage and/or destruction.

B. In case of any damage to or destruction of the buildings, structures and equipment on the demised premises, or any part thereof, Tenant, whether or not the insurance proceeds, if any, payable on account of such damage and/or destruction shall be sufficient for such purpose, at Tenant's sole cost, risk and expense will promptly commence and complete the restoration, repair and replacement of said buildings, structures and equipment as nearly as possible to their value, condition and character immediately prior to such damage and/or destruction, with such alterations in and additions thereto as may be approved in writing by Landlord (hereinafter sometimes referred to as the "Restoration").

C. All insurance proceeds, if any, payable on account of such damage to or destruction of the buildings, structures and equipment on the demised premises shall be held by Landlord. Landlord shall be protected in acting upon any certificate believed by Landlord to be genuine and to have been executed by the proper party and shall receive such certificate as conclusive evidence of any fact or as to any matter therein set forth. Such certificate shall be full warranty, authority and protection to Landlord in acting thereon, and Landlord shall be under no duty to take any action other than as set forth in this paragraph 14.

D. Insurance proceeds received by Landlord on account of any damage to or destruction of the buildings, structures and equipment on the demised premises, or any part thereof (less the costs, fees and expenses incurred by Landlord and Tenant in the collection thereof, including, without limitation, adjuster's and attorney's fees and expenses) shall be applied as follows:

(i) Net insurance proceeds as above defined shall be paid to Tenant or as Tenant may direct from time to time as Restoration progresses to pay (or reimburse Tenant for) the cost of Restoration, upon written request of Tenant to Landlord accompanied by (a) certificate of a supervising architect or engineer approved by Landlord, describing in reasonable detail the work and material in question and the cost thereof, stating that the same were necessary or appropriate to the Restoration and constitute a complete part thereof, and that no part of the cost thereof has theretofore been reimbursed, and specifying the additional amount, if any, necessary to complete the Restoration, and (b) an opinion of counsel satisfactory to Landlord that there exist no mechanics', materialmen's or similar liens for labor or materials except such, if any, as are discharged by the payment of the amount requested.

(ii) Upon receipt by Landlord of evidence of the character required by the foregoing clauses (i)(a) and (b) that Restoration has been completed and the cost thereof paid in full, and that there are no mechanics', materialmen's or similar liens for labor or materials supplied in connection therewith, the balance, if any, of such proceeds shall be paid to Tenant or as Tenant may direct.

E. In the event that Tenant does not promptly commence Restoration, or after commencement Tenant does not diligently proceed to the completion of same, Landlord shall have the right to commence or complete Restoration after Landlord has given Tenant thirty (30) days prior written notice requesting the commencement of Restoration or that Tenant diligently proceeds to the completion of same. If Tenant during such thirty (30) day period does not so commence or proceed to diligently complete Restoration, in such event, Landlord shall retain the insurance proceeds, and Tenant shall pay any deficiency if such proceeds are not sufficient for Restoration.

15. Condemnation:

A. If during the term hereof, any part of the demised premises shall be acquired or condemned by eminent domain for any public or quasi-public use or purpose, or are sold to a condemning authority under threat of condemnation; and after such taking by or sale to said condemning authority the remainder of the demised premises is not susceptible to efficient and economic occupation and operation by Tenant, this Lease shall automatically terminate as of the date that said condemning authority takes possession of the demised premises, and Landlord shall refund to Tenant any prepaid but unaccrued rental less any sum then owing by Tenant to Landlord.

B. If after such taking by or sale to said condemning authority the remainder of the demised premises is susceptible to efficient and economic occupation and operation by Tenant, this Lease shall not terminate but the rental due hereunder shall be adjusted so that Tenant shall be required to pay for the remainder of the term hereof the sum obtained by multiplying each monthly rental installment due hereunder, as adjusted from time to time pursuant to paragraph 5, by a fraction, the numerator of which shall be the number of square feet remaining in the demised premises after the taking by or sale to said condemning authority and denominator of which shall be the square footage originally contained in the demised premises. The rental adjustment called for herein shall not commence until said condemning authority actually takes possession of the condemned portion of the demised premises.

C. If this Lease is not terminated pursuant to Section A, Tenant shall promptly restore the improvements on the demised premises, and the condemnation proceeds to which Landlord and Tenant are entitled shall be awarded and paid first to cover the costs and expenses for restoring the remaining portion of the demised premises to a condition susceptible to efficient and economic occupation and operation by Tenant, and any remaining proceeds to which Landlord and Tenant are entitled shall be awarded and paid to Landlord and Tenant, as their interest may appear. If this Lease is terminated pursuant to Section A, condemnation proceeds to which Landlord and Tenant are entitled shall be awarded and paid to Landlord and Tenant as their interests may appear.

16. Utilities. Tenant shall be responsible at Tenant's sole cost and expense for obtaining all utility connections at or for the demised premises and Tenant shall pay all charges for water, electricity, gas, sewer, telephone or any other utility connections, tap-in fees and services furnished to the demised premises during the term hereof. Landlord shall in no event be liable or responsible for any cessation or interruption in any such utility services.

17. Common Facilities. Tenant and Tenant's employees, agents, servants, customers and other invitees shall have the non-exclusive right to use all common facilities, improvements, equipment and services which may now exist or which may hereafter be provided by Landlord for the accommodation and convenience of Landlord's customers and tenants, including landing and takeoff facilities, means of ingress and egress to the demised premises, other airport installations, and all other reasonable services which may be provided without charge from time to time by Landlord in operating the Airport. All such common facilities shall at all times be under the exclusive control and management of Landlord and may be rearranged, modified, changed or terminated from time to time at Landlord's sole discretion.

18. Rules and Regulations. Landlord has adopted Rules and Regulations (hereinafter referred to as the "Rules and Regulations") which shall govern Tenant in the use of the demised premises and all common facilities, a copy of which has been furnished to Tenant. The Rules and Regulations are incorporated by reference as if written verbatim herein, and Tenant agrees to comply fully at all times with the Rules and Regulations. Landlord shall have the right to amend, notify and alter the Rules and Regulations from time to time in a reasonable manner for the purpose of assuring the safety, welfare and convenience of Landlord, Tenant and all other Tenants and customers of the Airport.

19. Signs and Equipment. After first securing Landlord's approval which will not be unreasonably withheld, Tenant shall have the right from time to time to install and operate advertising signs and radio, communications, meteorological, aerial navigation and other equipment and facilities in or on the demised premises that may be reasonably necessary for the operation of Tenant's business.

20. Landlord's Right of Entry. Landlord and Landlord's authorized representatives shall have the right, during the normal business hours, to enter the demised premises (i) to inspect the general condition and state of repair thereof, (ii) to make repairs permitted under this Lease, (iii) to show the demised premises to any prospective tenant or purchaser or (iv) for any other reasonable and lawful purpose.

During the final one hundred eighty (180) days of the term hereof, Landlord and Landlord's authorized representatives shall have the right to erect and maintain on or about the demised premises customary signs advertising the demised premises for lease or for sale.

21. Indemnity and Exculpation:

A. Landlord shall not be liable to Tenant or to Tenant's employees, agents, servants, customers, invitees, or to any other person whomsoever, for any injury to persons or damage to property on or about the demised premises or any adjacent area owned by Landlord caused by the negligence or misconduct of Tenant, Tenant's employees, servants, customers, invitees, subtenants, licensees or concessionaires or any other person entering the demised premises under express or implied invitation of Tenant, or arising out of the use of the demised premises by Tenant and the conduct of Tenant's business thereon, or arising out of any breach or default by Tenant in the performance of Tenant's obligations hereunder; and Tenant hereby agrees to indemnify Landlord and hold Landlord harmless from any loss, expense or claims arising out of such damage or injury.

B. Landlord and Landlord's agents and employees shall not be liable to Tenant for any injury to persons or damage to property resulting from the demised premises becoming out of repair or by defect in or failure of equipment, pipes, or wiring, or broken glass, or by the backing up of drains, or by gas, water, steam, electricity or oil leaking, escaping or flowing into the demised premises, regardless of the source, or dampness or by fire, explosion, falling plaster or ceiling or for any other reason whatsoever. Landlord shall not be liable to Tenant for any loss or damage that may be occasioned by or through the acts or omissions of other tenants of Landlord or caused by operations in construction of any private, public or quasi-public work, or of any other persons whomsoever, excepting only duly authorized agents and employees of Landlord.

22. Default by Tenant. The following events shall be deemed to be events of default by Tenant under this Lease:

A. Failure of Tenant to pay any installment of rent or any other sum payable to Landlord hereunder on the date that same is due and such failure shall continue for a period of ten (10) days.

B. Failure of Tenant to comply with any term, condition or covenant of this Lease, other than the payment of rent or other sum of money, and such failure shall not be cured within thirty (30) days after written notice thereof to Tenant.

C. Insolvency, the making of a transfer in fraud of creditors, or the making of an assignment for the benefit of creditors by Tenant or any guarantor of Tenant's obligations.

D. Filing of a petition under any section or chapter of the National Bankruptcy Act, as amended, or under any similar law or statute of the United States or any State thereof by Tenant or any guarantor of Tenant's obligations, or adjudication as a bankrupt or insolvent in proceedings filed against Tenant or such guarantor.

E. Appointment of a receiver or trustee for all or substantially all of the assets of Tenant or any guarantor of Tenant's obligations.

F. Abandonment by Tenant of any substantial portion of the demised premises or cessation of use of the demised premises for the purpose leased.

23. Remedies of Landlord. Upon the occurrence of any of the events of default listed in paragraph 22, Landlord shall have the option to pursue any one or more of the following remedies without the notice or demand whatsoever:

A. Terminate this Lease, in which event Tenant shall immediately surrender the demised premises to Landlord. If Tenant fails to so surrender the demised premises, Landlord may, without prejudice to any other remedy which Landlord may have for possession of the demised premises or arrearages in rent, enter upon and take possession of the demised premises and expel or remove Tenant and any other person who may be occupying the demised premises or any part thereof, without being liable for prosecution or any claim for damages therefor. Tenant shall pay to Landlord on demand the amount of all loss and damages which Landlord may suffer by reason of such termination, whether through inability to relet the demised premises on satisfactory terms or otherwise.

B. Terminate this Lease, in which event Tenant shall immediately surrender the demised premises to Landlord. If Tenant fails to so surrender the demised premises, Landlord may, without prejudice to any other remedy which Landlord may have for possession of the demised premises or arrearages in rent, enter upon and take possession of the demised premises and expel or remove Tenant and any other person who may be occupying the demised premises or any part thereof, without being liable for prosecution or any claim for damages therefor. Landlord shall pay to Landlord on the date of such termination damages in any amount equal to the excess, if any, of the total amount of all monthly rental and other amounts to be paid by Tenant to Landlord hereunder for the period which would otherwise have constituted the unexpired portion of the term of this Lease over the then fair market rental value of the demised premises for such unexpired portion of the term of this Lease.

C. Enter upon and take possession of the demised premises without terminating this Lease and without being liable for prosecution or for any claim for damages therefor, and expel or remove Tenant and any other person who may be occupying the demised premises or any part thereof. Landlord may relet the demised premises and receive the rent therefor. Tenant agrees to pay to Landlord monthly rent on

demand from time to time any deficiency that may arise by reason of any such reletting. In determining the amount of such deficiency, brokerage commissions, attorneys' fees, remodeling expenses and other costs of reletting shall be subtracted from the amount of rent received under such reletting.

D. Enter upon the demised premises without terminating this Lease and without being liable for prosecution or for any claim for damages therefor, and do whatever Tenant is obligated to do under the terms of this Lease. Tenant agrees to pay Landlord on demand for expenses which Landlord may incur in thus effecting compliance with Tenant's obligations under this Lease, together with interest thereon at the rate of ten percent (10%) per annum from the date expended until paid. Landlord shall not be liable for any damages resulting to Tenant from such action, whether caused by negligence of Landlord or otherwise.

Pursuit of any of the foregoing remedies shall not preclude pursuit of any of the other remedies herein provided or any other remedies provided by law, nor shall pursuit of any remedy herein provided constitute a forfeiture or waiver of any rent due to Landlord hereunder or of any damages accruing to Landlord by reason of the violation of any of the terms, conditions and covenants herein contained.

24. **Default by Landlord.** No default by Landlord hereunder shall constitute an eviction or disturbance of Tenant's use and possession of the demised premises or render Landlord liable for damages or entitle Tenant to be relieved from any of Tenant's obligations hereunder (including the obligation to pay rent) or grant Tenant any right of deduction, abatement, set-off or recoupment or entitle Tenant to take any action whatsoever with regard to the demised premises or Landlord until thirty (30) days after Tenant has given Landlord written notice specifically setting forth such default by Landlord, and Landlord has failed to cure such default within said thirty (30) day period, or in the event such default cannot be cured within said thirty (30) day period then within an additional reasonable period of time so long as Landlord has commenced curative action within said thirty (30) day period and thereafter is diligently attempting to cure such default. In the event that Landlord fails to cure such default within said thirty (30) day period, or within said additional reasonable period of time, Tenant shall have the right to:

(i) Proceed to cure such default and deduct the cost of curing same plus interest thereon at the rate of ten percent (10%) per annum from the next succeeding rental installment(s) due by Tenant to Landlord hereunder; or

(ii) Proceed to cure such default and bring suit against Landlord for the cost of curing same plus interest thereon at the rate of ten percent (10%) per annum.

If any mortgagee of Landlord has given Tenant its address for notices and specifically requests such notice, Tenant agrees to give the notice required hereinabove to such mortgagee at the time Tenant gives same to Landlord, and to accept curative action, if any, undertaken by such mortgagee as if such curative action had been taken by Landlord.

25. **Waiver of Subrogation.** Each party hereto waives any and every claim which arises or may arise in such party's favor against the other party hereto during the term of this Lease for any and all loss of, or damage to, any of such party's property located within or upon, or constituting a part of, the demised premises, which loss or damage is covered by valid and collectible fire and extended coverage insurance policies, to the extent that such loss or damage is recoverable under such insurance policies. Such mutual waivers shall be in addition to, and not in limitation or derogation of, any other waiver or release contained in this Lease with respect to any loss of, or damage to, property of the parties hereto. Inasmuch as such mutual waivers will preclude the assignment of any aforesaid claim by way of subrogation or otherwise to an insurance company (or any other person), each party hereby agrees immediately to give to each insurance company which has issued to such party policies of fire and extended coverage insurance, written notice of the terms of such mutual waivers, and to cause such insurance policies to be properly endorsed, if necessary, to prevent the invalidation of such insurance coverages by reason of such waivers.

26. **Title to Improvements.** Any and all improvements on the demised premises shall become the property of Landlord upon the expiration or termination of this Lease; provided, however: (i) If Tenant is not then in default hereunder, Tenant shall have the right to remove all personal property and trade fixtures owned by Tenant from the demised premises, but Tenant shall be required to repair any damage to the demised premises caused by such removal in a good and workmanlike manner and at Tenant's sole cost and expense; and (ii) Landlord may elect to require Tenant to remove all improvements from the demised premises and restore the demised premises to the condition in which the same existed on the date hereof, in which event Tenant shall promptly perform such removal and restoration in a good and workmanlike manner and at Tenant's sole cost and expense.

27. **Mechanics' and Materialmen's Liens.** Tenant agrees to indemnify and hold Landlord harmless of and from all liability arising out of the filing of any mechanics' or materialmen's liens against the demised premises by reason of any act or omission of Tenant or anyone claiming under Tenant, and Landlord, at Landlord's option, may satisfy such liens and collect the amount expended from Tenant together with interest thereon as provided in paragraph 37 as additional rent; provided, however, that Landlord shall not so satisfy such liens until fifteen (15) days after written notification to Tenant of Landlord's intention to do so and Tenant's failure during such fifteen (15) day period to bond such liens or escrow funds with appropriate parties to protect Landlord's interest in the demised premises.

28. **Title.** Tenant accepts the demised premises subject to: (i) the Base Lease; (ii) the Rules and Regulations; (iii) easements and rights-of-way and (iv) zoning ordinances and other ordinances, laws, statutes or regulations now in effect or hereafter promulgated by any governmental authority having jurisdiction over the demised premises.

29. **Quiet Enjoyment and Subordination.** Landlord covenants, represents and warrants that Landlord has full right and power to execute and perform this Lease and to grant the estate demised herein, and that Tenant, upon payment of the rents herein reserved, and performance of the terms, conditions, covenants and agreements herein contained, shall peaceably and quietly have, hold and enjoy the demised premises during the full term of this Lease; provided, however, that Tenant accepts this Lease subject and subordinate to any recorded mortgage, deed of trust or other lien presently existing upon the demised premises. Landlord further is hereby irrevocably vested with full power and authority by Tenant to subordinate Tenant's interest hereunder to any mortgage, deed of trust or other lien now existing or hereafter placed on the demised premises or to declare this Lease prior and superior to any mortgage, deed of trust or other lien now existing or hereafter placed on the demised premises; provided, however, any such subordination shall be upon the express conditions that (i) this Lease shall be recognized by the mortgagee and that all of the rights of Tenant shall remain in full force and effect during the full term of this Lease on condition that Tenant attorn to the mortgagee, its successors and assigns, and perform all of the covenants and conditions required by the terms of this lease, and (ii) in the event of foreclosure or any enforcement of any such mortgage, the rights of Tenant hereunder shall expressly survive and this Lease shall in all respects continue in full force and effect so long as Tenant shall fully perform all Tenant's obligations hereunder and attorn to the purchaser. Tenant also agrees upon demand to execute further instruments declaring this Lease prior and superior to any mortgage, deed of trust or other lien and specifically providing that this Lease shall survive the foreclosure of such mortgage, deed of trust or other lien.

30. **Rent on Net Return Basis.** Except for the rental due under the Base Lease during the time that AATI is the Landlord hereunder, it is intended that the rent provided for in this Lease shall be an absolutely net return to Landlord for the term of this Lease, free of any loss, expenses or charges with respect to the demised premises, including, without limitation, maintenance, repairs, replacement, insurance, taxes and assessments, and this Lease shall be construed in accordance with and to effectuate such intention.

31. **Holding Over.** Should Tenant, or any of Tenant's successors in interest fail to surrender the demised premises, or any part thereof, on the expiration of the term of this Lease, such holding over shall constitute a tenancy from month to month only terminable at any time by either Landlord or Tenant after thirty (30) days prior written notice to the other, at a monthly rental equal to two hundred percent (200%) of the rent paid for the last month of the term of this Lease.

32. **Waiver of Default.** No waiver by the parties hereto of any default or breach of any term, condition or covenant of this Lease shall be deemed to be a waiver of any subsequent default or breach of the same or any other term, condition or covenant contained herein.

33. **Release of Landlord Upon Transfer.** All of Landlord's personal liability for the performance of the terms and provisions of this Lease (except for any liability accruing prior to such transfer) shall terminate upon a transfer of the demised premises by Landlord, provided that the obligations of Landlord under this Lease are covenants running with the land and shall be binding upon the transferee of Landlord's interest in this Lease and the demised premises.

34. **Attorneys' Fees.** If, on account of any breach or default by Landlord or Tenant of their respective obligations under this Lease, it shall become necessary for the other to employ an attorney to enforce or defend any of such party's rights or remedies hereunder, and should such party prevail, such party shall be entitled to collect reasonable attorneys' fees incurred in such connection from the other party.

35. **Financial Information.** Tenant agrees that Tenant will from time to time upon the written request of Landlord during the term of this Lease furnish to Landlord such credit and banking references as Landlord may reasonably request.

36. **Estoppel Certificates.** Tenant agrees that from time to time, upon not less than ten (10) days' prior written request by Landlord, Tenant will deliver to Landlord a statement in writing certifying that:

A. This Lease is unmodified and in full force and effect (or if there have been modifications, that this Lease as modified is in full force and effect and stating the modifications).

B. The dates to which rent and other charges have been paid.

C. Landlord is not in default under any term or provision of this Lease or if in default the nature thereof in detail in accordance with an exhibit attached thereto.

D. If requested by Landlord, Tenant will not pay rent for more than one (1) month in advance and that this Lease will not be amended without notice to Landlord's mortgagee and that the same will not be terminated without the same notice required by the Lease to be

furnished to Landlord also being furnished to Landlord's mortgagee and Landlord's mortgagee fails to cure such default within the curative period allowed Landlord under this Lease.

Landlord agrees that from time to time, upon not less than ten (10) days' prior written request by Tenant, Landlord will deliver to Tenant a statement in writing certifying that:

A. This Lease is unmodified and in full force and effect (or if there have been modifications, that the Lease as modified is in full force and effect and stating the modifications).

B. The dates to which rent and other charges have been paid.

C. Tenant is not in default under any term or provision of this Lease or if in default the nature thereof in detail in accordance with an exhibit attached thereto.

37. Interest on Tenant's Obligations and Manner of Payment. All monetary obligations of Tenant to Landlord under this Lease remaining unpaid ten (10) days after the due date of the same (if no due date has been established under other provisions hereof, the "due date" shall be the date upon which Landlord demands payment from Tenant in writing) shall bear interest at the rate of ten percent (10%) per annum from and after said tenth (10th) day until paid. If more than twice during the term of the Lease Tenant's personal or corporate check is not paid by the bank on which it is drawn for whatever reason, Landlord may require by giving written notice to Tenant that the payment of all future monetary obligations of Tenant under this Lease are to be made on or before the due date by cash, cashier's check, certified check or money order, and the delivery of Tenant's personal or corporate check will no longer constitute payment of such monetary obligations. Any acceptance by Landlord of a personal or corporate check after such notice shall not be deemed or construed as a waiver or estoppel of Landlord to require other payments as required by said notice.

38. Independent Contractor. It is understood and agreed that in leasing and operating the demised premises, Tenant is acting as an independent contractor and is not acting as agent, partner, joint venturer or employee of Landlord.

39. Force Majeure. In the event performance by Landlord of any term, condition or covenant in this Lease is delayed or prevented by any Act of God, strike, lockout, shortage of material or labor, restriction by any governmental authority, civil riot, flood, or any other cause not within the control of Landlord, the period for performance of such term, condition or covenant shall be extended for a period equal to the period Landlord is so delayed or hindered.

40. Exhibits. All exhibits, attachments, annexed instruments and addenda referred to herein shall be considered a part hereof for all purposes with the same force and effect as if copied verbatim herein.

41. Use of Language. Words of any gender used in this Lease shall be held and construed to include any other gender, and words in the singular shall be held to include the plural, unless the context otherwise requires.

42. Captions. The captions or headings or paragraphs in this Lease are inserted for convenience only, and shall not be considered in construing the provisions hereof if any question of intent should arise.

43. Successors. The terms, conditions and covenants contained in this Lease shall apply to, inure to the benefit of, and be binding upon the parties hereto and their respective successors in interest and legal representatives except as otherwise herein expressly provided. All rights, powers, privileges, immunities and duties of Landlord under this Lease, including, but not limited to, any notices required or permitted to be delivered by Landlord to Tenant hereunder, may, at Landlord's option, be exercised or performed by Landlord's agent or attorney.

44. Severability. If any provision in this Lease should be held to be invalid or unenforceable, the validity and enforceability of the remaining provisions of this Lease shall not be affected thereby.

45. Notices. Any notice or document required or permitted to be delivered hereunder may be delivered in person or shall be deemed to be delivered, whether actually received or not, when deposited in the United States mail, postage prepaid, registered or certified mail, return receipt requested, addressed to the parties at the addresses indicated below, or at such other addresses as may have theretofore been specified by written notice delivered in accordance herewith.

LANDLORD:

TENANT:

Addison Airport of Texas, Inc.
P. O. Box 34067
Dallas, Texas 75234

City of Addison, Texas

P. O. Box 194

Addison, Texas 75001

Bunnell Properties, Inc.
14951 Dallas Parkway, Suite 900
Dallas, Texas 75240

980-7704

46. Fees or Commissions. Each party hereto hereby covenants and agrees with the other that such party shall be solely responsible for the payment of any brokers', agents' or finders' fees or commissions agreed to by such party arising from the execution of this Lease or the performance of the terms and provisions contained herein, and such party agrees to indemnify and hold the other party harmless from the payment of any such fees or commissions.

47. Counterparts. This Lease may be executed in multiple counterparts, each of which shall be deemed an original, and all of which shall constitute but one and the same instrument.

48. Governing Law and Venue. This Lease and all of the transactions contemplated herein shall be governed by and construed in accordance with the laws of the State of Texas, and Landlord and Tenant both irrevocably agree that venue for any dispute concerning this Lease or any of the transactions contemplated herein shall be in any court of competent jurisdiction in Dallas County, Texas.

49. Entire Agreement and Amendments. This Lease, consisting of forty-nine (49) paragraphs and Exhibits A through B attached hereto, embodies the entire agreement between Landlord and Tenant and supersedes all prior agreements and understandings, whether written or oral, and all contemporaneous oral agreements and understandings relating to the subject matter hereof. Except as otherwise specifically provided herein, no agreement hereafter made shall be effective to change, modify, discharge or effect an abandonment of this Lease, in whole or in part, unless such agreement is in writing and signed by or in behalf of the party against whom enforcement of the change, modification, discharge or abandonment is sought.

EXECUTED as of the day month and year first above written.

The additional provisions contained
in the Addendum attached hereto
are hereby incorporated herein
for all purposes.

LANDLORD:

ADDISON AIRPORT OF TEXAS, INC.

By: 

Its: President

CITY OF ADDISON, TEXAS

By: 

Its: Mayor

TENANT: Bunnell Properties, Inc.

By: 

Its: President

5

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared Henry Stuart
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11 day of October, 19 83.

Dorothy L. James
Notary Public
Dallas
County, Texas

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared Henry Redding
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purpose and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 22nd day of November, 19 83.



Jaqueline Sharp
Notary Public
Dallas
County, Texas

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared David Bunnett
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11 day of October, 19 83.

Dorothy L. James
Notary Public
Dallas
County, Texas

ADDENDUM TO GROUND LEASE,
dated October 11, 1983,
by and among
the City of Addison, Texas,
Addison Airport of Texas, Inc.
and Bunnell Properties, Inc.

This Addendum is attached to and made a part of the foregoing and above referenced Lease for all purposes. In the event of conflict or inconsistency between the printed portion of this Lease and this Addendum, the terms of this Addendum shall control.

A. The words "general office uses" are added to the list of the purposes for which Tenant may use and occupy the demised premises contained in paragraph 6 of the printed portion of this Lease.

B. To induce Landlord to allow use and occupancy of the demised premises for general office purposes, Tenant agrees to give preference to prospective office tenants whose businesses are aeronautically related (hereinafter referred to as "preferred tenant") conditioned upon (i) availability of space, (ii) willingness of the preferred tenant to pay market rental rates, (iii) the preferred tenant's credit standing favorably comparing to those of other prospective tenants, and (iv) willingness of the preferred tenant to enter into a term of agreement comparable to those offered by other prospective tenants.

C. Landlord agrees to remove the electrical lines and poles presently running along the western boundary of the demised premises.

D. Tenant shall have the option to terminate this Lease by delivering written notice of such election to Landlord before April 30, 1984, if Tenant has been unable to obtain revenue bond financing for the improvements which Tenant proposes to construct on the demised premises. If Tenant does not timely deliver such written notice of election to terminate, all rights of Tenant to terminate this Lease pursuant to the foregoing shall lapse and be null and void.

1824S

2
404918-K (176)
69

THIS INSTRUMENT OF BEING RE-FILED TO REPLACE A NEW
EXHIBIT "C", TO ADD EXHIBIT'S "A" AND "B" AND TO
REFLECT ALL CHANGES AS TO EXHIBIT "C"-ATTACHMENT-3.

STATE OF TEXAS §
§
COUNTY OF DALLAS §
SETTLEMENT AND FIRST AMENDMENT
TO LEASE AGREEMENT 2140412
11/03/97 728168 \$27.00

This Settlement and First Amendment to Lease Agreement (the "Agreement") is made and entered into this 22 day of April, 1997 by and between the Town of Addison, Texas (the "City"), Addison Airport of Texas, Inc. ("AATI") (the City and AATI are hereinafter referred to together as the "Landlord"), and Concourse Plaza, Ltd., a Texas limited partnership (the "Tenant"). 2470809

WHEREAS, Landlord and Bunnell Properties, Inc., Tenant's predecessor in interest, entered into a Ground Lease dated October 11, 1983 (copy attached as Exhibit A and hereinafter referred to as the "Ground Lease") of certain real property (the "demised premises" as defined and described in the Ground Lease, and herein referred to as the "Original Demised Premises") located within the Addison Airport and adjacent to Keller Springs Road; and

WHEREAS, the rights, duties and obligations of Bunnell Properties, Inc. under the Ground Lease were assigned to Tenant by that Assignment of Lease dated December 1, 1983 (copy attached as Exhibit B); and

WHEREAS, a portion of the Original Demised Premises is to be taken (the "Part Taken", and being Area B on Attachment A to Exhibit C attached hereto and incorporated herein) by the Texas Turnpike Authority for the purpose of constructing a toll tunnel under the Addison Airport in order to connect the eastern and western termini of Keller Springs Road (the "Toll Tunnel Project"); and

WHEREAS, as a result of the taking of the Part Taken by the TTA for the Toll Tunnel Project, Landlord and Tenant desire to amend the Ground Lease by amending the description of the Original Demised Premises to provide for a continuation of the Ground Lease; and

WHEREAS, Landlord and Tenant acknowledge and agree that in the absence of their cooperation and agreement as set forth herein, the TTA would exercise its power of eminent domain to acquire the Part Taken; and

WHEREAS, in order to expedite the Toll Tunnel Project and to avoid the costs, expenses and inconvenience of prosecuting an eminent domain lawsuit, Landlord and Tenant have worked together to reach a full and final agreement and settlement of all issues regarding the interests of Landlord and Tenant in the demised premises and the extent of damages incurred by Tenant as a result of the Toll Tunnel Project, the terms of which agreement and settlement are set forth herein.

NOW, THEREFORE, for and in consideration of the mutual promises and covenants hereinafter set forth, the benefits flowing to the parties hereto, and other good

Settlement and First Amendment
To Lease Agreement - Page 1

97214 02291

97247 03370

and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by both parties, Landlord and Tenant contract and agree as follows:

1. **Incorporation of premises.** The above and foregoing premises are true and correct and are incorporated herein and made a part hereof for all purposes.
2. **Amendment to Ground Lease.** The Ground Lease is hereby modified and amended as follows:
 - A. **Demised Premises:** Exhibit A to the Ground Lease, being the description of the Original Demised Premises, is amended to read as set forth in Exhibit C (the "Amended Demised Premises") attached hereto and incorporated herein. ^{**new re-filed Exhibit "C" and as shown on Exhibit "C" - attachment 1.}
 - B. Except to the extent modified or amended herein, all other terms and obligations of the Ground Lease shall remain unchanged and in full force and effect.
3. **Landscaping.** As a result of the Toll Tunnel Project, a portion of the landscaping along the most northerly property line of the demised premises (and being adjacent to the proposed Keller Springs right-of-way) will be damaged. In conjunction with the construction of the Toll Tunnel Project, the City shall, at its sole cost and expense, replace the damaged landscaping along the Keller Springs right-of-way line to as good a condition as before the construction of the Toll Tunnel Project. Trees that require removal as a result of the Toll Tunnel Project will be replaced with 6-8 inch (measured 4 feet from the ground) caliper trees of similar type. Upon completion of the Toll Tunnel Project, the City will restore irrigation to cover the entire greenway between the parking lot and the southern curb of Keller Springs.
4. **Curbing and Parking.** City shall add curbs and stripe the parking lot at its sole cost and expense. Tenant shall have the right to approve curbing and striping before it is started, provided such approval shall not be unreasonably withheld. Parking spaces shall be a minimum 9'x18'.
5. **Access.** The City shall not block access to the rear of the building. The Demised Premises will not be used for general access to the Airport during the period that Keller Springs is not usable or during any construction period.
6. **Dumpster.** The City will relocate the dumpster enclosure at its sole cost and expense. Tenant shall have the right to approve the location of the dumpster enclosure. The dumpster enclosure shall be constructed using brick and shall retain its current appearance.

Settlement and First Amendment
To Lease Agreement - Page 2

97247 03371

97214 02292

7. **Release; Indemnity.** Tenant does hereby fully and completely compromise, settle, remise, release and forever discharge Landlord of and from any and all claims, actions, causes of action, liability or lawsuit of any kind whatsoever (including any claim, action, cause of action, or lawsuit for any fees, costs or expenses), known or unknown, in law or in equity, which Tenant has or may have against either Landlord relating to, in whole or in part, the value of or damages to the Original Demised Premises, or any part thereof, as a result of the taking of the Part Taken for the Toll Tunnel Project.

Tenant shall indemnify the City and AATI, their officials, officers, employees and agents against, and hold the City and AATI, their officials, officers, employees and agents harmless from, any and all costs, expenses, charges or fees in the event any person ever institutes suit or files a claim against the City or AATI with respect to the value of or damages to the Original Demised Premises, or any part thereof, as a result of the taking of the Part Taken for the Toll Tunnel Project; such indemnification shall include, but is not limited to, the amounts of said claims, and the cost of defending them, including attorneys fees and court costs. The provisions of this Paragraph 7 shall survive the termination of this Agreement.

8. **Landlord Indemnity.** The City shall, at its own cost and expense, defend, indemnify and hold harmless the Tenant, its directors, officers, partners, agents, employees and assigns, and successors in interest, from and against any and all liability, damages, losses, claims, demands, actions, causes of action, costs including reasonable attorneys' fees and expenses (including reasonable attorneys' fees and expenses on appeal), or any of them, resulting from the death or injury to persons (including employees of Landlord) or damage to any property, caused by the construction of the Toll Tunnel Project.

Landlord shall, at its own cost and expense, reimburse Tenant for any and all costs and expenses (including property replacements costs) arising from damage to or loss of Tenant's property or third party property at Concourse Plaza caused by the construction of the Toll Tunnel Project.

9. **Miscellaneous.**
- A. **Governing Law; Venue.** This Agreement shall be construed under, and in accordance with, the laws of the State of Texas, and all obligations of the parties created by this Agreement are performable in Dallas County, Texas. Venue for any action under this Agreement shall be in Dallas County, Texas.

- B. *Legal Construction.* In case any one or more of the provisions contained in this Settlement Agreement shall for any reason be held to be invalid, illegal, or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provision of the Agreement, and this Agreement shall be construed as if such invalid, illegal, or unenforceable provision had never been included in this Agreement.
- C. *Entire Agreement.* This Settlement Agreement represents the entire and integrated agreement between Landlord and Tenant relative to the Toll Tunnel Project and the damages resulting therefrom and supersedes all prior negotiations, representations and/or agreements, either written or oral.
- D. *Amendment.* This Settlement Agreement may not be altered, waived, amended or extended except by an instrument in writing signed by the City, AATI and the Grantee.
- F. *Authority to execute.* The undersigned officers and/or agents of the parties hereto are the properly authorized officials and have the necessary authority to execute this Settlement Agreement on behalf of the parties hereto, and each party hereby certifies to the other that any necessary resolutions or other act extending such authority have been duly passed and are now in full force and effect.

EXECUTED at Dallas County, Texas on the day and year first written above.

LANDLORD
TOWN OF ADDISON, TEXAS

By: Ron Whitehead
Ron Whitehead, City Manager

TENANT
CONCOURSE PLAZA, LTD.

By: Stephen T. Wynn
Its: General Partner

ADDISON AIRPORT OF TEXAS, INC.

By: Sam Stuart
Sam Stuart, President 3/24/11

Settlement and First Amendment
To Lease Agreement - Page

97247 03373

97214 02294

EXHIBIT C
FIELD NOTE DESCRIPTION
CONCOURSE PLAZA LAND LEASE
ADDISON MUNICIPAL AIRPORT

Being a tract of land situated in the E. Cook Survey, Abstract No. 326, Dallas County, Texas and located on Addison Municipal Airport, Addison, Texas and being more particularly described as follows:

BEGINNING at a point for corner, said point being the intersection of the west right-of-way line of Addison Road and the south right-of-way line of Keller Springs Road as evidenced by a 1/2-inch iron rod;

THENCE departing the west right-of-way line of said Addison Road, a distance of 2.29 feet to a 5/8-inch iron rod found in the south right-of-way of Keller Springs Road and continuing S 69°35'33" W along the south right-of-way of said Keller Springs Road, 108.70 feet for a total distance of 110.99 feet to a point for a corner as evidenced by an "X" in concrete;

THENCE S 64°05'33" W along the south right-of-way of said Keller Springs Road, a distance of 78.03 feet to a point for a corner;

THENCE S 22°07'10" E, a distance of 64.73 feet to a point for a corner;

THENCE S 20°33'10" E, a distance of 43.25 feet to a point for a corner;

THENCE S 13°45'43" E, a distance of 204.27 feet to a point for a corner;

THENCE S 1°20'34" W, a distance of 130.52 feet to a point for a corner;

THENCE N 89°36'51" E, a distance of 145.35 feet to a point for a corner, said point being in the west right-of-way line of said Addison Road and in the east line of Addison Municipal Airport, as evidenced by a 1/2-inch iron rod found;

THENCE N 0°22'50" W along the west right-of-way line of said Addison Road and the east line of Addison Municipal Airport, a distance of 298.44 feet to a point in a curve to the left as evidenced by a 1/2-inch iron rod, said curve to the left having a central angle of 15°17'42", a radius of 788.51 feet and chord bearing distance of N 14°58'43" W, 209.87;

THENCE along said curve to the left of said west right-of-way line and the east line of said Addison Municipal Airport, a distance of 210.49 feet to the POINT OF BEGINNING and containing 78,506 square feet of land.

97247 03374

EXHIBIT A

97247 03375

.....



97247 03380

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared Henry Stuart
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11 day of October, 19 53

Barney L. James
Notary Public
Dallas
County, Texas

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared Wiley Padden
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 20th day of November, 19 53



Wiley Padden
Notary Public
Dallas
County, Texas

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared David Burnett
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11 day of October, 19 53

Barney L. James
Notary Public
Dallas
County, Texas

33252 7446

97247 03381

ADDENDUM TO GROUND LEASE,
dated October 11, 1983,
by and among
the City of Addison, Texas,
Addison Airport of Texas, Inc.,
and Sunell Properties, Inc.

This Addendum is attached to and made a part of the foregoing and above referenced Lease for all purposes. In the event of conflict or inconsistency between the printed portion of this Lease and this Addendum, the terms of this Addendum shall control.

A. The words "general office uses" are added to the list of the purposes for which Tenant may use and occupy the devised premises contained in paragraph 6 of the printed portion of this Lease.

B. To induce Landlord to allow use and occupancy of the devised premises for general office purposes, Tenant agrees to give preference to prospective office tenants whose businesses are aeronautically related (hereinafter referred to as "preferred tenant") conditioned upon (i) availability of space, (ii) willingness of the preferred tenant to pay market rental rates, (iii) the preferred tenant's credit standing favorably comparing to those of other prospective tenants, and (iv) willingness of the preferred tenant to enter into a term of agreement comparable to those offered by other prospective tenants.

C. Landlord agrees to remove the electrical lines and poles presently running along the western boundary of the devised premises.

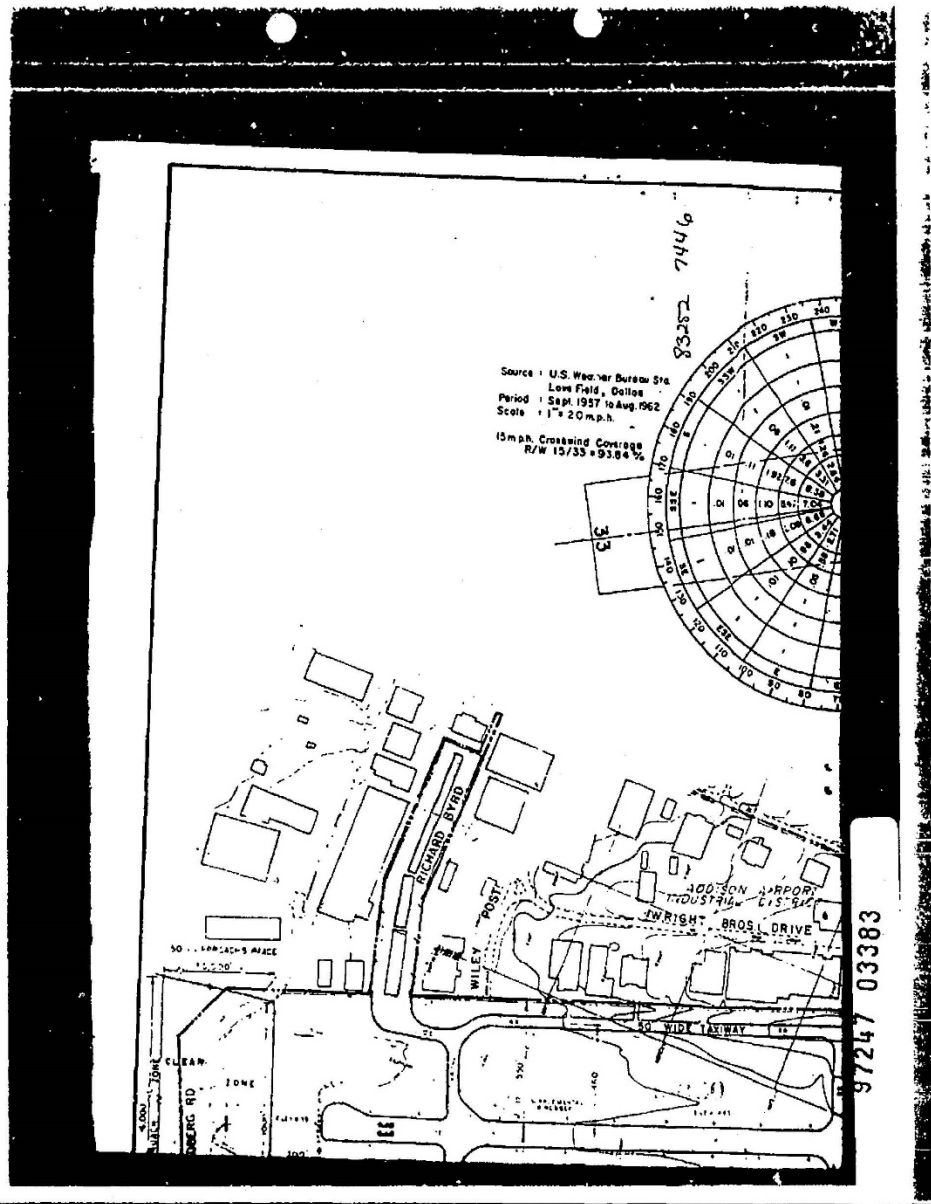
D. Tenant shall have the option to terminate this Lease by delivering written notice of such election to Landlord before April 30, 1984, if Tenant has been unable to obtain revenue bond financing for the improvements which Tenant proposes to construct on the devised premises. If Tenant does not timely deliver such written notice of election to terminate, all rights of Tenant to terminate this Lease pursuant to the foregoing shall lapse and be null and void.

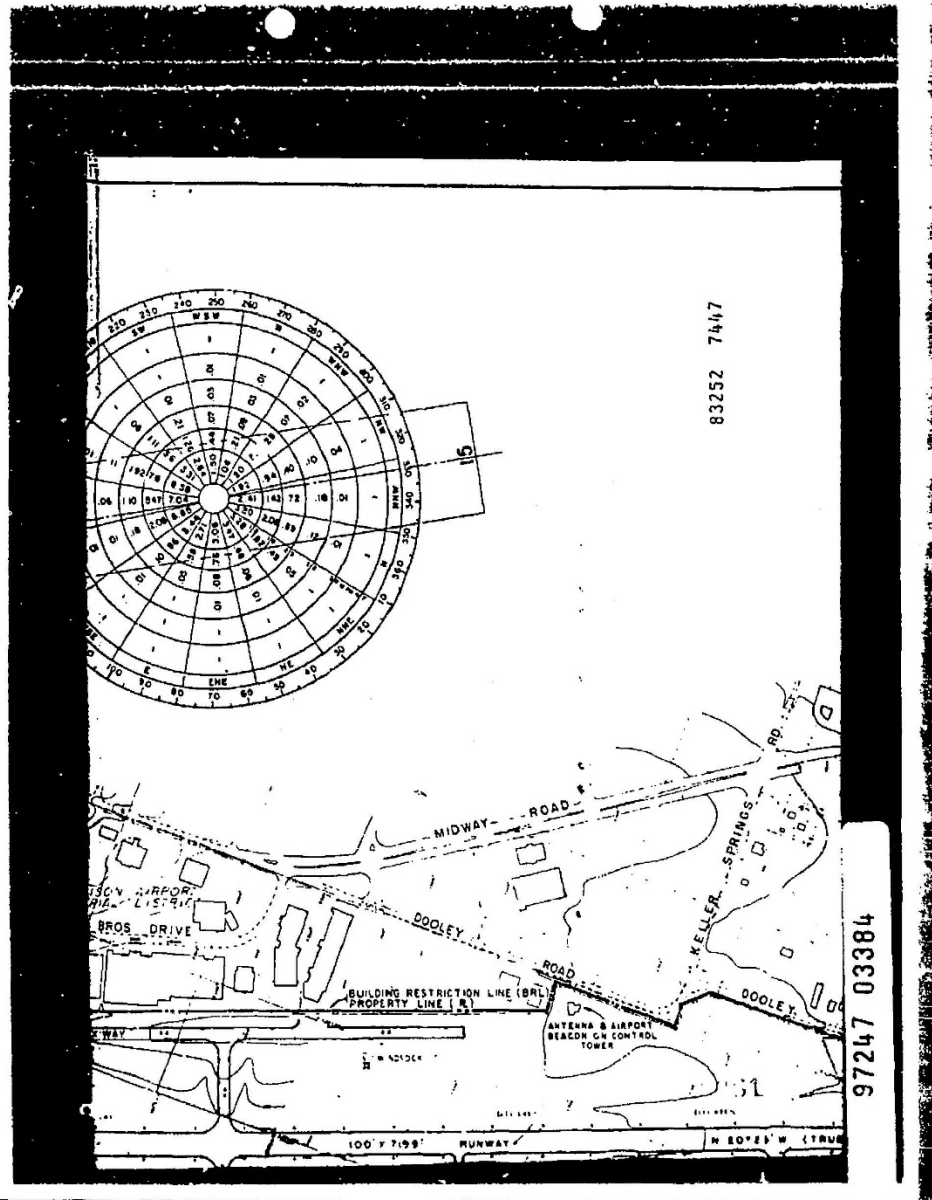
18245

83252 7465

ETS 10/9/83

97247 03382





EX. B

83252 7448

BASIC RUNWAY DATA TABLE

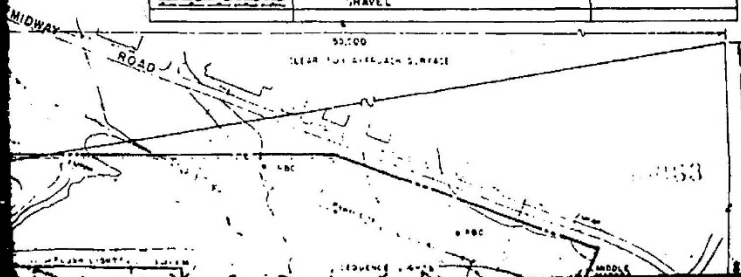
	RUNWAY 15/33	
	EXISTING	ULTIMATE
EFFECTIVE GRADIENT IN %	0.03	SAME
% WIND COVERAGE	93.84	SAME
INSTRUMENT RUNWAY	YES	YES
PAVEMENT STRENGTH	805,1000 16007	SAME
APPROACH SURFACE	50:1 BOTH	SAME
RUNWAY LIGHTING	MIRL	SAME
RUNWAY MARKINGS	ALL WEATHER	SAME
NAVIGATIONAL AIDS	ILS	SAME

BASIC AIRPORT DATA TABLE

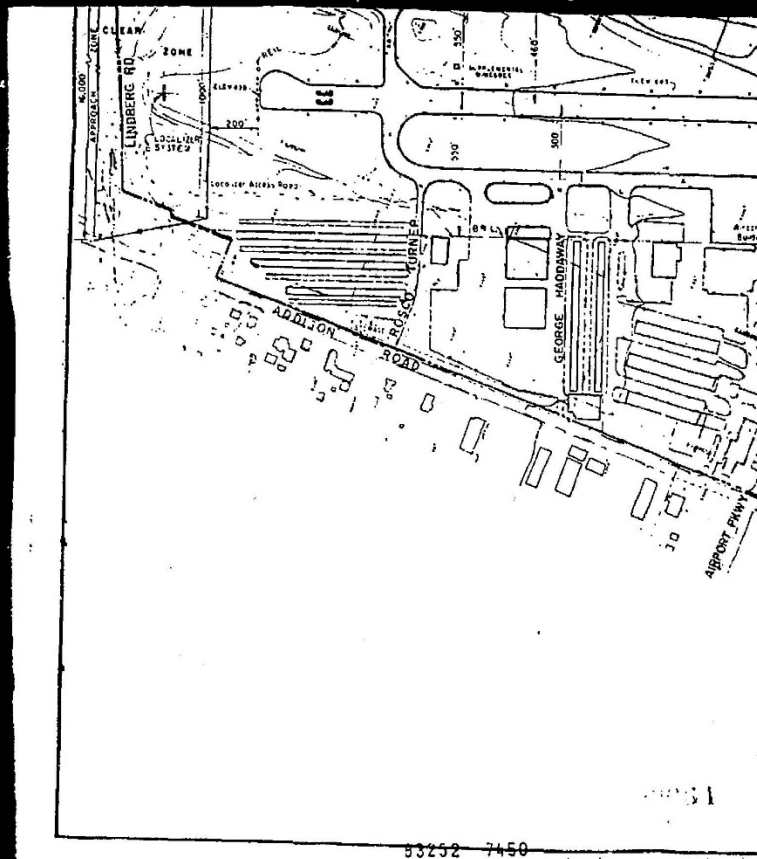
	EXISTING	ULTIMATE
AIRPORT ELEVATION - MSL	543.00	
AIRPORT REFERENCE POINT (ARP) COORDINATES	LAT 32° 58' 10.585" LNG. 96° 50' 08.482"	SAME
MEAN MAX TEMP OF HOTTEST MONTH	96.1° F	SAME
AIRPORT AND TERMINAL NAVIGATIONAL AIDS	ILS	SAME

LEGEND

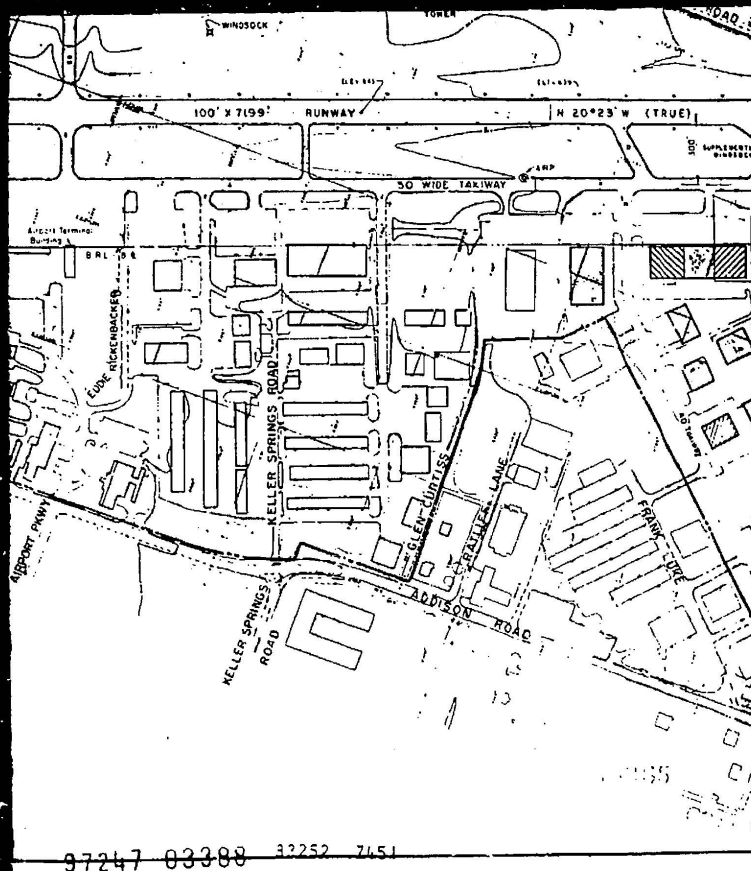
EXISTING	
[Symbol]	FENCE
[Symbol]	RUNWAY LIGHTS
[Symbol]	GROUND CONTOURS
[Symbol]	BUILDINGS PERTAINING TO AIRPORT
[Symbol]	EXISTING PROPERTY LINE
[Symbol]	PROPERTY ACQUIRED THIS PROJECT
[Symbol]	BUILDING RESTRICTION LINE (BRL)
[Symbol]	EASEMENTS
[Symbol]	ASPHALT PAVEMENT
[Symbol]	GRAVEL

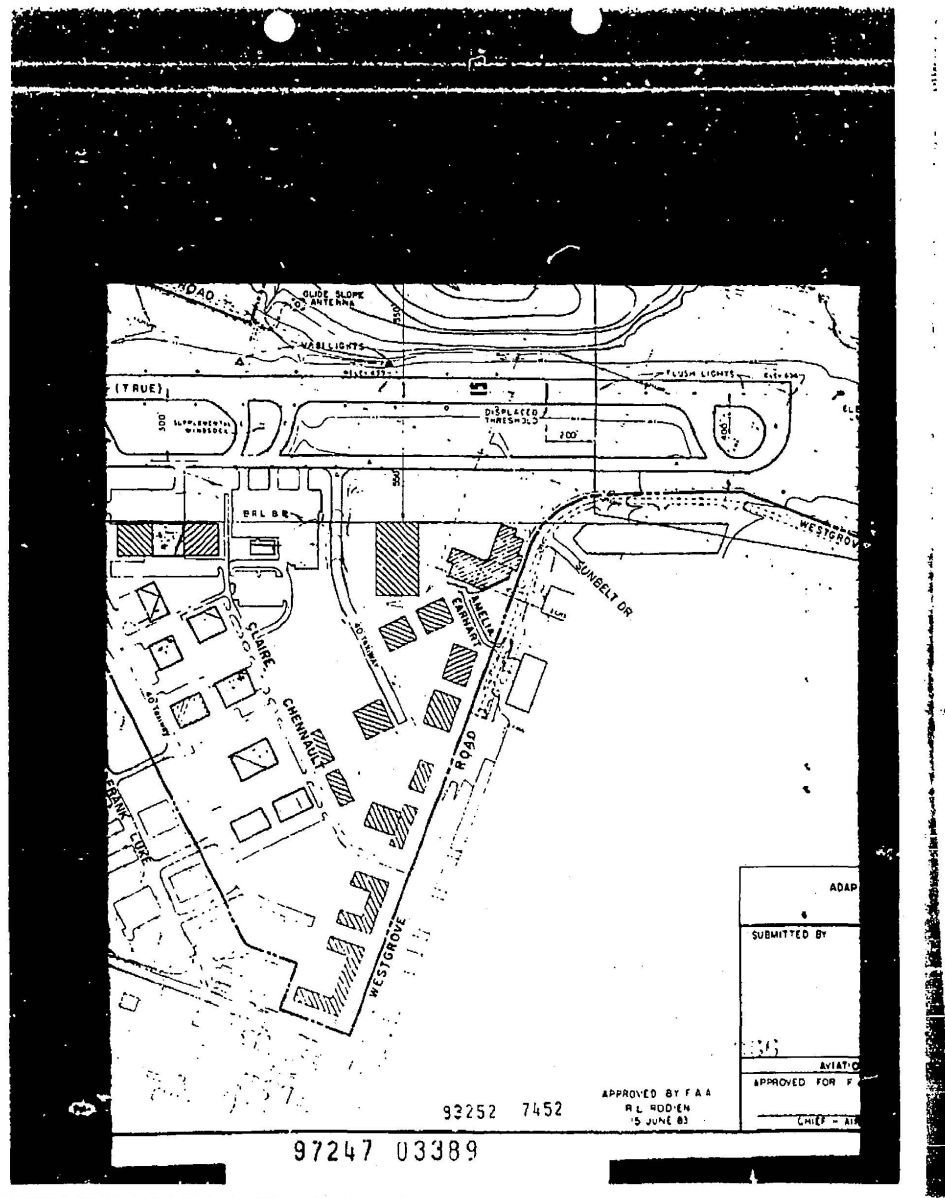


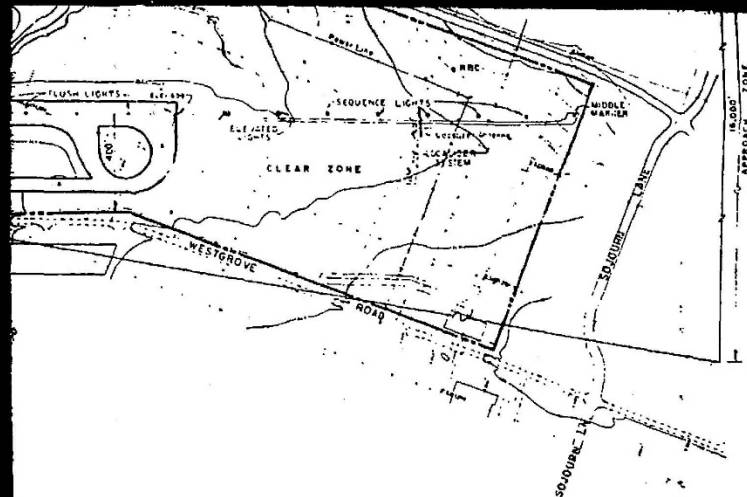
97247 03386



97247 03387







ADAP Project No.					
SUBMITTED BY		DATE		No. Revision By Approved Date	
				ADDISON MUNICIPAL AIRPORT AIRPORT LAYOUT PLAN ADDISON, TEXAS GINN, INC. CONSULTING ENGINEERS, Dallas, Texas	
AVIATION DIRECTOR		DESIGNED DATE		TRACED DATE	
APPROVED FOR F.A.A.		DRAWN DATE		CHECKED DATE	
CHIEF - AIRPORTS BRANCH		8852 N 1493		FILE NO. SCALE 1" = 300'	
				SHEET 1 of 1	

APPROVED BY F.A.A.
L. RODEN
19 JUNE 83

97247 03390

EXHIBIT A
REAL PROPERTY DESCRIPTION

SITUATED in Dallas County, Texas, and BEING a tract of land situated in the E. COOK SURVEY, ABSTRACT 326, and located on Addison Municipal Airport, Addison, Texas, and being more particularly described as follows:

COMMENCING at the intersection of the centerline of Airport Parkway and the West right-of-way of Addison Road;

THENCE, North 00°22'50" West, along said West right-of-way a distance of 358.67 feet to the POINT OF BEGINNING;

THENCE, South 89°37'10" West, a distance of 145.27 feet;

THENCE, North 1°45'47" East, a distance of 169.44 feet;

THENCE, North 0°38'48" West, a distance of 136.88 feet;

THENCE, North 20°14'53" West, a distance of 180.00 feet;

THENCE, North 71°51'57" East, a distance of 147.04 feet to a point on a curve to the right, said curve having a central angle of 16°46'21", a radius of 788.51 feet and a chord bearing South 45°41'02" East, 230 feet;

THENCE, along an arc length of 230.82 feet to a point;

THENCE, South 0°22'50" East, along the West right-of-way of Addison Road, a distance of 298.48 feet to the POINT OF BEGINNING, containing 1.661 acres (72,348.19 square feet) of land, more or less.

97247 03391

83252 7454

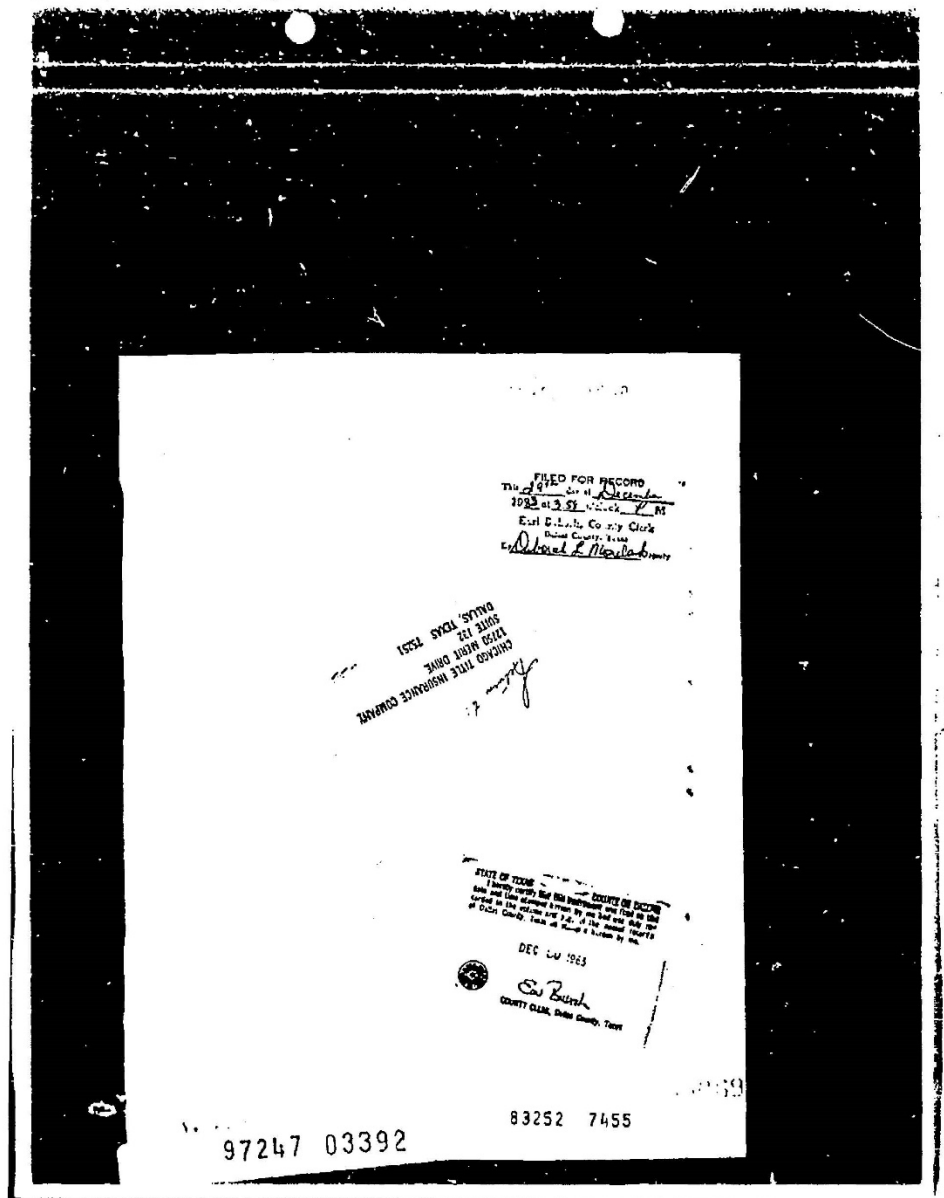


EXHIBIT B

97247 03393

83-25-1011-PP-11-00 (3) CFC

ASSIGNMENT OF LEASE

1980

21.00 DEED
2/12/83

THIS AGREEMENT is made as of this the 1st day of December, 1983, at Addison, Texas, between BUNNELL PROPERTIES, INC., a Texas corporation, hereinafter called "Assignor", and CONCOURSE PLAZA, LTD., a Texas limited partnership, hereinafter called "Assignee".

WHEREAS, a lease executed on October 11, 1983, between CITY OF ADDISON and ADDISON AIRPORT OF TEXAS, INC., as the Lessor, and the Assignor, as the Lessee, by the terms of which certain real property located on ...o Addison Airport was leased to the Assignor as Lessee upon the terms and conditions provided therein; and

WHEREAS, the Assignor now desires to assign the Lease to the Assignee, and the Assignee desires to accept an assignment thereof;

NOW, THEREFORE, for and in consideration of the sum of Ten and No/100 Dollars (\$10.00), receipt of which is hereby acknowledged, and the agreement of the Assignee, hereinafter set forth, the Assignor hereby assigns and transfers to the Assignee, its successors and assigns, all of its right, title and interest in and to the Lease hereinbefore described, a copy of which is attached hereto as Exhibit "A", and the Assignee hereby agrees to and does accept the assignment, and in addition expressly assumes and agrees to keep, perform and fulfill all the terms, covenants, conditions and obligations required to be kept, performed and fulfilled by the Assignor as the Lessee thereunder, including the making of all payments due to or payable on behalf of the Lessor under said Lease when due and payable.

This Agreement shall be binding on and inure to the benefit of the parties hereto, their heirs, executors, administrators, successors in interest, and assigns.

Grantee:

Suite 900
First Texas Tower
16951 Dallas Parkway
Dallas, TX 75240

83252.7456

97217 03394

12-29-83

EXECUTED as of the day and year first above written.

ASSIGNOR:

Bunnett Properties, Inc.

By: *Samuel H. Hume*

ASSIGNEE:

Concourse Plaza, Ltd.

By: Bunnett Properties, Inc., Managing
General Partner

By: *Samuel H. Hume*

CONSENT OF LESSOR

The undersigned is the Lessor under the Lease described in the foregoing Assignment and hereby consents to the assignment of the Lease to the Assignee, waiving none of their rights thereunder as to the Lessee or the Assignee.

LESSOR:

CITY OF ADDISON

By: *John Kelly*

ADDISON AIRPORT OF TEXAS, INC.

By: *Robert L. Hume, Vice President*

97247 03395

83252 7457

STATE OF TEXAS §
COUNTY OF DALLAS §

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared David A. Bunnell, known to me to be the person and officer whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same on behalf of Bunnell Properties, Inc., a Texas corporation, for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this 27th day of December, 1983.

Kay P. Robertson/Kudick
Notary Public

My Commission Expires:

3-7-84



KAY P. ROBERTSON/KUDICK
Notary Public, State of Texas
My Comm. Expires 3-7-84

STATE OF TEXAS §
COUNTY OF DALLAS §

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared David A. Bunnell, known to me to be the person and officer whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same on behalf of Bunnell Properties, Inc., a Texas corporation, as managing general partner of Concourse Plaza, Ltd., a Texas limited partnership, for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this 27th day of December, 1983.

Kay P. Robertson/Kudick
Notary Public

My Commission Expires:

3-7-84

97247 03396

83252 7458

GROUND LEASE

This Ground Lease (hereinafter referred to as the "Lease") is made and entered into as of October 11, 1963, and among the City of Addison, Texas, a municipal corporation (hereinafter sometimes referred to as the "City"), Addison Airport of Texas, Inc., a Texas Corporation (hereinafter sometimes referred to as "AAT") and Bumell Properties, Inc., a Texas corporation (hereinafter referred to as "Tenant").

WITNESSETH:

WCM, REAS, AAT123456 that certain real property (hereinafter referred to as the "demised premises") described in attached Exhibit A from the City pursuant to that certain instrument captioned Agreement for Operation of the Addison Airport (hereinafter referred to as the "Ease Lease") between the City and Addison Airport, Inc. (predecessor of AAT1); and

WHEREAS, the demised premises are situated at Addison Airport (hereinafter referred to as the "Airport") in Dallas County, Texas, the Airport being primarily in a plat attached hereto as Exhibit B, and

WHEREAS, the City and AATI hereby lease and demise the demised premises to Tenant, and Tenant hereby leases and takes the demised premises from the City and AATI, upon the terms and conditions set forth herein;

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS:

1. Base Lease. All of the terms and conditions of the Base Lease are incorporated into this lease by reference as if written verbatim herein, and Tenant's execution hereof acknowledges that AATi has furnished Tenant with a copy of the Base Lease. Tenant agrees to fully comply with all terms and conditions of the Base Lease insofar as the same relate to the demised premises and/or the use and operation thereof, except that Tenant shall not be responsible for the payment of any rental due under the Base Lease which shall be paid by AATi.

2. Definition of Landlord and Effect of Default under the Base Lease. The term "Landlord" as hereinafter used in this Lease shall mean KATCO, Inc. City. So long as the Base Lease is in effect, AATCO shall be obligated to all the rights, benefits and remedies of the Landlord under this Lease and all of the duties, covenants and obligations of the Landlord under this Lease. Upon the expiration of the Base Lease, the rights and duties shall revert to and inure to the benefit of the City. Notwithstanding this Lease, and shall perform all of the duties, covenants and obligations of the Landlord under this Lease. The City agrees that (i) until such time as the City notifies Tenant to the contrary in writing, Tenant is fully authorized to make all payments due under this Lease to AATCO, and (ii) that default by AATCO under the Base Lease shall have no effect on this Lease so long as Tenant pays and performs all duties, covenants and obligations under this Lease.

3. Term. The term hereof shall commence on the earlier of October 1, 1984, or the first day of the first calendar month after Tenant completes the construction hereinafter described and opens for business at the defined premises; the applicable date being hereinafter referred to as the "Commencement Date", and shall end four hundred eighty (480) months thereafter; provided, however, in any event, upon the renewal premises by Tenant prior to the Commencement Date shall be, subject to all the terms and conditions hereof, except this defined term shall not apply.

4. Rental. Subject to adjustment as hereinbefore provided, Tenant agrees to pay to Landlord, without abatement or deduction, rent for the demised premises at the rate of SIXTEEN HUNDRED SEVENTY-SIX AND 07/100----- per month in advance. The first of such monthly installment shall be due and payable on or before the Commencement Date, and a like installment shall be due and payable on or before the first day of each calendar month thereafter during the term hereof.

(f) A corporation shall be deemed to have "received" any item for the Dollars, Tens, Millions or Area (hereinafter referred to as the "Prize Index") as it exists on the Commencement Date and as it exists on the 7th day of the calendar month preceding the next opposite Adjustment Date.

(ii) The monthly rental for the two (2) year period beginning with and following the then applicable Adjustment Date shall be either increased or decreased, as the case may be, by the percentage of increase or decrease in the Price Index between the Commencement Date and the then applicable Adjustment Date, but in no event shall such monthly rental ever be decreased below the monthly rental set forth in paragraph 4.

(iii) In the event that the Price Index is unavailable for whatever reason for the computations set forth hereinabove, another index approximating the Price Index as closely as feasible shall be substituted therefor.

6. Use of Demised Premises and Construction of Improvements. The demised premises shall be used and occupied by Tenant only for the following purposes: sale of aircraft and aircraft parts; aircraft maintenance and repair; aircraft storage; aircraft training; aircraft

in connection with such use and occupancy, Tenant intends to construct upon the demised premises the improvements depicted in the plans and specifications.

These improvements consist of a combination office/airplane hanger facility containing approximately 82,600 square feet of office space and five airplane hangars, the preliminary plans for which have been prepared by Bogard Architects, Inc. Construction prints to be approved by Addison Municipal Airport prior to the start of construction.

All construction shall be strictly in accordance with such plans and specifications, and such construction shall be performed in a first class, workmanlike manner. Tenant agrees to promptly pay and discharge all costs, expenses, claims for damages, liens and any and all other obligations and liabilities which shall be incurred, with such exceptions.

7. Acceptance of Demised Premises. Tenant acknowledges that Tenant has fully inspected the demised premises and accepts the demised premises as suitable for the purpose for which the same are leased in their present condition.

8. Securing Governmental Permits and Compliance with Law. Teleni at Teleni's sole cost and expense shall obtain any and all governmental licenses, permits and approvals necessary for the construction of improvements and for the use and occupancy of the demised premises. Teleni shall comply at all times with all governmental laws, ordinances and regulations applicable to the use of the demised premises, and shall promptly comply with all governmental orders and directives for the extraction, prevention and abatement of nuisances in or upon, or connected with the demised premises, all at Teleni's sole cost and expense.

9. Assignment, Subselling and Mortgaging of Leased Estate:

A. Without the prior written consent of Landlord, Tenant may not assign this Lease or any rights of Tenant hereunder (to sell to, lease, license, mortgage, or otherwise provide) or sublet the whole or any part of the premises premises. Any assignment or subletting shall be subject to the terms and provisions of this Lease, including the provisions of paragraph 6 pertaining to the use of the premises. If Tenant desires to assign or sublet the premises, Tenant shall first obtain the written consent of Landlord. If Landlord grants its consent, then the assignee or sublessee will be bound by the terms and provisions of this Lease. If Tenant assigns or sublets all or substantially all of the premises, then the occurrence of an event of default under this Lease shall be deemed to have occurred to the assignee or sublessee. In addition to any other remedies available to Landlord, Landlord shall have the right to terminate this Lease if Tenant assigns or sublets all or substantially all of the premises without Landlord's prior written consent. Landlord shall not be bound by any assignment or subletting and shall not be held responsible for any claims or damages due to Landlord hereunder. No direct action by Landlord may be brought against any person claiming to be an assignee or sublessee of the premises or any person claiming to be an assignee or sublessee of the premises.

[illegible]

97247 03397 1 83252 7459

97247 03397

93252 7459

200

83252 7450

15. Generalization

12. If this Lease is not consummated pursuant to Section A, Tenant shall promptly restore the improvements on the demised premises to their original condition, together with the Landlord and Tenant are entitled shall be awarded and paid to cover the costs and expenses of removing the remaining portion of the demised premises to a condition suitable for efficient and economic occupation and operation of Tenant, and any action or proceedings to which Landlord and Tenant are entitled shall be awarded and paid to Landlord and Tenant, as interest may appear. If this Lease is terminated pursuant to Section A, a condemnation process to which Landlord and Tenant are entitled shall be awarded and paid to Landlord and Tenant as their interests may appear.

13. Common Facilities. Tenant and Landlord's employees, agents, servants, customers and other invitees shall have the non-exclusive right to use all common facilities, improvements, equipment and services which may now exist or which may hereafter be provided by Landlord for the accommodation and convenience of Landlord's customers and tenants, including landing and takeoff facilities, means of ingress and egress to the demised premises, other airport installations, and all other reasonable services which may be provided without charge from time to time by Landlord in operating the Airport. All such common facilities shall at all times be under the exclusive control of Landlord.

18. Signs and Equipment. After first securing Landlord's approval which will not be unreasonably withheld, Tenant shall have the right from time to time to install and operate advertising signs and radio, communications, meteorological, aerial navigation and other signs and facilities in or on the premises which may be reasonably necessary for the operation of Tenant's business.

21. Landlord shall not be liable to Tenant or to Tenant's employees, agents, servants, customers, invitees, or to any other person (other than, for any injury to persons or damage to property on or about the demised premises or any space area owned by Landlord) for the negligence or misconduct of Tenant, Tenant's employees, servants, customers, invitees, subtenants, licensees or assignees, or of any other person entering the demised premises under express or implied invitation of Tenant, or arising out of the use of the demised premises by Tenant and the conduct of Tenant's business thereon, or arising out of any breach of duty by Tenant in the

23. **Default by Tenant.** The following events shall be deemed to be events of default by Tenant under this Lease:

- a. Failure of Tenant to pay any principal, interest or any other sum payable to Landlord hereunder on the date that same is due and mature and/or continuing for a period of ten (10) days;
- b. Failure of Tenant to comply with any term, condition or covenant of this Lease, other than the payment of rent or other sums of money, and such failure shall not be cured within thirty (30) days after written notice thereof to Tenant.

guarantor of Tenant's obligations:

- Filing of a petition under any section or chapter of the National Bankruptcy Act, as amended, or under any similar law or statute of the United States or any State in which by Tenant or any guarantor of Tenant's obligations, or judicial action as a bankrupt or insolvent or in proceedings filed against Tenant or such guarantor;
- Appointment of a receiver or trustee for all or substantially all of the assets of Tenant or any guarantor of Tenant's obligations;
- Appointment by Tenant of any a partnership, joint or sole, as the general manager or managing agent of the premises, including the

[illegible]

10-10-68 83852 7451

For purposes of any deficiency that may arise by reason of any such selling, in determining the amount of such deficiency, commissions, attorney fees, remolding expenses and other costs of placing shall be subtracted from the amount of sale proceeds.

c. Except as provided herein, Tenant shall remain liable for all obligations under this Lease, whether or not such obligations are assigned to Landlord, and shall remain liable for all obligations under this Lease, whether or not such obligations are assigned to Landlord, and shall remain liable for all obligations under this Lease, whether or not such obligations are assigned to Landlord.

[illegible]

(c) Directed to cure such default and deduct the cost of curing same plus interest thereon at the rate of ten percent (10%) per annum from the next succeeding rental installment(s) due by Tenant to Landlord hereunder, or

If any mortgagee of Landlord has given Tenant his address for notices and specifically requests such notice, Tenant agrees to give the notice required hereinafter to such mortgagee at the time Tenant gives same to Landlord, and to accept curative action, if any, undertaken by such mortgagee as if such curative action had been taken by Landlord.

35. Waiver of Subrogation Each party hereto waives any and every claim which arises or may arise in such party's favor against the other party hereto during the term of this lease for any and all loss of, or damage to, any of such party's property located within or upon, or constituting a part of, the demised premises, which loss or damage is covered by valid and collectible fire and extended coverage insurance policies, to the extent all such loss or damage is recoverable under such insurance policies. Such mutual waiver shall be in

addition to, and not in limitation of, the obligation of, any other insurer or reinsurer contained in this lease with respect to any loss of, or damage to, property of the parties hereto. Inasmuch as such mutual waters will preclude the assignment of any amount claimed by way of subrogation or otherwise to an insurance company for any other person, each party hereto agrees immediately to the eighth insurance company which has issued to such party policies of fire and extended coverage insurance, within ninety (90) days of the date of such mutual waters, and to cause such insurance policies to be properly endorsed, if necessary, to prevent the institution of such insurance coverage by reason of such waters.

28. Title to Improvements. Any and all improvements on the demised premises shall become the property of Landlord upon the expiration or termination of this Lease, provided, however, (a) if Tenant is not then in default hereof, Tenant shall have the right to remove all personal property and trade fixtures owned by Tenant from the demised premises, but Tenant shall be required to repair any damage to the demised premises caused by such removal in a good and workmanlike manner and at Tenant's sole cost and expense, and (b) Landlord may elect to require Tenant to remove all improvements from the demised premises and restore the demised premises to the original condition.

27. Merchant's and Defendant's Lless, Tenant agrees to indemnify and hold Landlord harmless of and from all liability arising out of the filing of any mechanic's or attachment liens against the Covered Premises by reason of any act or omission of Tenant or anyone claiming under Tenant, and Landlord, at Landlord's option, may satisfy such liens and collect the amount expended from Tenant in full.

with interest the terms set forth in paragraph 37 as set forth herein. provided, however, that Landlord shall not at any time shall not unilaterally (15) days after written application to Tenant of Landlord's intention to do so and Tenant's failure during such fifteen (15) day period to bond such sums or to execute a deed with appropriate covenants to protect Landlord's interest in the demised premises.

28. Title. Tenant accepts the demised premises subject to (i) the Base Lease; (ii) the Rules and Regulations, (iii) easements and rights-of-way and zoning ordinances and other ordinances, laws, statutes or regulations now in effect or hereafter promulgated by any governmental authority, having jurisdiction over the demised premises.

28. **Cite Employment and Subordination:** Landlord covenants, represents and warrants that Landlord has full right and power to execute and perform this Lease and to grant the estate covenanted herein, and that Tenant, upon payment of the rent herein specified, a full performance of the terms, conditions, covenants and agreements herein contained, shall peacefully and quietly have, hold and enjoy the demised premises during the full term of this Lease; provided, however, that Tenant accepts this Lease subject and subordinate to any and all conditions, covenants, agreements and matters then existing upon the demised premises. Landlord further hereby irrevocably and

with full power and authority to Tenant to subordinate Tenant's interest hereunder to any mortgage, deed of trust or other lien on or against the realtor placed on the defined premises, or to place its lease prior and superior to any mortgage, deed of trust or other lien now existing or hereafter placed on the defined premises, provided, however, any such subordination shall be upon the express condition that (a) the Lease shall be recognized by the mortgagee and that all of the rights of Tenant shall remain in full force and effect during the full term of this Lease or on condition that Tenant assign to the mortgagee, its successors and assigns, and perform all of the obligations of the Lease to the mortgagee, its successors and assigns, and

30. **Landlord's Right to Foreclose.** If the Lessor is a mortgagee of the Premises, the Lessor shall have the right to foreclose on the mortgage of the Premises. The Lessor shall not be required to provide any notice of foreclosure to the Tenant. The Lessor shall have the right to foreclose on the mortgage of the Premises at any time during the term of this Lease, and the Lessor shall not be required to provide any notice of foreclosure to the Tenant. The Lessor shall have the right to foreclose on the mortgage of the Premises at any time during the term of this Lease, and the Lessor shall not be required to provide any notice of foreclosure to the Tenant. The Lessor shall have the right to foreclose on the mortgage of the Premises at any time during the term of this Lease, and the Lessor shall not be required to provide any notice of foreclosure to the Tenant.

It is intended that the term provided for in this Lease shall be an absolute net return to Landlord for the term of this Lease, free of any lost expenses of Tenant with respect to the demised premises, including, without limitation, maintenance, repairs, replacement, insurance, taxes and assessments, and this Lease shall be construed in accordance with and to effectuate such intention.

32. Waiver of Default. It is a covenant by the parties hereto on any default or breach of any term, condition or covenant of this lease shall be deemed to be a waiver of any subsequent default or breach of the same or any other term, condition or covenant contained herein.

33. Release of Landlord Upon Transfer. All of Landlord's personal liabilities for the performance of the terms and conditions of this lease shall be released upon the transfer of the property to a new owner.

34. **Attorneys' Fees.** In the event of any breach or default by Landlord or Tenant of their respective obligations under this Lease, it shall become necessary for the other to employ an attorney to enforce or defend any of such party's rights or remedies hereunder, and

25. Financial Information. Tenant agrees that Tenant will from time to time upon the written request of Landlord during the term of this lease furnish to Landlord such credit and banking references as Landlord may reasonably request.

1. This lease is deemed to be in full force and effect if there have been modifications, changes, alterations, additions, deletions, and amendments to the lease and if the modifications, changes, alterations, additions, deletions, and amendments are in full force and effect and if the modifications, changes, alterations, additions, deletions, and amendments are in full force and effect.

3-2252 7463

Page 99 of 206

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared Henry Stuart
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11 day of October, 19 53

Reuben L. James
Notary Public
Dallas
County, Texas

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared Julius Padden
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 27th day of November, 19 53



Reuben L. James
Notary Public
Dallas
County, Texas

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared David Bunne
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11 day of October, 19 53

Reuben L. James
Notary Public
Dallas
County, Texas

97247 03402

93252 7464

ADDENDUM TO GROUND LEASE,
dated October 11, 1983,
by and among
the City of Addison, Texas,
Addison Airport of Texas, Inc.
and Bunnell Properties, Inc.

This Addendum is attached to and made a part of the foregoing and above referenced Lease for all purposes. In the event of conflict or inconsistency between the printed portion of this Lease and this Addendum, the terms of this Addendum shall control.

A. The words "general office uses" are added to the list of the purposes for which Tenant may use and occupy the demised premises 3 contained in paragraph 6 of the printed portion of this Lease.

B. To induce Landlord to allow use and occupancy of the demised premises for general office purposes, Tenant agrees to give preference to prospective office tenants whose businesses are aeronautically related (hereinafter referred to as "preferred tenant") conditioned upon (i) availability of space, (ii) willingness of the preferred tenant to pay market rental rates, (iii) the preferred tenant's credit standing favorably comparing to those of other prospective tenants, and (iv) willingness of the preferred tenant to enter into a term of agreement comparable to those offered by other prospective tenants.

C. Landlord agrees to remove the electrical lines and poles presently running along the western boundary of the demised premises.

D. Tenant shall have the option to terminate this Lease by delivering written notice of such election to Landlord before April 30, 1984, if Tenant has been unable to obtain revenue bond financing for the improvements which Tenant proposes to construct on the demised premises. If Tenant does not timely deliver such written notice of election to terminate, all rights of Tenant to terminate this Lease pursuant to the foregoing shall lapse and be null and void.

18245

97247 03403

83252 7465

CHICAGO TITLE INSURANCE COMPANY
12750 MARKET DRIVE
SUITE 102
DALLAS, TEXAS 75251

STATE OF TEXAS COUNTY CLERK, DALLAS
I hereby certify that the foregoing is a true and correct copy of the original as the same was filed for record in the office of the County Clerk, Dallas County, Texas, on the 28th day of December, 1983.

DEC 30 1983

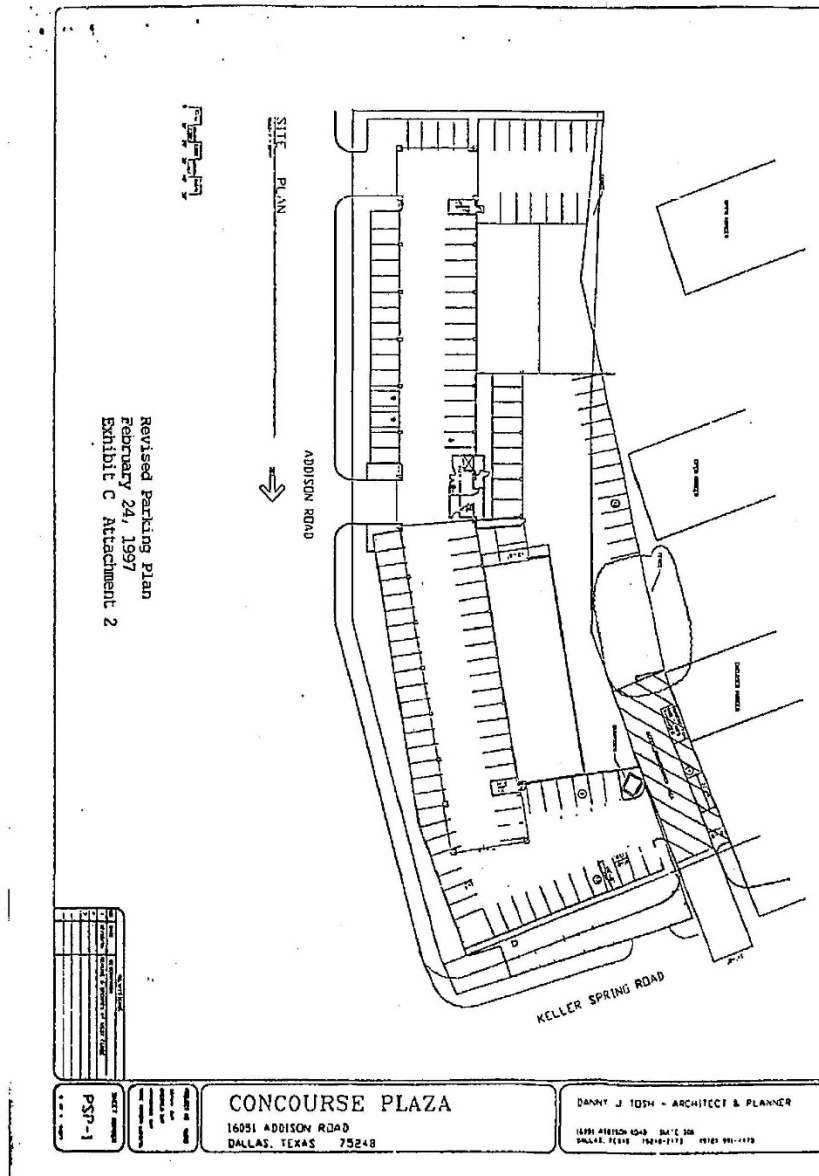


County Clerk, Dallas County, Texas

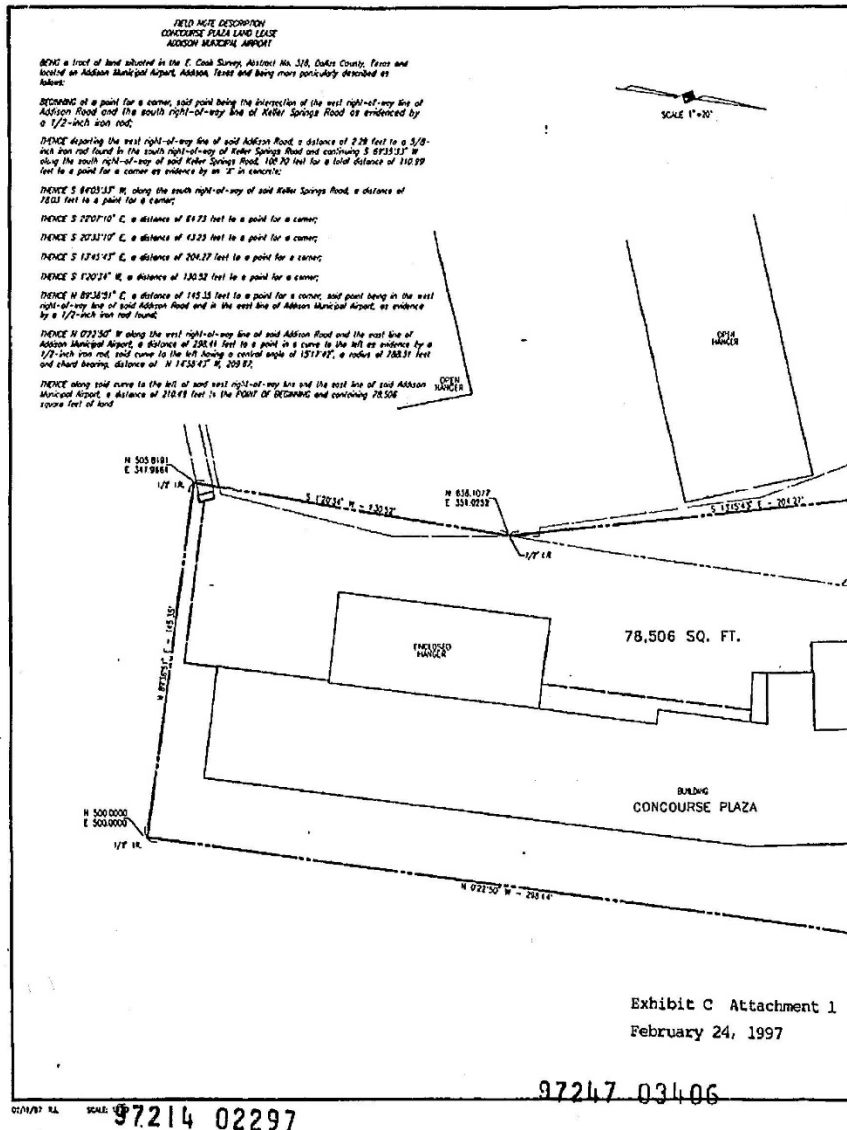
65 : 2 14 82 330 88.

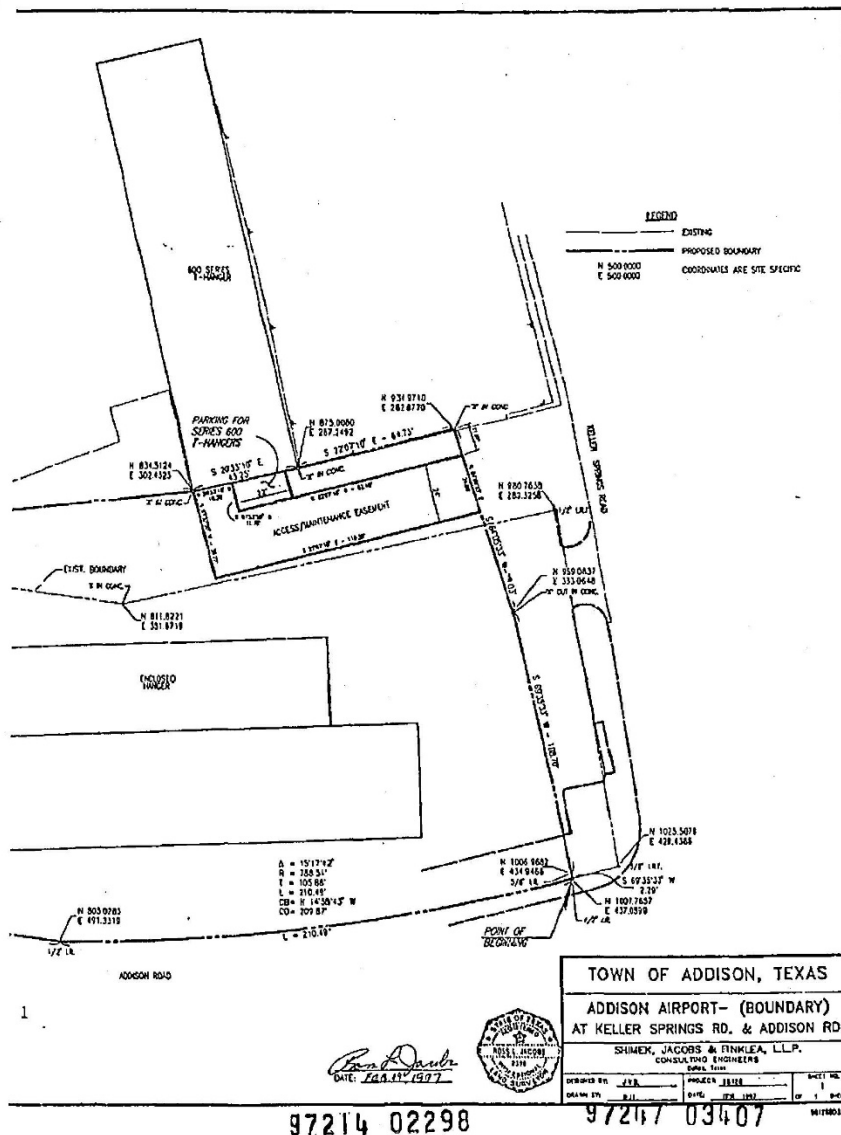
93252 7466

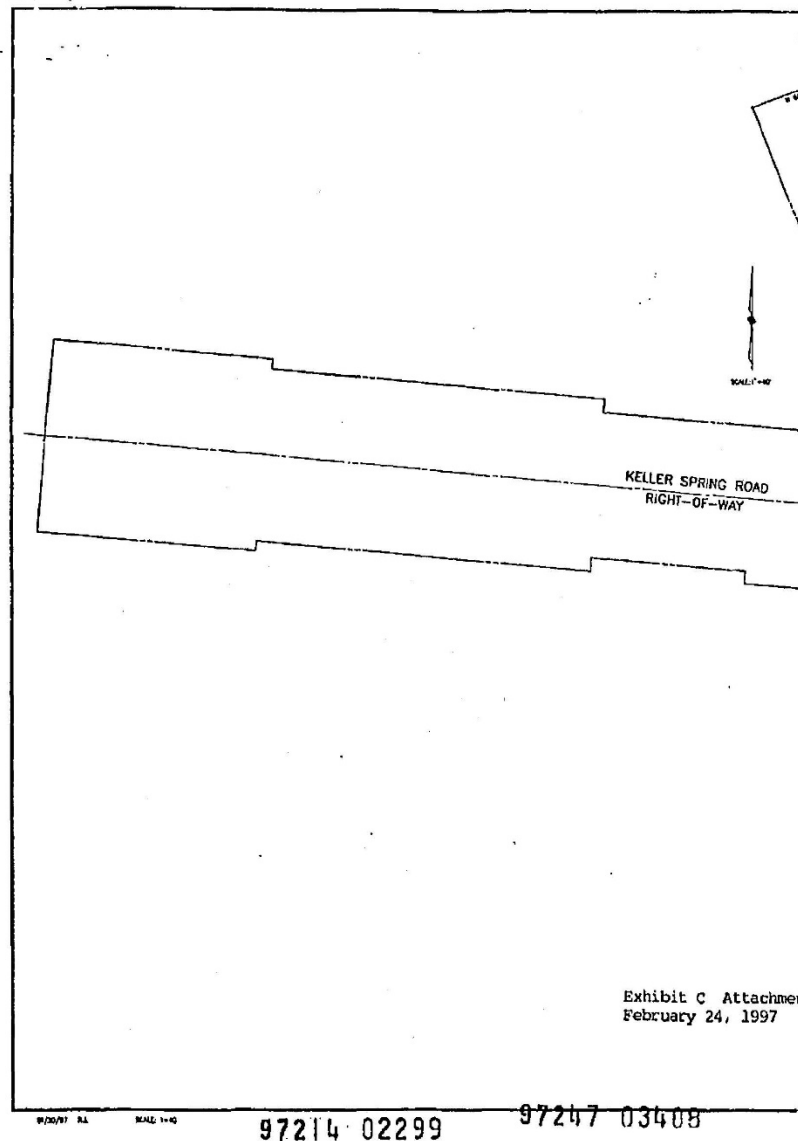
97247 03404

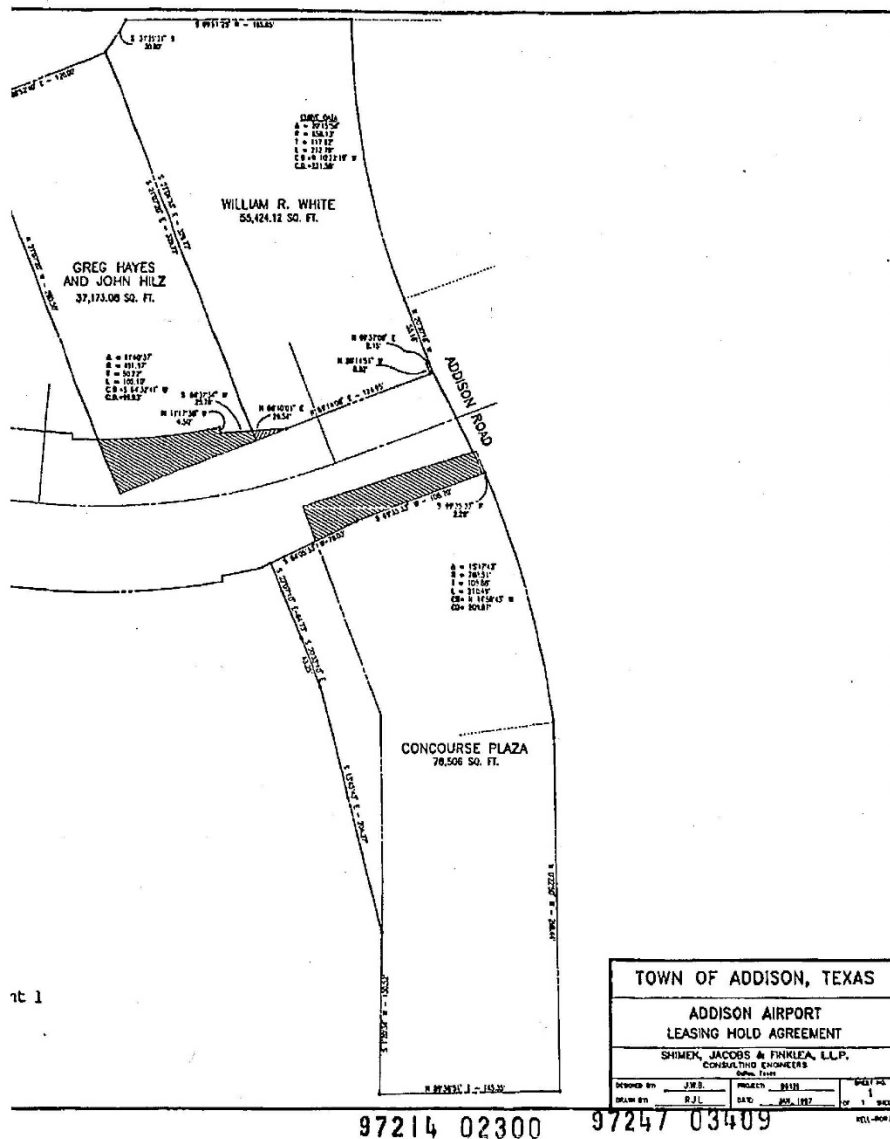


97214 02296 972147 03405









01480 24226
97214 02301

Return to: (176)

AMERICAN TITLE COMPANY
6029 Bellino Road, Suite 250
Dallas, TX 75240

97214
COUNTY CLERK
DALLAS COUNTY

97 NOV -3 AM 10:57

Any provision herein which results in the sale, rental, or use of the described real property because of color or race is invalid and unenforceable under Federal law.
STATE OF TEXAS COUNTY OF DALLAS
I hereby certify this instrument was filed on the date and time stamped herein by me and was duly recorded in the volume and page of the named records of Dallas County, Texas as stamped herein by me.

DEC 22 1997



Earl Baisch
COUNTY CLERK, Dallas County, Texas

FILED
Earl Baisch
COUNTY CLERK
DALLAS COUNTY
97 DEC 22 PM 12:23

Any provision herein which results in the sale, rental, or use of the described real property because of color or race is invalid and unenforceable under Federal law.
STATE OF TEXAS COUNTY OF DALLAS
I hereby certify this instrument was filed on the date and time stamped herein by me and was duly recorded in the volume and page of the named records of Dallas County, Texas as stamped herein by me.



NOV 3 1997

Earl Baisch
COUNTY CLERK, Dallas County, Texas

97214 02301

ASSIGNMENT OF LEASE

STATE OF TEXAS §
 §
COUNTY OF DALLAS §

THIS ASSIGNMENT OF GROUND LEASE (the "Assignment") entered into and effective as of the 31st day of December, 1997, at Addison, Texas, between CONCOURSE PLAZA, LTD., a Texas limited partnership (hereinafter called "Assignor") and CONCOURSE PLAZA II, LTD., a Texas limited partnership (hereinafter called "Assignee").

WHEREAS, Assignor is the Lessee under that certain Ground Lease (as amended, the "Ground Lease") executed on October 11, 1983 between CITY OF ADDISON and ADDISON AIRPORT OF TEXAS, INC., as the Lessor, and BUNNELL PROPERTIES, INC. ("Bunnell"), as the Lessee, by the terms of which certain real property located on the Addison Airport was leased to the Assignor as Lessee upon the terms and conditions provided therein, which lease was (a) assigned by Bunnell to Assignor pursuant to an Assignment of Lease dated December 1, 1993 recorded in Volume 83252, Page 7456, et seq. of the Real Property Records of Dallas County, Texas, and (ii) amended by a Settlement Agreement and First Amendment to Lease Agreement dated April 22, 1997, and recorded in the real Property Records of Dallas County, Texas, as more particularly described on the attached Exhibit A; and

WHEREAS, the Assignor now desires to assign the Ground Lease to the Assignee, and the Assignee desires to accept the Assignment thereof;

NOW, THEREFORE, for and in consideration of the mutual promises, covenants, and conditions contained herein, the sufficiency of which are hereby acknowledged, the parties hereto, each intending to be legally bound, agree as follows:

1. Assignor hereby assigns, bargains, sells and conveys to Assignee, effective as of the date above, all Assignor's rights, title and interest in and to the Ground Lease.
2. Prior to the effective date of this Assignment, Assignee agrees to pay an assignment fee in the amount of Four Hundred Fifty and no/100 Dollars (\$450.00) to Landlord.

Address of Assignee:
4560 Beltline Road
Suite 201
Dallas, Texas 75244

3. Assignee hereby agrees to be bound by and comply with the terms of the Ground Lease.
4. This Agreement shall be binding on and inure to the benefit of the parties hereto, their heirs, executors, administrators, successors in interest, and assigns.

Address of Assignee:
4560 Beltline Road
Suite 201
Dallas, Texas 75244

-2-

EXECUTED as of the day and year first above written.

ASSIGNOR:

CONCOURSE PLAZA, LTD., a Texas
limited partnership

By: Winn Development, Inc.,
General Partner

By: Stephen T. Winn
Stephen T. Winn, President

ASSIGNEE:

CONCOURSE PLAZA II, LTD., a Texas
limited partnership

By: Harkinson Investment Corporation,
General Partner

By: William J. Harkinson
William J. Harkinson, President

Address of Assignee:
4560 Beltline Road
Suite 201
Dallas, Texas 75244

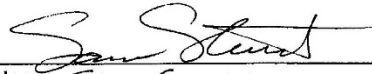
-3-

CONSENT OF LANDLORD

The undersigned Landlord and Owner in the Ground Lease described in the foregoing Assignment and hereby consent to the Assignment of the Ground Lease to Assignee, waiving none of their rights thereunder as to the Assignor or Assignee.

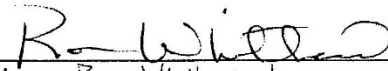
LANDLORD:

ADDISON AIRPORT OF TEXAS, INC.

By: 
Name: SAM STUART
Title: President

OWNER:

CITY OF ADDISON

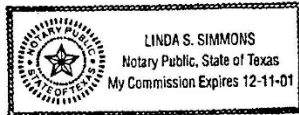
By: 
Name: Ron Whitehead
Title: City Manager

Address of Assignee:
4560 Beltline Road
Suite 201
Dallas, Texas 75244

-4-

STATE OF TEXAS §
 §
COUNTY OF DALLAS §

This instrument was acknowledged before me on December 23, 1997, by STEPHEN T. WINN, President of Winn Development, Inc., as general partner of and on behalf of Concourse Plaza, Ltd., a Texas limited partnership, on behalf of such corporation and partnership.



Linda S. Simmons
Notary Public in and for the State of Texas

My Commission Expires:

12-11-01

Print Name of Notary:

LINDA S. SIMMONS

STATE OF TEXAS §
 §
COUNTY OF DALLAS §

This instrument was acknowledged before me on December 23, 1997, by WILLIAM J. HARKINSON, President of Harkinson Investment Corporation, as general partner of and on behalf of Concourse Plaza II, Ltd., a Texas limited partnership, on behalf of such corporation and partnership.

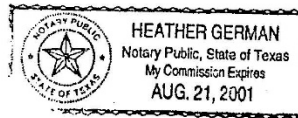
Heather German
Notary Public in and for the State of Texas

My Commission Expires:

Aug. 21, 2001

Print Name of Notary:

Heather German

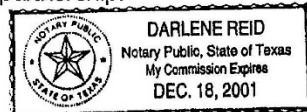


Address of Assignee:
4560 Beltline Road
Suite 201
Dallas, Texas 75244

-5-

STATE OF TEXAS §
 §
COUNTY OF DALLAS §

This instrument was acknowledged before me on Sept 11th, 1998, by SAM STUART, President of Addison Airport of Texas, Inc., on behalf of such corporation and partnership.



Darlene Reid
Notary Public in and for the State of Texas

My Commission Expires:

Print Name of Notary:

Darlene Reid

STATE OF TEXAS §
 §
COUNTY OF DALLAS §

This instrument was acknowledged before me on SEPTEMBER 17, 1998, by RON WHITEHEAD, CITY MANAGER of the Town of Addison, Texas, a municipal corporation, on behalf of such corporation.



Michele L. Covino
Notary Public in and for the State of Texas

My Commission Expires:

Print Name of Notary:

9/22/2001

MICHELE L. COVINO

STATE OF TEXAS §
COUNTY OF DALLAS §

This instrument was acknowledged before me on Dec 30, 1997, by Sam Stuart, President of Addison Airport of Texas, Inc., on behalf of such corporation and partnership.



Heather German
Notary Public in and for the State of Texas

My Commission Expires:

August 21, 2001

Print Name of Notary:

Heather German

STATE OF TEXAS §
COUNTY OF DALLAS §

This instrument was acknowledged before me on August 5, 1998, by Ron Whitehead, City Manager of the Town of Addison, Texas, a municipal corporation, on behalf of such corporation.



Michele L. Covino
Notary Public in and for the State of Texas

My Commission Expires:

09.22.2001

Print Name of Notary:

Michele L. Covino

EXHIBIT A

GROUND LEASE

WITNESSETH:

WHEREAS, the demised premises are situated at Addison Airport (hereinafter referred to as the "Airport") in Dallas County, Texas, the Airport being delineated in a plat attached hereto as Exhibit B, and

WHEREAS, the City and AATI hereby lease and demise the demised premises to Tenant, and Tenant hereby leases and demises the demised premises from the City and AATI, upon the terms and conditions set forth herein;

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS:

2. Definition of Landlord and Effect of Default under the Base Lease: The term "Landlord" as hereinafter used in this Lease shall mean either AATI or the City. So long as this Base Lease is in effect, AATI shall be entitled to all of the rights, benefits and remedies of a landlord under this Lease, and shall perform all of the duties, covenants and obligations of the Landlord under this Lease upon termination or determination of the Base Lease. The City shall be entitled to all of the rights, benefits and remedies of this Landlord under this Lease, and shall perform all of the duties covenants and obligations of the Landlord under this Lease. The City agrees that if AATI notifies the City as the City notifies Tenant to the contrary in writing, Tenant is fully authorized to make all payments due under this Lease to AATI and that the obligations by AATI under this Lease shall have no effect on this Lease so long as Tenant pays and performs its duties, covenants and obligations under this Lease.

3. Term: The term hereof shall commence on the earlier of October 1, 1984, or the first day of the first month after Tenant completes the construction hereinafter described and opens for business at the demised premises. The term shall terminate on the day which is the first anniversary of the date of the Commencement Date. Notwithstanding the foregoing, the term shall not be less than one (1) year and not more than five (5) years. Notwithstanding the foregoing, however, that any entry upon the demised premises by Tenant prior to the Commencement Date shall be subject to the terms and conditions hereof except that rental shall not be a true.

5. Adjustment of Rental: Commencing on the second anniversary of the Commencement Date and on every business anniversary thereafter (hereinafter referred to as the "Adjustment Date"), the monthly rental due under paragraph 4 shall be adjusted as follows:

(ii) The monthly rental for the two (2) year period beginning with and following the then applicable Adjustment Date shall either be increased or decreased, as the case may be, by the percentage of increase or decrease in the Price Index from the Commencement Date and the then applicable Adjustment Date, but in no event shall such monthly rental ever be decreased below the monthly rental set forth in paragraph 4.

(iii) In the event that the Price Index is unavailable for whatever reason for the computations set forth hereinabove, and in the event that the Price Index is not available for the computations set forth hereinabove, then the Price Index shall be substituted therefor.

In connection with such use and occupancy, Tenant intends to construct upon the demised premises the improvements depicted on plans and specifications.

These improvements consist of a combination office/airplane hangar facility containing approximately 42,600 square feet of office space and five airplane hangars, the preliminary plans for which have been prepared by Bogard Architects, Inc. Construction prints to be approved by Addison Municipal Airport prior to the start of construction.

All construction shall be strictly in accordance with such plans and specifications, and such construction shall be performed in a clean, workmanlike manner. Tenant agrees to promptly pay and discharge all costs, expenses, claims for damages, liens and any and all other liabilities and obligations which arise in connection with such construction.

7. Acceptance of Demised Premises: Tenant acknowledges that Tenant has fully inspected the demised premises and accepts the demised premises as suitable for the purpose for which the same are leased in their present condition.

demised premises. Tenant shall comply at all times with all governmental laws, ordinances and regulations applicable to the use of demised premises, and shall promptly comply with all governmental orders and directives for the correction, prevention and abatement of nuisances in or upon, or connected with the demised premises, all at Tenant's sole cost and expense.

1. Assignment, Subletting and Mortgaging of Leasehold Estate:

A. Without the prior written consent of Lender, Tenant may not assign this lease or any rights of Tenant hereunder, except a second mortgage as hereinafter provided, or sublet the whole or any part of the demised premises. Any assignment of part of the premises shall be expressly subject to the terms and provisions of this lease, including the provisions of paragraph pertaining to the leased demised premises. In the event of any assignment or subletting, Tenant shall not assign Tenant's rights hereunder or sublet the leased premises to any person or entity who is not qualified to perform the services for which the leased premises are being assigned or sublet, as determined by Lender. Tenant shall be bound by the terms and provisions of this lease. No such assignment or subletting shall constitute a breach of the occurrence of an event of default until the demised premises are assigned or sublet. Lender, in addition to any other remedies provided herein or by law, may at Lender's option, collect directly from each assignee or subtenant all amounts becoming due under this lease and may also sue and/or enforce the lease against each assignee or subtenant. Lender may, at its option, assign or sublet all or part of the leased premises to any assignee or subtenant, and may sue Tenant from the payment or performance of Tenant's obligations hereunder.

A Tenant shall have the right to mortgage the leasehold estate of Tenant created hereby in order to secure a mortgage loan purpose of obtaining funds for the construction of the improvements described in paragraph 6 or for other construction work on the premises approved from time to time by Landlord in writing. In the event that Tenant purports to mortgage or pledge all or part of the leasehold estate of Tenant created hereby, the leasehold mortgage shall in no event become personally liable to the lender or creditors of Tenant upon this lease and until said mortgage becomes the owner of the leasehold estate pursuant to a foreclosure sale of the property, the lender or creditors of Tenant shall not be entitled to foreclose on the property. In the event that such mortgage remains the owner of the leasehold estate, the mortgagee, upon forming this special lien upon the property, shall be such mortgagee by Tenant and any other actions taken pursuant to the terms of such mortgage shall not be the Tenant's obligation to pay the rents due hereunder and otherwise be fully perform the terms and conditions of this Lease.

Page 120 of 206

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared Henry Street
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11 day of October, 19 54

Bartholomew P. Jones
Notary Public
Dallas
County, Texas

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared Julius Piddie
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purpose and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 22nd day of November, 19 54



Bartholomew P. Jones
Notary Public
Dallas
County, Texas

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared David Purnell
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11 day of October, 19 54

Bartholomew P. Jones
Notary Public
Dallas
County, Texas



ADDENDUM TO GROUND LEASE,
dated October 11, 1983,
by and among
the City of Addison, Texas,
Addison Airport of Texas, Inc.
and Bunnell Properties, Inc.

This Addendum is attached to and made a part of the foregoing and above referenced Lease for all purposes. In the event of conflict or inconsistency between the printed portion of this Lease and this Addendum, the terms of this Addendum shall control.

A. The words "general office uses" are added to the list of the purposes for which Tenant may use and occupy the demised premises contained in paragraph 6 of the printed portion of this Lease.

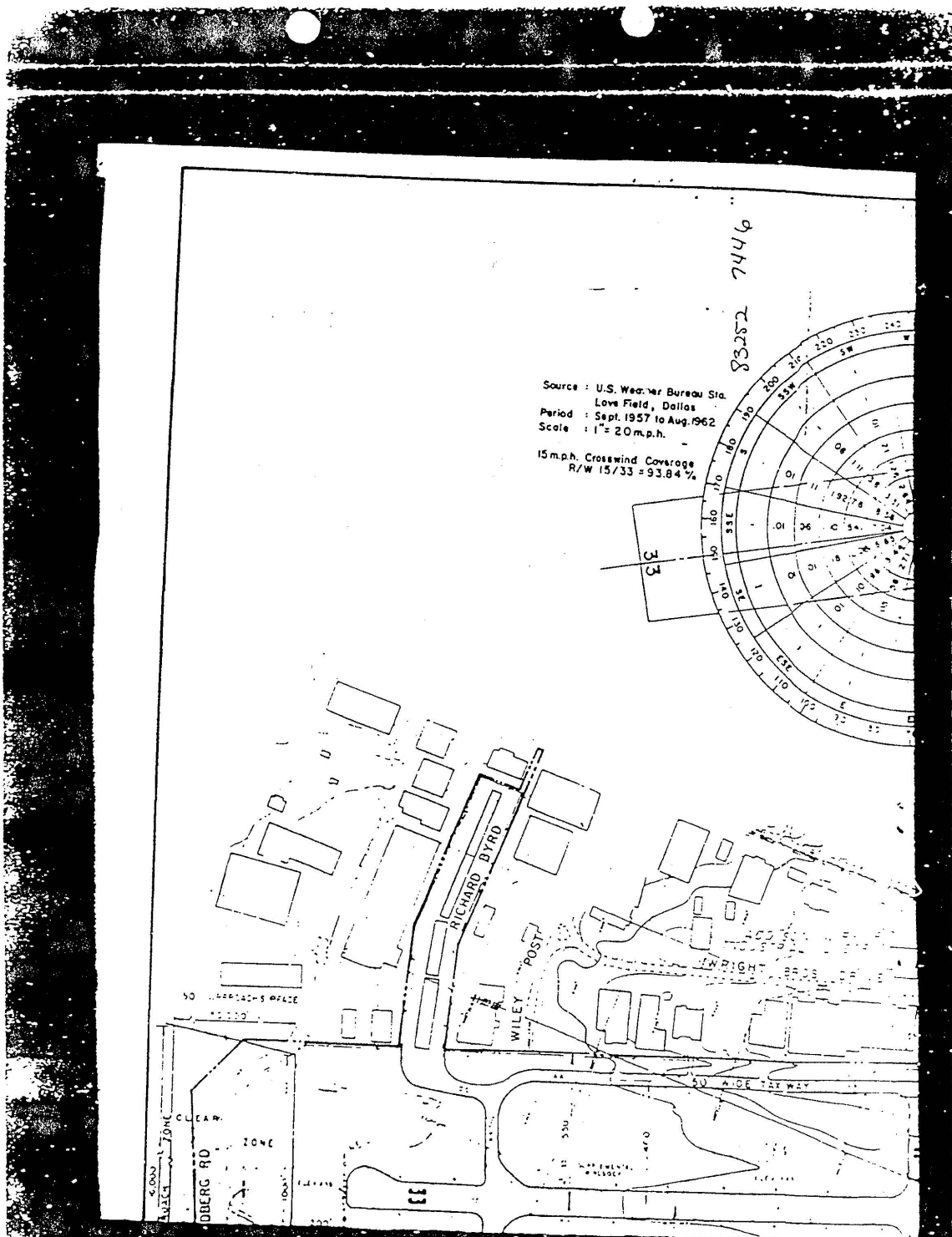
B. To induce Landlord to allow use and occupancy of the demised premises for general office purposes, Tenant agrees to give preference to prospective office tenants whose businesses are aeronautically related (hereinafter referred to as "preferred tenants") conditioned upon (i) availability of space, (ii) willingness of the preferred tenant to pay market rental rates, (iii) the preferred tenant's credit standing favorably comparing to those of other prospective tenants, and (iv) willingness of the preferred tenant to enter into a term of agreement comparable to those offered by other prospective tenants.

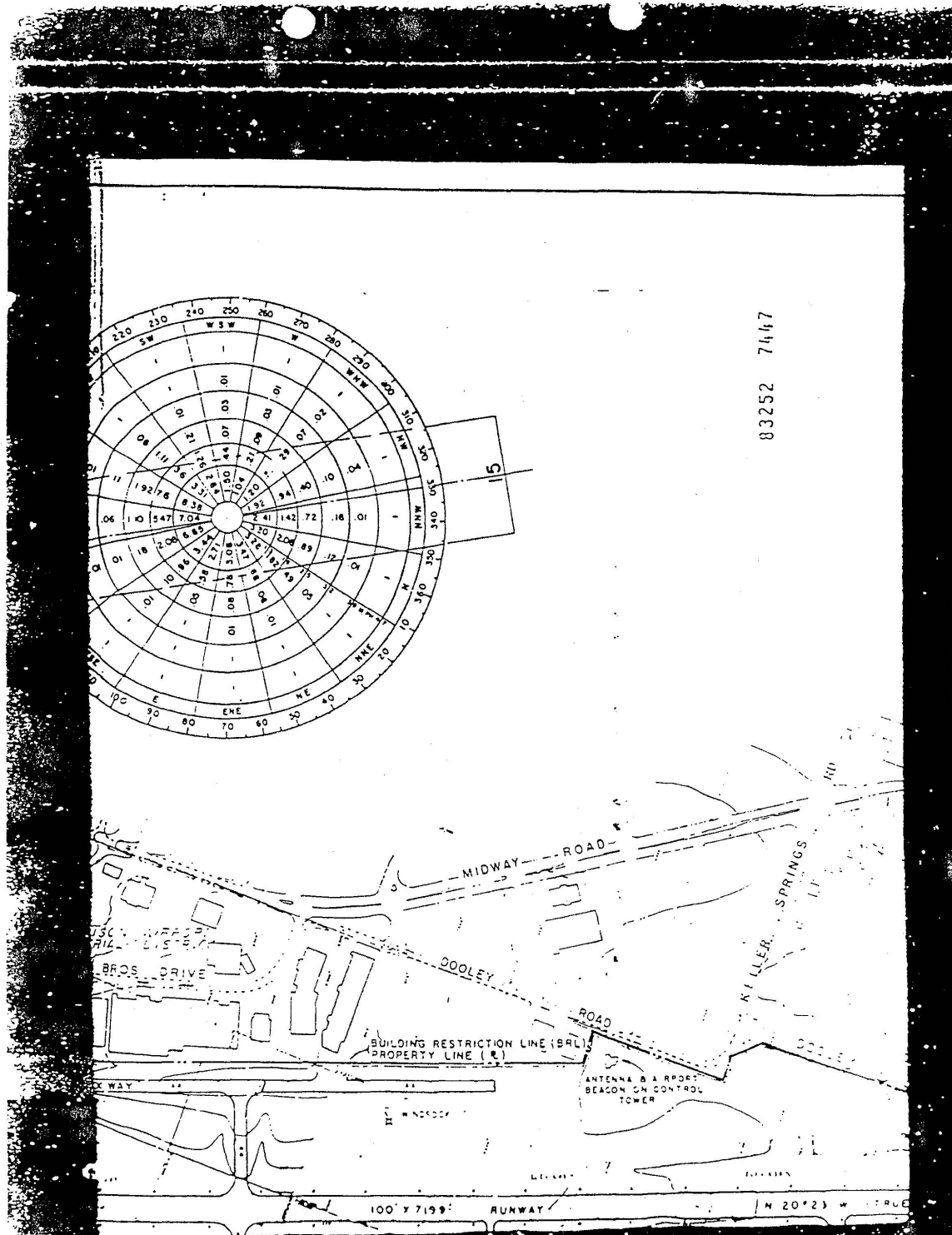
C. Landlord agrees to remove the electrical lines and poles presently running along the western boundary of the demised premises.

D. Tenant shall have the option to terminate this Lease by delivering written notice of such election to Landlord before April 30, 1984, if Tenant has been unable to obtain revenue bond financing for the improvements which Tenant proposes to construct on the demised premises. If Tenant does not timely deliver such written notice of election to terminate, all rights of Tenant to terminate this Lease pursuant to the foregoing shall lapse and be null and void.

18245

ETS





EX. B

83252 7448

BASIC RUNWAY DATA TABLE

	RUNWAY 15/33	
	EXISTING	ULTIMATE
EFFECTIVE GRADIENT (IN%)	0.03	SAME
% WIND COVERAGE	93.84	SAME
INSTRUMENT RUNWAY	YES	YES
PAVEMENT STRENGTH	805,1000 1600T	SAME
APPROACH SURFACE	50:1 BOTH	SAME
RUNWAY LIGHTING	MIRL	SAME
RUNWAY MARKINGS	ALL WEATHER	SAME
NAVIGATIONAL AIDS	ILS	SAME

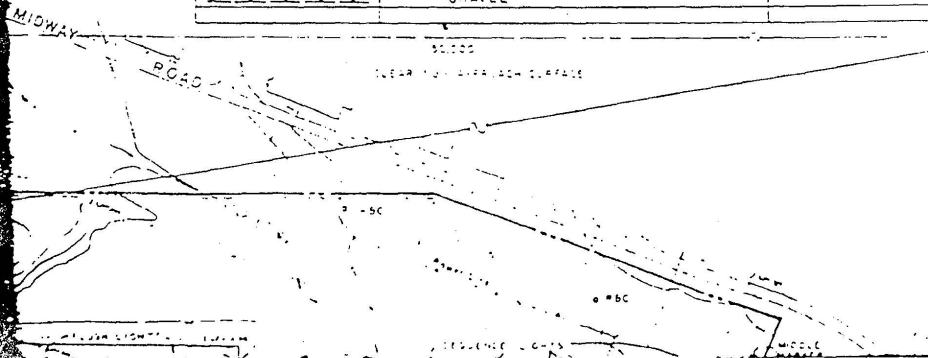
BASIC AIRPORT DATA TABLE

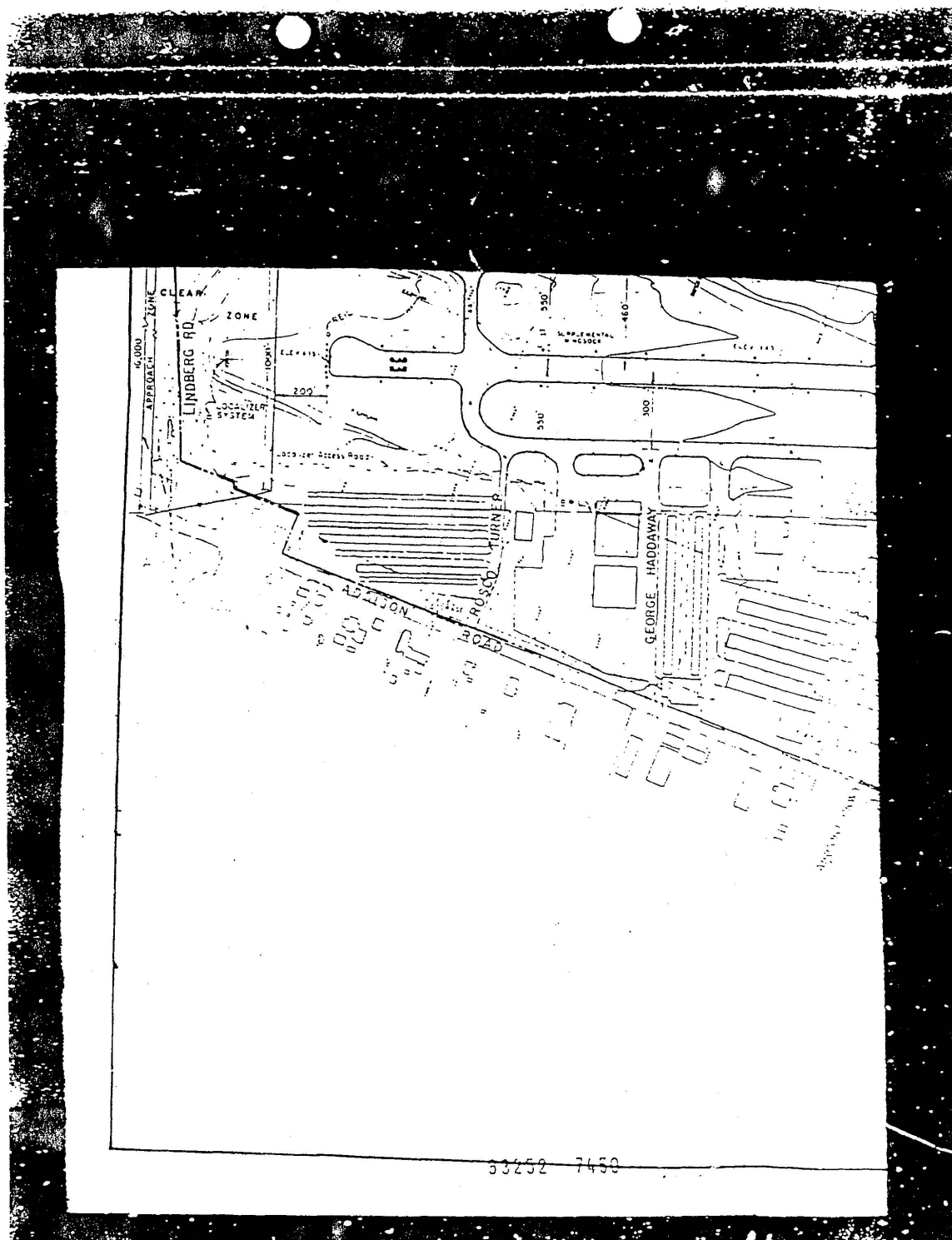
	EXISTING	ULTIMATE
AIRPORT ELEVATION, M.S.L.	643.00	
AIRPORT REFERENCE POINT (ARP) COORDINATES	LAT 32° 58' 10.525" LNG 96° 50' 08.482"	SAME
MEAN MAX TEMP OF HOTTEST MONTH	96.1°F	SAME
AIRPORT AND TERMINAL NAVIGATIONAL AIDS	ILS	SAME

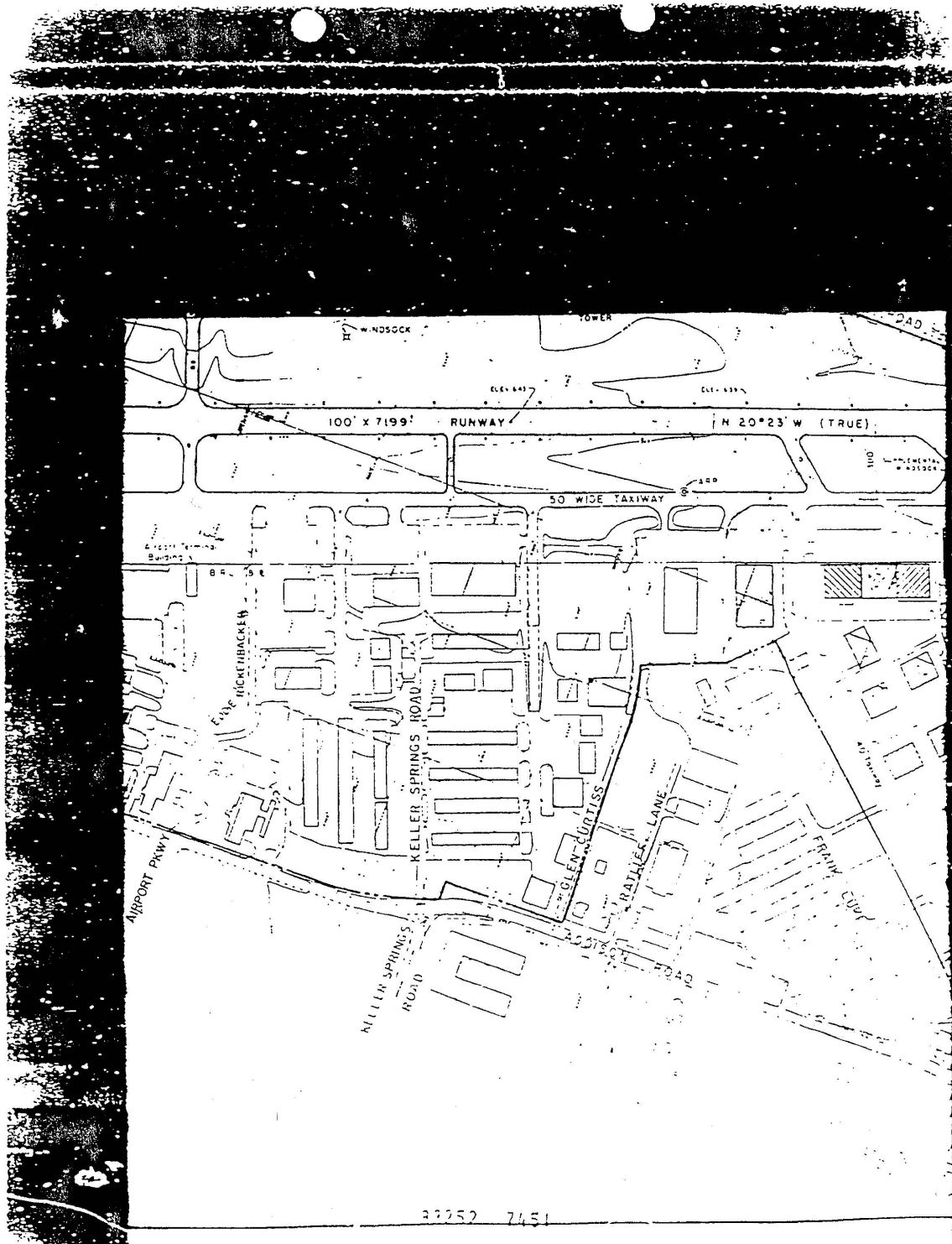
LEGEND

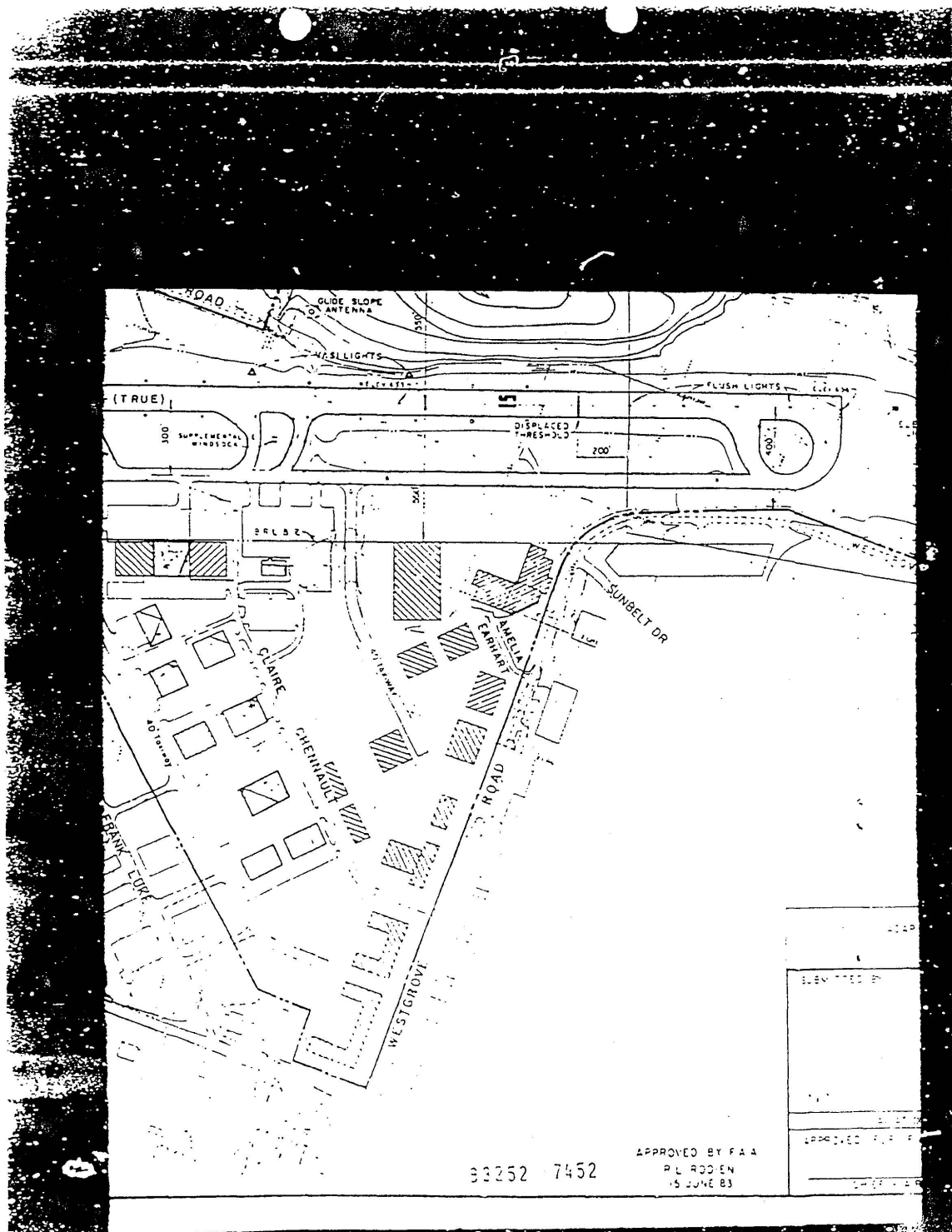
EXISTING		
—X—X—X—	FENCE	
•••••	RUNWAY LIGHTS	
—•••••	GROUND CONTOURS	
—•••••	BUILDINGS PERTAINING TO AIRPORT	
—•••••	EXISTING PROPERTY LINE	
—•••••	PROPERTY ACQUIRED THIS PROJECT	
—•••••	BUILDING RESTRICTION LINE (BRL)	
—•••••	EASEMENTS	
—•••••	ASPHALT PAVEMENT	
—•••••	GRAVEL	

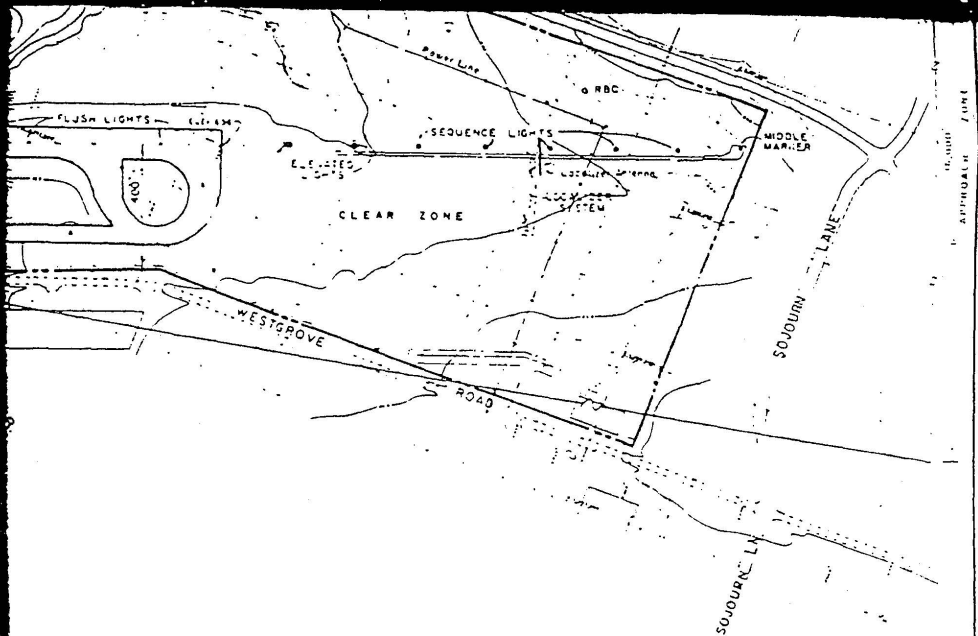
GRAPHIC SCALE











ACAP Project No.		No.		Revision		By		Date	
SUBMITTED BY		DATE		ADDISON MUNICIPAL AIRPORT <u>AIRPORT LAYOUT PLAN</u> ADDISON, TEXAS GINN, INC. Consulting Engineers Dallas, Texas					
AVIATION DIRECTOR		DESIGNED		DATE		TRACED		DATE	
APPROVED FOR F.A.A.		DRAWN		RSC		DATE		CHECKED	
CHIEF - AIRPORTS BRANCH		32832T N47453		FILE NO.		SCALE		SHEET	

REVIEWED BY F.A.A.
 CARL ROSEN
 19 JUNE 83

EXHIBIT A

REAL PROPERTY DESCRIPTION

SITUATED in Dallas County, Texas, and BEING a tract of land situated in the E. 1/4, SEC. 36, T. 10N, R. 10E, SURVEY, ABSTRACT 326, and located on Addison Municipal Airport, Addison, Texas, and being more particularly described as follows:

COMMENCING at the intersection of the centerline of Airport Parkway and the West right-of-way of Addison Road;

THENCE, North 00°22'50" West, along said West right-of-way a distance of 358.57 feet to the POINT OF BEGINNING;

THENCE, South 89°37'10" West, a distance of 149.27 feet;

THENCE, North 1°45'47" East, a distance of 169.44 feet;

THENCE, North 0°33'48" West, a distance of 136.88 feet;

THENCE, North 20°14'53" West, a distance of 180.00 feet;

THENCE, North 71°51'57" East, a distance of 147.04 feet to a point on a curve to the right, said curve having a central angle of 16°46'21", a radius of 788.51 feet and a chord bearing South 45°41'02" East, 230 feet;

THENCE, along an arc length of 230.82 feet to a point;

THENCE, South 0°22'50" East, along the West right-of-way of Addison Road, a distance of 298.48 feet to the POINT OF BEGINNING, containing 1.661 acres (72,348.15 sq. ft.) of land, more or less.

FILED FOR RECORD
THIS 19TH DAY OF December
1983 BY S. S. [unclear]
Earl D. [unclear] County Clerk
Dallas County, Texas
[Signature]

CHICAGO TITLE INSURANCE COMPANY
1750 MERRITT DRIVE
SUITE 132
DALLAS, TEXAS 75201

STATE OF TEXAS
COUNTY OF DALLAS
I HEREBY CERTIFY THAT THE FOREGOING IS A TRUE AND CORRECT
COPY OF THE RECORD AS THE SAME APPEARS IN THE PUBLIC RECORDS
OF THE COUNTY OF DALLAS, TEXAS, THIS 19TH DAY OF DECEMBER, 1983.
[Signature]
COUNTY CLERK, DALLAS COUNTY, TEXAS

93252 7455

83-115-10711- FF 21.00 (2) CTTC

ASSIGNMENT OF LEASE

1080

THIS AGREEMENT is made as of this the 1st day of December, 1983, at Addison, Texas, between BUNNELL PROPERTIES, INC., a Texas corporation, hereinafter called "Assignor", and CONCOURSE PLAZA, LTD., a Texas limited partnership, hereinafter called "Assignee".

WHEREAS, a lease executed on October 11, 1983, between CITY OF ADDISON and ADDISON AIRPORT OF TEXAS, INC., as the Lessor, and the Assignor, as the Lessee, by the terms of which certain real property located on the Addison Airport was leased to the Assignor as Lessee upon the terms and conditions provided therein; and

WHEREAS, the Assignor now desires to assign the Lease to the Assignee, and the Assignee desires to accept an assignment thereof;

NOW, THEREFORE, for and in consideration of the sum of Ten and No/100 Dollars (\$10.00), receipt of which is hereby acknowledged, and the agreement of the Assignee, hereinafter set forth, the Assignor hereby assigns and transfers to the Assignee, its successors and assigns, all of its right, title and interest in and to the Lease hereinbefore described, a copy of which is attached hereto as Exhibit "A", and the Assignee hereby agrees to and does accept the assignment, and in addition expressly assumes and agrees to keep, perform and fulfill all the terms, covenants, conditions and obligations required to be kept, performed and fulfilled by the Assignor as the Lessee thereunder, including the making of all payments due to or payable on behalf of the Lessor under said Lease when due and payable.

This Agreement shall be binding on and inure to the benefit of the parties hereto, their heirs, executors, administrators, successors in interest, and assigns.

Grantee:

Suite 900
First Texas Tower
14951 Dallas Parkway
Dallas, TX 75240

EXECUTED as of the day and year first above written.

ASSIGNOR:

Bunnell Properties, Inc.

By: 

ASSIGNEE:

Concourse Plaza, Ltd.

By: Bunnell Properties, Inc., Managing
General Partner

By: 

CONSENT OF LESSOR

The undersigned is the Lessor under the Lease described in the foregoing Assignment and hereby consents to the assignment of the Lease to the Assignee, waiving none of their rights thereunder as to the Lessee or the Assignee.

LESSOR:

CITY OF ADDISON

By: 

ADDISON AIRPORT OF TEXAS, INC.

By: 

EXHIBIT A

REAL PROPERTY DESCRIPTION

SITUATED in Dallas County, Texas, and BEING a tract of land situated in the E. 1/4 of SURVEY, ABSTRACT 326, and located on Addison Municipal Airport, Addison, Texas, and being more particularly described as follows:

CORNERING at the intersection of the centerline of Airport Parkway and the West right-of-way of Addison Road;

THENCE, North 00°22'50" West, along said West right-of-way a distance of 358.77 feet to the POINT OF BEGINNING;

THENCE, South 89°37'10" West, a distance of 145.27 feet;

THENCE, North 1°45'47" East, a distance of 169.44 feet;

THENCE, North 0°33'48" West, a distance of 135.88 feet;

THENCE, North 20°14'53" West, a distance of 180.00 feet;

THENCE, North 71°51'57" East, a distance of 147.04 feet to a point on a curve to the right, said curve having a central angle of 16°46'21", a radius of 788.51 feet and a chord bearing South 45°41'02" East, 230 feet;

THENCE, along an arc length of 230.82 feet to a point;

THENCE, South 0°22'50" East, along the West right-of-way of Addison Road, a distance of 298.48 feet to the POINT OF BEGINNING, containing 1.661 acres (72,345.25 sq. feet) of land, more or less.

STATE OF TEXAS §
COUNTY OF DALLAS §

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared David A. Bunnell, known to me to be the person and officer whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same on behalf of Bunnell Properties, Inc., a Texas corporation, for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this 27th day of December, 1983.

Kay D. Robertson/Rudick
Notary Public

My Commission Expires:

3-7-84



KAY D. ROBERTSON/RUDICK
Notary Public, State of Texas
My Comm. Expires Mar. 7, 1984

STATE OF TEXAS §
COUNTY OF DALLAS §

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared David A. Bunnell, known to me to be the person and officer whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same on behalf of Bunnell Properties, Inc., a Texas corporation, as managing general partner of Concourse Plaza, Ltd., a Texas limited partnership, for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this 27th day of December, 1983.

Kay D. Robertson/Rudick
Notary Public

My Commission Expires:

3-7-84

10. The rights or deeds of trust whereby Tenant mortgages the leasehold estate of Tenant created hereby shall contain provisions authorizing the mortgagee to give Landlord fifteen (15) days written notice prior to accelerating the debt of Tenant in the event of default and of initiating foreclosure proceedings under said mortgages or deeds of trust, and the following Landlord during such period of fifteen (15) days shall have the right to assume Tenant's position under said mortgages or deeds of trust.

11. Landlord agrees, if and so long as the leasehold estate of Tenant is encumbered by a leasehold mortgage and written notice of such effect has been given to Landlord, to give the holder of such leasehold mortgage at such address or addresses as may be stated in such written notice to Landlord for the giving of notices to the leasehold mortgage, or as otherwise may be specified by the leasehold mortgage to Landlord in writing, written notice of any default hereunder by Tenant, simultaneously with the giving of such notice to Tenant and the holder of any such leasehold mortgage shall have the right, for a period of fifteen (15) days after its receipt of such notice or within any longer period of time specified in such notice, to take such action or to make payment as may be necessary or appropriate to cure any such default so specified, it being the intention of the parties hereto that Landlord shall not exercise Landlord's right to terminate this lease without first giving any such leasehold mortgage the notice provided for herein and affording any such leasehold mortgage the right to cure such default as provided for herein.

12. Landlord further agrees to execute and deliver to any proposed leasehold mortgage of Tenant a "Non-Disturbance Agreement" wherein Landlord agrees that Landlord will recognize such mortgagee and its successors and assigns after foreclosure or default in the mortgage, as Tenant hereunder, and will continue to perform all of Landlord's obligations hereunder so long as such mortgagee and its successors and assigns performs all of the obligations of Tenant hereunder. Landlord also agrees to execute and deliver to any proposed leasehold mortgage any other documents which such proposed leasehold mortgage may reasonably request concerning its mortgage by Tenant of the leasehold estate created hereby, provided, however, that Landlord shall never be required to subordinate Landlord's interest in the demised premises to the mortgage of such proposed leasehold mortgage.

13. Property Taxes and Assessments: Tenant shall pay any and all property taxes or assessments levied or assessed on the improvements on the demised premises, the personal property and fixtures on the demised premises, and, if applied to upon the leasehold estate of Tenant created hereby. Upon the request of Landlord, Tenant shall from time to time furnish to Landlord's proper receipt or other written evidence that all such taxes have been paid by Tenant.

14. Maintenance and Repair of Demised Premises:

A. Tenant shall, throughout the term hereof, maintain in good repair and condition all the demised premises and all fixtures, equipment and personal property on the demised premises and keep them free from waste or nuisance and, at the expiration or termination of this lease, deliver up the demised premises clean and free of trash and in good repair and condition, the fixtures and equipment situated in the demised premises in working order, reasonable wear and tear excepted.

B. In the event Tenant shall fail to so maintain the demised premises and the fixtures, equipment and personal property situated thereon Landlord shall have the right (but not the obligation) to cause all repairs or other maintenance to be made and the reasonable costs thereof extended by Landlord plus interest thereon as provided in paragraph 37 shall be paid by Tenant on demand.

15. Alterations, Additions and Improvements: After completion of the improvements described in paragraph 6, Tenant shall not make any changes in the roof or exterior walls, or make any alterations, additions or improvements to the demised premises without the prior written consent of Landlord. Consent for non-structural alterations, additions or improvements shall not be unreasonably withheld by Landlord. Tenant shall have the right to erect or install shelves, bins, machinery, air conditioning or heating equipment and trade fixtures provided that Tenant complies with all applicable governmental laws, ordinances and regulations.

All alterations, additions and improvements in and to the demised premises shall be performed in a first class, workmanlike manner, and Tenant shall promptly pay and discharge all costs, expenses, claims for damages, liens and any and all other obligations and obligations which arise in connection therewith.

16. Insurance: Tenant shall during the term hereof maintain at Tenant's sole cost and expense insurance relating to the demised premises as follows:

(i) Insurance against loss or damage to improvements by fire, lightning and other risks from time to time included under standard extended coverage policies and sprinkler, vandalism and malicious mischief, all in amounts sufficient to protect Landlord or Tenant from becoming a co-insured in any loss under the applicable policies but in any event in amounts not less than the replacement value of the improvements on the demised premises. The term "full insurable value" as used herein shall mean the replacement value of the improvements on the demised premises. Upon request, such replacement value shall be determined by a qualified appraiser or appraisers of whose findings shall be submitted to Landlord and, therefore, proper adjustment in the limits of insurance coverage shall be effected.

(ii) General public liability insurance against claims for bodily injury, death or property damage occurring on, in or about the demised premises, such insurance to afford protection to Landlord of not less than \$500,000.00 with respect to any one person and \$1,000,000.00 with respect to any one accident and not less than \$200,000.00 with respect to property damage.

(iii) Workers' compensation insurance covering all persons employed by Tenant in connection with any work done or to be done on the demised premises with respect to which claims for death or bodily injury could be asserted against Landlord or the demised premises, or in lieu of such workers' compensation insurance, a program of self-insurance complying with the rules, regulations and requirements of the appropriate state agency of the State of Texas.

(iv) If applicable, boiler and pressure vessel insurance on all steam boilers, parts thereof and appurtenances attached to connected thereto which by reason of their use or existence are capable of bursting, exploding, collapsing, imploding or exploding in the minimum amount of \$100,000.00 for damage to property resulting from such perils.

(v) Such other insurance on improvements in such amounts and against such other insurable hazard which at the time and commonly obtained in the case of property similar to such improvements.

(vi) Manager/keeper's liability insurance providing for coverage in the following limits, \$200,000.00 per aircraft and \$400,000.00 per occurrence on property damage to aircraft in the care, custody or control of Tenant.

(vii) During any period of construction, a Builder's Risk Completed Value policy with an all risks endorsement.

All such policies of insurance shall be issued by insurance companies acceptable to Landlord. This shall name Landlord as an additional insured and shall cover, as the case may be, and this shall provide for at least ten (10) days written notice to Landlord of any change or modification. Tenant shall provide Landlord with duplicate originals of all insurance policies required by this paragraph.

17. Liability Damage or Destruction:

A. In case of any damage to or destruction of the buildings, structures and equipment on the demised premises, if such damage or destruction is caused by fire, explosion, lightning, windstorm, hail, flood, earthquake, riot, civil commotion, strike, sabotage, terrorism, or any other cause, then Landlord shall promptly give written notice thereof to Landlord, generally describing the nature and extent of such damage and destruction.

B. In case of any damage to or destruction of the buildings, structures and equipment on the demised premises, if such damage or destruction is caused by fire, explosion, lightning, windstorm, hail, flood, earthquake, riot, civil commotion, strike, sabotage, terrorism, or any other cause, then Landlord shall promptly give written notice thereof to Landlord, generally describing the nature and extent of such damage and destruction. If such damage or destruction is caused by fire, explosion, lightning, windstorm, hail, flood, earthquake, riot, civil commotion, strike, sabotage, terrorism, or any other cause, then Landlord shall promptly give written notice thereof to Landlord, generally describing the nature and extent of such damage and destruction. If such damage or destruction is caused by fire, explosion, lightning, windstorm, hail, flood, earthquake, riot, civil commotion, strike, sabotage, terrorism, or any other cause, then Landlord shall promptly give written notice thereof to Landlord, generally describing the nature and extent of such damage and destruction.

C. Any insurance proceeds, if any, payable on account of such damage to or destruction of the buildings, structures and equipment on the demised premises shall be paid by Landlord. Landlord shall be entitled in writing to any certificate or certificates of insurance or a supervising architect or engineer approved by Landlord, describing in reasonable detail the work and materials used and the cost thereof, stating that the same were necessary and appropriate to the restoration and construction of the buildings, structures and equipment as nearly as possible in their value, condition and character as immediately prior to such damage or destruction, with such alterations and additions thereto as may be approved in writing by Landlord. Thereafter, Landlord shall be under no duty to take any action other than as set forth in this paragraph 17.

D. Insurance proceeds received by Landlord on account of any damage to or destruction of the buildings, structures and equipment on the demised premises to which the provisions of this paragraph 17 apply shall be paid to Landlord and Tenant in the following order of priority, including without limitation, attorneys' fees and expenses shall be applied as follows:

(i) First, to the insurance proceeds as above defined shall be paid to Tenant or as Tenant may direct from time to time as follows: (a) To the insurance proceeds to pay the cost of restoration, upon written request of Tenant to Landlord accompanied by a certificate of a supervising architect or engineer approved by Landlord, describing in reasonable detail the work and materials used and the cost thereof, stating that the same were necessary and appropriate to the restoration and construction of the buildings, structures and equipment as nearly as possible in their value, condition and character as immediately prior to such damage or destruction, with such alterations and additions thereto as may be approved in writing by Landlord. Thereafter, Landlord shall be under no duty to take any action other than as set forth in this paragraph 17.

...shall be the responsibility of the party causing such damage. In determining the amount of such damage, the cost of repairing and other costs of making shall be subtracted from the amount of the damage.

C. Other than the premises, the party causing such damage shall be responsible for the cost of repairing and other costs of making. The party causing such damage shall be responsible for the cost of repairing and other costs of making.

Pursuant to any of the foregoing remedies shall not preclude pursuit of any of the other remedies herein provided for any of the remedies provided by law. No shall pursue any remedy herein provided constitute a forfeiture or waiver of any rent due to Landlord or any other damages or any damages accruing to Landlord by reason of the incurrence of any of the terms, conditions and covenants herein contained.

24. Default by Landlord. No default by Landlord hereunder shall constitute an eviction or disturbance of Tenant's use and possession of the demised premises or render Landlord liable for damages or annuity. Tenant to be relieved from any of Tenant's obligations hereunder, including the obligation to pay rent or grant Tenant any right of deduction, abatement, set-off or recoupment to enable Tenant to take any action whatsoever with respect to the demised premises or Landlord until thirty (30) days after Tenant has given Landlord written notice specifically setting forth such default by Landlord and Landlord has failed to cure such default within said thirty (30) day period, or, if not even such default cannot be cured within said thirty (30) day period then within an additional reasonable period of time set by Landlord and or has commenced curative action within said thirty (30) day period and thereafter is diligently attempting to cure such default, the event that Landlord fails to cure such default within said thirty (30) day period, or within said additional reasonable period of time, Tenant shall have the right to:

(i) Proceed to cure such default and deduct the cost of curing same plus interest thereon at the rate of ten percent (10%) per annum from the next succeeding rental installment(s) due to Tenant to Landlord hereunder, or

(ii) Proceed to cure such default and bring suit against Landlord for the cost of curing same plus interest thereon at the rate of ten percent (10%) per annum.

If any mortgagee of Landlord has given Tenant its address for notices and specifically requests such notice, Tenant agrees to give the notice required hereinafter to such mortgagee at the time Tenant gives same to Landlord, and to accept curative action, if any undertaken by such mortgagee, as if such curative action had been taken by Landlord.

25. Waiver of Subrogation. Each party hereto waives any and every claim which arises or may arise in such party's favor against the other party hereto during the term of this Lease for any and all loss of, or damage to, any of such party's property caused in whole or in part by or constituting a part of, the demised premises, which loss or damage is covered by valid and collectible fire and extended coverage insurance policies to the extent that such loss or damage is recoverable under such insurance policies. Such mutual waivers shall not, in addition to, and in conjunction with, derogation of, any other waiver or release contained in this Lease with respect to any loss or damage to property of the parties hereto, inasmuch as such mutual waivers will preclude the assignment of any of the parties' obligations or otherwise to any insurance company for the other party's claim. Each party hereto agrees immediately to give each insurance company which has issued to such party policies of fire and extended coverage insurance, written notice of the terms of such mutual waivers, and to cause such insurance policies to be properly endorsed, if necessary, to prevent the invalidation of such insurance coverages by reason of such waivers.

26. Title to Improvements. Any and all improvements on the demised premises shall become the property of Landlord upon the expiration or termination of this Lease; provided, however, (i) if Tenant is not then in default hereunder, Tenant shall have the right to remove all personal property and trade fixture, owned by Tenant from the demised premises, but Tenant shall be required to repair any damage to the demised premises caused by such removal in a good and workmanlike manner and at Tenant's sole cost and expense; and (ii) Landlord may elect to require Tenant to remove all improvements from the demised premises and restore the demised premises to the condition in which the same existed on the date hereof, in which event Tenant shall promptly perform such removal and restoration in a good and workmanlike manner and at Tenant's sole cost and expense.

27. Lien and Lienholder's Lien. Tenant agrees to indemnify and hold Landlord harmless of and from all liability, including the filing of any mechanic's lien or other liens against the demised premises by reason of any assignment of the Lease to a third party claiming under Tenant and Landlord, and Landlord's position, may satisfy such liens and collect the amount expended from Tenant with interest thereon as provided in paragraph 27 as additional rent; provided, however, that Landlord shall not be liable for such assignment of the Lease to a third party until after written notification to Tenant of Landlord's intention to do so and Tenant's failure during such fifteen (15) day period to bond such third party with appropriate parties to protect Landlord's interest in the demised premises.

28. Title. Tenant assigns to the demised premises, subject to the Base Lease, all the Rules and Regulations, easements, rights of way and all other rights and interests in the demised premises, including all rights of way and all other rights and interests in the demised premises.

29. Quiet Enjoyment and Subordination. Landlord covenants, represents and warrants that Landlord has full right and power to execute and perform this Lease and to grant the estate demised herein, and that Tenant, upon payment of the rent hereunder, shall have quiet enjoyment of the premises, conditions, covenants and agreements herein contained, shall peacefully and quietly have, hold and enjoy the demised premises during the full term of this Lease; provided, however, that Tenant accepts this Lease subject and subordinate to any recorded mortgage, deed of trust or other lien presently existing upon the demised premises. Landlord further is hereby irrevocably vested with full power and authority by Tenant to subordinate Tenant's interest hereunder to any mortgage, deed of trust or other lien now existing or hereafter placed on the demised premises or to dedicate this Lease prior and superior to any mortgage, deed of trust or other lien now existing or hereafter placed on the demised premises; provided, however, any such subordination shall be upon the express conditions that (i) this Lease shall be recognized by the mortgagee and that all of the rights of Tenant shall remain in full force and effect during the full term of this Lease on condition that Tenant assign to the mortgagee, its successors and assigns, and perform all of the covenants and conditions required by the terms of this Lease, and (ii) in the event of foreclosure or any enforcement of any such mortgage, the rights of Tenant hereunder shall expressly survive and this Lease shall in all respects continue in full force and effect so long as Tenant shall fully perform all Tenant's obligations hereunder and assign to the purchaser. Tenant also agrees upon demand to execute and record instruments declaring this Lease prior and superior to any mortgage, deed of trust or other lien and specifically providing that the same shall survive the foreclosure of such mortgage, deed of trust or other lien.

30. Rent on Non-Rentable Basis. Except for the general due under the Base Lease during the time that AAT is the Landlord the parties intend that the rent provided for in this Lease shall be an absolutely return to Landlord for the term of this Lease, free of all taxes, expenses or charges with respect to the demised premises, including, without limitation, maintenance, repairs, red abatement, taxes, taxes and assessments; and this Lease shall be construed in accordance with and to effectuate such intention.

31. Holding Over. Should Tenant, or any of Tenant's successors in interest, fail to surrender the demised premises to Landlord at the expiration of the term of this Lease, such holding over shall constitute a tenancy from month to month until, at any time by either Landlord or Tenant after the thirty (30) days prior written notice to the other, at a monthly rental equal to one hundred percent (100%) of the rental paid for the last month of the term of this Lease.

32. Waiver of Default. No waiver by the parties hereto of any default or breach of any term, condition or covenant of this Lease shall be deemed to be a waiver of any subsequent default or breach of the same or any other term, condition or covenant of this Lease.

33. Release of Landlord Upon Transfer. All of Landlord's personal liability for the performance of the terms and conditions of this Lease, except for any liability accruing prior to such transfer, shall terminate upon a transfer of the demised premises, provided that the obligations of Landlord under this Lease are covenants running with the land and shall bind the transferee of the Landlord's interest in this Lease and the demised premises.

34. Attorney's Fees. In the event of any breach of default by Landlord or Tenant of their respective obligations under this Lease, it shall become necessary for the other to employ an attorney to enforce or defend any of such party's rights or interests hereunder, should such party prevail, such party shall be entitled to collect reasonable attorney's fees incurred in such enforcement or defense.

35. Survival of Information. Tenant agrees that Tenant will, from the expiration of the term of this Lease, retain and preserve all information relating to this Lease, including, without limitation, all such books and data as Landlord may reasonably request.

36. Escrowed Certificates. Tenant agrees that from time to time, upon notice from Landlord, Tenant shall, upon request, deliver to Landlord, for escrow, all certificates of title and other documents relating to the demised premises.

A. This Lease is understood and in full force and effect as of the date hereof and shall be binding upon the parties hereto and their heirs and assigns.

B. The parties hereto and their heirs and assigns have been advised.

C. Landlord is not in default under any term, condition or covenant of this Lease or in default under any other term, condition or covenant of this Lease.

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared Harry Stuart
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11 day of October, 1954

Barth L. Jones
Notary Public
Dallas
County, Texas

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared Julius Peddini
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purpose and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 22nd day of November, 1954



Harry Sharp
Notary Public
Dallas
County, Texas

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared David Funnell
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11 day of October, 1954

Barth L. Jones
Notary Public
Dallas
County, Texas

ADDENDUM TO GROUND LEASE,
dated October 11, 1983,
by and among
the City of Addison, Texas,
Addison Airport of Texas, Inc.
and Sunnell Properties, Inc.

This Addendum is attached to and made a part of the foregoing and above referenced Lease for all purposes. In the event of conflict or inconsistency between the printed portion of this Lease and this Addendum, the terms of this Addendum shall control.

A. The words "general office uses" are added to the list of the purposes for which Tenant may use and occupy the demised premises contained in paragraph 6 of the printed portion of this Lease.

B. To induce Landlord to allow use and occupancy of the demised premises for general office purposes, Tenant agrees to give preference to prospective office tenants whose businesses are aeronautically related (hereinafter referred to as "preferred tenant") conditioned upon (i) availability of space, (ii) willingness of the preferred tenant to pay market rental rates, (iii) the preferred tenant's credit standing favorably comparing to those of other prospective tenants, and (iv) willingness of the preferred tenant to enter into a term of agreement comparable to those offered by other prospective tenants.

C. Landlord agrees to remove the electrical lines and poles presently running along the western boundary of the demised premises.

D. Tenant shall have the option to terminate this Lease by delivering written notice of such election to Landlord before April 13, 1984, if Tenant has been unable to obtain revenue bond financing for the improvements which Tenant proposes to construct on the demised premises. If Tenant does not timely deliver such written notice of election to terminate, all rights of Tenant to terminate this Lease pursuant to the foregoing shall lapse and be null and void.

12245

SJS

CHICAGO TITLE INSURANCE COMPANY
12750 MERIT DRIVE
SUITE 132
DALLAS, TEXAS 75251

STATE OF TEXAS
COUNTY OF DALLAS
I, the undersigned, County Clerk of Dallas County, Texas, do hereby certify that this instrument was filed in the public records of Dallas County, Texas, on the 30th day of December, 1983, at 3:53 PM.

DEC 30 1983



Earl B. Burch
COUNTY CLERK, Dallas County, Texas

DEC 30 1983 3:53 PM

93252 7463

404-187K (176)

STATE OF TEXAS

§
§
§
§

SETTLEMENT AND FIRST AMENDMENT
TO LEASE AGREEMENT

2140412

COUNTY OF DALLAS

Deed 11/03/97 728168 \$27.00

This Settlement and First Amendment to Lease Agreement (the "Agreement") is made and entered into this 22 day of April, 1997 by and between the Town of Addison, Texas (the "City"), Addison Airport of Texas, Inc. ("AATP") (the City and AATI are hereinafter referred to together as the "Landlord"), and Concourse Plaza, Ltd., a Texas limited partnership (the "Tenant").

WHEREAS, Landlord and Bunnell Properties, Inc., Tenant's predecessor in interest, entered into a Ground Lease dated October 11, 1983 (copy attached as Exhibit A and hereinafter referred to as the "Ground Lease") of certain real property (the "demised premises" as defined and described in the Ground Lease, and herein referred to as the "Original Demised Premises") located within the Addison Airport and adjacent to Keller Springs Road; and

WHEREAS, the rights, duties and obligations of Bunnell Properties, Inc. under the Ground Lease were assigned to Tenant by that Assignment of Lease dated December 1, 1983 (copy attached as Exhibit B); and

WHEREAS, a portion of the Original Demised Premises is to be taken (the "Part Taken", and being Area B on Attachment 1 to Exhibit C attached hereto and incorporated herein) by the Texas Turnpike Authority for the purpose of constructing a toll tunnel under the Addison Airport in order to connect the eastern and western termini of Keller Springs Road (the "Toll Tunnel Project"); and

WHEREAS, as a result of the taking of the Part Taken by the TTA for the Toll Tunnel Project, Landlord and Tenant desire to amend the Ground Lease by amending the description of the Original Demised Premises to provide for a continuation of the Ground Lease; and

WHEREAS, Landlord and Tenant acknowledge and agree that in the absence of their cooperation and agreement as set forth herein, the TTA would exercise its power of eminent domain to acquire the Part Taken; and

WHEREAS, in order to expedite the Toll Tunnel Project and to avoid the costs, expenses and inconvenience of prosecuting an eminent domain lawsuit, Landlord and Tenant have worked together to reach a full and final agreement and settlement of all issues regarding the interests of Landlord and Tenant in the demised premises and the extent of damages incurred by Tenant as a result of the Toll Tunnel Project, the terms of which agreement and settlement are set forth herein.

NOW, THEREFORE, for and in consideration of the mutual promises and covenants hereinafter set forth, the benefits flowing to the parties hereto, and other good

Settlement and First Amendment
To Lease Agreement - Page 1

and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by both parties, Landlord and Tenant contract and agree as follows:

1. **Incorporation of premises.** The above and foregoing premises are true and correct and are incorporated herein and made a part hereof for all purposes.
2. **Amendment to Ground Lease.** The Ground Lease is hereby modified and amended as follows:
 - A. **Demised Premises:** Exhibit A to the Ground Lease, being the description of the Original Demised Premises, is amended to read as set forth in Exhibit C (the "Amended Demised Premises") attached hereto and incorporated herein.
 - B. Except to the extent modified or amended herein, all other terms and obligations of the Ground Lease shall remain unchanged and in full force and effect.
3. **Landscaping.** As a result of the Toll Tunnel Project, a portion of the landscaping along the most northerly property line of the demised premises (and being adjacent to the proposed Keller Springs right-of-way) will be damaged. In conjunction with the construction of the Toll Tunnel Project, the City shall, at its sole cost and expense, replace the damaged landscaping along the Keller Springs right-of-way line to as good a condition as before the construction of the Toll Tunnel Project. Trees that require removal as a result of the Toll Tunnel Project will be replaced with 6-8 inch (measured 4 feet from the ground) caliper trees of similar type. Upon completion of the Toll Tunnel Project, the City will restore irrigation to cover the entire greenway between the parking lot and the southern curb of Keller Springs.
4. **Curbing and Parking.** City shall add curbs and stripe the parking lot at its sole cost and expense. Tenant shall have the right to approve curbing and striping before it is started, provided such approval shall not be unreasonably withheld. Parking spaces shall be a minimum 9'x18'.
5. **Access.** The City shall not block access to the rear of the building. The Demised Premises will not be used for general access to the Airport during the period that Keller Springs is not usable or during any construction period.
6. **Dumpster.** The City will relocate the dumpster enclosure at its sole cost and expense. Tenant shall have the right to approve the location of the dumpster enclosure. The dumpster enclosure shall be constructed using brick and shall retain its current appearance.

7. **Release; Indemnity.** Tenant does hereby fully and completely compromise, settle, remise, release and forever discharge Landlord of and from any and all claims, actions, causes of action, liability or lawsuit of any kind whatsoever (including any claim, action, cause of action, or lawsuit for any fees, costs or expenses), known or unknown, in law or in equity, which Tenant has or may have against either Landlord relating to, in whole or in part, the value of or damages to the Original Demised Premises, or any part thereof, as a result of the taking of the Part Taken for the Toll Tunnel Project.

Tenant shall indemnify the City and AATI, their officials, officers, employees and agents against, and hold the City and AATI, their officials, officers, employees and agents harmless from, any and all costs, expenses, charges or fees in the event any person ever institutes suit or files a claim against the City or AATI with respect to the value of or damages to the Original Demised Premises, or any part thereof, as a result of the taking of the Part Taken for the Toll Tunnel Project; such indemnification shall include, but is not limited to, the amounts of said claims, and the cost of defending them, including attorneys fees and court costs. The provisions of this Paragraph 7 shall survive the termination of this Agreement.

8. **Landlord Indemnity.** The City shall, at its own cost and expense, defend, indemnify and hold harmless the Tenant, its directors, officers, partners, agents, employees and assigns, and successors in interest, from and against any and all liability, damages, losses, claims, demands, actions, causes of action, costs including reasonable attorneys' fees and expenses (including reasonable attorneys' fees and expenses on appeal), or any of them, resulting from the death or injury to persons (including employees of Landlord) or damage to any property, caused by the construction of the Toll Tunnel Project.

Landlord shall, at its own cost and expense, reimburse Tenant for any and all costs and expenses (including property replacements costs) arising from damage to or loss of Tenant's property or third party property at Concourse Plaza caused by the construction of the Toll Tunnel Project.


9. **Miscellaneous.**

- A. ***Governing Law; Venue.*** This Agreement shall be construed under, and in accordance with, the laws of the State of Texas, and all obligations of the parties created by this Agreement are performable in Dallas County, Texas. Venue for any action under this Agreement shall be in Dallas County, Texas.

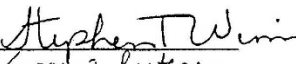
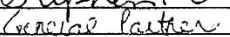
- B. *Legal Construction.* In case any one or more of the provisions contained in this Settlement Agreement shall for any reason be held to be invalid, illegal, or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provision of the Agreement, and this Agreement shall be construed as if such invalid, illegal, or unenforceable provision had never been included in this Agreement.
- C. *Entire Agreement.* This Settlement Agreement represents the entire and integrated agreement between Landlord and Tenant relative to the Toll Tunnel Project and the damages resulting therefrom and supersedes all prior negotiations, representations and/or agreements, either written or oral.
- D. *Amendment.* This Settlement Agreement may not be altered, waived, amended or extended except by an instrument in writing signed by the City, AATI and the Grantee.
- E. *Authority to execute.* The undersigned officers and/or agents of the parties hereto are the properly authorized officials and have the necessary authority to execute this Settlement Agreement on behalf of the parties hereto, and each party hereby certifies to the other that any necessary resolutions or other act extending such authority have been duly passed and are now in full force and effect.

EXECUTED at Dallas County, Texas on the day and year first written above.

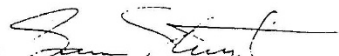
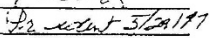
LANDLORD
TOWN OF ADDISON, TEXAS

By: 
Ron Whitehead, City Manager

TENANT
CONCOURSE PLAZA, LTD.

By: 
Its: 

ADDISON AIRPORT OF TEXAS, INC.

By: 
Sam Stuart, 

Settlement and First Amendment
To Lease Agreement - Page 4

022911

EXHIBIT A

13-145-109211-FF-13.00-CITE ①
THE STATE OF TEXAS
COUNTY OF DALLAS

GROUND LEASE

This Ground Lease (hereinafter referred to as the "Lease") is made and entered into as of October 11, 1988, by and among the City of Addison, Texas, a municipal corporation (hereinafter sometimes referred to as the "City"), Addison Airport, Texas, Inc., a Texas Corporation (hereinafter sometimes referred to as "AATI") and Bunnell Properties, Inc., a Texas corporation (hereinafter referred to as "Tenant").

WITNESSETH:

WHEREAS, AATI leases that certain real property (hereinafter referred to as the "demised premises") described in attached Exhibit A from the City pursuant to that certain instrument captioned Agreement for Operation of the Addison Airport (hereinafter referred to as the "Base Lease") between the City and Addison Airport, Inc. (predecessor to AATI); and

WHEREAS, the demised premises are situated at Addison Airport (hereinafter referred to as the "Airport") in Dallas County, Texas, the Airport being delineated in a plat attached hereto as Exhibit B; and

WHEREAS, the City and AATI hereby lease and demise the demised premises to Tenant, and Tenant hereby leases and takes the demised premises from the City and AATI, upon the terms and conditions set forth herein;

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS:

1. Base Lease: All of the terms and conditions of the Base Lease are incorporated into this Lease by reference as if written verbatim herein, and Tenant by Tenant's execution hereof acknowledges that AATI has furnished Tenant with a copy of the Base Lease. Tenant agrees to fully comply at all times and in all respects with the terms and conditions of the Base Lease insofar as the same relate to the demised premises and/or the use and operation thereof, except that Tenant shall not be responsible for the payment of any rental due under the Base Lease which shall be paid by AATI.

2. Definition of Landlord and Effect of Default under the Base Lease: The term "Landlord" as hereinafter used in this Lease shall mean either AATI or the City. So long as the Base Lease is in effect, AATI shall be entitled to all of the rights, benefits and remedies of the Landlord under this Lease, and shall perform all of the duties, covenants and obligations of the Landlord under this Lease. Upon the expiration or termination of the Base Lease, the City shall be entitled to all of the rights, benefits and remedies of the Landlord under this Lease, and shall perform all of the duties, covenants and obligations of the Landlord under this Lease. The City agrees that (i) within a reasonable time as the City notifies Tenant to the contrary in writing, Tenant is fully authorized to make all payments due under this Lease to AATI; and (ii) that default by AATI under the Base Lease shall have no effect on this Lease so long as Tenant pays and performs its duties, covenants and obligations under this Lease.

3. Term: The term hereof shall commence on the earlier of October 1, 1988, or the first day of the first calendar month after Tenant completes the construction hereinafter described and opens for business at the demised premises. The applicable date being hereinafter referred to as the "Commencement Date", and shall end four hundred eighty (480) months thereafter; provided, however, that any entry upon the demised premises by Tenant prior to the Commencement Date shall be subject to all of the terms and conditions hereof except that rental shall not accrue.

4. Rental: Subject to adjustment as hereinafter provided, Tenant agrees to pay to Landlord, without offset or deduction, rental for the demised premises at the rate of SIXTEEN HUNDRED SEVENTY-SIX AND 07/100 per month in advance. The first of such monthly installment shall be due and payable on or before the Commencement Date, and a like installment shall be due and payable on or before the first day of each calendar month thereafter during the term hereof.

5. Adjustment of Rental: Commencing on the second anniversary of the Commencement Date and on every biannual anniversary thereafter (hereinafter referred to as the "Adjustment Date"), the monthly rental due under paragraph 4 shall be adjusted as follows:

(i) A comparison shall be made between the Consumers' Price Index-All Items for the Dallas, Texas Metropolitan Area (hereinafter referred to as the "Price Index") as it existed on the Commencement Date and as it exists on the first day of the calendar month preceding the then applicable Adjustment Date;

(ii) The monthly rental for the two (2) year period beginning with and following the then applicable Adjustment Date shall be either increased or decreased, as the case may be, by the percentage of increase or decrease in the Price Index between the Commencement Date and the then applicable Adjustment Date, but in no event shall such monthly rental ever be decreased below the monthly rental set forth in paragraph 4;

(iii) In the event that the Price Index is unavailable for whatever reason for the computations set forth hereinabove, another index approximating the Price Index as closely as feasible shall be substituted therefor.

6. Use of Demised Premises and Construction of Improvements: The demised premises shall be used and occupied by Tenant for the following purposes: sale of aircraft and aircraft parts; aircraft maintenance and repair; aircraft storage; aircraft training; aircraft charter; and aircraft rentals; and not otherwise without the prior written consent of Landlord.

In connection with such use and occupancy, Tenant intends to construct upon the demised premises the improvements described in the plans and specifications.

These improvements consist of a combination office/airplane hangar facility containing approximately 42,600 square feet of office space and five airplane hangars, the preliminary plans for which have been prepared by Bogard Architects, Inc. Construction prints to be approved by Addison Municipal Airport prior to the start of construction.

All construction shall be strictly in accordance with such plans and specifications, and such construction shall be performed in a first class, workmanlike manner. Tenant agrees to promptly pay and discharge all costs, expenses, claims for damages, liens and any and all other liabilities and obligations which arise in connection with such construction.

7. Acceptance of Demised Premises: Tenant acknowledges that Tenant has fully inspected the demised premises and accepts the demised premises as suitable for the purpose for which the same are leased in their present condition.

8. Securing Governmental Approvals and Compliance with Law: Tenant at Tenant's sole cost and expense shall obtain any and all governmental licenses, permits and approvals necessary for the construction of improvements and for the use and occupancy of the demised premises. Tenant shall comply at all times with all governmental laws, ordinances and regulations applicable to the use of the demised premises, and shall promptly comply with all governmental orders and directives for the correction, prevention and abatement of nuisances in or upon, or connected with the demised premises, all at Tenant's sole cost and expense.

9. Assignment, Subletting and Mortgaging of Leasehold Estate:

A. Without the prior written consent of Landlord, Tenant may not assign this Lease or any rights of Tenant hereunder (except to a leasehold mortgage as hereinafter provided) or sublet the whole or any part of the demised premises. Any assignment or subletting shall be expressly subject to all the terms and provisions of this Lease, including the provisions of paragraph 6 pertaining to the use of the demised premises. In the event of any assignment or subletting, Tenant shall not assign Tenant's rights hereunder or sublet the demised premises without first obtaining a written agreement from each such assignee or sublessee whereby each such assignee or sublessee agrees to be bound by the terms and provisions of this Lease. No such assignment or subletting shall constitute a novation. In the event of the occurrence of an event of default while the demised premises are assigned or sublet, Landlord, in addition to any other remedy provided herein or by law, may at Landlord's option, collect directly from such assignee or subtenant all rents becoming due under such assignment or subletting and apply such rent against any sums due to Landlord hereunder. No direct collection by Landlord from any assignee or subtenant shall release Tenant from the payment or performance of Tenant's obligations hereunder.

B. Tenant shall have the right to mortgage the leasehold estate of Tenant created hereby in order to secure a mortgage loan for the purpose of obtaining funds for the construction of the improvements described in paragraph 6 or for other construction upon the demised premises approved from time to time by Landlord in writing. In the event that Tenant pursuant to mortgages or deeds of trust mortgages the leasehold estate of Tenant created hereby, the leasehold mortgage shall in no event become personally liable to perform the obligations of Tenant under this Lease unless and until said mortgage becomes the owner of the leasehold estate pursuant to foreclosure. If such mortgage remains the owner of the leasehold estate, notwithstanding the foregoing, it is specifically understood and agreed that such mortgage by Tenant and/or any actions taken pursuant to the terms of such mortgage shall ever release Tenant of Tenant's obligation to pay the rents due hereunder and otherwise fully perform the terms and conditions of this Lease.

C. All mortgages or liens of Tenant created hereby shall be subject to the right of the lender to give Landlord fifteen (15) days written notice prior to accelerating the debt of Tenant's such mortgage and/or initiating foreclosure proceedings upon its mortgaged property or deeds of trust, and in allowing Landlord during such fifteen (15) day notice period to cure Tenant's default and prevent acceleration and/or foreclosure proceedings, and thereafter stand in its option to assume Tenant's position under said mortgage or deeds of trust.

D. Landlord agrees, if and so long as the leasehold estate of Tenant is encumbered by a leasehold mortgage and written notice to such effect has been given to Landlord, to give the holder of such leasehold mortgage at such address or addresses as may be specified in such written notice to Landlord for the giving of notices to the leasehold mortgage, or as otherwise may be specified by the leasehold mortgage to Landlord in writing, written notice of any default hereunder by Tenant, simultaneously with the giving of such notice to Tenant, and the holder of any such leasehold mortgage shall have the right, for a period of fifteen (15) days after its receipt of such notice or within any longer period of time specified in such notice, to take such action or to make payment as may be necessary or appropriate to cure any such default so specified, it being the intention of the parties hereto that Landlord shall not exercise Landlord's right to terminate this Lease without first giving any such leasehold mortgage the notice provided for herein and affording any such leasehold mortgage the right to cure such default as provided for herein.

E. Landlord further agrees to execute and deliver to any proposed leasehold mortgage of Tenant a "Non-Disturbance Agreement" wherein Landlord agrees that Landlord will (i) recognize such mortgage and its successors and assigns after foreclosure, or transfer in key of foreclosure, as Tenant hereunder, and (ii) continue to perform all of Landlord's obligations hereunder so long as such mortgage or its successors and assigns performs all of the obligations of Tenant hereunder. Landlord also agrees to execute and deliver to such proposed leasehold mortgage any other documents which such proposed leasehold mortgage may reasonably request concerning the mortgaging by Tenant of the leasehold estate created hereby, provided, however, that Landlord shall never be required to subordinate Landlord's interest in the demised premises to the mortgage of such proposed leasehold mortgage.

10. **Property Taxes and Assessments:** Tenant shall pay any and all property taxes or assessments levied or assessed on the improvements on the demised premises, the personal property and fixtures on the demised premises, and, if applicable, upon the leasehold estate of Tenant created hereby. Upon the request of Landlord, Tenant shall from time to time furnish to Landlord a "paid receipts" or other written evidence that all such taxes have been paid by Tenant.

11. **Maintenance and Repair of Demised Premises:**

A. Tenant shall, throughout the term hereof, maintain in good repair and condition all the demised premises and all fixtures, equipment and personal property on the demised premises and keep them free from waste or nuisance and, at the expiration or termination of this Lease, deliver up the demised premises clean and free of trash and in good repair and condition, with all fixtures and equipment situated in the demised premises in working order, reasonable wear and tear excepted.

B. In the event Tenant shall fail to so maintain the demised premises and the fixtures, equipment and personal property situated thereon, Landlord shall have the right (but not the obligation) to cause all repairs or other maintenance to be made and the reasonable costs thereof expended by Landlord plus interest thereon as provided in paragraph 37 shall be paid by Tenant on demand.

12. **Alterations, Additions and Improvements:** After completion of the improvements described in paragraph 6, Tenant shall not create any openings in the roof or exterior walls, or make any alterations, additions or improvements to the demised premises without the prior written consent of Landlord. Consent for non-structural alterations, additions or improvements shall not be unreasonably withheld by Landlord. Tenant shall have the right to erect or install shelves, bins, machinery, air conditioning or heating equipment and trade fixtures provided that Tenant complies with all applicable governmental laws, ordinances and regulations.

All alterations, additions and improvements in and to the demised premises shall be performed in a first class, workmanlike manner and Tenant shall promptly pay any discharge all costs, expenses, claims for damages, liens and any and all other liabilities and obligations which arise in connection therewith.

13. **Insurance:** Tenant shall during the term hereof maintain at Tenant's sole cost and expense insurance relating to the demised premises as follows:

(i) Insurance against loss or damage to improvements by fire, lightning, and other risks from time to time included under standard extended coverage policies, and sprinkler, vandalism and malicious mischief, all in amounts sufficient to prevent Landlord or Tenant from becoming co-insurers of any loss under the applicable policies but in any event in amounts not less than eighty percent (80%) of the full insurable value of the demised premises. The term "full insurable value" as used herein means actual replacement value at the time of such loss. Upon request, such replacement value shall be determined by a qualified appraiser, a copy of whose findings shall be submitted to Landlord, and, therefore, proper adjustment in the limits of insurance coverage shall be effected.

(ii) General public liability insurance against claims for bodily injury, death or property damage occurring on, in or about the demised premises, such insurance to afford protection to Landlord of not less than \$500,000.00 with respect to any one person, \$1,000,000.00 with respect to any one accident and not less than \$200,000.00 with respect to property damage.

(iii) Workmen's compensation insurance covering all persons employed by Tenant in connection with any work done on or about the demised premises with respect to which claims for death or bodily injury could be asserted against Landlord or the demised premises, or in the event such workmen's compensation insurance, a program of self-insurance complying with the rules, regulations and requirements of the appropriate state agency of the State of Texas.

(iv) If applicable, boiler and pressure vessel insurance on all steam boilers, parts thereof and appurtenances attached or connected thereto which by reason of their use or existence are capable of bursting, erupting, collapsing, imploding or exploding, in the minimum amount of \$100,000.00 for damage to property resulting from such perils.

(v) Such other insurance on improvements in such amounts and against such other insurable hazard which at the time are commonly obtained in the case of property similar to such improvements.

(vi) Hangar keeper's liability insurance providing for coverage in the following limits: \$200,000.00 per aircraft and \$400,000.00 per occurrence on property damage to aircraft in the care, custody or control of Tenant.

(vii) During any period of construction, a Builder's Risk Completed Value policy with an all risks endorsement.

All such policies of insurance (i) shall be issued by insurance companies acceptable to Landlord, (ii) shall name Landlord as an additional insured or loss payee, as the case may be, and (iii) shall provide for at least ten (10) days written notice to Landlord prior to cancellation or modification. Tenant shall provide Landlord with duplicate originals of all insurance policies required by this paragraph.

14. **Casualty Damage or Destruction:**

A. In case of any damage to or destruction of the buildings, structures and equipment on the demised premises, or any part thereof, Tenant will promptly give written notice thereof to Landlord, generally describing the nature and extent of such damage and or destruction.

B. In case of any damage to or destruction of the buildings, structures and equipment on the demised premises, or any part thereof, Tenant, whether or not the insurance proceeds, if any, payable on account of such damage and/or destruction shall be sufficient for such purpose, at Tenant's sole cost, risk and expense will promptly commence and complete the restoration, repair and replacement of such buildings, structures and equipment as nearly as possible in their former condition and character immediately prior to such damage and destruction, with such alterations and additions thereto as may be approved in writing by Landlord thereinafter sometimes referred to as the "Restoration".

C. All insurance proceeds, if any, payable on account of such damage to or destruction of the buildings, structures and equipment on the demised premises shall be held by Landlord. Landlord shall be protected in acting upon any certificate believed by Landlord to be genuine and to have been executed by the proper party and shall receive such certificate as conclusive evidence of any fact or as to any matter therein set forth. Such certificate shall be full warranty, authority and protection to Landlord in acting thereon, and Landlord shall be under no duty to take any action other than as set forth in this paragraph 14.

D. Insurance proceeds received by Landlord on account of any damage to or destruction of the buildings, structures and equipment on the demised premises, or any part thereof (less the costs, fees and expenses incurred by Landlord and Tenant in the collection thereof, including, without limitation, adjuster's and attorney's fees and expenses), shall be applied as follows:

(i) Net insurance proceeds as above defined shall be paid to Tenant or as Tenant may direct from time to time as Restored proceeds to pay for reimbursement of the cost of Restoration, upon written request of Tenant to Landlord accompanied by a certificate of a supervising architect or engineer approved by Landlord, describing in reasonable detail the work and materials in question and the cost thereof, stating that the same were necessarily or appropriate to the Restoration and constitute a complete item thereof, and that no part of the cost thereof has theretofore been reimbursed, and specifying the additional amount, if any, necessary to complete the Restoration and (ii), in the absence of such satisfactory certificate to Landlord that there exist no mechanics' liens, claims or liens for labor or materials except such, if any, as are discharged by the payment of the amount requested.

(ii) Upon receipt by Landlord of evidence of the existence of such liens as required by the foregoing clause (i) and (ii), the Restored proceeds shall be applied as follows:

E. In the event that Tenant does not promptly commence Restoration, or after commencement Tenant does not diligently prosecute the completion of same, Landlord shall have the right to commence or complete Restoration after Landlord has given Tenant thirty (30) days prior written notice requesting the commencement of Restoration or that Tenant diligently proceeds to the completion of same. Tenant during such thirty (30) day period does not so commence or proceed to diligently complete Restoration. In such event, Landlord shall retain the insurance proceeds, and Tenant shall pay any deficiency if such proceeds are not sufficient for Restoration.

15. Condemnation:

F. If during the term hereof, any part of the demised premises shall be acquired or condemned by eminent domain for any public or quasi-public use or purpose, or are sold to a condemning authority under threat of condemnation, and after such taking by or sale to said condemning authority the remainder of the demised premises is not susceptible to efficient and economic occupation and operation by Tenant, this Lease shall automatically terminate as of the date that said condemning authority takes possession of the demised premises, and Landlord shall refund to Tenant any prepaid but unaccrued rental less any sum then owing by Tenant to Landlord.

G. If after such taking by or sale to said condemning authority the remainder of the demised premises is susceptible to efficient and economic occupation and operation by Tenant, this Lease shall not terminate but the rental due hereunder shall be adjusted so that Tenant shall be required to pay for the remainder of the term hereof the sum obtained by multiplying each monthly rental installment due hereunder, as adjusted from time to time pursuant to paragraph 5, by a fraction, the numerator of which shall be the number of square feet remaining in the demised premises after the taking by or sale to said condemning authority and denominator of which shall be the square footage originally contained in the demised premises. The rental adjustment called for herein shall not commence until said condemning authority actually takes possession of the condemned portion of the demised premises.

H. If this Lease is not terminated pursuant to Section A, Tenant shall promptly restore the improvements on the demised premises and the condemnation proceeds to which Landlord and Tenant are entitled shall be awarded and paid first, or cover the cost of repairs for restoring the remaining portion of the demised premises to a condition susceptible to efficient and economic occupation and operation by Tenant, and any remaining proceeds to which Landlord and Tenant are entitled shall be awarded and paid to Landlord and Tenant, as their interest may appear. If this Lease is terminated pursuant to Section A, condemnation proceeds to which Landlord and Tenant are entitled shall be awarded and paid to Landlord and Tenant as their interests may appear.

16. Utilities. Tenant shall be responsible at Tenant's sole cost and expense for obtaining all utility connections at or for the demised premises and Tenant shall pay all charges for water, electricity, gas, sewer, telephone or any other utility connections, taxes and services furnished to the demised premises during the term hereof. Landlord shall in no event be liable or responsible for any cessation or interruption in any such utility services.

17. Common Facilities. Tenant and Tenant's employees, agents, servants, customers and other invitees shall have the non-exclusive right to use: (i) common facilities, improvements, equipment and service, which may now exist or which hereafter be provided by Landlord for the accommodation and convenience of Landlord's customers and tenants, including landing and takeoff facilities, means of ingress and egress to the demised premises, other airport installations, and all other reasonable services which may be provided without charge from time to time by Landlord in operating the Airport. All such common facilities shall at all times be under the exclusive control and management of Landlord and may be rearranged, modified, changed or terminated from time to time at Landlord's sole discretion.

18. Rules and Regulations. Landlord has adopted Rules and Regulations (hereinafter referred to as the "Rules and Regulations") which shall govern Tenant in the use of the demised premises and all common facilities, a copy of which has been furnished to Tenant. The Rules and Regulations are incorporated by reference as if written verbatim herein, and Tenant agrees to comply fully at all times with the Rules and Regulations. Landlord shall have the right to amend, modify and alter the Rules and Regulations from time to time in a reasonable manner for the purpose of assuring the safety, welfare and convenience of Landlord, Tenant and all other Tenants and customers of the Airport.

19. Signs and Equipment. After first securing Landlord's approval which will not be unreasonably withheld, Tenant shall have the right from time to time to install and operate advertising signs and radio, communications, meteorological, aerial navigation and other equipment and facilities in or on the demised premises that may be reasonably necessary for the operation of Tenant's business.

20. Landlord's Right of Entry. Landlord and Landlord's authorized representatives shall have the right, during the normal business hours, to enter the demised premises (i) to inspect the general condition and state of repair thereof, (ii) to make repairs permitted under this Lease, (iii) to show the demised premises to any prospective tenant or purchaser or (iv) for any other reasonable and lawful purpose.

During the final one hundred eighty (180) days of the term hereof, Landlord and Landlord's authorized representatives shall have the right to erect and maintain on or about the demised premises customary signs advertising the demised premises for lease or for sale.

21. Indemnity and Exculpation:

A. Landlord shall not be liable to Tenant or to Tenant's employees, agents, servants, customers, invitees, or to any other person whatsoever, for any injury to persons or damage to property on or about the demised premises or any adjacent area owned by Landlord caused by the negligence or misconduct of Tenant, Tenant's employees, servants, customers, invitees, subcontractors, licensees, or concessionaires or any other person entering the demised premises under express or implied invitation of Tenant, or arising out of the use of the demised premises by Tenant and the conduct of Tenant's business thereon, or arising out of any breach or default by Tenant in the performance of Tenant's obligations hereunder, and Tenant hereby agrees to indemnify Landlord and hold Landlord harmless from any loss, expense or claims arising out of such damage or injury.

B. Landlord and Landlord's agents and employees shall not be liable to Tenant for any injury to persons or damage to property resulting from the demised premises becoming out of repair or by defect in or failure of equipment, pipes, or wiring, or broken glass, or by the backing up of drains, or by gas, water, steam, electricity or oil leaking, escaping or flowing into the demised premises, regardless of the source, or dampness or by fire, explosion, falling plaster or ceiling or for any other reason whatsoever. Landlord shall not be liable to Tenant for any loss or damage that may be occasioned by or through the acts or omissions of other tenants of Landlord or caused by operations in construction of any private, public or quasi-public work, or of any other persons whatsoever, excepting only such authorized agents and employees of Landlord.

22. Default by Tenant. The following events shall be deemed to be events of default by Tenant under this Lease:

A. Failure of Tenant to pay any installment of rent or any other sum payable in Landlord hereunder on the date that same is due and such failure shall continue for a period of ten (10) days.

B. Failure of Tenant to comply with any term, condition or covenant of this Lease, other than the payment of rent or other sum of money, and such failure shall not be cured within thirty (30) days after written notice thereof to Tenant.

C. Insolvency, the making of a transfer in fraud of creditors, or the making of an assignment for the benefit of creditors by Tenant or any guarantor of Tenant's obligations.

D. Filing of a petition under any section or chapter of the National Bankruptcy Act as amended, or under any similar law or statute of the United States or any State thereof by Tenant or any guarantor of Tenant's obligations, or adjudication as a bankrupt or insolvent in proceedings filed against Tenant or such guarantor.

E. Appointment of a receiver or trustee for all or substantially all of the assets of Tenant or any guarantor of Tenant's obligations.

F. Abandonment by Tenant of any substantial portion of the demised premises or cessation of use of the demised premises for the purpose leased.

23. Remedies of Landlord. Upon the occurrence of any of the events of default listed in paragraph 22, Landlord shall have the option to pursue any one or more of the following remedies without the notice or demand whatsoever:

A. Terminate this Lease, in which event Tenant shall immediately surrender the demised premises to Landlord. If Tenant fails to so surrender the demised premises, Landlord may, without prejudice to any other remedy which Landlord may have for possession of the demised premises or arrears in rent, enter upon and take possession of the demised premises and expel or remove Tenant and any other person who may be occupying the demised premises or any part thereof, without being liable for prosecution or any claim for damages therefor. Tenant shall pay to Landlord on demand the amount of all loss and damages which Landlord may suffer by reason of such termination, whether through inability to relet the demised premises on satisfactory terms or otherwise.

B. Terminate this Lease, in which event Tenant shall immediately surrender the demised premises to Landlord. If Tenant fails to so surrender the demised premises, Landlord may, without prejudice to any other remedy which Landlord may have for possession of the demised premises or arrears in rent, enter upon and take possession of the demised premises and expel or remove Tenant and any other person who may be occupying the demised premises or any part thereof, without being liable for prosecution or any claim for damages therefor. Tenant shall pay to Landlord on demand the amount of all loss and damages in any amount equal to the excess, if any, of the total amount of all monthly rental and other amounts to be paid by Tenant to Landlord hereunder for the period which would otherwise have constituted the unexpired portion of the term of this Lease over the then fair market rental value of the demised premises for such unexpired portion of the term of this Lease.

C. Enter upon and take possession of the demised premises without terminating this Lease and without being liable for prosecution or any claim for damages therefor and expel or remove Tenant and any other person who may be occupying the demised premises and any other person who may be occupying the demised premises.

[illegible]

26. Default by Landlord. No default by Landlord hereunder shall constitute an eviction or disturbance of Tenant's use and possession of the demised premises or render Landlord liable for damages or an eviction of Tenant or release from any of Tenant's obligations hereunder (including the obligation to pay rent) or grant Tenant any kind of deduction, abatement, set-off or recoupment or entitle Tenant to take any action whatsoever with regard to its demised premises or any landlord unit until thirty (30) days after Tenant has given Landlord written notice specifically setting forth such default by Landlord and Landlord has failed to cure such default within said thirty (30) day period, or in the event such default cannot be cured within said thirty (30) day period then within an additional reasonable period of time so long as such default is cured within said thirty (30) day period and thereafter is diligently attempting to cure such default. In the event Landlord fails to cure such default within said thirty (30) day period, or within said additional reasonable period of time, Tenant shall have the right to:

(iii) Proceed to cure such default and bring suit against Landlord for the cost of curing same plus interest thereon at the rate of ten percent (10%) per annum.

25. Waiver of Subrogation. Each party hereby waives any and every claim which arises or may arise in such party's favor against the other party hereunder during the term of this lease for any and all loss of, or damage to, any of such party's property located within the scope or constituting a part of, the demised premises, which loss or damage is covered by valid and collectible fire and extended coverage.

26. **Termination to Improvements.** Any and all improvements on the demised premises shall become the property of Landlord upon the expiration or termination of this Lease. Provided, however, if if Tenant is not then in default hereunder, Tenant shall have the right to remove all personal property and trade fixtures owned by Tenant from the demised premises, but Tenant shall be required to repair any damage to the building and premises caused by such removal in a good and workmanlike manner and at Tenant's sole cost and expense. And if Tenant may not remove or restore the improvements on the demised premises and restore the demised premises to the condition in which it was in at the time of the expiration of this Lease, then Tenant shall promptly perform such removal and restoration of a good and workmanlike manner and at Tenant's sole cost and expense.

28. Title: Tenant accepts the demised premises subject to: (i) the Base Lease, (ii) the Rules and Regulations, (iii) easements and rights-of-way and (iv) zoning ordinances and other ordinances, laws, statutes or regulations now in effect or hereafter promulgated by any governmental authority having jurisdiction over the demised premises.

demised premises during the full term of this Lease, provided, however, that Tenant accepts this Lease subject and subordinate to any mortgage, deed of trust or other lien presently existing upon the demised premises. Landlord further is hereby irrevocably vested with full power and authority by Tenant to subordinate Tenant's interest hereunder to any mortgage, deed of trust or other lien now or hereafter existing upon the demised premises.

30. **Tenant's Net Return Basis.** Except for the rental due under the Base Lease during the time that AATI is the Landlord hereunder, it is intended that the rent provided for in this Lease shall be an absolutely net return to Landlord for the term of this Lease, free of any cost, expenses or charges with respect to the demised premises including, without limitation, maintenance, repairs, replacement, insurance

32. Waiver of Default. No waiver by the Parties hereof of any default or breach of any term, condition or covenant of this Lease shall be deemed to be a waiver of any subsequent default or breach of the same or any other term, condition or covenant contained herein.

34. Attorneys' Fees If, on account of any breach or default by Landlord or Tenant of their respective obligations under this Lease, it shall become necessary for the other to employ an attorney to enforce or defend any of such party's rights or remedies hereunder, then the party so employed should such party prevail, such party shall be entitled to collect reasonable attorneys' fees incurred in such connection from the party in default.

34. Easement Certificates: Tenant agrees that from time to time, upon notification (ten (10) days prior written request) by Lessor, Tenant will deliver to Lessor, in writing, certificates that:

C. Landlord is not a default under any term of the lease or in default therefor the rent thereon shall be reduced to \$100.00 per month.

2. INTERVIEWING AND INTERVIEWING TECHNIQUES - 10% OF THE TOTAL MARKS

100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%

to be paid to Landlord as to being furnished to Landlord's mortgage and Landlord's mortgage is to cure such default within the curative period allowed Landlord under this Lease.

Landlord agrees that from time to time, upon not less than ten (10) days prior written request by Tenant, Landlord will deliver to Tenant a statement in writing identifying that:

A. This Lease is unmodified and in full force and effect (or if there have been modifications, that the Lease as modified is in full force and effect and stating the modifications);

B. The dates to which rent and other charges have been paid;

C. Tenant is not in default under any term or provision of this Lease or if in default the nature thereof in detail in accordance with an exhibit attached thereto.

37. Interest on Tenant's Obligations and Manner of Payment. All monetary obligations of Tenant to Landlord under this Lease remaining unpaid ten (10) days after the due date of the same (if no due date has been established under other provisions hereof, the "due date" shall be the date upon which Landlord demands payment from Tenant in writing) shall bear interest at the rate of ten percent (10%) per annum from and after said tenth (10th) day until paid. If more than twice during the term of the Lease Tenant's personal or corporate check is not paid by the bank on which it is drawn for whatever reason, Landlord may require by giving written notice to Tenant that the payment of all future monetary obligations of Tenant under this Lease are to be made on or before the due date by cash, cashier's check, certified check or money order, and the delivery of Tenant's personal or corporate check will no longer constitute payment of such monetary obligations. Any acceptance by Landlord of a personal or corporate check after such notice shall not be deemed or construed as a waiver or estoppel of Landlord to require other payments as required by said notice.

38. Independent Contractor. It is understood and agreed that in leasing and operating the demised premises, Tenant is acting as an independent contractor and is not acting as agent, partner, joint venturer or employee of Landlord.

39. Force Majeure. In the event performance by Landlord of any term, condition or covenant in this Lease is delayed or prevented by any Act of God, strike, lockout, shortage of material or labor, restriction by any governmental authority, civil riot, flood, or any other cause not within the control of Landlord, the period for performance of such term, condition or covenant shall be extended for a period equal to the period Landlord is so delayed or hindered.

40. Exhibits. All exhibits, attachments, annexed instruments and addenda referred to herein shall be considered a part hereof for all purposes with the same force and effect as if copied verbatim herein.

41. Use of Language. Words of any gender used in this Lease shall be held and construed to include any other gender, and words in the singular shall be held to include the plural, unless the context otherwise requires.

42. Captions. The captions or headings of paragraphs in this Lease are inserted for convenience only, and shall not be considered in construing the provisions hereof if any question of intent should arise.

43. Successors. The terms, conditions and covenants contained in this Lease shall apply to, inure to the benefit of, and be binding upon the parties hereto and their respective successors in interest and legal representatives, except as otherwise herein expressly provided. All rights, powers, privileges, immunities and duties of Landlord under this Lease, including, but not limited to, any rights required or permitted to be delivered by Landlord to Tenant hereunder, may, at Landlord's option, be exercised or performed by Landlord's agent or attorney.

44. Severability. If any provision in this Lease should be held to be invalid or unenforceable, the validity and enforceability of the remaining provisions of this Lease shall not be affected thereby.

45. Notices. Any notice or document required or permitted to be delivered hereunder may be delivered in person or shall be deemed to be delivered, whether actually received or not, when deposited in the United States mail, postage prepaid, registered or certified mail, return receipt requested, addressed to the parties at the addresses indicated below, or at such other addresses as may have the parties been notified by written notice delivered in accordance herewith.

LANDLORD

TENANT

Addison Airport of Texas, Inc.
P. O. Box 24267
Dallas, Texas 75234

Bunnell Properties, Inc.
1495 Dallas Parkway, Suite 500
Dallas, Texas 75240

City of Addison, Texas

980-7704

P. O. Box 144

Addison, Texas 75001

46. Fees or Commissions. Each party hereto hereby covenants and agrees with the other that such party shall be solely responsible for the payment of any brokers', agents' or finders' fees or commissions agreed to by such party arising from the execution of this Lease or the performance of the terms and provisions contained herein, and such party agrees to indemnify and hold the other party harmless from the payment of any such fees or commissions.

47. Counterparts. This Lease may be executed in multiple counterparts, each of which shall be deemed an original, and all of which shall constitute but one and the same instrument.

48. Governing Law and Venue. This Lease and all of the transactions contemplated herein shall be governed by and construed in accordance with the laws of the State of Texas, and Landlord and Tenant both irrevocably agree that venue for any dispute concerning this Lease or any of the transactions contemplated herein shall be in any court of competent jurisdiction in Dallas County, Texas.

49. Entire Agreement and Amendments. This Lease, consisting of forty-nine (49) paragraphs and Exhibits A through B attached hereto, embodies the entire agreement between Landlord and Tenant and supersedes all prior agreements and understandings, whether written or oral, and all contemporaneous oral agreements and understandings relating to the subject matter hereof. Except as otherwise specifically provided herein, no agreement hereafter made shall be effective to change, modify, discharge or effect an amendment to this Lease, in whole or in part, unless such agreement is in writing and signed by or in behalf of the party against whom enforcement of the change, modification, discharge or amendment is sought.

EXECUTED as of the day month and year first above written.

LANDLORD

ADDISON AIRPORT OF TEXAS, INC.

By

Its

CITY OF ADDISON, TEXAS

By

Its

Bunnell Properties, Inc.

By

The additional provisions contained in the Addendum attached hereto are hereby incorporated herein for all purposes.

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared Henry Stuart
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11 day of October, 19 54

Donny P. Jones
Notary Public
Dallas
County, Texas



STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared Julius Piddin
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 22nd day of November, 19 53



Donny P. Jones
Notary Public
Dallas
County, Texas

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared David Russell
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11 day of October, 19 54



Donny P. Jones
Notary Public
Dallas
County, Texas

ADDENDUM TO GROUND LEASE,
dated October 11, 1983,
by and among
the City of Addison, Texas,
Addison Airport of Texas, Inc.
and Bunnell Properties, Inc.

This Addendum is attached to and made a part of the foregoing and above referenced Lease for all purposes. In the event of conflict or inconsistency between the printed portion of this Lease and this Addendum, the terms of this Addendum shall control.

A. The words "general office uses" are added to the list of the purposes for which Tenant may use and occupy the demised premises contained in paragraph 6 of the printed portion of this Lease.

B. To induce Landlord to allow use and occupancy of the demised premises for general office purposes, Tenant agrees to give preference to prospective office tenants whose businesses are aeronautically related (hereinafter referred to as "preferred tenant") conditioned upon (i) availability of space, (ii) willingness of the preferred tenant to pay market rental rates, (iii) the preferred tenant's credit standing favorably comparing to those of other prospective tenants, and (iv) willingness of the preferred tenant to enter into a term of agreement comparable to those offered by other prospective tenants.

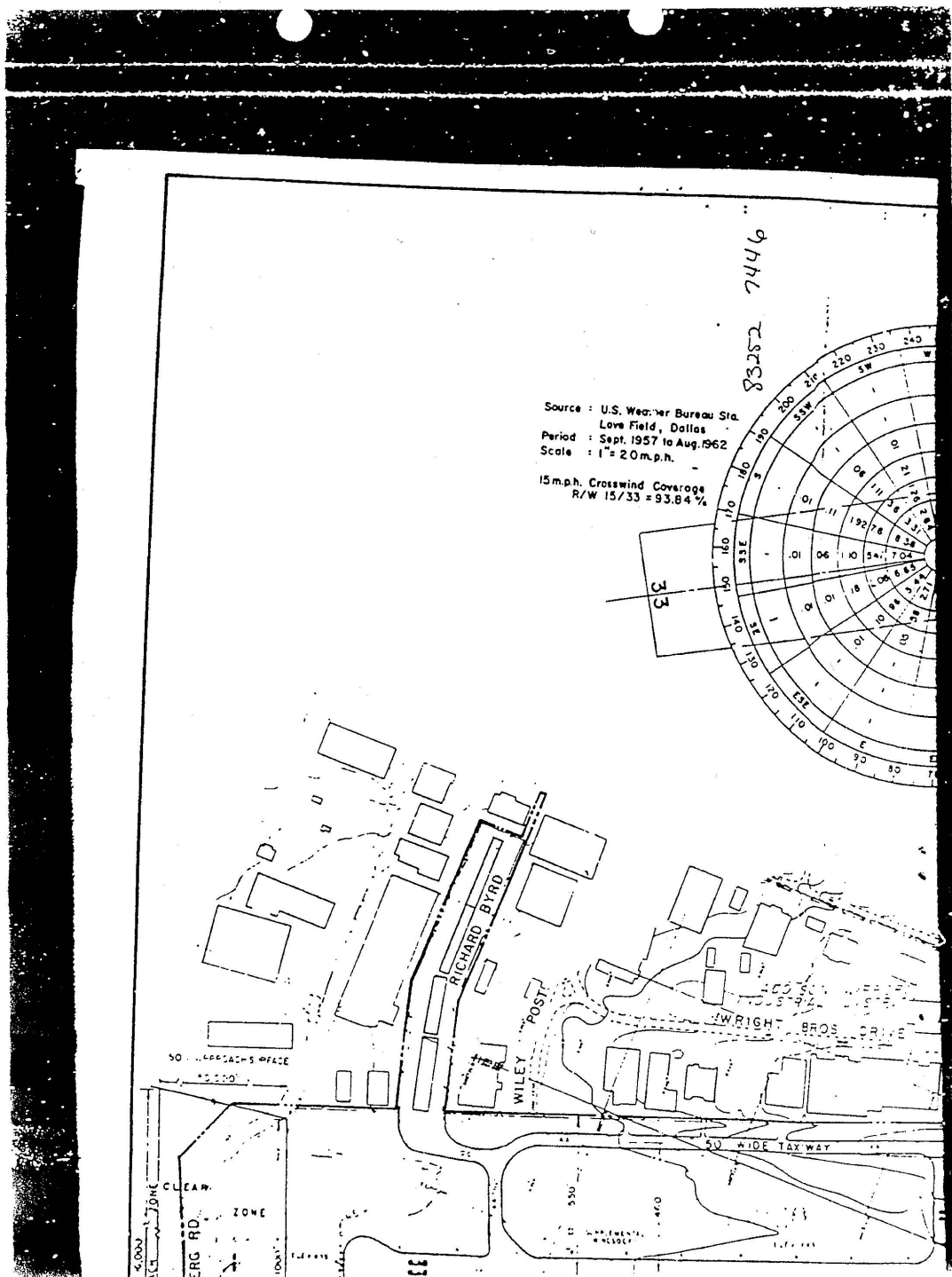
C. Landlord agrees to remove the electrical lines and poles presently running along the western boundary of the demised premises.

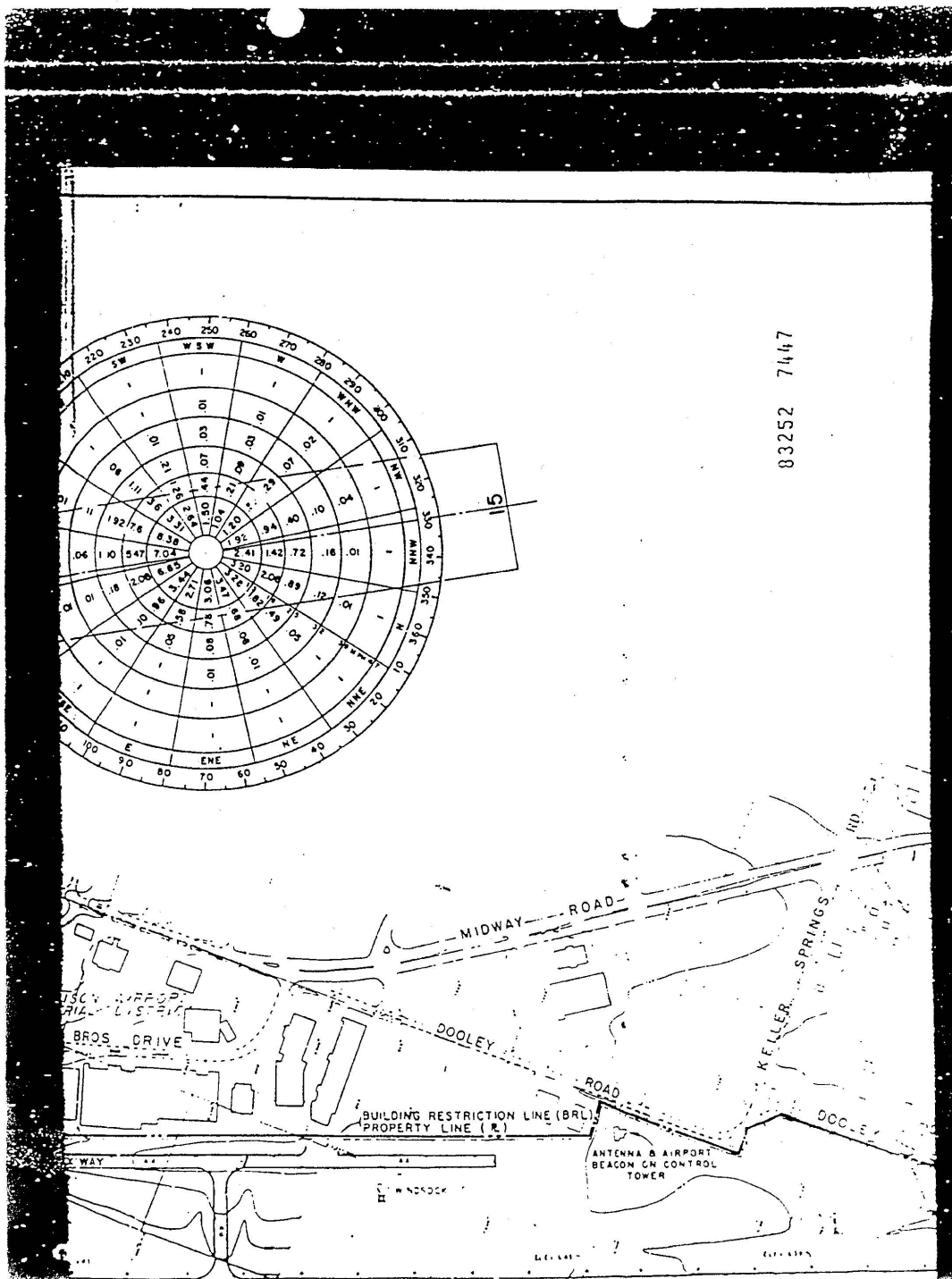
D. Tenant shall have the option to terminate this Lease by delivering written notice of such election to Landlord before April 30, 1984, if Tenant has been unable to obtain revenue bond financing for the improvements which Tenant proposes to construct on the demised premises. If Tenant does not timely deliver such written notice of election to terminate, all rights of Tenant to terminate this Lease pursuant to the foregoing shall lapse and be null and void.

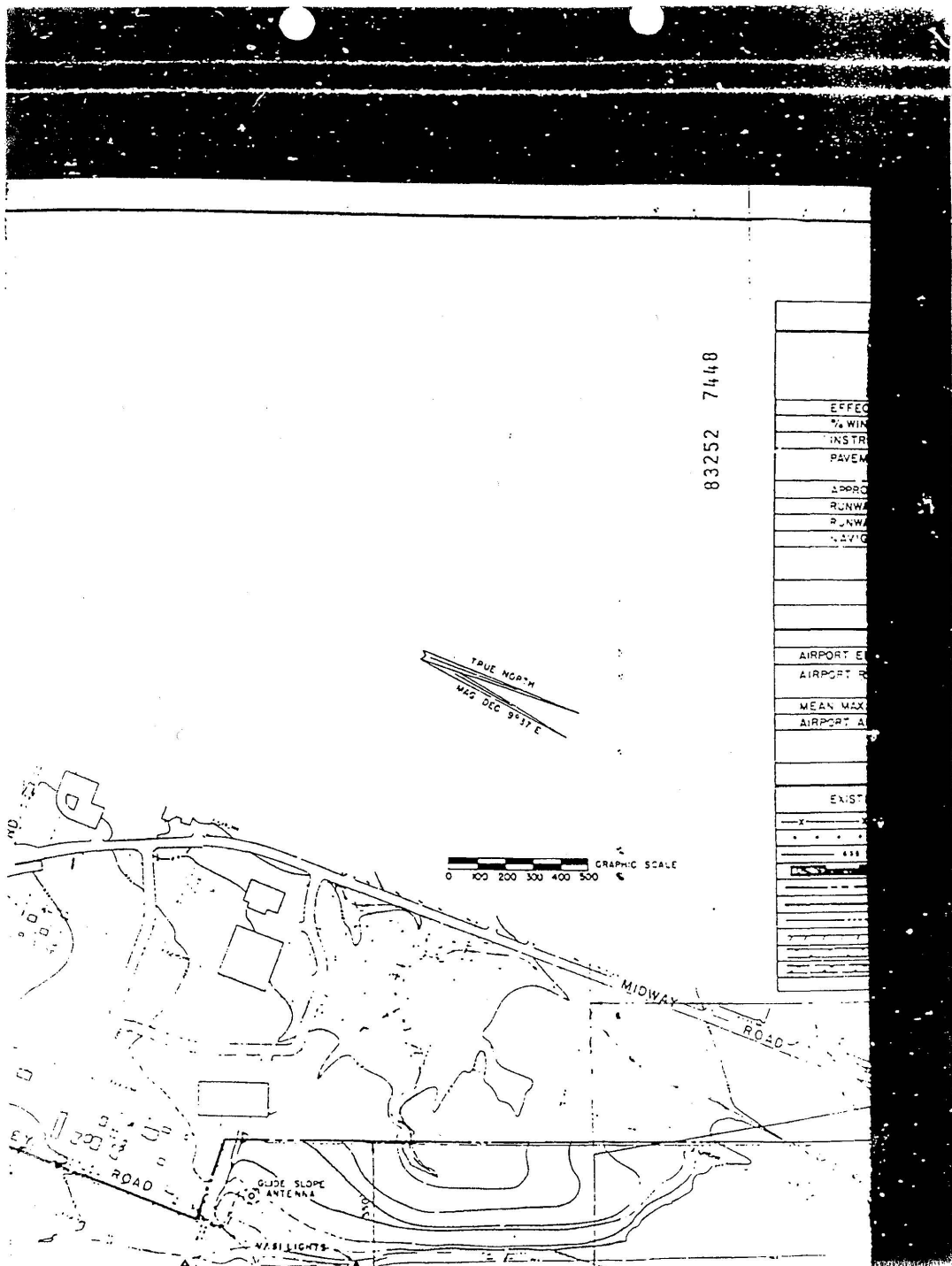
18245

577 7665

ETS






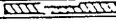
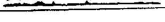


Ex. B

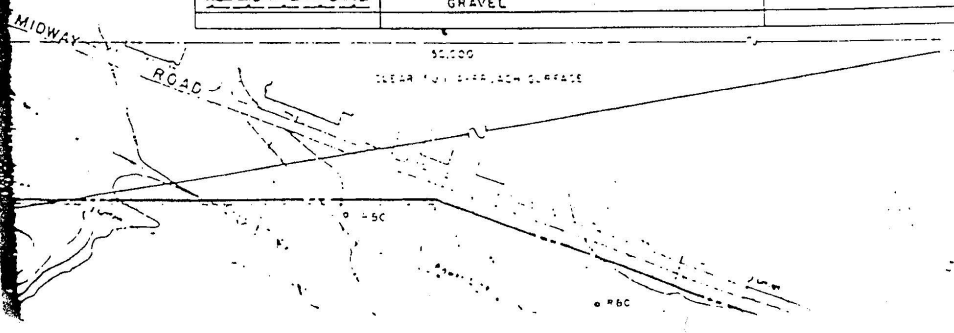
83252 7440

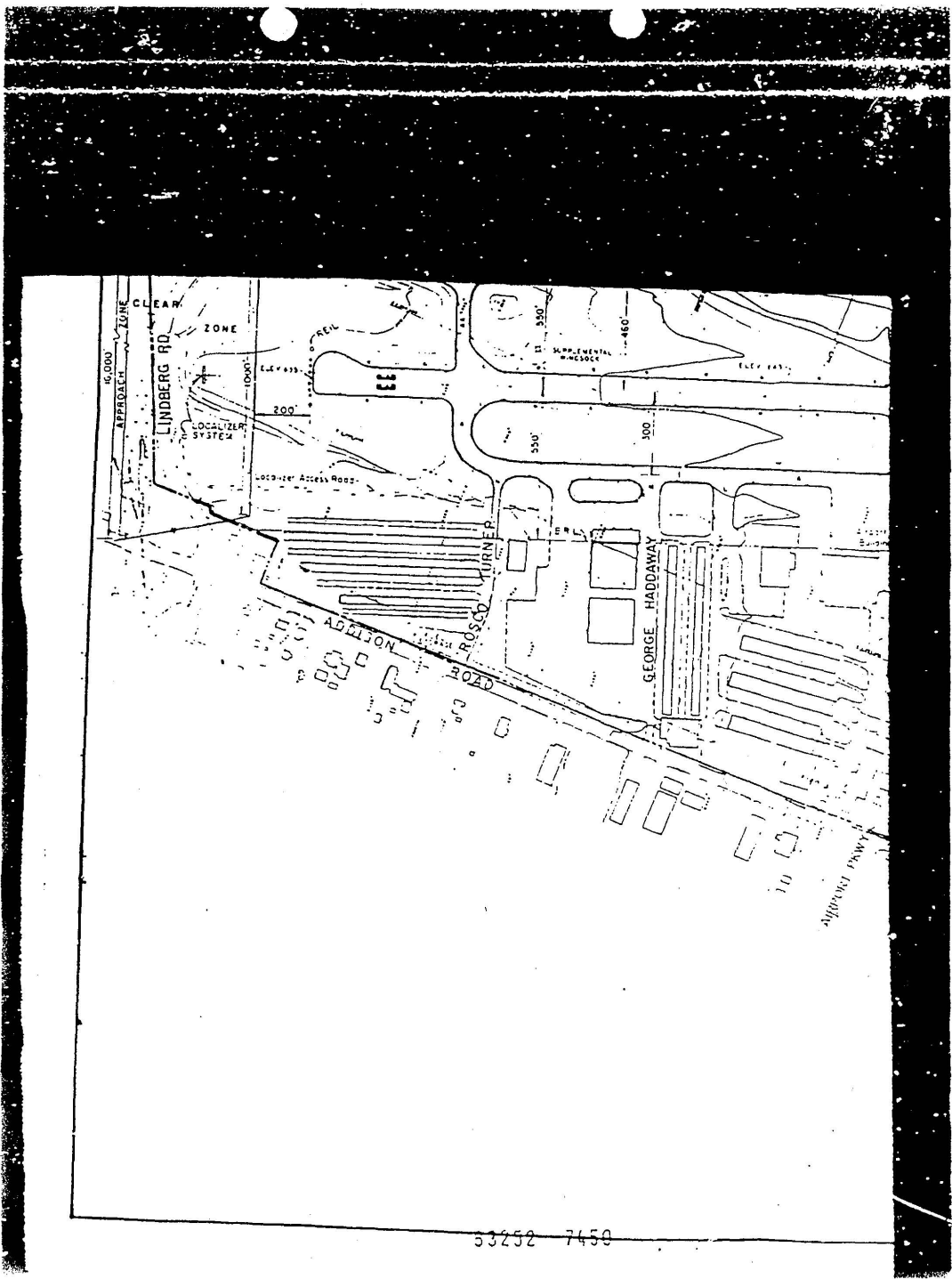
BASIC RUNWAY DATA TABLE			
	RUNWAY 15/33		
	EXISTING	ULTIMATE	
EFFECTIVE GRADIENT(IN%)	0.03	SAME	
% WIND COVERAGE	93.84	SAME	
INSTRUMENT RUNWAY	YES	YES	
PAVEMENT STRENGTH	80S,100D 1600T	SAME	
APPROACH SURFACE	50:1 BOTH	SAME	
RUNWAY LIGHTING	MIRL	SAME	
RUNWAY MARKINGS	ALL WEATHER	SAME	
NAVIGATIONAL AIDS	ILS	SAME	

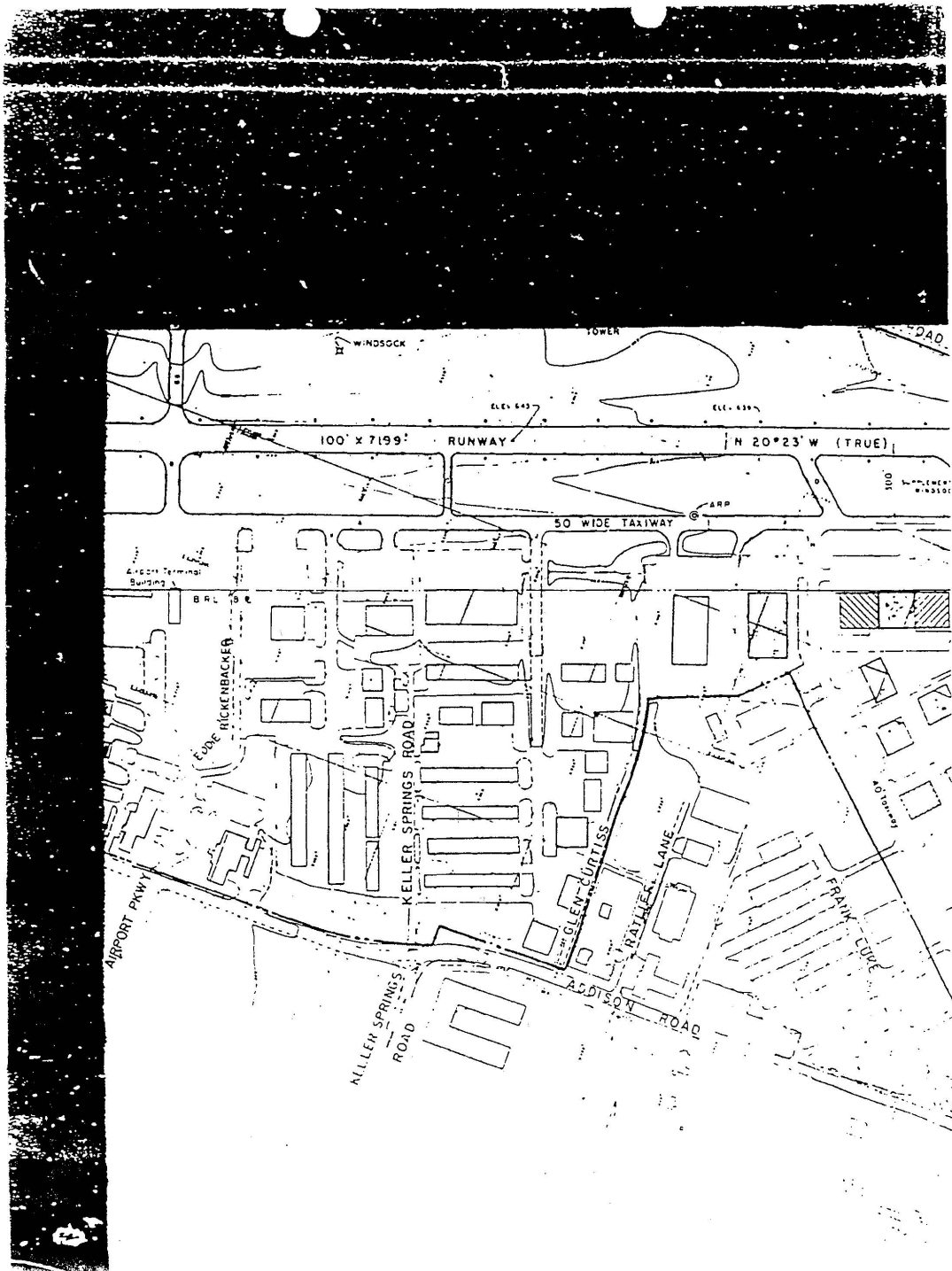
BASIC AIRPORT DATA TABLE			
	EXISTING	ULTIMATE	
AIRPORT ELEVATION, MSL	643.00		
AIRPORT REFERENCE POINT (ARP) COORDINATES	LAT. 32° 58' 10.585" LNG. 96° 50' 08.482"	SAME	
MEAN MAX TEMP. OF HOTTEST MONTH	96.1°F	SAME	
AIRPORT AND TERMINAL NAVIGATIONAL AIDS	ILS	SAME	

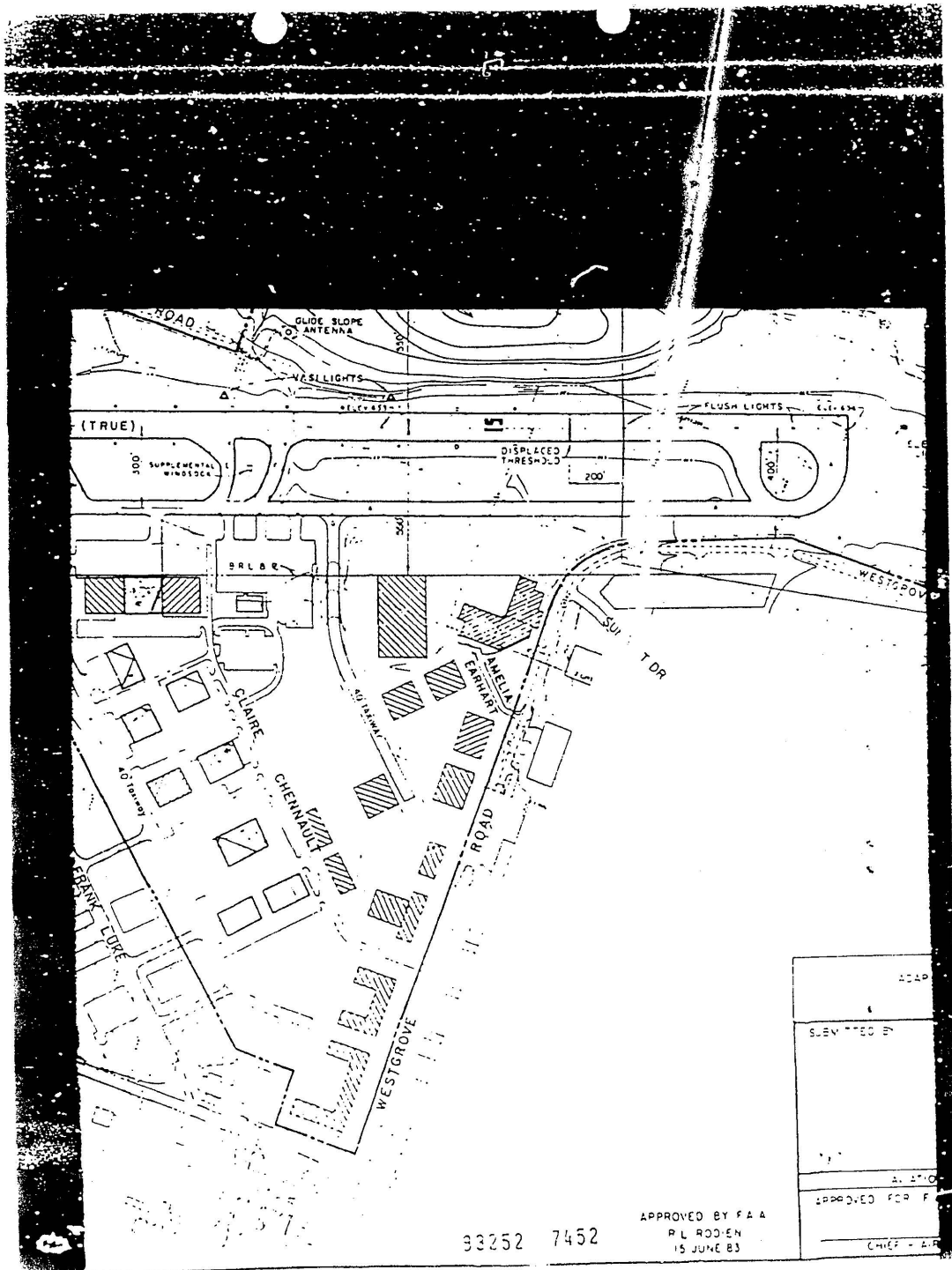
LEGEND		
EXISTING		
—X—X—X—	FENCE	
* * * *	RUNWAY LIGHTS	
— — — —	GROUND CONTOURS	
	BUILDINGS PERTAINING TO AIRPORT	
— — — —	EXISTING PROPERTY LINE	
— — — —	PROPERTY ACQUIRED THIS PROJECT	
— — — —	BUILDING RESTRICTION LINE (BRL)	
— — — —	EASEMENTS	
— — — —	ASPHALT PAVEMENT	
— — — —	GRAVEL	

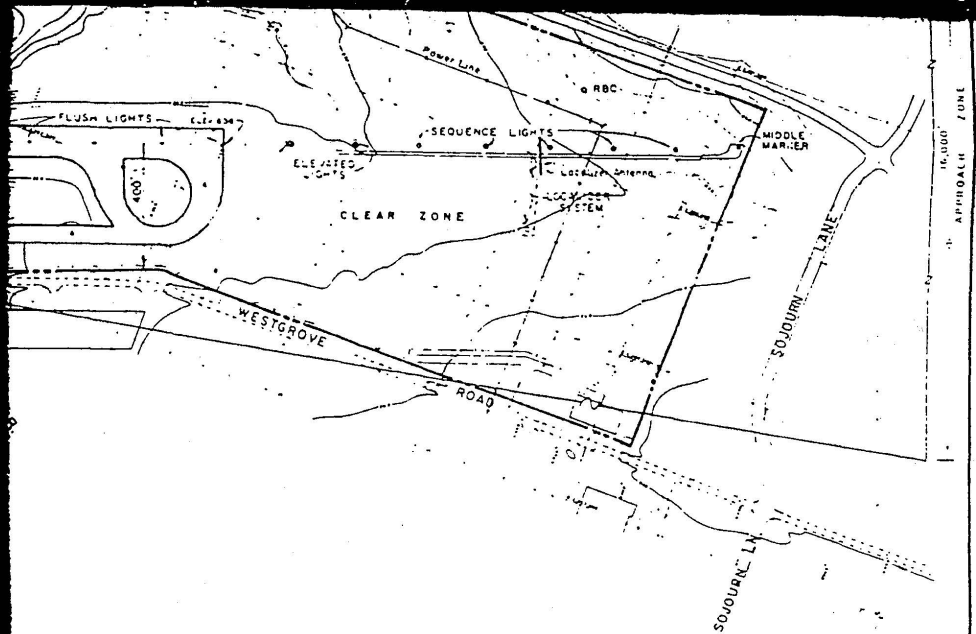
PHIC SCALE











ACAP Project No			
SUBMITTED BY		DATE	
AVIATION DIRECTOR		ADDISON MUNICIPAL AIRPORT AIRPORT LAYOUT PLAN ADDISON, TEXAS GINN, INC. Consulting Engineers Dallas Texas	
APPROVED FOR F.A.A.		DESIGNED	DATE
CHIEF - AIRPORTS BRANCH		DRAWN	DATE
		FILE No	SCALE 1"=300'
			SHEET 1 of 1

APPROVED BY F.A.A.
L. RODEN
15 JUNE 83

EXHIBIT A

REAL PROPERTY DESCRIPTION

SITUATED in Dallas County, Texas, and BEING a tract of land situated in the E. COOK SURVEY, ABSTRACT 326, and located on Addison Municipal Airport, Addison, Texas, and being more particularly described as follows:

BEGINNING at the intersection of the centerline of Airport Parkway and the West right-of-way of Addison Road;

THENCE, North 00°22'50" West, along said West right-of-way a distance of 358.67 feet to the POINT OF BEGINNING;

THENCE, South 89°37'10" West, a distance of 145.27 feet;

THENCE, North 1°45'47" East, a distance of 169.44 feet;

THENCE, North 0°38'48" West, a distance of 136.88 feet;

THENCE, North 20°14'53" West, a distance of 180.00 feet;

THENCE, North 71°51'57" East, a distance of 147.04 feet to a point on a curve to the right, said curve having a central angle of 16°46'21", a radius of 788.51 feet and a chord bearing South 45°41'02" East, 230 feet;

THENCE, along an arc length of 230.82 feet to a point;

THENCE, South 0°22'50" East, along the West right-of-way of Addison Road, a distance of 298.48 feet to the POINT OF BEGINNING, containing 1.661 acres (72,348.13 square feet) of land, more or less.

FILED FOR RECORD
This 29th day of December
1952 at 3 59 P.M.
Earl D. Lusk, Co. Clerk
Dallas County, Texas
Edmund L. Mearns Deputy

CHICAGO TITLE INSURANCE COMPANY
1750 MERRITT DRIVE
SUITE 132
DALLAS, TEXAS 75201

STATE OF TEXAS COUNTY OF DALLAS
I hereby certify that this instrument was filed on the
date and time stamped herein by me and was duly re-
corded in the public and e.s. of the public records
of Dallas County, Texas at Dallas, Texas by me.

DEC 31 1953



Earl D. Lusk
COUNTY CLERK, Dallas County, Texas

83252 7455

EXHIBIT B

83-165-109111- FF 11-00 (2) C.T.C.

ASSIGNMENT OF LEASE

1060

THIS AGREEMENT is made as of this the 1st day of December, 1983, at Addison, Texas, between BUNNELL PROPERTIES, INC., a Texas corporation, hereinafter called "Assignor", and CONCOURSE PLAZA, LTD., a Texas limited partnership, hereinafter called "Assignee".

WHEREAS, a lease executed on October 1, 1983, between CITY OF ADDISON and ADDISON AIRPORT OF TEXAS, INC. as the Lessor, and the Assignor, as the Lessee, by the terms of which certain real property located on the Addison Airport was leased to the Assignor as Lessee upon the terms and conditions provided therein; and

WHEREAS, the Assignor now desires to assign the Lease to the Assignee, and the Assignee desires to accept an assignment thereof;

NOW, THEREFORE, for and in consideration of the sum of Ten and No/100 Dollars (\$10.00), receipt of which is hereby acknowledged, and the agreement of the Assignee, hereinafter set forth, the Assignor hereby assigns and transfers to the Assignee, its successors and assigns, all of its right, title and interest in and to the Lease hereinbefore described, a copy of which is attached hereto as Exhibit "A", and the Assignee hereby agrees to and does accept the assignment, and in addition expressly assumes and agrees to keep, perform and fulfill all the terms, covenants, conditions and obligations required to be kept, performed and fulfilled by the Assignor as the Lessee thereunder, including the making of all payments due to or payable on behalf of the Lessor under said Lease when due and payable.

This Agreement shall be binding on and inure to the benefit of the parties hereto, their heirs, executors, administrators, successors in interest, and assigns.

WITNESSES:
BUNNELL PROPERTIES, INC.
1000 Texas Tower
1000 Dallas Parkway
Dallas, TX 75240

EXECUTED as of the day and year first above written.

ASSIGNOR:

Bunnell Properties, Inc.

By: 

ASSIGNEE:

Concourse Plaza, Ltd.

By: Bunnell Properties, Inc., Managing
General Partner

By: 

CONSENT OF LESSOR

The undersigned is the Lessor under the Lease described in the foregoing Assignment and hereby consents to the assignment of the Lease to the Assignee, waiving none of their rights thereunder as to the Lessee or the Assignee.

LESSOR:

CITY OF ADDISON

By: 

ADDISON AIRPORT OF TEXAS, INC.

By: 

STATE OF TEXAS §
 §
COUNTY OF DALLAS §

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared David A. Bunnell, known to me to be the person and officer whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same on behalf of Bunnell Properties, Inc., a Texas corporation, for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this 27th day of December, 1983.

Kay F. Robertson/Rudick
Notary Public

My Commission Expires:

3-7-84



KAY F. ROBERTSON RUDICK
Notary Public, State of Texas
My Comm. Expires Mar. 7, 1984

STATE OF TEXAS §
 §
COUNTY OF DALLAS §

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared David A. Bunnell, known to me to be the person and officer whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same on behalf of Bunnell Properties, Inc., a Texas corporation, as managing general partner of Concourse Plaza, Ltd., a Texas limited partnership, for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this 27th day of December, 1983.

Kay F. Robertson/Rudick
Notary Public

My Commission Expires:

3-7-84

STATE OF TEXAS
COUNTY OF DALLAS

GROUND LEASE

This Ground Lease (hereinafter referred to as the "Lease") is made and entered into as of October 11, 1983, by and among the City of Addison, Texas, a municipal corporation (hereinafter sometimes referred to as the "City"), Addison Airport, Inc., a Texas Corporation (hereinafter sometimes referred to as "AATI") and Gunnell Properties, Inc., a Texas Corporation (hereinafter referred to as "Tenant").

WITNESSETH:

NOW, REAS, AATI leases that certain real property (hereinafter referred to as the "demised premises") described in attached Exhibit A from the City pursuant to that certain instrument captioned Agreement for Operation of the Addison Airport (hereinafter referred to as the "Base Lease") between the City and Addison Airport, Inc. (predecessor of AATI), and

WHEREAS, the demised premises are situated at Addison Airport (hereinafter referred to as the "Airport") in Dallas County, Texas the Airport being delineated in a plat attached hereto as Exhibit B; and

WHEREAS, the City and AATI hereby lease and demise the demised premises to Tenant, and Tenant hereby leases and takes the demised premises from the City and AATI, upon the terms and conditions set forth herein;

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS:

1. Base Lease. All of the terms and conditions of the Base Lease are incorporated into this Lease by reference as if written verbatim herein, and Tenant by Tenant's execution hereof acknowledges that AATI has furnished Tenant with a copy of the Base Lease. Tenant agrees to fully comply at all times and in all respects with the terms and conditions of the Base Lease insofar as the same relate to the demised premises and/or the use and operation thereof, except that Tenant shall not be responsible for the payment of any rental due under the Base Lease which shall be paid by AATI.

2. Definition of Landlord and Effect of Default under the Base Lease. The term "Landlord" as hereinafter used in this Lease shall mean either: (A) the City so long as the Base Lease is in effect; AATI shall be entitled to all of the rights, benefits and remedies of the Landlord under this Lease, and shall perform all of the duties, covenants and obligations of the Landlord under this Lease. Upon the expiration or termination of the Base Lease, the City shall be entitled to all of the rights, benefits and remedies of the Landlord under this Lease, and shall perform all of the duties, covenants and obligations of the Landlord under this Lease. The City agrees that (i) until such time as the City notifies Tenant to the contrary in writing, Tenant is fully authorized to make all payments due under this Lease to AATI, and (ii) that default by AATI under the Base Lease shall have no effect on this Lease so long as Tenant pays and performs its duties, covenants and obligations under this Lease.

3. Term. The term hereof shall commence on the earlier of October 1, 1984, or the first day of the first calendar month after Tenant completes the construction hereinafter described and opens for business; all the demised premises; the applicable date being hereinafter referred to as the "Commencement Date", and shall end four hundred eighty (480) months thereafter; provided, however, that any entry upon the demised premises by Tenant prior to the Commencement Date shall be subject to all of the terms and conditions hereof except that rental shall not accrue.

4. Rental. Subject to adjustment as hereinbelow provided, Tenant agrees to pay to Landlord, without offset or deduction, rent for the demised premises at the rate of SIXTEEN HUNDRED SEVENTY-SIX AND 07/100 per month in advance. The first of such monthly installment shall be due and payable on or before the Commencement Date, and a like installment shall be due and payable on or before the first day of each calendar month thereafter during the term hereof.

5. Adjustment of Rental. Commencing on the second anniversary of the Commencement Date and on every bi-annual anniversary thereafter (hereinafter referred to as the "Adjustment Date"), the monthly rental due under paragraph 4 shall be adjusted as follows:

(i) A comparison shall be made between the Consumers' Price Index-All Items for the Dallas, Texas Metropolitan Area (hereinafter referred to as the "Price Index") as it existed on the Commencement Date and as it exists on the first day of the calendar month preceding the then applicable Adjustment Date.

(ii) The monthly rental for the two (2) year period beginning with and following the then applicable Adjustment Date shall be either increased or decreased, as the case may be, by the percentage of increase or decrease in the Price Index between the Commencement Date and the then applicable Adjustment Date, but in no event shall such monthly rental ever be decreased below the monthly rental set forth in paragraph 4.

(iii) In the event that the Price Index is unavailable for whatever reason for the computations set forth hereinabove, another index approximating the Price Index as closely as feasible shall be substituted therefor.

6. Use of Demised Premises and Construction of Improvements. The demised premises shall be used and occupied by Tenant only for the following purposes: sale of aircraft and aircraft parts; aircraft maintenance and repair; aircraft storage; aircraft training; aircraft charter; and aircraft rental; and not otherwise without the prior written consent of Landlord.

In connection with such use and occupancy, Tenant intends to construct upon the demised premises the improvements depicted in the plans and specifications.

These improvements consist of a combination office/airplane hangar facility containing approximately 42,000 square feet of office space and five airplane hangars, the preliminary plans for which have been prepared by Bogard Architects, Inc. Construction prints to be approved by Addison Municipal Airport prior to the start of construction.

All construction shall be strictly in accordance with such plans and specifications, and such construction shall be performed in a first class workmanlike manner. Tenant agrees to promptly pay and discharge all costs, expenses, claims for damages, liens and any and all other liabilities and obligations which arise in connection with such construction.

7. Acceptance of Demised Premises. Tenant acknowledges that Tenant has fully inspected the demised premises and accepts the demised premises as suitable for the purpose for which the same are leased in their present condition.

8. Securing Governmental Approvals and Compliance with Law. Tenant at Tenant's sole cost and expense shall obtain any and all governmental licenses, permits and approvals necessary for the construction of improvements and for the use and occupancy of the demised premises. Tenant shall comply at all times with all governmental laws, ordinances and regulations applicable to the use of the demised premises, and shall promptly comply with all governmental orders and directives for the correction, prevention and abatement of nuisances in or upon, or connected with the demised premises, all at Tenant's sole cost and expense.

9. Assignment, Subleasing and Mortgaging of Leased Premises:

A. Without the prior written consent of Landlord, Tenant may not assign this Lease or any rights of Tenant hereunder, in part or in whole, or sublease, or otherwise dispose of the whole or any part of the demised premises. Any assignment or subleasing shall be expressly subject to all the terms and provisions of this Lease, including the provisions of paragraph 6 pertaining to the use of the demised premises. In the event of any assignment or subleasing, Tenant shall not assign Tenant's rights hereunder, or sublease the demised premises without first obtaining a written agreement from each such assignee or sublessee whereby each such assignee or sublessee agrees to be bound by the terms and provisions of this Lease. No such assignment or subleasing shall constitute a breach of this Lease in the occurrence of an event of default while the demised premises are assigned or sublet. Landlord, in addition to any other remedies provided herein or by law, may at Landlord's option, collect directly from such assignee or sublessee all rents hereunder due under this assignment or subleasing and apply such rents against any sums due to Landlord hereunder. No direct collection by Landlord from any such assignee or sublessee shall release Tenant from the payment or performance of Tenant's obligations hereunder.

B. Tenant shall have the right to mortgage the leasedhold estate of Tenant created hereby in order to secure a mortgage loan for the purpose of obtaining funds for the construction of the improvements described in paragraph 6 or for other construction upon the demised premises approved from time to time by Landlord in writing. In the event that Tenant pursuant to mortgage or deeds of trust mortgages the leasedhold estate of Tenant created hereby, the leasedhold mortgage shall in no event become personally liable to or for the obligations of Tenant under this Lease unless and until said mortgage becomes a part of the leasedhold estate pursuant to the recording of the mortgage in the public records, and thereafter said mortgage mortgage shall be subject to all the terms and provisions of this Lease, and as such mortgage shall be a part of the leasedhold estate. Notwithstanding the foregoing, this specifically unenforceable and void as to any mortgage created by the parties to this Lease.

C. Any mortgages or deeds of trust whereby Tenant mortgages the leasehold estate of Tenant created hereby shall contain provisions requiring the mortgagee to give Landlord fifteen (15) days written notice prior to accelerating the debt of Tenant to such mortgagee and/or initiating foreclosure proceedings under said mortgage or deeds of trust, and (ii) allowing Landlord during such fifteen (15) day notice period to cure Tenant's default and prevent said acceleration and/or foreclosure proceedings, and the right to assume Tenant's position under said mortgages or deeds of trust.

D. Landlord agrees, if and so long as the leasehold estate of Tenant is encumbered by a leasehold mortgage and written notice of such encumbrance has been given to Landlord, to give the holder of such leasehold mortgage at such address or addresses as may be specified in writing, written notice of the giving of notices to the leasehold mortgagee, or as otherwise may be specified by the leasehold mortgage to Landlord in writing, written notice of any default hereunder by Tenant, simultaneously with the giving of such notice to Tenant, and the holder of any such leasehold mortgage shall have the right, for a period of fifteen (15) days after its receipt of such notice or within any longer period of time specified in such notice, to take such action or to make payment as may be necessary or appropriate to cure any such default as specified, it being the intention of the parties hereto that Landlord shall not exercise Landlord's right to terminate this Lease without first giving any such leasehold mortgage the notice provided for herein and affording any such leasehold mortgage the right to cure such default as provided for herein.

E. Landlord further agrees to execute and deliver to any proposed leasehold mortgagee of Tenant a "Non-Disturbance Agreement" wherein Landlord agrees that Landlord will recognize such mortgagee and its successors and assigns after foreclosure, or transfer, or loss of foreclosure, as Tenant hereunder, and (ii) continue to perform all of Landlord's obligations hereunder so long as such mortgagee or its successors and assigns performs all of the obligations of Tenant hereunder. Landlord also agrees to execute and deliver to any proposed leasehold mortgagee any other documents which such proposed leasehold mortgagee may reasonably request concerning the mortgaging by Tenant of the leasehold estate created hereby, provided, however, that Landlord shall never be required to subordinate Landlord's interest in the demised premises to the mortgage of such proposed leasehold mortgagee.

10. **Property Taxes and Assessments:** Tenant shall pay any and all property taxes or assessments levied or assessed on the improvements on the demised premises, the personal property and fixtures on the demised premises, and, if applicable, upon the leasehold estate of Tenant created hereby. Upon the request of Landlord, Tenant shall from time to time furnish to Landlord's agents receipts or other written evidence that all such taxes have been paid by Tenant.

11. **Maintenance and Repair of Demised Premises:**

A. Tenant shall, throughout the term hereof, maintain in good repair and condition all the demised premises and all fixtures, equipment and personal property on the demised premises and keep them free from waste or nuisance and, at the expiration or termination of this Lease, deliver up the demised premises clean and free of trash and in good repair and condition, except all fixtures and equipment situated in the demised premises in working order, reasonable wear and tear excepted.

B. In the event Tenant shall fail to so maintain the demised premises and the fixtures, equipment and personal property situated thereon, Landlord shall have the right (but not the obligation) to cause all repairs or other maintenance to be made and the reasonable costs therefor expended by Landlord plus interest thereon as provided in paragraph 37 shall be paid by Tenant on demand.

12. **Alterations, Additions and Improvements:** After completion of the improvements described in paragraph 6, Tenant shall not make any changes in the roof or exterior walls or make any alterations, additions or improvements to the demised premises without the prior written consent of Landlord. Consent for non-structural alterations, additions or improvements shall not be unreasonably withheld by Landlord. Tenant shall have the right to erect or install shelves, bins, machinery, air conditioning or heating equipment and trade fixtures provided that Tenant complies with all applicable governmental laws, ordinances and regulations.

All alterations, additions and improvements in and to the demised premises shall be performed in a first class, workmanlike manner and Tenant shall promptly pay and discharge all costs, expenses, claims for damages, liens and any and all other liabilities and obligations which arise in connection therewith.

13. **Insurance:** Tenant shall during the term hereof maintain at Tenant's sole cost and expense insurance relating to the demised premises as follows:

(i) Insurance against loss or damage to improvements by fire, lightning, and other risks from time to time included under standard extended coverage policies and sprinkler, vandalism and malicious mischief, all in amounts sufficient to cover Landlord or Tenant from becoming co-insured of any loss under the applicable policies but in any event in amounts not less than eight percent (8%) of the full insurable value of the demised premises. The term "full insurable value" as used here means important as a replacement value at the time of such loss. Upon request, such replacement value shall be determined by a qualified appraiser, a copy of whose findings shall be submitted to Landlord, and, therefore, proper adjustment in the limits of insurance coverage shall be effected.

(ii) General public liability insurance against claims for bodily injury, death or property damage occurring on or about the demised premises, such insurance to afford protection in the event of loss of not less than \$200,000.00 with respect to any one person, \$1,000,000.00 with respect to any one accident and not less than \$200,000.00 with respect to property damage.

(iii) Workmen's compensation insurance covering all persons employed by Tenant in connection with any work done on or at the demised premises with respect to which claims for death or bodily injury could be asserted against Landlord or the demised premises, or in lieu of such workmen's compensation insurance, a program of self-insurance complying with the rules, regulations and requirements of the appropriate state agency of the State of Texas.

(iv) If applicable, boiler and pressure vessel insurance on all steam boilers, parts thereof and appurtenances attached or connected thereto which by reason of their use or existence are capable of bursting, erupting, collapsing, imploding or exploding, in the minimum amount of \$100,000.00 for damage to property resulting from such perils.

(v) Such other insurance on improvements in such amounts and against such other insurable hazard which at the time is commonly obtained in the case of property similar to such improvements.

(vi) Hanger keeper's liability insurance providing for coverage in the following limits: \$200,000.00 per aircraft and \$400,000.00 per occurrence on property damage to aircraft in the care, custody or control of Tenant.

(vii) During any period of construction, a Builder's Risk Completed Value policy with an all risks endorsement.

All such policies of insurance (i) shall be issued by insurance companies acceptable to Landlord, (ii) shall name Landlord as an additional insured or loss payee, as the case may be, and (iii) shall provide for at least ten (10) days written notice to Landlord of any cancellation or modification. Tenant shall provide Landlord with duplicate originals of all insurance policies required by this paragraph.

14. **Casualty Damage or Destruction:**

A. In case of any damage to or destruction of the buildings, structures and equipment on the demised premises, or any part thereof, Tenant will promptly give written notice thereof to Landlord, generally describing the nature and extent of such damage and destruction.

B. In case of any damage to or destruction of the buildings, structures and equipment on the demised premises, or any part thereof, whether or not the insurance proceeds, if any, payable or account of such damage and/or destruction shall be sufficient for full purpose, at Tenant's sole cost, risk and expense will promptly commence and complete the restoration, repair and replacement of such buildings, structures and equipment as nearly as possible in their value, condition and character immediately prior to such damage and destruction, with such alterations and additions thereto as may be approved in writing by Landlord thereinafter same as referred to in the "Restoration".

C. All insurance proceeds, if any, payable on account of such damage to or destruction of the buildings, structures and equipment on the demised premises shall be held by Landlord. Landlord shall be protected in acting upon any certificate delivered by Landlord, if the genuine and to have been executed by the proper party and shall receive such certificate as conclusive evidence of any fact or as to the matter therein set forth. Such certificate shall be full warranty, authority and protection to Landlord in acting thereon, and Landlord shall be under no duty to take any action other than as set forth in this paragraph 14.

D. Insurance proceeds received by Landlord on account of any damage to or destruction of the buildings, structures and equipment on the demised premises, or any part thereof (less the costs, fees and expenses incurred by Landlord and Tenant in the disposition thereof, including, without limitation, adjuster's and attorney's fees and expenses) shall be applied as follows:

(i) Net insurance proceeds as above defined shall be paid to Tenant or as Tenant may direct from time to time as Restitution proceeds to pay for reimbursement to Tenant of the cost of Restoration, upon written request of Tenant to Landlord accompanied by a certificate of a supervising architect or engineer approved by Landlord, describing in reasonable detail the work and materials to be used and the cost thereof, stating that the same were necessary or appropriate to the Restoration and containing a complete itemized list of the cost thereof, and that the cost thereof has theretofore been reimbursed, and specifying the additional amount in any such request to complete the Restoration, and (ii) an opinion of counsel satisfactory to Landlord that there exist no mechanics' liens or other claims or interests for labor or materials except such as may be discharged by the payment of the amounts hereby provided.

[illegible]

15. Confirmation:

8. After such turn-over by the Tenant, said condemning authority the remainder of the demised premises is susceptible to efficient use and occupation and operation by the Tenant, this Lease shall not terminate but the rental due hereunder shall be adjusted so that the Tenant will be required to pay for the remainder of the term hereof the sum obtained by multiplying each monthly rental installment due hereunder, as adjusted from time to time pursuant to paragraph 5, by a fraction, the numerator of which shall be the number of square feet of the premises owned and occupied by the Tenant, and the denominator of which shall be the square footage of the premises actually contained in the demised premises. The Tenant shall retain the right to commence and maintain said condemning authority's actual taking possession of the condemned portion of the demised premises.

18. Utilities. Tenant shall be responsible at Tenant's sole cost and expense for obtaining all utility connections at or for the demised premises and Tenant shall pay all charges for water, electricity, gas, sewer, telephone or any other utility connections, tap-in fees and fees furnished to the demised premises during the term hereof. Landlord shall in no event be liable or responsible for any cessation or interruption in any such utility services.

18. Rules and Regulations. Landlord has adopted Rules and Regulations (hereinafter referred to as the "Rules and Regulations") which shall govern Tenant in the use of the demised premises and all common facilities, a copy of which has been furnished to Tenant. Tenant shall be bound by the Rules and Regulations, and shall be responsible for the payment of the cost of the Rules and Regulations. Landlord shall have the right to amend, not only after the Rules and Regulations from time to time in a reasonable manner for the purpose of assuring the safety, well-being and convenience of Landlord, Tenant and all other Tenants and owners of the Airport.

During the first one hundred (100) days of the term hereof, Landlord and Landlord's authorized representatives shall have the right to enter and maintain on or about the demised premises customary signs advertising the demised premises for lease or for sale.

8. Landlord and Landlord's agents and employees shall not be liable to Tenant for any injury to persons or damage to property resulting from the demised premises becoming open to repair or by defect in or failure of equipment, pipes, or wiring, or broken glass, or by backing up of drains, or by gas, water, steam, electricity or oil leaking, escaping or flowing into the demised premises, regardless of source, or dampness or fire, explosion, falling plaster or ceiling or for any other reason whatsoever. Landlord shall not be liable to Tenant for any loss or damage that may be occasioned by or through the acts or omissions of other tenants of Landlord or caused by persons or property of other tenants of Landlord or by persons or property of the public or quasi-public work, or of any other persons whatsoever, excepting only the persons, agents and employees of Landlord.

B. Failure of Tenant to comply with any term, condition or covenant of this Lease, other than the payment of rent or other sum of money, and such failure shall not be cured within thirty (30) days after written notice thereof to Tenant.

D. Filing of a petition under any section or chapter of the National Bankruptcy Act, as amended, or under any similar law of the United States or any State, the not by Tenant or any guarantor of Tenant's obligations, or adjudication as a bankrupt or insolvent, or proceedings filed against Tenant or such guarantor.

23 Remedies of Landlord upon the occurrence of any of the events of default listed in paragraph 52. Landlord shall have the right to:

B. "Notwithstanding the foregoing, in which event Tenant shall remain fully obligated to the Landlord for the amount of the rent then due, the Landlord may, at its option, provide for the late payment of which said rent has not been paid by the Landlord, by imposing a penalty of \$100.00 per month for each month that the rent and premises taxes and expenses remain unpaid by the tenant, which penalty may be deducted from the delivered premises of any such period, without being liable for proportionately sharing a percentage of the penalty. The Landlord shall not be liable for such late payment of the delivered premises of any such period, but shall be entitled to the amount of such late payment and penalty, which is to be paid by Tenant to Landlord prior to the period in which such late payment is made, and the unpaid portion of the late payment shall be added to the next late payment. The value of the delivered premises of any such period shall be \$100.00 per month."

and Tenant to any thing furnished to Landlord mortgage and Landlord mortgage fails to cure such defect within a
five (5) day period after the date of the same.

Landlord agrees that from the time, upon notice in writing (10) days prior to when request by Tenant, Landlord will provide
a statement of writing confirming that:

A. This Lease is unmodified and in full force and effect (if there have been modifications, that the Lease is modified in full force
and effect and stating the modifications).

B. The dates to which rent and other charges have been paid.

C. Tenant is not in default under any term or provision of this Lease or if in default the nature thereof in detail in accordance with an
exhibit attached hereto.

37. Interest on Tenant's Obligations and Manner of Payment. All monetary obligations of Tenant to Landlord under this Lease
remaining due ten (10) days after the due date of the same (if no due date has been established under other provisions hereof, the "due date")
shall be due upon which Landlord demands payment from Tenant in writing shall bear interest at the rate of ten percent (10%)
per annum from and after said tenth (10th) day until paid. If more than twice during the term of the Lease Tenant's personal or corporate
check is not paid by the date on which it is drawn for a reason, Landlord may require by giving written notice to Tenant that the
payment of all future monetary obligations of Tenant under this Lease are to be made on or before the due date by cash, cashiers check,
certified check or money order. And the delivery of Tenant's personal or corporate check will no longer constitute payment of such
monetary obligations. Any acceptance by Landlord of a personal or corporate check after such notice shall not be deemed or construed as
a waiver or estoppel of Landlord to require other payments as required by said notice.

38. Independent Contractor. It is understood and agreed that in leasing and operating the demised premises, Tenant is acting as an
independent contractor and is not acting as agent, partner, joint venturer or employee of Landlord.

39. Force Majeure. In the event performance by Landlord of any term, condition or covenant in this Lease is delayed or prevented by
any Act of God, strike, lockout, shortage of material or labor, restriction by any governmental authority, civil riot, flood, or any other cause
not within the control of Landlord, the period for performance of such term, condition or covenant shall be extended for a period equal to
the period Landlord is so delayed or hindered.

40. Exhibits. All exhibits, attachments, amended instruments and addenda referred to herein shall be considered a part hereof for all
purposes with the same force and effect as if recited verbatim herein.

41. Use of Language. Words of any gender used in this Lease shall be held and construed to include any other gender and words in
the singular shall be held to include the plural, unless the context otherwise requires.

42. Captions. The captions, headings or paragraphs in this Lease are inserted for convenience only and shall not be construed or
construing the provisions hereof if any question of intent should arise.

43. Successors. The terms, conditions and covenants contained in this Lease shall apply to, inure to the benefit of and be binding
upon the parties hereto and their respective successors in interest and legal representatives except as otherwise herein expressly
provided. All rights, claims, privileges, immunities and duties of Landlord under this Lease, including, but not limited to, any rights
required or permitted to be exercised by Landlord or Tenant hereunder, may, at Landlord's option, be exercised or performed by Landlord's
agent or attorney.

44. Severability. If any provision in this Lease should be held to be invalid or unenforceable, the validity and enforceability of the other
remaining provisions of this Lease shall not be affected thereby.

45. Notices. Any notice or document required or permitted to be delivered hereunder may be delivered in person or shall be deemed to
be delivered, whether actually received or not, when deposited in the United States mail postage prepaid, registered or certified mail,
return receipt requested, addressed to the parties at the addresses indicated below, or at such other addresses as may, from time to time,
be specified by written notice of record in accordance herewith.

LANDLORD

“TENANT”

Addison Airport of Texas, Inc.
P.O. Box 34059
Dallas, Texas 75234
City of Addison, Texas

Bunnell Properties, Inc.
14951 Dallas Parkway, Suite 900
Dallas, Texas 75240

P.O. Box 144

980-7704

Addison, Texas 75001

46. Fees or Commissions. Each party hereto hereby covenants and agrees with the other that such party shall be solely responsible for
the payment of any brokers', agents' or finders' fees or commissions agreed to by such party arising from the execution of this Lease or
the performance of the terms and provisions contained herein, and such party agrees to indemnify and hold the other party harmless from
the payment of any such fees or commissions.

47. Counterparts. This Lease may be executed in multiple counterparts, each of which shall be deemed an original and all of which
shall constitute but one and the same instrument.

48. Governing Law and Venue. This Lease and all of the transactions contemplated herein shall be governed by and construed in
accordance with the laws of the State of Texas, and Landlord and Tenant both irrevocably agree that venue for any dispute concerning this
Lease or any of the transactions contemplated herein shall be in any court of competent jurisdiction in Dallas County, Texas.

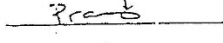
49. Entire Agreement and Amendments. This Lease, consisting of following (8) paragraphs and Exhibits A through E attached
hereto, embodies the entire agreement between Landlord and Tenant and supercedes all prior agreements and understandings, whether
written or oral, and all contemporaneous oral agreements and understandings relating to the subject matter hereof. Except as otherwise
specifically provided herein, no agreement hereafter made shall be effective in, amend, modify, discharge or effect an abandonment of this
Lease, in whole or in part, unless such agreement is in writing and signed by or in behalf of the party against whom enforcement is sought.
change, modification, discharge or abandonment is sought.

EXECUTED as of this day month and year first above written.

LANDLORD

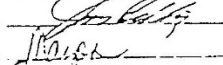
ADDISON AIRPORT OF TEXAS, INC.

By: 

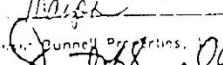
Its: 

City of Addison, Texas

By: 

Its: 

Bunnell Properties, Inc.

By: 

Its: 

The additional provisions contained
in the Addendum attached hereto
are hereby incorporated herein
for all purposes.

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared Harry Stuart
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11 day of October, 1954

Barney L. Jones
Notary Public
Dallas
County, Texas

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared John Padden
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 27th day of November, 1954



Reggie Sharp
Notary Public
Dallas
County, Texas

STATE OF TEXAS
COUNTY OF DALLAS

BEFORE ME, the undersigned authority, on this day personally appeared David Russell
known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same
for the purposes and considerations therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 11 day of October, 1954

Barney L. Jones
Notary Public
Dallas
County, Texas

ADDENDUM TO GROUND LEASE,
dated October 11, 1983,
by and among
the City of Addison, Texas,
Addison Airport of Texas, Inc.
and Sunnell Properties, Inc.

This Addendum is attached to and made a part of the foregoing and above referenced Lease for all purposes. In the event of conflict or inconsistency between the printed portion of this Lease and this Addendum, the terms of this Addendum shall control.

A. The words "general office uses" are added to the list of the purposes for which Tenant may use and occupy the demised premises contained in paragraph 6 of the printed portion of this Lease.

B. To induce Landlord to allow use and occupancy of the demised premises for general office purposes, Tenant agrees to give preference to prospective office tenants whose businesses are aeronautically related (hereinafter referred to as "preferred tenant") conditioned upon (i) availability of space, (ii) willingness of the preferred tenant to pay market rental rates, (iii) the preferred tenant's credit standing favorably comparing to those of other prospective tenants, and (iv) willingness of the preferred tenant to enter into a term of agreement comparable to those offered by other prospective tenants.

C. Landlord agrees to remove the electrical lines and poles presently running along the western boundary of the demised premises.

D. Tenant shall have the option to terminate this Lease by delivering written notice of such election to Landlord before April 30, 1984, if Tenant has been unable to obtain revenue bond financing for the improvements which Tenant proposes to construct on the demised premises. If Tenant does not timely deliver such written notice of election to terminate, all rights of Tenant to terminate this Lease pursuant to the foregoing shall lapse and be null and void.

18245

Signature

00252 7405

CHICAGO TITLE INSURANCE CO. INC.
12750 MERIT DRIVE
SUITE 132
DALLAS, TEXAS 75251

STATE OF TEXAS
COUNTY CLERK, DALLAS
I, _____, do hereby certify that this instrument was filed in the
office and time stamped herein by me and was duly re-
corded in the volume and page of the minute records
of Dallas County, Texas as stamped herein by me.

DEC 30 1983



Earl B. Burch
COUNTY CLERK, Dallas County, Texas

83 DEC 25 PM 3:15

93252 7466

EXHIBIT C

FIELD NOTE DESCRIPTION CONCOURSE PLAZA LAND LEASE ADDISON MUNICIPAL AIRPORT

Being a tract of land situated in the E. Cook Survey, Abstract No. 326, Dallas County, Texas and located on Addison Municipal Airport, Addison, Texas and being more particularly described as follows:

BEGINNING at a point for corner, said point being the intersection of the west right-of-way line of Addison Road and the south right-of-way line of Keller Springs Road as evidenced by a 1/2-inch iron rod;

THENCE departing the west right-of-way line of said Addison Road, a distance of 2.29 feet to a 5/8-inch iron rod found in the south right-of-way of Keller Springs Road and continuing S 69°35'33" W along the south right-of-way of said Keller Springs Road, 108.70 feet for a total distance of 110.99 feet to a point for a corner as evidenced by an "X" in concrete;

THENCE S 64°05'33" W along the south right-of-way of said Keller Springs Road, a distance of 78.03 feet to a point for a corner;

THENCE S 22°07'10" E, a distance of 64.73 feet to a point for a corner;

THENCE S 20°33'10" E, a distance of 43.25 feet to a point for a corner;

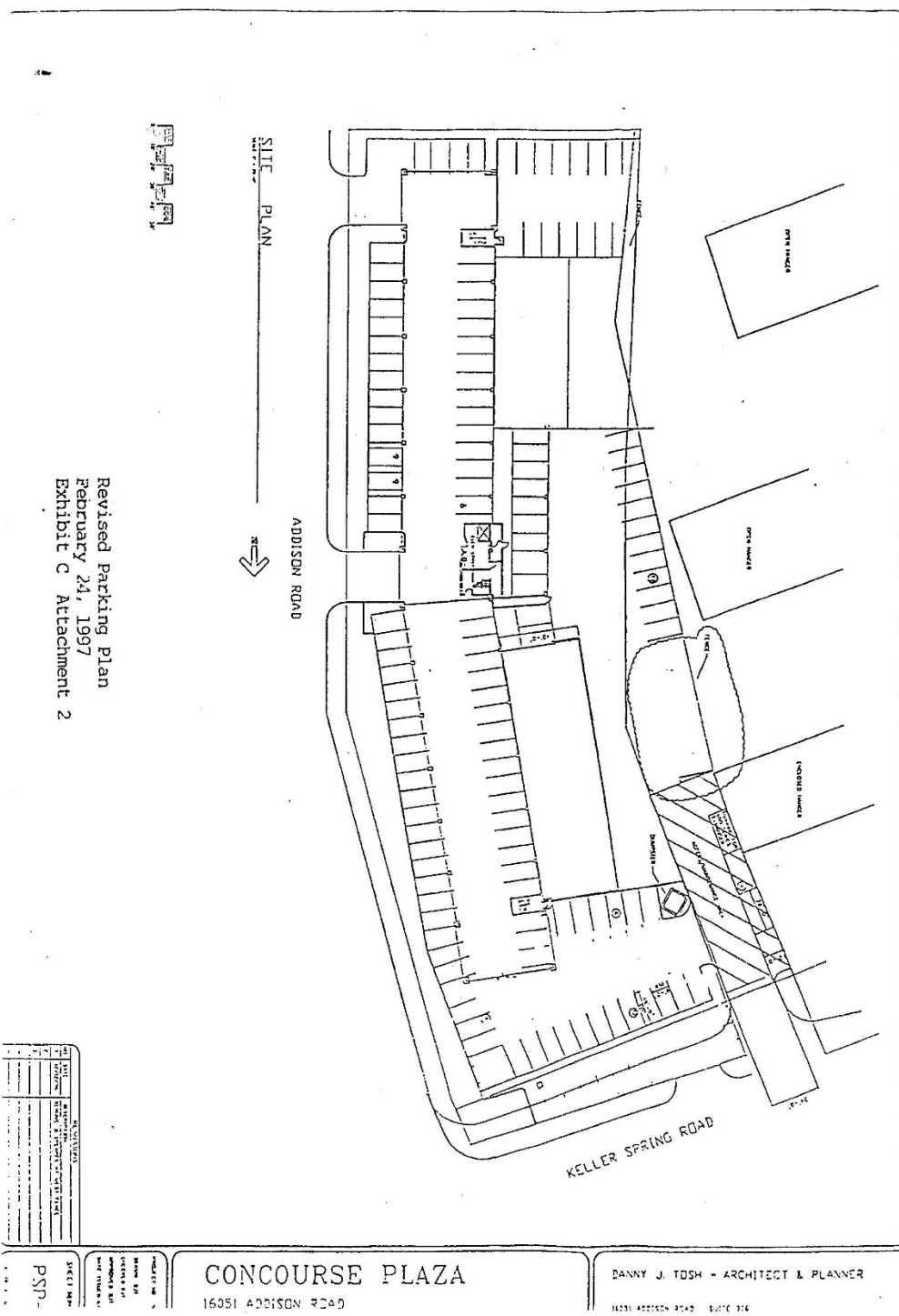
THENCE S 13°45'43" E, a distance of 204.27 feet to a point for a corner;

THENCE S 1°20'34" W, a distance of 130.52 feet to a point for a corner;

THENCE N 89°36'51" E, a distance of 145.35 feet to a point for a corner, said point being in the west right-of-way line of said Addison Road and in the east line of Addison Municipal Airport, as evidenced by a 1/2-inch iron rod found;

THENCE N 0°22'50" W along the west right-of-way line of said Addison Road and the east line of Addison Municipal Airport, a distance of 298.44 feet to a point in a curve to the left as evidenced by a 1/2-inch iron rod, said curve to the left having a central angle of 15°17'42", a radius of 788.51 feet and chord bearing distance of N 14°58'43" W, 209.87;

THENCE along said curve to the left of said west right-of-way line and the east line of said Addison Municipal Airport, a distance of 210.49 feet to the POINT OF BEGINNING and containing 78.506 square feet of land.



Revised Parking Plan
February 24, 1997
Exhibit C Attachment 2

NO.	DATE	DESCRIPTION
1	1/24/97	Initial Design
2	2/24/97	Revised Design

PROJECT NO. PSP-1

CONCOURSE PLAZA
16051 ADDISON ROAD

DANNY J. TOSH - ARCHITECT & PLANNER
16051 ADDISON ROAD SUITE 304

EXHIBIT "B"

PROPERTY SURVEY AND LEGAL DESCRIPTION
OF DEMISED PREMISES

LEGAL DESCRIPTION OF DEMISED PREMISES

FIELD NOTE DESCRIPTION
CONCOURSE PLAZA LAND LEASE
ADDISON MUNICIPAL AIRPORT

BEING a tract of land situated in the E. Cook Survey, Abstract No. 326, Dallas County, Texas and located on Addison Municipal Airport, Addison, Texas and being more particularly described as follows:

BEGINNING at a point for a corner, said point being the intersection of the west right-of-way line of Addison Road and the south right-of-way line of Keller Springs Road as evidenced by a 1/2-inch iron rod;

THENCE departing the west right-of-way line of said Addison Road, a distance of 2.29 feet to a 5/8-inch iron rod found in the south right-of-way of Keller Springs Road and continuing S 69°35'33" W along the south right-of-way of said Keller Springs Road, 108.70 feet for a total distance of 110.99 feet to a point for a corner as evidence by an "X" in concrete;

THENCE S 64°05'33" W, along the south right-of-way of said Keller Springs Road, a distance of 78.03 feet to a point for a corner;

THENCE S 22°07'10" E, a distance of 64.73 feet to a point for a corner;

THENCE S 20°33'10" E, a distance of 43.25 feet to a point for a corner;

THENCE S 13°45'43" E, a distance of 204.27 feet to a point for a corner;

THENCE S 1°20'34" W, a distance of 130.52 feet to a point for a corner;

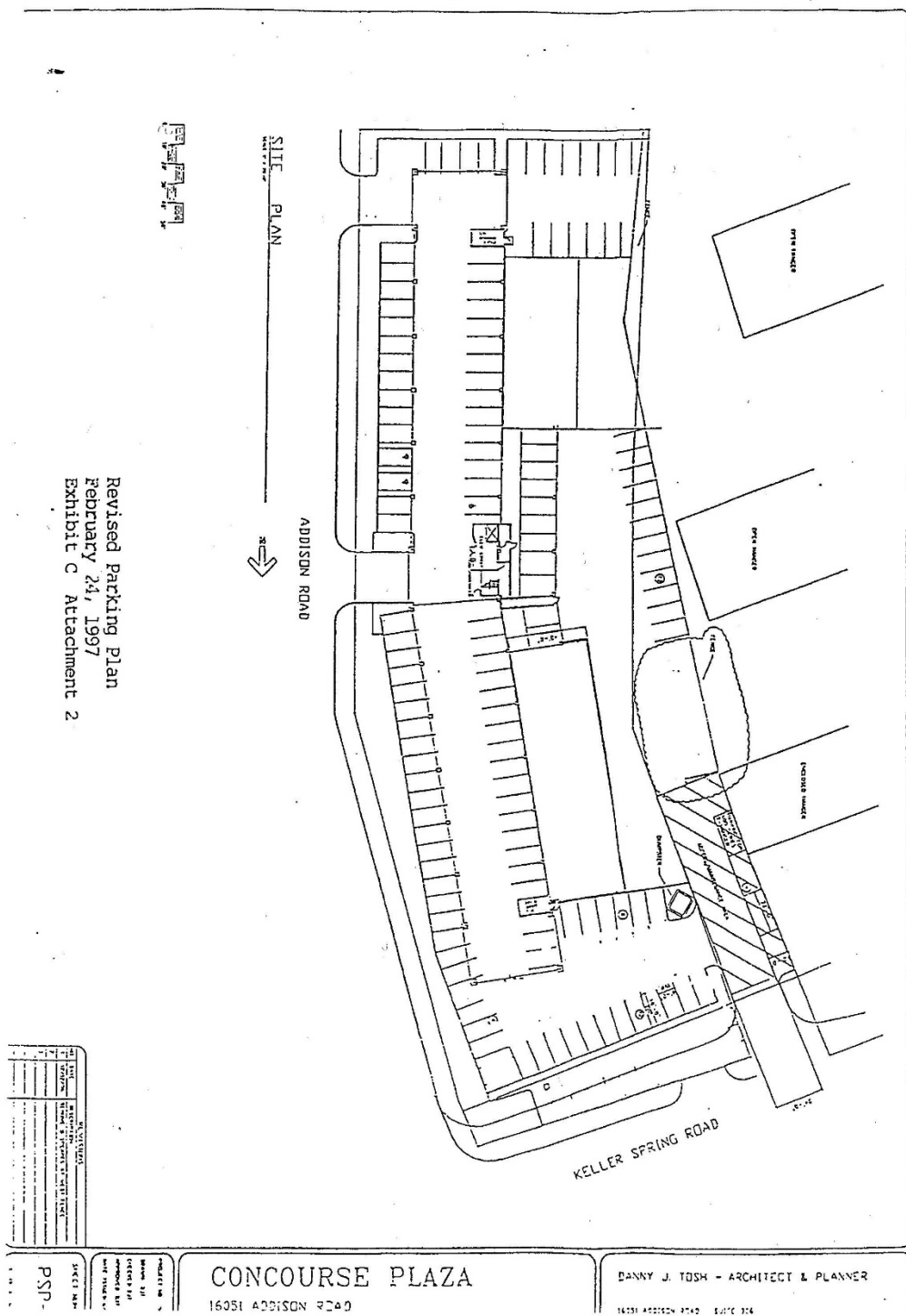
THENCE N 89°36'51" E, a distance of 145.35 feet to a point for a corner, said point being in the west right-of-way line of said Addison Road and in the east line of Addison Municipal Airport, as evidence by a 1/2-inch iron rod found;

THENCE N 0°22'50" W along the west right-of-way line of said Addison Road and the east line of Addison Municipal Airport, a distance of 298.44 feet to a point in a curve to the left as evidence by a 1/2-inch iron rod, said curve to the left having a central angle of 15°17'42", a radius of 788.51 feet and chord bearing, distance of N 14°58'43" W, 209.87;

THENCE along said curve to the left of said west right-of-way line and the east line of said Addison Municipal Airport, a distance of 210.49 feet to the POINT OF BEGINNING and containing 78,506 square feet of land.

OPEN
HANGER

1 11



Revised Parking Plan
February 24, 1997
Exhibit C Attachment 2

EXHIBIT "C"

BUILDING IMPROVEMENTS

	Description of Building Improvement	Estimated Improvement Cost
1.0	Building Entry and Lobby Expansion and Upgrades	
1.1	Blackened Plate Steel Entry Element	\$20,000
1.2	New storefront glass and lobby entrance doors	\$25,000
1.3	New wood panels at entry	\$48,000
1.4	Grid and tile in parking garage	\$129,000
1.5	Elevator interior cab modification	\$25,000
1.6	Signage on parking garage wall	\$5,000
1.7	Lobby Flooring	\$10,000
1.8	Lobby Digital Directory	\$8,500
1.9	Demo glass block windows on east side of building and new storefront glass	\$25,000
1.10	New Crown signage on north side of building	\$50,000
1.11	Demolition Work and Other Items	\$104,500
2.0	Exterior West Building Envelope	
2.1	New Extech Light Wall	\$128,000
2.2	Installation of Extech Light Wall	\$75,000
2.3	Demolition of existing metal panel system and other items	\$31,000
2.4	Repair and restoration of building corridors - Floors 2/3	\$66,000
2.5	Solar Glass on west side of building envelope	\$50,000
3.0	HVAC RTU Replacement and Controls Replacement	
3.1	New rooftop packaged HVAC Units	\$200,412
3.2	New wireless control system for building HVAC system	\$70,958
3.3	Contingencies	\$28,630
4.0	New Two Ply Modified Bitumen Roof	
4.1	Installation of two ply roof overlay system	\$100,000
5.0	Fire Sprinkler System, Accessibility and Code Modernization	
5.1	Replacement of fire sprinklers in parking garage	\$50,000
5.2	Replacement of fire sprinklers on 2nd and 3rd floor commons areas	\$50,000
5.3	Modification of 2nd and 3rd floor men's/women's restrooms to meet ADA compliance	\$100,000
5.4	Upgrade of fire/life safety devices per code	\$50,000
6.0	Contingencies	\$50,000
Grand Total		\$1,500,000

EXHIBIT "D"

MEMORANDUM OF LEASE

This Memorandum of Lease is dated as of _____, 20__, and executed by and between the Town of Addison, Texas ("Landlord" or "City") and Concourse Plaza II, LTD. ("Tenant").

WHEREAS, a Ground Lease (with Addendum To Ground Lease) was first made and entered into October 11, 1983 between the City of Addison, Texas (the same being the Town of Addison, Texas and sometimes referred to herein as the "City") and Addison Airport of Texas, Inc. ("AATI"), as Landlord, and Bunnell Properties, Inc., a Texas corporation, as tenant, by the terms of which Landlord leased to tenant a certain 1.661 acre tract of land at Addison Airport (which tract of land is referred to in the Ground Lease herein as the "Demised Premises" or "demised premises") as recorded in the Official Public Records of Dallas County, Texas in Book 83252, Page 7439 (Instrument #198302521079) of which certain real property now commonly referred to as 16051 Addison Road at Addison Airport within the Town of Addison, Texas and owned by the City (which the demised is more specifically described in **Exhibit "A"** attached hereto and incorporated herein by reference); and;

WHEREAS, the Ground Lease provides that, upon the expiration or termination of that certain agreement referred to and defined in the Ground Lease as the "Base Lease" (and being an Agreement for Operation of the Addison Airport between the City and AATI), the City is entitled to all of the rights, benefits and remedies, and will perform the duties, covenants, and obligations, of the Landlord under the Ground lease; and

WHEREAS, the said Base Lease has expired and the City alone is the Landlord under the Lease; and

WHEREAS, by that Assignment of Lease dated December 1 1983 and recorded in the Official Public Records of Dallas County, Texas in Book 83252, Page 7456 (Instrument #198302521080), the Ground Lease was assigned from Bunnell Properties, Inc., as assignor, to Concourse Plaza, LTD., a Texas limited partnership, as assignee; and

WHEREAS, the said Ground Lease was then modified by that Settlement and First Amendment to Lease Agreement dated April 22, 1997 as recorded in Book 97214, Page 2291 (instrument #199702120412) of the Official Public Records of Dallas County, Texas, with a corrected document recorded in Book 97247, Page 3370 (Instrument #19907024170809) of the Official Public Records of Dallas County, Texas on December 22, 1997, and

WHEREAS, by that Assignment of Lease entered into and made effective December 31, 1997 as recorded as Book 98063, Page 3557 (Instrument #199800090587) in the Official Public Records of Dallas County, Texas, the Ground Lease was assigned from Concourse Plaza, LTD, as assignor, to Concourse Plaza II, LTD, a Texas limited partnership, as assignee, and

NOW LET IT BE KNOWN, the said Ground Lease is further amended by that Second Amendment to Ground Lease, entered into and made effective _____, 2018, which,

First Amendment to Ground Lease 0960-8602 – Page 4 of 46

among other things, extends the Term so the Ground Lease shall expire on September 30, 2054 unless otherwise earlier terminated or extended.

This Memorandum of Lease is solely for recording and notice purposes and shall not be construed to alter, modify, expand, diminish or supplement the provisions of the Ground Lease, as amended. In the event of any inconsistency between the provisions of this Memorandum of Lease and the provisions of the Ground Lease (as amended), the provisions of the Ground Lease, as amended, shall govern. Reference should be made to the Ground Lease (and all amendments thereto) for the full description of the rights and duties of Landlord and Tenant thereunder, and this Memorandum of Lease shall in no way affect the terms and conditions of the Ground Lease (including all amendments thereto) or the interpretation of the rights and duties of Landlord and Tenant thereunder.

Upon the expiration or earlier termination of the Ground Lease, Landlord and Tenant agree that they shall execute and record a termination of this Memorandum of Lease.

IN WITNESS WHEREOF, the undersigned parties execute this Agreement this _____ day of _____, 2018.

TENANT:

CONCOURSE PLAZA II, LTD.

By: _____

LANDLORD:

TOWN OF ADDISON, TEXAS

By: _____

Wesley S. Pierson, City Manager

ACKNOWLEDGMENT

STATE OF TEXAS §
COUNTY OF DALLAS §

BEFORE ME, the undersigned authority, on this day personally appeared _____, a _____ of Concourse Plaza II, LTD, a Texas limited partnership, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein stated.

GIVEN under my hand and seal of office this _____ day of _____, 2018.

[SEAL]

Notary Public, State of Texas

STATE OF TEXAS §
COUNTY OF DALLAS §

BEFORE ME, the undersigned authority, on this day personally appeared Wesley S. Pierson, city manager of the Town of Addison, a home-rule municipality, known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and consideration therein stated.

GIVEN under my hand and seal of office this _____ day of _____, 2018.

[SEAL]

Notary Public, State of Texas

EXHIBIT A
to Memorandum of Lease

LEGAL DESCRIPTION OF DEMISED PREMISES

*FIELD NOTE DESCRIPTION
CONCOURSE PLAZA LAND LEASE
ADDISON MUNICIPAL AIRPORT*

BEING a tract of land situated in the E. Cook Survey, Abstract No. 326, Dallas County, Texas and located on Addison Municipal Airport, Addison, Texas and being more particularly described as follows:

BEGINNING at a point for a corner, said point being the intersection of the west right-of-way line of Addison Road and the south right-of-way line of Keller Springs Road as evidenced by a 1/2-inch iron rod;

THENCE departing the west right-of-way line of said Addison Road, a distance of 2.29 feet to a 5/8-inch iron rod found in the south right-of-way of Keller Springs Road and continuing S 69°35'33" W along the south right-of-way of said Keller Springs Road, 108.70 feet for a total distance of 110.99 feet to a point for a corner as evidence by an "X" in concrete;

THENCE S 64°05'33" W, along the south right-of-way of said Keller Springs Road, a distance of 78.03 feet to a point for a corner;

THENCE S 22°07'10" E, a distance of 64.73 feet to a point for a corner;

THENCE S 20°33'10" E, a distance of 43.25 feet to a point for a corner;

THENCE S 13°45'43" E, a distance of 204.27 feet to a point for a corner;

THENCE S 1°20'34" W, a distance of 130.52 feet to a point for a corner;

THENCE N 89°36'51" E, a distance of 145.35 feet to a point for a corner, said point being in the west right-of-way line of said Addison Road and in the east line of Addison Municipal Airport, as evidence by a 1/2-inch iron rod found;

THENCE N 0°22'50" W along the west right-of-way line of said Addison Road and the east line of Addison Municipal Airport, a distance of 298.44 feet to a point in a curve to the left as evidence by a 1/2-inch iron rod, said curve to the left having a central angle of 15°17'42", a radius of 788.51 feet and chord bearing, distance of N 14°58'43" W, 209.87;

THENCE along said curve to the left of said west right-of-way line and the east line of said Addison Municipal Airport, a distance of 210.49 feet to the POINT OF BEGINNING and containing 78,506 square feet of land.

OPEN
HANGER

1 11

LEASE ADDENDUM #2

TENANT'S LEASEHOLD MINIMUM MAINTENANCE AND REPAIR STANDARDS AND PRACTICES

I. Purpose: Pursuant to Section 11 (or elsewhere as provided for) of the Lease¹ the Tenant is required to maintain the Demised Premises and all improvements, fixtures, equipment and personal property thereto in "good repair and in a first class condition" and in accordance with all applicable ordinances, codes, rules and regulations of or adopted by the City of Addison or any regulating agency with oversight of any or all portions of the Demised Premises throughout the Term as it may be extended or otherwise amended.

Additionally, Section 26 entitled Title to Improvements provides, among other things, Tenant shall own and hold title to any building improvements constructed on the Demised Premises and upon the expiration or early termination of the ownership of said building improvements, said building improvements shall merge with the title of the Demised Premises and become the property of the Landlord. Landlord may, at Landlord sole discretion with a minimum of twelve months advance written notice to Tenant, effective the date of termination, elect Tenant to either: (i) deliver to Landlord the Demised Premises clean and free of trash and in good repair and condition in accordance with these Tenant's Leasehold Minimum Maintenance and Repair Standards and Practices together with all fixtures and equipment situated in the Demised Premises with ordinary wear and tear excepted; or (ii) prior to the expiration or early termination of the Term, demolish and remove or cause to be removed from the Demised Premises all building improvements together with any fixtures or equipment remaining and restore the Demised Premises to reasonably the same condition it was found immediately prior to Tenant's taking possession of the Demised Premises as of the Effective Date. Such demolition and removal shall be performed at Tenant's sole cost and risk in accordance with all prevailing ordinances, codes, rules and regulations governing same.

Therefore, these Tenant's Leasehold Minimum Maintenance and Repair Standards and Practices ("Maintenance Standards") hereby set forth in general the minimum level of standard of maintenance and repair or practice the Landlord expects of Tenant and Tenant (or any of its successors and, or assigns) agrees to be obliged in order to comply with the terms and conditions of the Lease.

II. Governing Standard or Practice: Section 8.A of the Lease, as amended or modified, states the Tenant agrees to comply with all laws, ordinances, rules, regulations, directives, permits, policies or standards of any governmental authority, entity, or agency affecting the use of the Demised Premises; and any "Construction/Maintenance Standards and Specifications" published by Landlord or its Airport Manager governing such matters at Addison Airport. Section 11.B. of the Lease states "Should there ever arise a conflict between the degree of standard or duty to practice any such standard or practice between [these Maintenance Standards] and any new

¹ All capitalized terms used in these Tenant's Minimum Leasehold Maintenance Standards and Procedures are as used and defined in the underlying Lease unless otherwise defined herein.

construction and maintenance and repair standard so adopted by the Landlord, the standard and/or practice representing the higher or greater degree of standard and/or practice shall prevail as if such higher degree of standard and/or practice is incorporated into and made a part of these [Maintenance Standards].

III. Terminology Used: Unless otherwise provided herein, the definition and/or the description of certain terms used or referred to below shall be the same as defined in the Lease or ASTM International Standard E2018-15² (as it may be amended or modified from time to time or its equivalence as generally accepted by the United States commercial real estate industry at the time).

For the purpose herein the standard being in “*good repair and in first-class condition*” generally means when the building component or system is serving its designed function, is of working condition and operating well, shows evidence of being well taken care of and does not require immediate or short-term repairs above its *de minimis* threshold or does not evidence a material physical deficiency.

Building System – Interacting or independent components or assemblies, which form single integrated units that comprise a building and its site work, such as pavement and flatwork, structural frame, roofing, exterior walls, plumbing, HVAC, electrical, etc. (ASTM E2018-15).

Component – A portion of a building system, piece of equipment, or building element (ASTM E2018-15).

Deferred Maintenance – Physical deficiencies that could have been remedied with routine maintenance, normal operating maintenance, etc., excluding *de minimis* conditions that generally do not present a material physical deficiency to the subject property (ASTM E2018-15).

Effective Age – The estimated age of a building component that considers actual age as affected by maintenance history, location, weather conditions, and other factors. Effective Age may be more or less than actual age (ASTM E2018-15).

Engineer: Designation reserved by law for a person professionally qualified, examined, and licensed by the appropriate governmental board having jurisdiction, to perform engineering services (ASTM E2018-15).

Expected Useful Life – The average amount of time in years that an item, component or system is estimated to function without material repair when installed new and assuming routine maintenance is practiced (ASTM E2018-15).

Fair Condition – To be found in working condition, but may require immediate or short-term repairs above the *de minimis* threshold of not evidencing a material physical deficiency (ASTM E2018-15).

Normal Wear and Tear - Defined as deterioration that results from the intended use of the commercial premises, including breakage or malfunction due to age or deteriorated condition, but the term does not include deterioration that results from negligence, carelessness, accident or abuse

² ASTM Designation E2018-15; November 2015 ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken PA 19428-2929, United States

of the premises, equipment or chattels by the Tenant, by a guest or invitee of the Tenant (Section 93.006[b]); Chapter 93 of the Texas Property Code entitled “Commercial Tenancies”

Physical Deficiency (ies) – The presence of a conspicuous defect or defects and/or material deferred maintenance of a subject property’s material systems, components, or equipment as observed. Specifically excludes deficiencies that may be remedied with routine maintenance, miscellaneous minor repairs, normal operating maintenance, etc. (ASTM E2018-15).

Poor Condition – Found not to be in working condition or requires immediate or short-term repairs substantially above the *de minimis* threshold of not evidencing a material physical deficiency (ASTM E2018-15).

Routine Maintenance - Repair that does not require specialized equipment, professional services, or licensed contractors but, rather can be corrected within the budget and skill set of typical property maintenance staff (ASTM E2018-15).

IV. Baseline Property Condition Assessment: Beginning on or about the tenth (10th) anniversary but no later than the twelfth (12th) anniversary of the Effective Date of the Second Amendment, Tenant shall procure, at the sole cost of Tenant, a Property Condition Assessment baseline report (PCA) to be prepared, written and signed by a licensed professional engineer qualified to assess the condition of the Demised Premises and all Building Improvements, fixtures and equipment made a part thereto pursuant to the then-operative version of ASTM International Standard Designation E2018 as of the date the PCA is performed. If at that time, for any reason, ASTM International no longer publishes standards for conducting property condition assessments for commercial real estate in the United States, Landlord and Tenant shall mutually agree to adopt another similar standard of practice to be performed by qualified third Parties recognized and accepted by the commercial real estate industry in the United States.

For any portion of the Demised Premises designed and constructed with the intent to be used for the storage and movement of aircraft, the PCA shall also include an aircraft pavement condition assessment performed for such areas in accordance with FAA Advisory Circular 150/5380-7A “Airport Pavement Management Program” and ASTM Standard Designation D5340 “Standard Test Method for Airport Pavement Condition Index Surveys” (or their respective operative standard in effect at the time of the PCA report date) (the “Pavement Standards”). If no such standard exists at the time, the pavement condition assessment shall be performed based on prevailing industry standards as of the date of the assessment.

A. Within thirty (30) days of the published date of the PCA report Tenant shall deliver to Landlord a complete signed original copy of the PCA report together with the aircraft pavement condition assessment, if any, together with:

(1.) “**Tenant’s Remedy Plan**”, a written plan prepared by Tenant itemizing and given in sufficient detail Tenant’s plan to remedy and cure, at Tenant’s sole cost and expense, any and all Physical Deficiencies and, or Deferred Maintenance matters identified and communicated in the PCA report. Tenant’s Remedy Plan shall indicate, among other things, that all work will be completed in a good and workman like condition pursuant to all local building codes and ordinances as required by the Lease within one hundred and

eighty (180) calendar days from the date of the PCA's published report date (the "Remedy Period") unless otherwise agreed to in writing by Landlord.

(a.) If the pavement condition index (PCI), as defined in the Pavement Standards, reflects a score less than 70 (or its equivalence) the Tenant's Remedy Plan shall set forth in sufficient detail Tenant's intended remedy and cost estimate necessary to increase the aircraft pavement PCI score to a minimum of 70 within the Remedy Period.

(b.) In the event the PCA recommends supplemental testing or evaluation of any building component including, but not limited to, structural, building envelope, roofing, HVAC, plumbing, electrical, fire alarm and suppression, elevator, hangar door and/or door operators, environmental, pavement and ADA, Tenant's Remedy Plan shall reflect Tenant's plan to complete such supplemental investigations as recommended within the Remedy Period.

(2.) **"Tenant's Facility Maintenance and Repair Plan"** (or "Maintenance Plan") which sets forth in sufficient detail Tenant's stated itemized objectives to maintain and keep all building components and systems, pavement and landscaped areas in good condition and repair together with any planned capital repairs, including those cited in the PCA report and any capital improvements planned within the next ten (10) years following the PCA published report date. Additionally, the Maintenance Plan should include but not be limited to the following:

(a.) Tenant's schedule and checklist for periodic self-inspection of all major building components and systems on annualized basis.

(b.) Tenant shall periodically update the Maintenance Plan to reflect scheduled repairs made together with itemized repair costs given, new conditions found as a result of Tenant's periodic self-inspections and Tenant's plan to maintain or repair said condition.

B. If Tenant fails to deliver to Landlord a complete signed original Baseline PCA Report, Tenant's Remedy Plan and Tenant's Facility Maintenance and Repair Plan as required herein, Landlord may provide written notice thereof to Tenant. Tenant shall have sixty (60) days after receipt of such notice to provide such report or plan. Tenant's failure to provide the documentation required herein shall be considered an event of default of the Lease. Tenant's failure to promptly remedy any Physical Deficiency (ies) identified and communicated in any PCA report as required herein is also considered an event of default under the Lease. In the event of such default(s), in addition to all other rights and remedies available to Landlord under the Lease and by law, Landlord may, but not be obligated to, cause such reports and plans to be prepared and implemented as deemed commercially reasonable; and all reasonable costs therefore expended by Landlord plus interest thereon as provided for in Section 39 of the Lease shall be paid by Tenant upon demand.

V. Requirement for Subsequent Baseline Property Condition Report Updates, Tenant Remedy Plan Updates and Tenant's Facility Maintenance and Repair Plan Updates:

A. Upon each ten (10) year anniversary of the Effective Date of the Second Amendment to Ground Lease (but not later than two (2) years after each 10-year anniversary) Tenant shall procure, at its sole cost and expense, a PCA update (including aircraft pavement condition assessment) with the subsequent PCA report being of similar form and scope as the initial baseline PCA outlined above. Consideration should be given to the age of all building components and whether any special assessments might be warranted. Within thirty (30) days of the published date of the subsequent PCA report, Tenant shall deliver to Landlord a complete signed original of the subsequent PCA report together with the aircraft pavement condition assessment findings. Simultaneously, Tenant shall deliver to Landlord its Tenant Remedy Plan setting forth Tenant's itemized and detailed plan for remedying and curing all Physical Deficiencies and/or Deferred Maintenance matters identified and communicated in the subsequent PCA report. Similarly, Tenant shall also deliver to Landlord Tenant's Facility Maintenance and Repair Plan updated to reflect the most recent subsequent PCA report findings and recommendations.

B. With no more than seventy-two (72) but no less than sixty (60) months remaining until the scheduled Lease expiration date as may be amended or modified over the Term, Tenant shall procure, at its sole cost and expense, a final PCA report (including aircraft pavement condition assessment) with the final PCA report being of similar form and scope as the initial baseline PCA outlined above (the "Final PCA Report"). Consideration should be given to the age of all building components and whether any special assessments might be warranted. Within thirty (30) days of the published date of the Final PCA Report, Tenant shall deliver to Landlord a complete signed original of the Final PCA Report together with the aircraft pavement condition assessment findings. Simultaneously, Tenant shall deliver to Landlord its Tenant Remedy Plan setting forth Tenant's itemized and detailed plan for remedying and curing all Physical Deficiencies and/or Deferred Maintenance matters identified and communicated in the Final PCA Report. Similarly, Tenant shall also deliver to Landlord Tenant's Facility Maintenance and Repair Plan updated to reflect the Final PCA Report findings and recommendations which are to be implemented through the Lease expiration date.

VI. Qualification of Property Condition Reviewer: The qualifications of a third-party consultant performing or overseeing the PCA shall be:

- Licensed in the state of Texas as a professional architecture or engineer;
- Demonstrated experience working with general aviation type properties;
- Having working knowledge of relevant FAA Advisory Circulars and ASTM Standards relating to facility and pavement maintenance and survey standards affecting the subject property type and scope (size and complexity, etc.); and
- Experience preparing property condition reports.

VII. Record Retention: Throughout the Term Tenant shall diligently gather and retain in an orderly manner all documentation affecting and relating to the Building Improvements and any fixtures or equipment made a part of the Demised Premises. To the extent possible the Tenant shall

retain digital copies of all such documentation, which can be easily reviewed, inspected and sourced. All such documents are to be made available to each consultant assigned to perform the property condition assessment and pavement condition analysis. Such documents to be retained should include but not be limited to:

- Site plan – updated as necessary.
- Property Survey – updated as necessary to reflect any changes to the leased premises.
- Construction and “as-built” drawings together with written building specifications.
- Certificate of Occupancy and building permits.
- Building Owner’s Manual received from the General Contractor
- Pavement Condition Assessment Reports (aircraft apron and other)
- Insurance casualty claims and adjustment reports affecting the Building Improvements
- Description of future/planned material improvement or repairs.
- Outstanding notices and citations for building, fire, and zoning code and ADA violations
- Previously prepared, if any, Property Condition Assessment reports or engineering testing and surveys pertaining to any aspect of the subject property’s physical condition.
- Lease listing literature, listing for sale, marketing/promotional literature such as photographs, descriptive information, reduced floor plans, etc.
- Periodic inspection reports (self or third-party) and supporting documentation.
- Irrigation Plans, updated as needed
- Operating manuals, instructions, parts lists

VIII. *Reversionary Process (at Lease Expiration or Early Termination):* Pursuant to the terms and conditions of the Lease, unless otherwise amended or modified the Lease is due to expire at the end of the Lease Expiration Date at which time any and all Building Improvements and any subsequent improvements and alterations made thereto as defined in the Lease revert and become under the ownership of the Landlord. If Tenant is not then in default of the Lease, Tenant shall have the right to remove all personal property and trade fixtures owned by the Tenant from the Demised Premises, but Tenant shall be required to repair any damage to the Demised Premises caused by such removal, which work shall be conducted in a good and workmanlike manner and at Tenant’s sole cost and expense.

Accordingly, in order to facilitate an orderly transfer of all the ownership interests of the Demised Premises, Tenant shall deliver or cause to be delivered to Landlord all of the following on or before the Expiration Date, or earlier termination of the Lease:

A. Tenant's Representations: Tenant shall certify and attest in writing, in a form acceptable to Landlord:

(1.) Tenant conveys to Landlord in good and indefeasible title all the Building Improvements free and clear of any and all liens, assessments, easements, security interests and other encumbrances; and

(2.) There are no lessees or sub-lessees in possession of any portion of the Building Improvements, tenants at sufferance or trespassers (this representation shall not apply to an early termination of the lease); and

(3.) There are no mechanic's liens, Uniform Commercial Code liens or unrecorded liens against the Building Improvements, and all obligations of Tenant arising from the ownership and operation of the Demised Premises and any business operated on the Building Improvements including but not limited to taxes, leasing commissions, salaries, contracts, and similar agreements, have been paid or will be paid before the Expiration Date; and

(4.) There is no pending or threatened litigation, condemnation, or assessment affecting the Building Improvements; and

(5.) Tenant has disclosed to Landlord to the best of its knowledge any and all known conditions of a material nature with respect to the Building Improvements which may affect the health or safety of any occupant of the Demised Premises. Except as disclosed in writing by Landlord or Tenant, to the best of Tenant's knowledge the Improvements have no known latent structural defects or construction defects of a material nature, and none of the improvements has been constructed with materials known to be a potential health hazard to occupants of the Building Improvements; and

(6.) Except as otherwise disclosed in writing by Tenant to Landlord, to the best of Tenant's knowledge the Building Improvements do not contain any Hazardous Materials other than lawful quantities properly stored in containers in compliance with applicable laws. For the purpose herein, "Hazardous Materials" means any pollutants, toxic substances, oils, hazardous wastes, hazardous materials or hazardous substances as defined in or pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, as amended, the Clean Water Act, as amended, or any other federal, state or local environmental law, ordinance, rule, or regulation, whether existing or subsequently enacted during the Term.

B. Any rental and monies due under the Lease unless paid in full; and

C. A Bill of Sale conveying personal property remaining or left on the Demised Premises, if any, free and clear of liens, security interest and encumbrances; and

D. All plans, drawings and specifications respecting the Building Improvements, including as-built plans and specifications, landscape plans, building system plans (HVAC, Telecom/Data, Security System, plumbing) air-conditioning in Tenant's possession or control; and

E. Inventory with corresponding descriptions and identification of all keys, lock combinations, access codes and other such devices or means to access every securable

- portion, compartment, cabinet, panel, closet, gate or point of entry within the Demised Premises; and
- F. All soil reports, engineering and architectural studies, grading plans, topographical maps, feasibility studies and similar information in Tenant's possession or control relating to the Demised Premises; and.
- G. A list and complete copies of all current service contracts, maintenance contracts, management contracts, warranties, licenses, permits, operating agreements, reciprocal easement agreements, maps, if any, applicable to the Demised Premises, certificate of occupancy, building inspection approvals and covenants, and conditions and restrictions respecting the Demised Premises; and
- H. Copies of all utility bills (electric, water/sewer and gas) and similar records respecting the Building Improvements for the past three (3) months; and
- I. A schedule of all service contracts, agreements and other documents not expressly referenced herein relating to the Demised Premises.

End

EXHIBIT B



When recorded, return to:

Timothy Shea
Robinson Waters & O'Dorisio, P.C.
1099 18th Street, Suite 2600
Denver, CO 80202

STATE OF TEXAS §
 §
COUNTY OF DALLAS §

NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.

ESTOPPEL LETTER WITH LANDLORD'S CONSENT

[May 14, 2021]

Independent Financial
1331 17th Street
Denver, Colorado 80202
Attention: Sean Sjodin

Town of Addison
P. O. Box 9010
Addison, TX 75001-9010

RE: Ground Lease dated October 11, 1983 (the "**Ground Lease**"), by and among the Town of Addison, Texas, a home-rule municipality (the "**City**", the same being the Town of Addison, Texas) and Addison Airport of Texas, Inc., a Texas corporation, as Landlord (the City now being the sole Landlord under the Ground Lease, the "Base Lease" (as defined in the Ground Lease) having expired, and the City alone being referred to herein as the "**Landlord**") and Bunnell Properties, Inc., as tenant; the said Ground Lease then having been assigned to Concourse Plaza, LTD, a Texas limited partnership, by that Assignment

of Lease entered into on December 1, 1993 recorded in Volume 83252, Page 7456 of the Official Public Records of Dallas County, Texas ("**OPR**"); the said Ground Lease then having been modified by that Settlement and First Amendment to Lease Agreement ("**First Amendment**") dated April 22, 1997 as recorded in Volume 97214, Page 2291 (Instrument #199702140412) of the OPR, with a corrected document recorded in Volume 97247, Page 3370 (Instrument #199702470809) of the OPR on December 22, 1997; then said Ground Lease, as amended, then having been assigned by Concourse Plaza, LTD to Concourse Plaza II, LTD., a Texas limited partnership, the "Tenant," by that Assignment of Lease entered into on December 30, 1997 as recorded in Volume 98063, Page 3557 (Instrument #199800090587) in the OPR; the said Ground Lease was then modified by that Second Amendment to Ground Lease ("**Second Amendment**") dated and made effective August 14, 2018, so evidenced by that Memorandum of Lease of same date recorded in the OPR as Instrument #201800245457; whereby, among other things, the Term was extended to expire on September 30, 2054; the said Ground Lease was then modified by that Third Amendment to Ground Lease ("**Third Amendment**") dated and made effective October 1, 2020, so evidenced by that Memorandum of Lease of same date recorded in the OPR as Instrument #202000287922; whereby the Term was extended to expire on September 30, 2060; the Ground Lease then having been assigned by Concourse Plaza II, LTD to 16051 Addison Road, LLC, a Texas limited liability company ("**Tenant**") by way of that certain Assignment of Ground Lease dated _____ and recorded as Instrument # _____ in the OPR; by which Ground Lease, as amended and modified as set forth herein above, Landlord leases to Tenant that certain real property (the "**Real Property**") located at 16051 Addison Road at Addison Airport in Dallas County, Texas, as specifically described in the Ground Lease (and being approximately 1.80 acres in Dallas County, Texas), and being generally described as the "Demised Premises" in the Terms and Conditions set forth in the Ground Lease. The term "**Ground Lease**" herein shall collectively mean the Ground Lease, as amended and modified as set forth herein above, including the First Amendment, the Second Amendment and the Third Amendment.

Ladies and Gentlemen:

INDEPENDENT FINANCIAL, a Texas bank ("**Bank**") intends to make a loan to **16051 ADDISON ROAD, LLC**, a Texas limited liability company, which loan (the "**Loan**") in the approximate original stated principal amount of **FOUR MILLION FIVE HUNDRED THOUSAND AND NO/100 DOLLARS (\$4,500,000.00)** will be secured by, among other things, a lien against the leasehold interest of Tenant in the Real Property created pursuant to a leasehold deed of trust (the "**Deed of Trust**") to be executed by Tenant to **DANIEL W. BROOKS**, an individual, as Trustee for the benefit of Bank, which Deed of Trust shall be, subject to the terms and conditions hereof, subordinate and inferior to the Ground Lease and Landlord's lien (contractual and statutory) and other rights thereunder and all terms and conditions thereof.

Bank has advised Tenant that Bank requires the written acknowledgment of Landlord to the execution by Tenant of the above-described Deed of Trust and the written acknowledgment and consent of the Landlord to the statements set forth in this letter agreement.

ESTOPPEL LETTER WITH LANDLORD'S CONSENT - PAGE 2

Therefore, by executing the enclosed copy of this letter agreement and returning it to the undersigned, Landlord hereby specifically states as follows:

1. Landlord takes notice of the Deed of Trust and the subordinate and inferior lien provided for therein being impressed solely against the leasehold interest of Tenant in the Real Property.
2. The Ground Lease has not been modified, altered, or amended except as described herein.
3. Landlord has no actual knowledge of the existence of any lien against the Real Property other than that created by the Ground Lease and any lien for taxes as may be provided by law.
4. Landlord will give to Bank, at the address of Bank specified in this letter agreement, or at such other address as Bank may hereafter designate in writing to Landlord, with a copy to Independent Financial, 2100 McKinney Avenue, Suite 1200, Dallas, Texas 75201 Attn: Commercial Real Estate Department, prompt written notice, as provided in the Second Amendment, Section 2.Q of the Ground Lease, of any default by Tenant under the Ground Lease simultaneously with the giving of such notice to Tenant, and Bank shall have the right, but not the obligation, for a period of fifteen (15) days after its receipt of such notice or within any longer period of time specified in such notice, to take such action or to make such payment as may be necessary or appropriate to cure any such default so specified. Landlord shall not exercise Landlord's right to terminate the Ground Lease without first giving Bank the notice provided for herein and affording Bank the right to cure such default as provided for herein. Should Landlord terminate the Ground Lease without giving Bank proper written notice of Tenant's default and the right to remedy said default as provided for herein, such termination of Ground Lease shall be null and void.
5. If Bank or a third party (provided such third party is approved by Landlord in accordance with the terms of the Ground Lease for approval of an assignee) succeeds to the interest of Tenant in and to the Ground Lease and the Real Property by means of foreclosure under the Deed of Trust, by means of a transfer in lieu of such foreclosure, or by any other means due to the failure or inability of Tenant to pay the Loan secured by the Deed of Trust, Landlord shall thereafter accept, recognize, and treat Bank or such approved third party as the Tenant under the Ground Lease and Landlord shall continue to perform all of its obligations under the Ground Lease. Bank may thereafter, with the written consent of Landlord, which consent shall not be unreasonably withheld or delayed, assign its leasehold right, title, and interest in and to the Ground Lease. For purposes hereof and any applicable law, and without limitation as to other grounds for Landlord withholding consent, it shall be deemed to be reasonable for Landlord to withhold its consent when any one or more of the following apply:

ESTOPPEL LETTER WITH LANDLORD'S CONSENT - PAGE 3

- (a) the proposed assignee is of a character or of a reputation or is engaged in a business which is not consistent with the Master or Strategic Plan of Addison Airport as determined by Landlord;
- (b) the proposed assignee has not demonstrated sufficient financial responsibility or creditworthiness to the satisfaction of Landlord considering the duties, obligations, and responsibilities of the Tenant under the Ground Lease at the time when the consent is requested;
- (c) the proposed assignee's intended use of the demised premises as defined in the Ground Lease is inconsistent with the Ground Lease;
- (d) the proposed assignment would cause Landlord to be in violation of another lease or agreement to which Landlord is a party or to which Landlord or the Addison Airport is subject (including, without limitation, any grant agreements or grant assurances of the Federal Aviation Administration or any other governmental entity or agency);
- (e) if at any time consent is requested or at any time prior to the granting of consent, Tenant is in default under the Ground Lease or would be in default under the Ground Lease but for the pendency of a grace or cure period; or
- (f) the proposed assignee does not intend to occupy the entire Demised Premises as described in the Ground Lease and conduct its business therefrom for a substantial portion of the then remaining term of the Ground Lease.

For purposes hereof and any applicable law, and without limitation as to other grounds for Landlord delaying consent, it shall be deemed to be reasonable for Landlord to delay its consent for a period of forty-five (45) days after the receipt by Landlord of all information requested by Landlord regarding or in connection with the proposed assignment and the proposed assignee.

- 6. To the actual knowledge of Landlord, no rent has been paid more than thirty (30) days in advance of its due date.
- 7. As long as Bank holds any mortgages or deeds of trust on the Real Property:
 - (a) Landlord will not agree to any material amendment or termination of the Ground Lease without Bank's prior written consent;
 - (b) After delivery of written notice from Bank to Landlord stating the Bank is exercising its rights and remedies under the Deed of Trust, Bank may exercise any and all rights of Tenant under the Ground Lease and all rights of Tenant under the Deed of Trust and other loan documents evidencing the Loan that are related to the Ground Lease;

(c) Should Bank exercise the rights of Tenant under the Ground Lease as set forth in (b) above, Bank shall promptly provide Landlord written notice of the name and contact information of the substitute Tenant under the Ground Lease;

(d) Notwithstanding any provisions of the Ground Lease to the contrary, no default or event of default under the Deed of Trust or any other document or instrument evidencing or securing the Loan will, in and of itself, constitute a default or event of default under the Ground Lease.


(e) In the event that any landlord under the Ground Lease becomes the subject of a case under the U.S. Bankruptcy Code (or any other or successor law providing similar relief), and such landlord or any trustee of such landlord rejects or seeks authority to reject the Ground Lease under 11 U.S.C. Section 365 (or any other or successor provision permitting any similar relief): (i) the Tenant shall elect, and hereby does elect, without further act, unless Bank consents in writing to any other election, to remain in possession for the balance of the term of the Ground Lease and any renewal or extension thereof, pursuant to 11 U.S.C. Section 365(h) (and any other successor provision permitting a similar election); (ii) any purported election by the Tenant to treat the Ground Lease as terminated shall be void and of no effect, unless Bank consents in writing thereto; and (iii) the lien of the Deed of Trust shall not be impaired by such rejection. If Tenant becomes the subject of a case under the U.S. Bankruptcy Code (or any other law providing similar relief), Landlord shall give prompt notice to Bank of any notice it receives of a request by the Tenant or any trustee of the Tenant for authority to reject the Ground Lease. Landlord acknowledges and agrees that any such rejection of the Ground Lease shall have no effect upon the continued existence of the leasehold estate in the Real Property or the Deed of Trust. If the Ground Lease is terminated or rejected by Tenant in any bankruptcy proceeding, then Landlord shall, upon Bank's written request made within thirty (30) days after any such termination or rejection, enter into a new ground lease with Bank for the remainder of the term of the Ground Lease, at the same rent, and having the same other provisions as the Ground Lease; provided, that, Bank cures all monetary defaults by Tenant which exist on the date of such new ground lease.

8. There shall be no merger of the Ground Lease or the leasehold estate in the Real Property thereunder with the fee estate in the Real Property by reason of the fact that the Ground Lease or the leasehold estate thereunder may be held, directly or indirectly, by or for the account of any entities who hold the fee estate. No such merger shall occur unless all entities having an interest in the fee estate and all entities (including Bank) having an interest in the Ground Lease or the leasehold estate thereunder join in a written statement effecting such merger and duly record the same.
9. Except for a foreclosure or deed in lieu of foreclosure, upon the recording of the full and final release of the Deed of Trust pursuant to an instrument executed by Bank, this agreement shall be deemed automatically terminated and released without the necessity of the execution or recordation of any additional instrument.

Very truly yours,

BANK:

INDEPENDENT FINANCIAL,
a Texas state bank


By: 
Name: Sean Sjodin
Title: Senior Vice President

Cc: Real Estate Manager
Addison Airport
16051 Addison Road, Suite 220
Addison, Texas 75001

STATE OF Colorado §
§
COUNTY OF Denver §

The foregoing instrument was ACKNOWLEDGED before me this 14th day of May, 2021, by Sean Sjodin, the Senior Vice President of **INDEPENDENT FINANCIAL**, a Texas state bank, on behalf of said state bank.

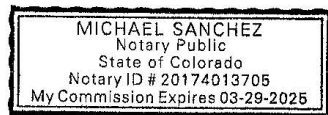
[S E A L]


Notary Public, State of Colorado

My Commission Expires:

03/29/2025

Michael Sanchez
(Printed Name of Notary Public)



ESTOPPEL LETTER WITH LANDLORD'S CONSENT - PAGE 6

Acknowledged and consented to as of the date first written above.

LANDLORD:

TOWN OF ADDISON, TEXAS,
a home rule municipality

By: _____
Name: Wesley S. Pierson
Title: City Manager

STATE OF TEXAS §
§
COUNTY OF DALLAS §

The foregoing instrument was ACKNOWLEDGED before me this _____ day of _____, 2021, by Wesley S. Pierson, the City Manager of **TOWN OF ADDISON, TEXAS**, a home rule municipality, on behalf of said home rule municipality.

[S E A L]

Notary Public, State of Texas

My Commission Expires:

(Printed Name of Notary Public)

Acknowledged and consented to as of the date first written above.

TENANT:

(for purposes of agreeing and consenting to any amendments to the Ground Lease only)

16051 ADDISON ROAD, LLC,
a Texas limited liability company

By: _____

Name: _____

Title: _____

STATE OF TEXAS §

§

COUNTY OF DALLAS §

The foregoing instrument was ACKNOWLEDGED before me this _____ day of _____, 2021, by Greg Bates, the _____ of **16051 ADDISON ROAD, LLC**, a Texas limited liability company, on behalf of said limited liability company.

[S E A L]

Notary Public, State of Texas

My Commission Expires:

(Printed Name of Notary Public)

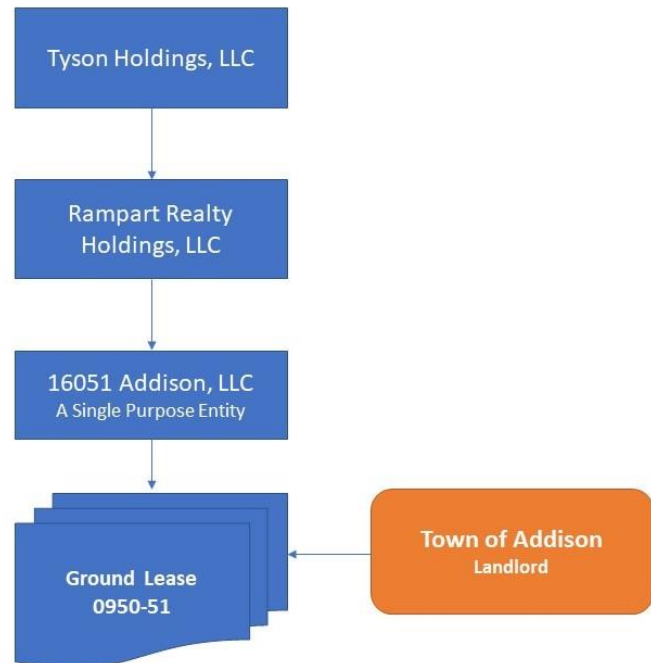


Background Information: The 40-year ground lease was first entered into in October 1983 with Brunnell Properties, Inc. who subsequently sold and assigned its leasehold interest to Concourse Plaza, LTD. in December 1983. The ground lease was modified by that Settlement and First Amendment to Lease Agreement dated April 22, 1997, which, among other things, modified the leasehold premises to accommodate the widening of Keller Springs and the future Addison Airport Toll Tunnel. In 1997, the ground lease was sold and assigned from Concourse Plaza, LTD. to Concourse Plaza II, LTD., a Texas limited partnership, the current Tenant.

In 2018, the Town entered into a Second Amendment to Ground Lease with Tenant which, among other things, extended the lease term 30 years, or to September 30, 2054, in consideration of a market rental adjustment and \$1.5M in capital repairs and improvements to be completed by Tenant at its sole cost and expense. A Third Amendment to Ground Lease was entered into by the parties effective September 2020, extending the lease term an additional six years, or to September 30, 2060, in consideration of an additional \$500,000 in capital repairs and improvements that were completed by Tenant.

The leased premises consist of 1.8 acres of airport land located at the southwest corner of Keller Springs Drive and Addison Road. The site is improved with a 43,000 square-foot, three-story, multi-tenant office building with five executive hangars at the rear of the building. In 2019, tenant completed extensive capital improvements throughout the complex including updating all restrooms, common hallways, building entry, adding exterior windows, HVAC smart system upgrades, landscape improvements, and various other improvements.

About 16051 Addison, LLC: The assignee of the proposed transaction is 16051 Addison, LLC, a Texas limited liability company (“Assignee”); it is, a single-purpose entity intended to hold only the assets of the assigned leasehold interests and title to the building improvements now or in the future constructed upon the leased premises. The Assignee is a wholly owned subsidiary of Rampart Realty Holdings, LLC, which both companies are managed, and majority owned by Christopher Frain of Little Colorado. Christopher Frain is also the founder and CEO of Tyton Holdings, Inc, an investment, and private equity firm founded in 2011.



16051 Addison, LLC intends to sublease nearly 25,000 rental square feet of the leased premises to its parent company, Tyton Holdings, Inc. (“Tyton”), who intends to relocate its corporate headquarters and its affiliates’ general corporate administration services (including business development, finance, human resources, and legal) from Littleton, Colorado. In doing so, Tyton anticipates relocating 35 full-time employees to Addison this year and projects to expand to 100 full-time employees within the next three years. Tyton also intends to base its two corporate aircraft - a 2018 Cirrus SR22T and 2016 Honda Jet - at Addison Airport. In 2019, Tyton Holdings, Inc. and its related companies generated over \$500M in revenue.

Leasehold Mortgage: The proposed transaction is subject to the Town’s consent to the creation of a \$4.5M leasehold mortgage to acquire the property secured by, among other things, a lien against the leasehold interest of the Assignee in the real property created pursuant to a leasehold deed of trust. The Deed of Trust will be subordinate and inferior to the Ground Lease and Landlord’s lien (contractual and statutory) and other rights under the Ground Lease. The Town’s consent to this leasehold mortgage is to be evidenced by the Bank Estoppel Letter, attached hereto as **Exhibit 2** from Independent Bank and acknowledged by the Town. The Bank Estoppel Letter sets forth the terms and conditions under which the Town recognizes the Bank’s lien and, in the event of default, the Bank as Tenant should it foreclose or take possession of the property by deed-in-lieu of foreclosure.

Conclusion and Recommendation: Concourse Plaza II, LTD., tenant of the above- referenced ground leasehold, is requesting the Town’s consideration and consent to their proposed sale and assignment of their building improvements and the remaining leasehold interests to 16051 Addison, LLC, a Texas limited liability company, subject to a leasehold mortgage created through Independent Bank, the mortgagee. 16051 Addison, LLC intends to sublease 25,000 rental square feet to its parent company Tyton Holdings Inc. Tyton is relocating its corporate headquarters and thirty-five staff personnel to Addison from Littleton, Colorado.

The proposed transaction is beneficial to the airport and the Town. Tyton will base its two aircraft at Addison Airport. It will also absorb 25,000 rentable square feet of current vacant office space, without displacing any current tenants. Their relocation to Addison will contribute to the Town's tax base and benefit other local businesses.

Airport staff recommends the town council give its consent and authorize the city manager to execute the Assignment of Ground Lease Agreement ("**Exhibit 1**") and Bank Estoppel Letter ("**Exhibit 2**") on behalf of the Town, and any subsequent documents that may necessitate the city attorney's review. The city attorney has reviewed the aforementioned documents and finds them acceptable for the Town's purposes.



Aerial 1: 16051 Addison Road at Addison Airport



Aerial 2: 16051 Addison Road at Addison Airport - street view

Council Meeting

5.

Meeting Date: 05/25/2021

Department: Finance

Pillars: Gold Standard for Financial Health

Milestones: Continue development and implementation of Long Term Financial Plan

AGENDA CAPTION:

Consider Action on the **Second Quarter Update from the Finance Committee to the City Council for the Period from January 2021 to March 2021.**

BACKGROUND:

The Finance Committee (Committee) serves in an advisory capacity to the City Council. The Committee includes: Council Member Tom Braun, Council Member Ivan Hughes, and Council Member Marlin Willesen. The Committee reviews and makes recommendations to the City Council regarding the following matters:

- Quarterly Financial Reports;
- Comprehensive Annual Financial Report;
- Long-term debt capacity of the Town;
- Engagement of independent accounting firms to audit the financial statements; and
- Review the adequacy and implementation of an internal audit function.

The Committee meets monthly and is required to provide quarterly reports to the Council. The attached report cover topics discussed at the Committee Meetings for the second quarter of Fiscal Year 2021 from January to March 2021.

RECOMMENDATION:

Administration recommends approval.

Attachments

Finance Committee Quarterly Report - Second Quarter (January - March 2021)



Finance Committee Report

January - March 2021

The Finance Committee (Committee) shall serve solely in an advisory capacity to the City Council. Among other matters that may be requested from time to time by the Council, the Finance Committee may review and make recommendations to the City Council regarding the following matters:

- Quarterly financial reports;
- Comprehensive Annual Financial Report;
- Long term debt capacity of the Town;
- Engagement of independent accounting firms to audit the financial statements;
- Review the adequacy and implementation of any internal audit function.

Finance Committee members as of March 2021:

- Tom Braun, Council Member
- Ivan Hughes, Council Member
- Marlin Willesen, Council Member

This document covers the topics discussed by the Committee from January to March 2021.

January 18, 2021

Topic	Discussion
Quarterly Finance Committee Report	Staff provided a draft of the Quarterly Finance Committee Report October to December 2020 to the Committee. This report was placed on the Consent Agenda on the January 26, 2021 Council Meeting.
Senior Property Tax Exemptions	Staff provided a presentation regarding the Town's existing exemption structure and that of all cities in Dallas County and all comparator cities. Additional information was requested by the committee for the following Finance Committee meeting.

Attendees: Tom Braun, Ivan Hughes, Marlin Willesen, Wes Pierson, Bill Hawley, Steven Glickman



Finance Committee Report

January - March 2021

February 8, 2021

Topic	Discussion
Fiscal Year 2020 Audit	Audit results presented by BKD. Senior Audit Manager Rachel Ormsby stated that the Town received an unmodified “clean” opinion. Staff created the Comprehensive Annual Financial Report in-house and it was reviewed by the auditors. Staff informed the Committee that the Comprehensive Annual Financial Report will be submitted to the Government Finance Officer’s Association (GFOA) for consideration for the Certificate of Achievement in Financial Reporting. This would be the 45 th consecutive year the Town had received the award.
1 st Quarter Financial and Investment Report Review (ending December 31, 2020)	The Committee and Staff reviewed a draft of the Quarterly Financial and Investment Report for the 1 st quarter of Fiscal Year 2021. The report was presented at the January 26 th , 2021 Council Meeting.
Senior Property Tax Exemptions	Staff provided updated and additional information regarding the Town’s existing exemption structure and that of all cities in Dallas County and all comparator cities. No additional action was recommended by the committee.

Attendees: Tom Braun, Ivan Hughes, Marlin Willesen, Wes Pierson, Bill Hawley, Steven Glickman, Amanda Turner, Rachel Ormsby

March 2021

There was no meeting held in March.

Council Meeting

6.

Meeting Date: 05/25/2021

Department: Infrastructure- Development Services

Pillars: Excellence in Asset Management

Milestones: Implement the Asset Management Plan

AGENDA CAPTION:

Consider Action on a **Resolution Approving a Contract Between the Town of Addison and Rey-Mar Construction for the Kellway Lift Station Bypass Project and Authorizing the City Manager to Execute a Contract** in an Amount Not to Exceed \$777,100.

BACKGROUND:

The purpose of this item is to award a contract with Rey-Mar Construction (Rey-Mar) for the Kellway Lift Station Bypass Project. The project scope consists of the installation of a new third pump, valving, piping, a new manhole, adjustments to the wet well, a new wall core, and appurtenances. The changes to the wet well will allow the Town to inspect, drain, and perform maintenance on the wet well. The new third pump will optimize the operational efficiency and effectiveness of the current pumping system.

The Kellway Lift Station was originally constructed in 1996. In 2017, an assessment of Kellway Lift Station was conducted by Garver LLC (Garver). Garver's scope of work for the assessment was to check the existing condition of the facility, recommend operational improvements, identify any regulatory deficiencies, optimization strategies, and process improvements. This project's scope is based on Garver's assessment.

In July 2020, a Professional Services Agreement with Garver was executed for design services associated with the Lift Station Bypass Project. This design was completed in March of 2021. The project was posted to CIVCAST for bidding on March 29, 2021 and closed on April 20, 2021. The Town received two proposals ranging in cost from \$771,100 to \$798,500. Staff evaluated the proposals based on price, bidder qualifications and construction experience. Below is the result of this scoring.

- Rey-Mar Construction 100
- Acadia Services 68.7

Rey-Mar received a score of 100 out of 100 points and was found to be the best value for the contract. Garver has checked Rey-Mar's references and recommends they be awarded the contract. The proposal comparison can be found in the attached tabulation document.

Funding for this project is budgeted in the Fiscal Year 2021 Capital Improvements Program. The budget for the construction of this project is \$1,149,000. Construction is anticipated to take 4.5 months to complete.

RECOMMENDATION:

Administration Recommends Approval.

Attachments

Resolution - Rey Mar
Rey Mar Construction Proposal Forms
Proposal Scoring Sheet
Contract Documents
Technical Specifications
Kellway Bypass Plans

RESOLUTION NO. _____

A RESOLUTION OF THE CITY COUNCIL OF THE TOWN OF ADDISON, TEXAS APPROVING AN AGREEMENT BETWEEN THE TOWN OF ADDISON AND REY-MAR CONSTRUCTION, FOR THE ADDISON KELLWAY LIFT STATION BY-PASS PROJECT IN AN AMOUNT NOT TO EXCEED \$777,100.00 AUTHORIZING THE CITY MANAGER TO EXECUTE THE AGREEMENT, AND PROVIDING AN EFFECTIVE DATE.

BE IT RESOLVED BY THE CITY COUNCIL OF THE TOWN OF ADDISON, TEXAS:

SECTION 1. The Agreement between the Town of Addison and Rey-Mar Construction, for the Addison Kellway Lift Station By-Pass Project in an amount not to exceed \$777,100.00, a copy of which is attached to this Resolution as **Exhibit A** and which incorporates the Town of Addison's General and Specific Conditions for construction contracts, and the Advertisement for Bids, Instruction to Bidders, General Provisions, Special Provisions, Plans and other bid documents, is hereby approved. The City Manager is hereby authorized to execute the agreement.

SECTION 2. This Resolution shall take effect from and after its date of adoption.

DULY RESOLVED AND ADOPTED by the City Council of the Town of Addison, Texas, on this the **25th** day of **MAY** 2021.

TOWN OF ADDISON, TEXAS

Joe Chow, Mayor

ATTEST:

APPROVED AS TO FORM:

Irma Parker, City Secretary

City Attorney

EXHIBIT A

SECTION CA

CONTRACT AGREEMENT

Project No. 20W05015
Kellway Lift Station By-Pass Project

1

Section CA
Contract Agreement

CONTRACT AGREEMENT

STATE OF TEXAS

COUNTY OF DALLAS

THIS AGREEMENT is made and entered into this _____ day of _____, 2021, by and between the Town of Addison, of the County of Dallas and State of Texas, acting through its City Manager, thereunto duly authorized so to do, Party of the First Part, hereinafter termed the OWNER, and Rey-Mar Construction, of the City of Fort Worth, County of Tarrant, State of Texas, Party of the Second Part, hereinafter termed CONTRACTOR.

WITNESSETH: That for and in consideration of the payment and agreement hereinafter mentioned, to be made and performed by the OWNER, the said CONTRACTOR hereby agrees with the said OWNER to commence and complete construction of certain improvements as follows:

ADDISON KELLWAY LIFT STATION BY-PASS PROJECT PUBLIC WORKS AND ENGINEERING DEPARTMENT BID NUMBER 21-53

and all extra work in connection therewith, under the terms as stated in the General and Specific Conditions of the AGREEMENT; and at his own proper cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance and other accessories and services necessary to complete the said construction, in accordance with the conditions and prices stated in the Proposal attached hereto and in accordance with the Advertisement for Bids, Instructions to Bidders, General Provisions, Special Provisions, Plans, and other drawings and printed or written explanatory matter thereof, and the Technical Specifications and Addenda thereto, as prepared by the OWNER, each of which has been identified by the endorsement of the CONTRACTOR and the OWNER thereon, together with the CONTRACTOR's written Proposal and the General Provisions, all of which are made a part hereof and collectively evidence and constitute the entire AGREEMENT.

The CONTRACTOR hereby agrees to commence work within ten (10) calendar days after the date of written notice to do so shall have been given to him, to complete the work within one hundred and twenty (120) calendar days, after he commences work, subject to such extensions of time as are provided by the General Provisions.

The OWNER agrees to pay the CONTRACTOR ^{seven hundred seventy seven thousand one hundred} _____ Dollars (\$ 777,100) in current funds for the performance of the Contract in accordance with the Proposal submitted thereof for the Base Bid, as provided in the General Provisions, and to make payments of account thereof as provided therein.


IN WITNESS WHEREOF, the parties of these presents have executed this AGREEMENT in the year and day first above written.

TOWN OF ADDISON, TEXAS (OWNER)

ATTEST:

By: _____
City Manager

By: _____

 (CONTRACTOR)

ATTEST:

By: David Martinez

By: 

The following to be executed if the CONTRACTOR is a corporation:

I, _____ certify that I am the secretary of the corporation named as CONTRACTOR herein; that _____, who signed this Contract on behalf of the CONTRACTOR is the _____ (official title) of said corporation; that said Contract was duly signed for and in behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

Signed: _____

Corporate Seal

SECTION PF-1

PROPOSAL FORM

PROPOSAL FORM

April 20, 2021

TO: The Honorable Mayor and Town Council
Town of Addison, Texas

All:

The undersigned bidder, having examined the plans, specifications and contract documents, and the location of the proposed work, and being fully advised as to the extent and character of the work, proposes to furnish all equipment and to perform labor and work necessary for completion of the work described by and in accordance with the Plans, Specifications and Contract for the following prices, to wit:

Signed by: _____

David Martinez

ACKNOWLEDGMENT OF ADDENDA:

The Bidder acknowledges receipt of the following addenda:

Addendum No. #1 pm Addendum No. _____

Addendum No. _____ Addendum No. _____

Addendum No. _____ Addendum No. _____

The following pages contain all bid items for:

ADDISON KELLWAY LIFT STATION BY-PASS PROJECT
BID NUMBER 21-53

**TOWN OF ADDISON
KELLWAY LIFT STATION BY-PASS
BID NO. 21-53
UNIT PRICES**

ITEM NO.	QUANTITY	UNIT	DESCRIPTION AND PRICE IN WORDS	UNIT PRICE	TOTAL AMOUNT
----------	----------	------	--------------------------------	------------	--------------

1	1	LS	Kellway Lift Station By-Pass Improvements		
---	---	----	---	--	--

This item consists of all supervision, labor, materials, equipment, tools, incidentals and related items required for Installation of the following:

- A third pump and associated piping, valving, and appurtenances,
- Connection of pump suction lines in the existing lift station,
- Installation of a bypass pumping connection to provide direct connection to the forcemain and bypass the lift station,
- Installation of new pre-cast concrete manhole with piping between the lift station and connection between the new and existing manhole,
- Piping between the existing manhole and the lift station, including valves and new wall cores,
- Electrical work associated with level detection, installation of the third pump, and work to bring the lift station on-line.

Reference project drawing details. This item includes subgrade preparation, grading of concrete, installation of manholes, installation of piping and appurtenances, installation of pump pad and pipe supports, installation or bypass pumping connection, and road repair. Repairs to concrete roads damaged from the construction of the Project are incidental to the Project and are not included in this item. The bid price for this item will not be subject to re-negotiation due to quantity overruns or underrun limitations set forth in the general specifications. Measurement and payment will be per Unit Price as set forth in the Contract; complete and in place, the sum of

three hundred seventy five thousand DOLLARS

AND zero CENTS

ITEM NO.	QUANTITY	UNIT	DESCRIPTION AND PRICE IN WORDS	UNIT PRICE	TOTAL AMOUNT
2	1	LS	Kellway Lift Station By-Pass Pumping		
<p>This item consists of all supervision, labor, materials, equipment, tools, power, incidentals, and related items as required for the project, for providing bypass pumping during the construction phase of this project. This item includes all work associated with bypassing Kellway Lift Station during construction as detailed in the Contract Documents. This work includes all incidental work specified and/or shown on the drawings and specifications not included in other bid items, this includes, but is not limited to, equipment placement, rental, power connection, and all other work, labor, and materials for a complete and operational project not specifically described in other bid items. Payment will be made at the Lump Sum Price as set forth in this contract; complete and in place, the sum of</p>					
<p><u>one hundred fifty thousand</u></p>				DOLLARS	
<p>AND <u>zero</u></p>				CENTS	
3	1	LS	Kellway Lift Station By-Pass Electrical and Control Improvements		
<p>This item consists of all supervision, labor, materials, equipment, tools, incidentals, and related items required for modification of the following:</p> <ul style="list-style-type: none"> • Modify existing Control Panel for 3 pumps operation. Provide and install all additional hardware to include but not limited to: 3 pumps alternator, relays, terminal blocks, lights, switches, wire, conduit, and all required hardware for a complete working system. • Modify existing lift station wet wells for installation of new ultrasonic level transducers. Provide and install new ultrasonic transducers, terminal boxes, wire, conduit, and all required hardware for a complete working system. <p>Reference project drawing details. This item includes electrical controls and control panel upgrades and work to bring the new, third pump on-line. The bid price for this item will not be subject to re-negotiation due to quantity overruns or underrun limitations set forth in the general specifications. Measurement and payment will be per Unit Price as set forth in the Contract; complete and in place, the sum of</p>					
<p><u>five thousand five hundred</u></p>				DOLLARS	
<p>AND <u>zero</u></p>				CENTS	

4 1 LS Kellway Lift Station By-Pass I&C Improvements

This item consists of all supervision, labor, materials, equipment, tools, incidentals, and related items required for modification of the following:

- Modify existing PLC panel and reprogram existing PLC for 3 pumps operation. Provide and install relays, I/O expansion modules, terminal blocks, and all required hardware for a complete working system.
- Provide, install, and program Siemens Hydorangers for secondary operation of 3 pumps.
- Work to be performed by Prime Controls, LP.

Reference project drawing details. This item includes electrical controls and control panel upgrades and work to bring the new, third pump on-line. The bid price for this item will not be subject to re-negotiation due to quantity overruns or underrun limitations set forth in the general specifications. Measurement and payment will be per Unit Price as set forth in the Contract; complete and in place, the sum of

seven thousand five hundred DOLLARS

AND zero CENTS

5 1 LS Excavation Protection and Shoring

This item consists of all supervision, labor, materials, equipment, tools, incidentals and related items required for Installation of the following:

- Excavation and shoring around the wetwell for wetwell connections, installation of new manhole, and existing manhole cores.
- Excavation and shoring around the new bypass pumping connection area.

Reference project drawing details. This item includes shoring and excavation protection for work on this lift station. Benching the excavation will not be allowed. The bid price for this item will not be subject to re-negotiation due to quantity overruns or underrun limitations set forth in the general specifications. Measurement and payment will be per Unit Price as set forth in the Contract; complete and in place, the sum of

one hundred thirty seven thousand eight hundred DOLLARS

AND zero CENTS

6 1 EA Project Sign

This item consists of all supervision, labor, materials, equipment, incidentals and related items required for Installation of the project sign as detailed in specification PS – PROJECT SIGN.

Reference project specifications. This item includes construction and installation of one (1) project sign to be displayed at the construction site. The bid price for this item will not be subject to re-negotiation due to quantity overruns or underrun limitations set forth in the general specifications. Measurement and payment will be per Unit Price as set forth in the Contract; complete and in place, the sum of

two thousand DOLLARS

AND zero CENTS

7 1 LS Mobilization

This item consists of all supervision, labor, materials, equipment, incidentals and related items required for construction mobilization.

Reference project specifications. This item includes getting all equipment, sub-contractors, and contractor prepared to begin construction of this project. The bid price for this item will not be subject to re-negotiation due to quantity overruns or underrun limitations set forth in the general specifications. Measurement and payment will be per Unit Price as set forth in the Contract; complete and in place, the sum of

thirty nine thousand DOLLARS

AND zero CENTS

8 1 LS Bonds and Insurance

This item consists of all labor, and related items required for to provide performance bond, payment bond, maintenance bond, and insurance as detailed in specifications PrB – PERFORMANCE BOND, PyB – PAYMENT BOND, MB – MAINTENANCE BOND, and IS – INSURANCE REQUIREMENTS, respectively.

Reference project specifications. The bid price for this item will not be subject to re-negotiation due to quantity overruns or underrun limitations set forth in the general specifications. Measurement and payment will be per Unit Price as set forth in the Contract; complete and in place, the sum of

twenty three thousand three hundred DOLLARS

AND zero CENTS

9 1 LS Construction Contingency Allowance

This bid item consists of up to 5% of the base-bid subtotal including items 1 through 8 to allow for contingency items during construction. Construction contingency items will consist of labor, materials, equipment, tools, incidentals, and related items as required to furnish and install equipment required for the Addison Kellway Lift Station By-Pass project, as defined in the contract documents.

Payment, for part or in full, for this item will only be made following written authorization by the Town of Addison to perform the work.

thirty seven thousand DOLLARS

AND zero CENTS

SUMMARY OF BID ITEMS AND TOTAL AMOUNT FOR AWARD EVALUATION:

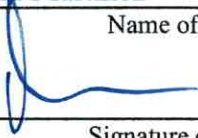
ITEM NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL BID AMOUNT
1	Kellway Lift Station By-Pass Improvements	LS	1	375,000.00	375,000.00
2	Lift Station Bypass Pumping	LS	1	150,000.00	150,000.00
3	Kellway Lift Station By-Pass Electrical and Control Improvements	LS	1	5,500.00	5,500.00
4	Kellway Lift Station By-Pass I&C Improvements	LS	1	7,500.00	7,500.00
5	Excavation Protection and Shoring	LS	1	137,800.00	137,800.00
6	Project Sign	EA	1	2,000.00	2,000.00
7	Mobilization	LS	1	39,000.00	39,000.00
8	Bond and Insurance	LS	1	23,300.00	23,300.00
9	Construction Contingency Allowance	LS	1	37,000.00	37,000.00
TOTAL BID PRICE IN WORDS		seven hundred seventy seven thousand one hundred			
OWNER'S ALLOWANCE As directed by the Owner. Written approval is required prior to start of work.		37,000.00			
TOTAL BID PRICE		777,100.00			

- NOTES:
1. All items, labor, materials, equipment, facilities, incidentals and work required for construction of the project are to be provided and installed by the Contractor as part of the project and payment for the cost of such shall be included in the price bid for the construction of the project.
 2. Prices must be shown in words and figures for each item listed in the Proposal. In the event of discrepancy, the words shall control.
 3. Materials, which are "tax exempt", are those items which are physically incorporated into the facilities constructed for the Town of Addison, as set forth in the Special Provisions. Materials include, but are not limited to purchased items such as water pipe, sanitary sewer pipe, storm drain pipe, etc.
 4. Services, which are "not tax exempt", are those items which are used by the Contractor but are not physically incorporated into the Town of Addison's facility and/or items which are consumed by

construction, as set forth in the Special Provisions. Services include, but are not limited to, items such as supplies, tools, skill and labor, the purchase, rental or lease of equipment, etc.

David Martinez

Name of Person Signing Bid



Signature of Person Signing Bid

3416 Reed Street, Fort Worth, TX 76119

Address

817-938-3537

Telephone No.

817-535-0153

Fax No.

46-0714295

T.I.N. (Tax Identification or Employer's Number)

If BIDDER is:

AN INDIVIDUAL

By _____ (Seal)
(Individual's Name)

doing business as _____

Business address: _____

Phone No. _____

A PARTNERSHIP

By Rey-Mar Construction _____ (Seal)
(Firm Name)

David Martinez _____
(General Partner)

doing business as Rey-Mar Construction _____

Business address: 3416 Reed Street Fort Worth, TX 76119 _____

Phone No. 817-535-3451 _____



A CORPORATION

By _____
(Corporation Name)

(State of Incorporation)

By _____
(Name of Person Authorized to Sign)

(Title)

(Corporate Seal)

Attest _____
(Secretary)

Business address: _____

Phone No. _____



A JOINT VENTURE

By _____
(Name)

(Address)

By _____
(Name)

(Address)

(Each joint venture must sign. The manner of signing for each individual, partnership and corporation that is a party to the joint venture should be in the manner indicated above.)

SECTION BB
BID BOND

ATTACHED

BID BOND ATTACHED

Bidder shall submit a bid bond equal to five percent (5%) of the bid price. Failure to submit a bid bond when required may deem the bid non-responsive. Bid Bonds may be submitted electronically with the executed original provided immediately upon request.

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we Rey-Mar Construction

as Principal, hereinafter called the Principal, and Continental Casualty Company

a corporation duly organized under the laws of the State of Illinois as Surety, hereinafter called the Surety, are held and firmly bound unto Town of Addison

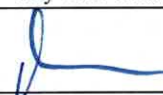
_____ as Obligee, hereinafter called the Obligee, in the sum of Five Percent of Greatest Amount Bid Dollars (\$ 5% G.A.B.), for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for _____
Town of Addison, TX, Kellway Lift Station By-Pass

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

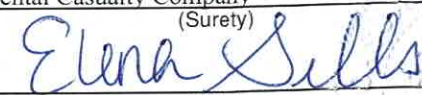
Signed and sealed this 20th day of April, 2021.


(Witness)

Rey-Mar Construction
(Principal) (Seal)

DAVID M. HIGHT (Title) General Partner


(Witness)

Jennifer Upton, Witness

Continental Casualty Company
(Surety) (Seal)

(Title)

Elena Sells, Attorney-in-Fact

Printed in cooperation with the American Institute of Architects (AIA) by the CNA Insurance Companies.

The language in this document conforms exactly to the language used in AIA Document A310 - Bid Bond - February 1970 Edition.

Figure: 28 TAC §1.601(a)(3)

1 IMPORTANT NOTICE

To obtain information or make a complaint:

2 You may contact Continental Casualty Company, National Fire Insurance Company, American Casualty Company or Continental Insurance Company at 312-822-5000.

3 You may call Continental Casualty Company, National Fire Insurance Company, American Casualty Company or Continental Insurance Company's toll-free telephone number for information or to make a complaint at:

1-877-672-6115

4 You may also write to Continental Casualty Company, National Fire Insurance Company, American Casualty Company or Continental Insurance Company at:

CNA Surety
333 South Wabash
Chicago, IL 60604

5 You may contact the Texas Department of Insurance to obtain information on companies, coverages, rights or complaints at:

1-800-252-3439

6 You may write the Texas Department of Insurance:

P.O. Box 149104
Austin, TX 78714-9104
Fax: (512) 475-1771
Web: <http://www.tdi.state.tx.us>
E-Mail: ConsumerProtection@tdi.state.tx.us

7 PREMIUM OR CLAIM DISPUTES:

Should you have a dispute concerning your premium or about a claim you should contact Continental Casualty Company, National Fire Insurance Company, American Casualty Company or Continental Insurance Company first. If the dispute is not resolved, you may contact the Texas Department of Insurance.

8 ATTACH THIS NOTICE TO YOUR POLICY:

This notice is for information only and does not become a part or condition of the attached document.

Form F8277

AVISO IMPORTANTE

Para obtener informacion o para someter una queja:

Puede comunicarse con Continental Casualty Company, National Fire Insurance Company, American Casualty Company or Continental Insurance Company al 312-822-5000.

Usted puede llamar al numero de telefono gratis de Continental Casualty Company, National Fire Insurance Company, American Casualty Company or Continental Insurance Company's para informacion o para someter una queja al:

1-877-672-6115

Usted tambien puede escribir a Continental Casualty Company, National Fire Insurance Company, American Casualty Company or Continental Insurance Company:

CNA Surety
333 South Wabash
Chicago, IL 60604

Puede comunicarse con el Departamento de Seguros de Texas para obtener informacion acerca de companias, coberturas, derechos o quejas al:

1-800-252-3439

Puede escribir al Departamento de Seguros de Texas:

P.O. Box 149104
Austin, TX 78714-9104
Fax: (512) 475-1771
Web: <http://www.tdi.state.tx.us>
E-Mail: ConsumerProtection@tdi.state.tx.us

DISPUTAS SOBRE PRIMAS O RECLAMOS:

Si tiene una disputa concerniente a su prima o a un reclamo, debe comunicarse con el Continental Casualty Company, National Fire Insurance Company, American Casualty Company or Continental Insurance Company primero. Si no se resuelve la disputa, puede entonces comunicarse con el departamento (TDI).

UNA ESTE AVISO A SU POLIZA: Este aviso es solo para proposito de informacion y no se convierte en parte o condicion del documento adjunto.

POWER OF ATTORNEY APPOINTING INDIVIDUAL ATTORNEY-IN-FACT

Know All Men By These Presents, That Continental Casualty Company, an Illinois insurance company, National Fire Insurance Company of Hartford, an Illinois insurance company, and American Casualty Company of Reading, Pennsylvania, a Pennsylvania insurance company (herein called "the CNA Companies"), are duly organized and existing insurance companies having their principal offices in the City of Chicago, and State of Illinois, and that they do by virtue of the signatures and seals herein affixed hereby make, constitute and appoint

Kathy Sells, Steven W Lewis, Lanny Land, Jennifer Upton, Elena Sells, Individually

of Grapevine, TX, their true and lawful Attorney(s)-in-Fact with full power and authority hereby conferred to sign, seal and execute for and on their behalf bonds, undertakings and other obligatory instruments of similar nature

- In Unlimited Amounts -

and to bind them thereby as fully and to the same extent as if such instruments were signed by a duly authorized officer of their insurance companies and all the acts of said Attorney, pursuant to the authority hereby given is hereby ratified and confirmed.

This Power of Attorney is made and executed pursuant to and by authority of the By-Law and Resolutions, printed on the reverse hereof, duly adopted, as indicated, by the Boards of Directors of the insurance companies.

In Witness Whereof, the CNA Companies have caused these presents to be signed by their Vice President and their corporate seals to be hereto affixed on this 12th day of March, 2021.

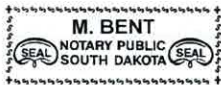


Continental Casualty Company
National Fire Insurance Company of Hartford
American Casualty Company of Reading, Pennsylvania

Paul T. Bruflat Vice President

State of South Dakota, County of Minnehaha, ss:

On this 12th day of March, 2021, before me personally came Paul T. Bruflat to me known, who, being by me duly sworn, did depose and say: that he resides in the City of Sioux Falls, State of South Dakota; that he is a Vice President of Continental Casualty Company, an Illinois insurance company, National Fire Insurance Company of Hartford, an Illinois insurance company, and American Casualty Company of Reading, Pennsylvania, a Pennsylvania insurance company described in and which executed the above instrument; that he knows the seals of said insurance companies; that the seals affixed to the said instrument are such corporate seals; that they were so affixed pursuant to authority given by the Boards of Directors of said insurance companies and that he signed his name thereto pursuant to like authority, and acknowledges same to be the act and deed of said insurance companies.



My Commission Expires March 2, 2026

M. Bent Notary Public

CERTIFICATE

I, D. Johnson, Assistant Secretary of Continental Casualty Company, an Illinois insurance company, National Fire Insurance Company of Hartford, an Illinois insurance company, and American Casualty Company of Reading, Pennsylvania, a Pennsylvania insurance company do hereby certify that the Power of Attorney herein above set forth is still in force, and further certify that the By-Law and Resolution of the Board of Directors of the insurance companies printed on the reverse hereof is still in force. In testimony whereof I have hereunto subscribed my name and affixed the seal of the said insurance companies this 20th day of April, 2021.



Continental Casualty Company
National Fire Insurance Company of Hartford
American Casualty Company of Reading, Pennsylvania

D. Johnson Assistant Secretary

Form F6853-4/2012

SECTION BQS

BIDDER QUALIFICATION STATEMENT

SECTION BQS

ALL BIDDERS ARE NOTIFIED THAT THE FOLLOWING QUALIFICATION STATEMENT MUST BE COMPLETED AND SUBMITTED WITH THE BID PROPOSAL

CONTRACTOR'S QUALIFICATIONS

The Contractor shall show that he has experience with similar projects that require working on water and sanitary sewer projects, working in confined areas and with electrical equipment in close proximity to many physical features (such as: fences, carports, utility poles, guy lines, gas lines and meters, water lines, sewer manholes and cleanouts, etc.) which will require the Contractor to plan his work efforts and equipment needs with these limitations in mind. The Contractor shall submit a complete list of ALL Municipal and Similar Non-Municipal current and completed projects for the past three (3) years for review. This list shall include the names of supervisors and type of equipment used to perform this work. [ATTACHED](#)

[Schedule A,B & C](#)

BIDDERS QUALIFICATION STATEMENT

PUBLIC WORKS AND ENGINEERING DEPARTMENT BID NUMBER 21-53, ADDISON KELLWAY LIFT STATION BY-PASS

Contractor: Rey-Mar Construction

Indicate One: Sole Proprietor X Partnership Other
 Corporation Joint Venture

Name: David Martinez Partner: Oscar Martinez

Title: General Partner Title: Partner

Address: 3416 Reed Street Address: 3416 Reed Street

City: Fort Worth City: Fort Worth

State & Zip: TX, 76119 State & Zip: TX, 76119

Phone: 817-938-3537 Phone: 817-999-2364

State and Date of Incorporation, Partnership, Ownership, Etc. Partnership

Location of Principal Office: 3416 Reed Street Fort Worth, TX 76119

Contact and Phone at Principal Office: David Martinez 817-535-3451

Liability Insurance Provider and Limits of Coverage: Box Insurance Agency / Liberty Mutual / Travelers

Workers Compensation Insurance Provider: Texas Mutual

Surety (Performance and Payment): CNA

Address: 333 South Wabash, Chicago, IL 60604

Contact and Phone: Roger Bales / 214-532-7363

Superintendent and Backup Superintendent: (Work Resume - attach additional sheets.) (Safety Record – attached additional sheets; if needed show all verified safety violations.) The superintendent shall be able to communicate in English and not operate any equipment and have not had any verified job safety violations in the past five years. Any variations shall be reviewed by the OWNER for approval or denial. A job site shall be shut down if proper supervision is not provided.

Superintendent Name

Jeff Nealy

Backup Superintendent Name

Israel Arredondo

Safety Record – List ALL Verified Violations for Superintendent and Backup Superintendent with explanation, date and action taken to correct future safety violations:

Superintendent

Jeff Nealy - 0

Backup Superintendent

Israel Arredondo - 0

Total Number of Employees to be Associated with this Job: 6

Managerial 1 Administrative 1 Professional

Skilled 2 Semi-Skilled 2 Other

Percentage of work to be done by Bidder's Employees (Based on Dollars Bid): 92%

Type(s) of work to be done by Bidder's Employees (examples: concrete paving, structural concrete, waterlines, sanitary sewer lines, storm pipe, storm inlets, excavation, lime, bridge fencing, etc.)

demo, by-pass, mechanical, underground, excavation, trench safety, utility, & erosion control

Access to Tools and Equipment: Percent Owned 90% Percent Rented 10%

Number of Years in Business as a Contractor on Above Types of Works: 30 years

Type(s) of Work to be done by Sub-Contractors

Include Name, Address, and Phone Number of Sub-Contractor.

Use additional sheets if needed.

Type of Work	Sub-Contractor
<u>electrical</u>	<u>H&H Electrical</u>
<u>wall coring</u>	<u>TBD</u>
<u>I&C</u>	<u>Prime Controls</u>
<u>Trench Safety Plan</u>	<u>TBD</u>

List Equipment to be used on this project (Make/Model/Age of Major Equipment) Any Equipment not listed shall be reviewed by the OWNER for approval or rejection prior to use of Equipment on this project. (Use additional sheets if necessary)

Type of Equipment	Make	Model	Age (years)
<u>CAT 349EL</u>	<u>2017</u>	<u>CAT</u>	<u>5</u>
<u>CAT 950GC</u>	<u>2019</u>	<u>CAT</u>	<u>3</u>
<u>CAT 279</u>	<u>2018</u>	<u>CAT</u>	<u>4</u>

List of ALL Municipal and Similar Non-Municipal current and completed projects for the past three (3) years. (Use additional sheets if necessary.) ATTACHED Schedule A & B with more details

1. Project: Travis Ranch 3F

Current Status: Ongoing

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: NO

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: NO

Project Description: New Lift Station

Owner/Agency: Kaufman County MUD #7 / DR Horton

Year Built: 2021 Contract Price: 628,863.00

Contact Person: Matt Lee Phone: 214-556-6910

2. Project: Linden Hills Lift Station

Current Status: Ongoing

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: NO

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: NO

Project Description: New Lift Station & Force Main

Owner/Agency: Mustang SUD

Year Built: 2021 Contract Price: 869,830.00

Contact Person: Justin Christ Phone: 469-587-5383

3. Project: Big Sky Lift Station

Current Status: Ongoing

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: NO

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: NO

Project Description: New Lift Station

Owner/Agency: LGI/Krum TX

Year Built: 2021 Contract Price: 1,047,000.00

Contact Person: Ted Nelson Phone: 210-621-5174

4. Project: Bridgewater Lift Station

Current Status: Ongoing

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: NO

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: NO

Project Description: New Lift Station

Owner/Agency: Princeton TX / Lennar Homes

Year Built: 2021 Contract Price: 3,686,590.00

Contact Person: Todd Hensley Phone: 972-731-3803

5. Project: Grove Creek Lift Station

Current Status: Completed

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: NO

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: NO

Project Description: Installation of new lift station while existing lift station remained in service - by-pass pump the master station & bring new online

Owner/Agency: Waxahachie TX

Year Built: 2020 Contract Price: 2,011,700.00

Contact Person: Andrew Mata Phone: 214-361-7900

6. Project: Hickory Creek Lift Station

Current Status: Ongoing

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: NO

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: NO

Project Description: Installation of new lift station while existing lift station remained in service - by-pass pump the master station & bring new online

Owner/Agency: Denton TX

Year Built: 2021 Contract Price: 3,418,000.00

Contact Person: Scott Hardy Phone: 940-349-7100

7. Project: Wellington Lift Station

Current Status: Completed

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: NO

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: NO

Project Description: Demo old lift station & commission new lift station into service

Owner/Agency: Wellington Place Apartments

Year Built: 2021 Contract Price: 701,820.96

Contact Person: Juan Vasquez Phone: 972-278-2948

8. Project: Arlington Lift Station

Current Status: Completed

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: NO

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: NO

Project Description: Rehab old lift station (2) for coatings, odor control units, & pumps

Owner/Agency: Arlington TX

Year Built: 2019 Contract Price: 972,087.14

Contact Person: Tyler Kay Phone: 817-339-2241

9. Project: Rock Creek Lift Station

Current Status: Completed

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: NO

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: NO

Project Description: New Lift Station

Owner/Agency: Fort Worth TX

Year Built: 2019 Contract Price: 1,419,049.40

Contact Person: Eddie Eckart Phone: 817-329-4373

10. Project: Pecan Square Lift Station & WWTP

Current Status: Completed

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: NO

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: NO

Project Description: New Lift Station & WWTP

Owner/Agency: Northlake TX

Year Built: 2018 Contract Price: 1,771,127.63

Contact Person: Will Bowman Phone: 817-900-8529

Trade references (List Company, Address, Contact Person, and Phone):

Fortiline Waterworks / Blake Wegener / 214-918-9379

Sun State Rentals / Sam Muff / 682-309-0268

Core & Main / Chad Lorang / 972-635-2722

Bank References (List Institution, Address, Contact Person, and Phone)

BB&T / Amir Timani / 817-585-2465

BB&T /

Claims and Suits (if the answer to any of the following questions is yes, please attached details):

1. Has your organization ever failed to complete any work awarded to it? NO

2. Are there any judgments, claims, arbitration proceedings, or suits pending or outstanding

against your organization or officers? NO

3. Has your organization filed any lawsuits or requested arbitration with regard to construction contracts within the last five years? NO

4. Within the last five (5) years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? NO

I, David Martinez, being duly sworn deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

Date this 20th day of April, 2021.

Name of
Organization: Rey-Mar Construction

By: [Signature]

Title: General Partner

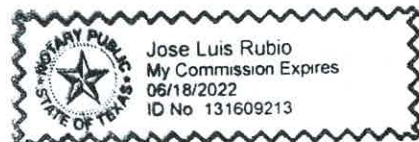
STATE OF TEXAS

COUNTY OF DALLAS

BEFORE ME the undersigned authority, on this day personally appeared _____
David Martinez, known to me to be the person whose name subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and considerations therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this 20th day of April, 2021.

[Signature]
Notary Public in and for TARRANT County, Texas



Schedule A (Ongoing)

Compl.

Name, Location, description of Project	Owner	Engineer	Developer/Contact	Date	Reference/Contact
Travis Ranch	Kaufman County MUD #7	Westwood	DR Horton/ Damon Ainsworth	7/21	Matt Lee, 214.556.6910
Linden Hills, Denton County, new lift station, Force main	Mustang SUD	Kimley-Horn	Lennar Homes/Kyle Dickerson	3/21	Chris Igo, 817.339.2258
Woodcreek, Fate Texas, Utilities, sewer, water lines installation	The 160 Fate Invest. Land	Kimley-Horn	Scarborough/Thomas Freed	3/21	Kasey Ross, 972.335.3580
Big Sky WWTP, Denton County, new WWTP	LGI	Pape-Dawson	LGI/Elaine Torres	7/21	Ted Nelson, 210.621.5174
Rhome East WWTP, Rhome, TX, expansion of exist WWTP	City of Rhome	Kimley-Horn	City of Rhome Project	8/21	Chris Vela, 817.339.2299
Big Sky Lift Station, Denton County, TX, New lift station, Force main	LGI	Pape-Dawson	LGI/Elaine Torres	3/21	Ted Nelson, 210.621.5174
Hickory Creek, City of Denton, TX, expansion of exist lift station	City of Denton	Hazen and Sawyer	City of Denton Project	4/21	Scott Hardy, 682.777.6311
Glen Rose Lift Station, Glen Rose, TX, new lift station, force main	City of Glen Rose	EH-T	City of Glen Rose	7/21	Chris Hay, 325.6655.0191
Patriot Estates Lift Station, Venus, TX, improv. of exist lift station, force main	LGI	Pape-Dawson	LGI/Elaine Torres	6/21	Ted Nelson, 210.621.5174
Trophy Club Utilities, Trophy Club, utilities, water lines	City of Trophy Club	Halff, TBPELS #312	Town of Trophy Club	7/21	Lea Hodge, 817.764.7459
Lopez Lift Station, Royse City, Texas	Interstate Pipeline	Birkhoff, Hendricks, Carter	City of Royse City	8/21	Jerry Daniels, 214.507.1311

SCHEDULE A

CURRENT EXPERIENCE

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
Travis Ranch Lift Station	Name: Address: Telephone:	Name: Thomas Freed Company: Westwood Professional Contractor Telephone: 512-635-0388		New Lift Station Infrastructure	current	\$628,863.00
Linden Hills Lift Station	Name: Address: Telephone:	Name: Justin Christ Company: Kimley-Horn Telephone: 241-325-9696		New Lift Station Infrastructure	current	\$869,830.00
Bridgewater Lift Station	Name: Address: Telephone:	Name: Todd Hensley Company: Kimley Horn Telephone: 972-731-3803		New Lift Station Infrastructure	current	\$3'686,590.00
Hickory Creek Lift Station	Name: Address: Telephone:	Name: Cindy Alonzo Company: Hazen & Sawyer Telephone: 940-349-7100		New Lift Station Infrastructure	current	\$3'418,000.00
Grove Creek Lift Station	Name: Address: Telephone:	Name: Andrew Mata Company: Birkhoff, Hendricks & Carter, L.L.P. Telephone: 214-361-7900		New Lift Station Infrastructure	current	\$2'011,700.00
Big Sky Lift Station	Name: Address: Telephone:	Name: Ted Nelson Company: Pape - Dawson Engineering Telephone:		New Lift Station Infrastructure	current	\$1'047,000.00
Wellington Place addition	Name: Address: Telephone:	Name: Juan Vasquez Company: Vasquez Engineering Telephone: 972-278-2948		Storm water drain Infrastructure	current	\$701,820.96

SCHEDULE A

CURRENT EXPERIENCE

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
Arcadia Lift Station	Name: Address: Telephone:	Name: Company: Telephone:				
Krum Big Sky Waste Water Treatment Plant	Name: Address: Telephone:	Name: Company: LGI homes Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

Schedule B (Completed)

Name, Location, description of Project	Owner	Design Engineer	Date Complete	Amount Completed	Reference/Contact
Chisholm Springs Lift Station, Newark, TX, new lift station force main	Aqua America	Teague Nall, Perkins	11/1/20	\$ 798,000.00	Sam Knight, 817.665.7148
Wellington Lift Station, Coppell, TX, new storm lift station	Pace Realty	Vasquez Engineering	12/1/20	\$ 862,156.00	Juan Vasquez, 469.951.3526
Pecan Square WWTP & Lift Station, new lift station and WWTP	City of Northlake	Kimley Horn	8/1/19	\$ 1,771,127.00	
Williamsburg Master Lift Station, triplex lift station new construction	City of Fate, TX	Jacobs/LJA	1/1/20	\$ 1,302,455.00	Eric Ammerman, 972.316.0462
Prarie Oaks Lift Station & Force Main, Little Elm, TX	City of Little Elm, TX	Kimley Horn	3/1/18	\$ 1,522,868.00	Mike Trevino, 214.236.7171
Frisco Hill Lift Station Improvements, Little Elm, TX	City of Little Elm, TX	Pettitt Barraza	4/2/20	\$ 1,423,597.00	Jason Cork, 214.773.6013
Northlake Estates Lift Station, Northlake , TX, new lift station	City of Northlake, TX	Pettitt Barraza	4/1/18	\$ 643,820.00	Mike Trevino 214.236.7171
Grove Creek Lift Station, new lift station, Waxahachie, TX	City of Waxahachie	Birkoff, Hendricks & Ca	11/1/20	\$ 2,011,700.00	Andrew Mata, 214.361.7900



SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
Arlington Lift Station Rehabilitation	Name: Address: Telephone:	Name: Tyler Kay Company: Kimley Horn & Associates Telephone: 817-339-2241	Dec 2019	Lift Station Rehabilitation	completed	\$972,087.14
Rock Creek Lift Station	Name: Address: Telephone:	Name: Eddie Eckart Company: Goodwin & Marshall Telephone: 817-329-4373	Aug. 2018	New Lift Station	completed	\$1'419,049.40
Williams Road Pump Station	Name: Address: Telephone:	Name: Nicole Conner Company: Kennedy Jenks Telephone: 469-621-6231	Nov. 2018	New Pump Station	completed	\$1'013,881.89
Shahan Lift Station	Name: Address: Telephone:	Name: Kevin Kessler Company: Jacobs Telephone: 214-920-8106	Nov. 2018	New Lift Station	completed	\$469,535.00
Pecan Square WWTP & Lift Station	Name: Address: Telephone:	Name: Will Bowman Company: Kimley Horn & Associates Telephone: 817-9008529	Nov. 2018	WWTP & Lift Station	completed	\$1'771,127.65
Williamsburg Master Lift Station	Name: Address: Telephone:	Name: Kevin Kessler Company: Jacobs Telephone: 214-893-3173	Feb. 2018	New Triplex Lift Station	completed	\$1'302,455.11
Trophy Club High Service Pump Station	Name: Address: Telephone:	Name: Mike McMahon Company: CP&Y Telephone: 817-538-1872	Feb. 2018	Pump Station Rehab	completed	\$592,000.00

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
Parie Oaks Lift Station & Force Main	Name: Address: Telephone:	Name: Tyler Kay Company: Kimley Horn & Associates Telephone: 817-339-2241	April 2018	New Lift Station & Force Main	completed	\$1'522,868.73
Harvest Lift Station	Name: Address: Telephone:	Name: Rodney Velasquez Company: Jones - Carter Telephone: 972-265-7189	June 2018	New Lift Station	completed	\$880,488.34
Frisco Hills Lift Station	Name: Address: Telephone:	Name: Ricardo Doi Company: Petitt Barraza LLC Telephone: 214-221-9955	Sept. 2017	Lift Station & Force Main Rehab.	completed	\$1'423,597.50
North Lake Estates Lift Station	Name: Address: Telephone:	Name: Ricardo Doi Company: Petitt Barraza LLC Telephone: 214-221-9955	June 2017	New Lift Station	completed	\$643,820.08
T.W. King Elevated Storage Line Repair.	Name: Address: Telephone:	Name: Mike McMahon Company: Trophy Club Telephone: 817-538-1872	June 2017	EST emergency Line Repair	completed	\$54,805.53
Cedar Hill Lift Station	Name: Address: Telephone:	Name: Kevin Clement Company: H&H Electrical Telephone: 972-524-0205	March 2017	Lift Station Rehab	completed	\$283,788
Eastland Lift Station	Name: Address: Telephone:	Name: Scott D. Hay Company: Enprotec /Hibbs & Todd, Inc Telephone: 325-698-5560	Nov. 2016	Lift Station Rehab.	completed	\$140,377.50

EJCDC® C-451, Qualifications Statement.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies,
and American Society of Civil Engineers. All rights reserved.

Page 3 of 4

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
Torian Place Lift Station	Name: Address: Telephone:	Name: Richard E. Simpson Company: Neel-Schaffer/Cheatham Telephone: 817-870-2422	Aug. 2016	New Lift Station	completed	\$1'455,793.00
Beaver Creek Lift Station	Name: Address: Telephone:	Name: Elaine Torres Company: LGI/City of Denton Telephone: 281-362-8998	July 2016	New Lift Station & Force Main	completed	\$1'169,134.16
Paving, Drainage, Utility & improvements	Name: Address: Telephone:	Name: Haytham Hassan Company: City of Dallas Telephone: 214-651-1441	April 2016	Road Utility Improvement	completed	\$1'365,504.85
Trophy Club Water Line Relocate	Name: Address: Telephone:	Name: Jay Reissig Company: Halff Telephone: 940-597-2268	Feb. 2016	Relocate water line	completed	\$224,185.00
Valve Replacement	Name: Address: Telephone:	Name: Hunter Stevens Company: City of Richardson Telephone: 972-744-4283	Mar. 2017	Rehab- Valve replacement	completed	\$185,288.00
Paloma Creek Lift Station	Name: Address: Telephone:	Name: Jessica Lee Company: Pettitt Barraza LLC Telephone: \$696,080.00	May 2016	New Lift Station	completed	\$696,080.00
12" ss Line Repair	Name: Address: Telephone:	Name: Jason Warren Company: City of Granbury Telephone: 214-668-1746	Oct. 2016	Bypass Line Repair	completed	\$123,003.00

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
Trophy Club MUD	Name: Address: Telephone:	Name: Mike McMahon Company: City of Trophy Club Telephone: 817-538-1872	2016	Aerial crossing/ I-beam protection	completed	\$95,345.00
Trophy Club MUD	Name: Address: Telephone:	Name: Mike McMahon Company: Trophy Club Telephone: 817-538-1872	2016	14" emergency Line Stop	completed	\$62,421.00
Regency Park Booster Pump Station	Name: Address: Telephone:	Name: Todd Strouse Company: Kimley Horn & associates Telephone: 972-776-1768	2015	New pump Station	completed	\$727,887.08
Lift Station #2 Improvements	Name: Address: Telephone:	Name: Kevin R. Glover Company: The Wallace Group Telephone: 214-747-3733	2015	Gravity Sewer/ Bypass SS Line	completed	\$92,834.38
Sewer Infrastructure Improvements	Name: Address: Telephone:	Name: Scott Hay Company: Enprotec/Hibbs & Todd Telephone: 325-698-5560	2015	Rehab, existing Sewer	completed	\$184,750
Harrison Lane -Tarrant County CS0902-49-186	Name: Address: Telephone:	Name: Benjamin L. McGahey Company: HALFF Telephone: 214-346-6200	2015	Rehab Existing Storm Drain	completed	\$64,511.09
Lakeshore/120 Sanitary Sewer & Lift Station	Name: Address: Telephone:	Name: Bryan E. Sherrieb Company: Dannenbaum Engineering Telephone: \$411,085.00	2015	New Lift Station	completed	\$411,085.00

EJCDC® C-451, Qualifications Statement.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies,
and American Society of Civil Engineers. All rights reserved.

Page 3 of 4

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
Verandah Lift Station	Name: Address: Telephone:	Name: Tomas Freed Company: Westwood Professional Contractor Telephone: 512-635-0388		New Lift Station Infrastructure	Completed	\$776,543.00
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

EQUIPMENT SCHEDULE LIST Rev. 04/07/2021

EJCDC C-451 SCHEDULE C

Asset or serial number	Item description (make and model)	Location	Condition	Vendor	Years of service left
	Make Model	Main branch	good	local	5
CBZY01704	CATERPILLAR 349	ON SITE	NEW	HOLT CATERPILLAR	
M5T01065	CATERPILLAR 950	ON SITE	NEW	HOLT CATERPILLAR	
HHM00242	CATERPILLAR 303	ON SITE	GOOD	HOLT CATERPILLAR	
KCJTR00318	CATERPILLAR D6	ON SITE	NEW	HOLT CATERPILLAR	
LTE03543	CATERPILLAR 926	ON SITE	GOOD	HOLT CATERPILLAR	
PRA00508	CATERPILLAR 420	ON SITE	GOOD	HOLT CATERPILLAR	
JWJ00703	CATERPILLAR 420	ON SITE	GOOD	HOLT CATERPILLAR	
XCF00756	CATERPILLAR 323	ON SITE	GOOD	HOLT CATERPILLAR	
XCF01056	CATERPILLAR 323	ON SITE	GOOD	HOLT CATERPILLAR	
	HAM ROLLER	ON SITE	GOOD	HAMM	
FTL02568	CATERPILLAR 259	ON SITE	GOOD	HOLT CATERPILLAR	
MWD07377	CATERPILLAR 226	ON SITE	GOOD	HOLT CATERPILLAR	
TSWL03614	CATERPILLAR 938	ON SITE	GOOD	HOLT CATERPILLAR	
EMB00528	CATERPILLAR 950	ON SITE	GOOD	HOLT CATERPILLAR	
REE00346	CATERPILLAR 320EL	ON SITE	NEW	HOLT CATERPILLAR	7
0WBK01377	CATERPILLAR 320EL	ON SITE	NEW	HOLT CATERPILLAR	8
BZY01704	CATERPILLAR 336EL	ON SITE	NEW	HOLT CATERPILLAR	10
D2W00278	CATERPILLAR 316 EL	ON SITE	NEW	HOLT CATERPILLAR	7
OXFA02999	CATERPILLAR 305 CR	ON SITE	NEW	HOLT CATERPILLAR	7
LTE02021	CATERPILLAR 926	MAIN OFFICE	NEW	HOLT CATERPILLAR	
HXC03042	CATERPILLAR 924H	MAIN OFFICE	GOOD	HOLT CATERPILLAR	
JWJ01914	CATERPILLAR 420E	MAIN OFFICE	GOOD	HOLT CATERPILLAR	

H1880230	HAMM Padfoot Roller	ON SITE	NEW	HOLT CATERPILLAR	6
H1880209	HAMM Padfoot Roller	ON SITE	NEW	HOLT CATERPILLAR	7
GTL00231	CATERPILLAR 279D	MAIN OFFICE	GOOD	HOLT CATERPILLAR	7
1FDPK74P8JVA 01308	FORD F700	MAIN OFFICE	FAIR	FORD	2
NA	BUMPER PULL 24'	MAIN OFFICE	GOOD	MISC	4
NA	8X20' CONEX	MAIN OFFICE	GOOD	MISC	10
NA	8X20' CONEX	MAIN OFFICE	GOOD	MISC	10
NA	8X20' CONEX	ON SITE	GOOD	MISC	10
NA	8X20' CONEX	ON SITE	GOOD	MISC	10
NA	8X40' CONEX	ON SITE	GOOD	MISC	10
NA	8X40' CONEX	ON SITE	GOOD	MISC	10
NA	8'X20' CONEX	MAIN OFFICE	FAIR	MISC	10
NA	8'X20' CONEX	MAIN OFFICE	NEW	MISC	10
NA	8'X20' CONEX	MAIN OFFICE	NEW	MISC	10
NA	9'X40' CONEX	MAIN OFFICE	GOOD	MISC	10
1FT7W2BT8HEC 77154	2017 FORD F250	RUBIO	GOOD	FORD	
1FTFW1RG7HFB 32969	2017 F150 RAPTOR	DAVID MARTINEZ	GOOD	FORD	
1FT7W2BT8HC7 7154	2017 FORD F250	OSCAR	NEW	FORD	
1FT7W2BT9JEC 63110	2018 FORD F250	JORGE R	NEW	FORD	
1FT7W2BT8JEB 21962	2018 FORD F250	SHOP	NEW	FORD	
1FT8W3ATXBEC 29383	2011 FORD F350	JEFFS CREW	FAIR	FORD	
1FT8W3CT7DEB 18113	2013 FORD F350	TIRSO	FAIR	FORD	
1FD8W3GT5FEA 10047	2015 FORD F350	RICHEY	FAIR	FORD	
1HTWCAZR9J1 76234	2009 VAC TRUCK	YARD	GOOD	INTL	
3FDPF7564YMA 37396	2000 FORD DUMP TRUCK	YARD	GOOD	FORD	
1FT7W2BT6KEC 34391	2019 FORD F250	GABRIEL	NEW	FORD	
1FT7W2BT6KRC 34407	2019 FORD F250	JESUS	NEW	FORD	
1FT7W2BT0KEC 41773	2019 F250	PEDRO	NEW	FORD	
1FT7W2BT3KED 74852	2019 F250	ISREAL A	NEW	FORD	
1FT7W2BT6KEE 56199	2019 F250	DAVID MENA	NEW	FORD	
1FTEW1EF3HFB 13103	2017 F150	DAVID MARTINEZ	NEW	FORD	
0	LINCON WELDER	ON SITE	GOOD	LINCON	

KK046574	MILLER BOBCAT WELDER	ON SITE	GOOD	MILLER	8
004-150137	DIESEL AIR COMPRESSOR	MAIN OFFICE	FAIR	JOHN DEERE	3
0	DIESEL AIR COMPRESSOR	MAIN OFFICE	FAIR	INGROSS	4
NA	GAS POWERED AIR COMPRESSOR	MAIN OFFICE	FAIR	DELTA	4
NA	SUBMERSIBLE 7HP PUMP	MAIN OFFICE	GOOD	KSD	NA
NA	SUBMERSIBLE 10HP PUMP	MAIN OFFICE	GOOD	FLYGT	NA
NA	SUBMERSIBLE 15HP PUMP	MAIN OFFICE	GOOD	ABS	NA
NA	SUBMERSIBLE 25HP PUMP	MAIN OFFICE	GOOD	KSD	NA
NA	SUBMERSIBLE 65HP PUMP	MAIN OFFICE	NEW	KSD	NA
NA	4" TRASH PUMP	MAIN OFFICE	NEW	WACKER	6
NA	4" TRASH PUMP	MAIN OFFICE	NEW	WACKER	7
NA	3" TRASH PUMP	MAIN OFFICE	GOOD	HONDA	6
NA	3" TRASH PUMP	MAIN OFFICE	GOOD	HONDA	6
NA	3" TRASH PUMP	MAIN OFFICE	GOOD	HONDA	6
NA	3" TRASH PUMP	MAIN OFFICE	GOOD	HONDA	6
NA	2" TRASH PUMP	MAIN OFFICE	GOOD	HONDA	6
NA	2" TRASH PUMP	MAIN OFFICE	GOOD	HONDA	6
NA	5.5 HP HYDRO/TEST PUMP	MAIN OFFICE	GOOD	HONDA	10
NA	WACKER WP 1550	MAIN OFFICE	GOOD	WACKER	5
NA	WACKER BS60-4	MAIN OFFICE	GOOD	WACKER	6
NA	RAMMER COMPACTOR	ON SITE	GOOD		5
NA	RAMMER COMPACTOR	MAIN OFFICE	GOOD		5
NA	CHAMPION GENERATOR	MAIN OFFICE	FAIR	SEARS	3
NA	CHAMPION GENERATOR	MAIN OFFICE	FAIR	MISC	4
NA	CHAMPION GENERATOR	MAIN OFFICE	FAIR	MISC	0
NA	CHAMPION GENERATOR	MAIN OFFICE	FAIR	MISC	0
NA	GENERATOR	MAIN OFFICE	FAIR	MISC	5
NA	GENERATOR	MAIN OFFICE	FAIR	MISC	5
NA	GENERATOR	MAIN OFFICE	FAIR	MISC	5
NA	INGERSOLL-RAND	MAIN OFFICE	GOOD	SEARS	5
NA	STEHL 460	MAIN OFFICE	GOOD	STEHL	3
NA	STEHL 410	MAIN OFFICE	NEW	STEHL	2
NA	STEHL 420	ON SITE	NEW	STEHL	3
NA	STEHL 420	ON SITE	NEW	STEHL	4
NA	STEHL 421	ON SITE	NEW	STEHL	5

NA	STEHL 422	ON SITE	NEW	STEHL	6
NA	STEHL 420	ON SITE	GOOD	STEHL	5
NA	STEHL 420	ON SITE	GOOD	STEHL	6
NA	STEHL 18" CHAIN SAW	MAIN OFFICE	GOOD	STEHL	4
NA	MUELLER TAP MACHINE (1.5"-2")	MAIN OFFICE	GOOD	MUELLER	10
NA	MUELLER TAP MACHINE (1"-3/4")	MAIN OFFICE	GOOD	MUELLER	10
5LCLB2029F103 5136	2015 KEARNY 20 FT	MAIN OFFICE	FAIR	KEARNY	
5UTGN3225HM0 06087	2017 TIGER 32FT GN	MAIN OFFICE	GOOD	TIGER	304
N/A	1900 UT 18 FT	MAIN OFFICE	GOOD	HOME MADE	302
44ZSA5816ET01 5863	2014 LAWH 10FT	MAIN OFFICE	GOOD	LAWH	306
5UTBU202XKM0 15661	2019 TIGER 20FT PB	MAIN OFFICE	GOOD	TIGER	
5VWGC3233L6 008389	2020 DELCO 32FT	MAIN OFFICE	GOOD	DELCO	
14006	2003 HMDE 8FT	MAIN OFFICE	GOOD	HMDE	
5R8BD142XJM0 58201	2018 MAXX DUMP TRA	MAIN OFFICE	GOOD	MAXX	305
5UTB1829KM01 6993	2019 TIGER 16FT FB	MAIN OFFICE	GOOD	TIGER	
5VUTW132XHP0 00250	2017 WYLI WATER TRAILER	MAIN OFFICE	GOOD	WYLI	
17XFG1620A10 02846	2010 TXBR WATER TRAILER	MAIN OFFICE	GOOD	TXBR	308
1345425N	4" PULL BEHIND PUMP	MAIN OFFICE	GOOD	GREEN	
159049	G50/38 WACKER	MAIN OFFICE	GOOD	WACKER	
NA	45 MAGNUM GEN	MAIN OFFICE	GOOD	MAGNUM	
306417	35 MAGNUM GEN	MAIN OFFICE	GOOD	MAGNUM	
112461	35 MAGNUM GEN	MAIN OFFICE	GOOD	MAGNUM	
NA	MILWAKEE CORE MACHINE	MAIN OFFICE	GOOD	HD	5
NA	MILWAKEE CORE MACHINE	MAIN OFFICE	GOOD	HD	6
NA	SPECTRA PIPE LASER	MAIN OFFICE	GOOD	SPECTRA PRECISION	6
NA	PIPE LASER	MAIN OFFICE	GOOD	MISC	10
NA	8'X8'X16' TRENCH BOX	MAIN OFFICE	GOOD	U.S. SHORING	7
NA	8'X8'X8' TRENCH BOX	MAIN OFFICE	GOOD	U.S. SHORING	10
NA	8'X8'X12' TRENCH BOX	MAIN OFFICE	GOOD	U.S. SHORING	10
NA	8'X8'X12' TRENCH BOX	MAIN OFFICE	GOOD	U.S. SHORING	10
NA	8'X8'X10' TRENCH BOX	MAIN OFFICE	GOOD	U.S. SHORING	10
NA	HYDROLIC PIPE CUTTER	MAIN OFFICE	GOOD	NATION WATERWORKS	5
NA	RIGID PIPE CUTTER (6"-8")	MAIN OFFICE	GOOD	NATION WATERWORKS	5
NA	RIGID PIPE CUTTER (10"-12")	MAIN OFFICE	GOOD	NATION WATERWORKS	5
NA	4000 GAL FUEL TANK	MAIN OFFICE	GOOD	MISC	10

NA	1000 GAL FUEL TANK	MAIN OFFICE	GOOD	REEDER DIST.	5
NA	750 GAL FUEL TANK	MAIN OFFICE	GOOD	REEDER DIST.	6
NA	500 GAL FUEL TANK	MAIN OFFICE	GOOD	REEDER DIST.	5
NA	100 GAL FUEL TANK	MAIN OFFICE	GOOD	REEDER DIST.	5
NA	100 GAL FUEL TANK	MAIN OFFICE	GOOD	REEDER DIST.	5
NA	100 GAL FUEL TANK	MAIN OFFICE	GOOD	REEDER DIST.	5
NA	100 GAL FUEL TANK	MAIN OFFICE	GOOD	REEDER DIST.	5
NA	100 GAL FUEL TANK	MAIN OFFICE	GOOD	REEDER DIST.	5
95110583	TARGET PRO-40 III	MAIN OFFICE	FAIR	MISC	6
NA	GAS DETECTOR	MAIN OFFICE	GOOD	MISC	6
NA	GAS DETECTOR	MAIN OFFICE	NEW	UNITED RENT	7
NA	GAS DETECTOR	MAIN OFFICE	NEW	UNITED RENT	8
NA	2" RIGID PIPE THREADER	MAIN OFFICE	GOOD	MISC	3
NA	SAMSUNG LAPTOP	MAIN OFFICE	GOOD	WALMART	7
NA	DELL DESK TOP	MAIN OFFICE	NEW	DELL	5
NA	DELL DESK TOP	MAIN OFFICE	NEW	DELL	6
NA	DELL DESK TOP	MAIN OFFICE	NEW	DELL	7
NA	MAC DESK TOP	MAIN OFFICE	NEW	MAC	8
NA	MISC TOOLS	MAIN OFFICE	VARIES	MISC	10
NA	50 GAL FUEL TANK	MAIN OFFICE	GOOD	MISC	10
NA	50 GAL FUEL TANK	MAIN OFFICE	GOOD	MISC	10
NA	50 GAL FUEL TANK	MAIN OFFICE	GOOD	MISC	10
NA	90 LBS JACK HAMMER	MAIN OFFICE	GOOD	MISC	10
NA	60 LBS JACK HAMMER	MAIN OFFICE	GOOD	MISC	10
NA	30 LBS JACK HAMMER	MAIN OFFICE	GOOD	MISC	10
NA	15 LBS RIVET BUSTER	MAIN OFFICE	GOOD	MISC	10
NA	15 LBS RIVET BUSTER	MAIN OFFICE	GOOD	MISC	10
NA	15 LBS RIVET BUSTER	MAIN OFFICE	GOOD	MISC	10
NA	JOB BOX - JOBOX	MAIN OFFICE	GOOD	MISC	10
NA	PORTACABLE BAND SAW	MAIN OFFICE	GOOD	MISC	10
NA	BAND SAW	MAIN OFFICE	GOOD	MISC	10
NA	MH BLOWER	MAIN OFFICE	GOOD	MISC	10
NA	ELECT. AIR COMPRESSOR	MAIN OFFICE	GOOD	MISC	10
NA	ELECT. AIR COMPRESSOR	MAIN OFFICE	GOOD	MISC	10
NA	ELECT. AIR COMPRESSOR	MAIN OFFICE	GOOD	MISC	10

NA	ELECT. AIR COMPRESSOR	MAIN OFFICE	GOOD	MISC	10
NA	ELECT. AIR COMPRESSOR	MAIN OFFICE	GOOD	MISC	0
NA	ELECT. AIR COMPRESSOR	MAIN OFFICE	GOOD	MISC	0
NA	ELECT. AIR COMPRESSOR	MAIN OFFICE	GOOD	MISC	0
NA	2' SUBM. PUMP	MAIN OFFICE	GOOD	MISC	10
NA	MISC HAND TOOLS	MAIN OFFICE	FAIR	MISC	10
NA	ELECT. IMPACT DRIVER	MAIN OFFICE	GOOD	MISC	5
NA	HAMMER DRILL SDS PLUS	MAIN OFFICE	GOOD	MISC	5
NA	HAMMER DRILL SDS PLUS	MAIN OFFICE	GOOD	MISC	5
NA	HAMMER DRILL SDS PLUS	MAIN OFFICE	GOOD	MISC	5
NA	HAMMER DRILL SDS PLUS	MAIN OFFICE	GOOD	MISC	5
NA	1/2" DRIVE ELECT. DRILL	MIAN OFFICE	GOOD	MISC	5
NA	3/8" DRIVE ELECT DRILL	MAIN OFFICE	GOOD	MISC	5
NA	COOPER FLARING TOOLS 3/4", 1", 1-1/4" 1-1/2" 2"	MAIN OFFICE	GOOD	MISC	5
NA	COOPER CLAMP 3/4' TO 1"	MAIN OFFICE	GOOD	MISC	10
NA	COOPER CLAMP 1-1/2" TO 2"	MAIN OFFICE	GOOD	MISC	10
1402863	TRI POD SPOT LIGHT	MAIN OFFICE	GOOD	MISC	10
1402860	TRI POD SPOT LIGHT	MAIIN OFFICE	GOOD	MISC	10
49170	WATER WAGON	MAIN OFFICE	GOOD		
10610110	WATER WAGON	ON SITE	GOOD		
0	WATER WAGON	ON SITE	GOOD		
1DY3823	WAL BEHIND ROLLER	ON SITE	GOOD	KUBTA	
	WALK BEHIND ROLLER	ON SITE	GOOD		
NA	SURVEY ASSC.	MAIN OFFICE	GOOD	MISC	10
NA	MISC BARRICADES	MAIN OFFICE	FAIR	MISC	10
NA	SKILL SAW ELECT.	MAIN OFFICE	GOOD	MISC	3
NA	SKILL SAW ELECT.	MAIN OFFICE	GOOD	MISC	3

Request for Taxpayer Identification Number and Certification

Give Form to the
requester. Do not
send to the IRS.

► Go to www.irs.gov/FormW9 for instructions and the latest information.

Print or type.
See Specific Instructions on page 3.

1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.

Rey-Mar Construction

2 Business name/disregarded entity name, if different from above

3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only **one** of the following seven boxes.

☐ Individual/sole proprietor or single-member LLC

☐ C Corporation

☐ S Corporation

☒ Partnership

☐ Trust/estate

☐ Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ►

Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is **not** disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner.

☐ Other (see instructions) ►

4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):

Exempt payee code (if any) _____

Exemption from FATCA reporting code (if any) _____

(Applies to accounts maintained outside the U.S.)

5 Address (number, street, and apt. or suite no.) See instructions.

3416 Reed Street

6 City, state, and ZIP code

Fort Worth TX 76119

7 List account number(s) here (optional)

Requester's name and address (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

Note: If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

Social security number

____ - ____ - ____

or

Employer identification number

4 6 - 0 7 1 4 2 9 5

Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign
Here

Signature of
U.S. person ►

Date ►

4-19-2021

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to www.irs.gov/FormW9.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)

- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, later.

By signing the filled-out form, you:

1. Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
2. Certify that you are not subject to backup withholding, or
3. Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and
4. Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting*, later, for further information.

Note: If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien;
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;
- An estate (other than a foreign estate); or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States.

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity;
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust; and
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Pub. 515, *Withholding of Tax on Nonresident Aliens and Foreign Entities*).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items.

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.
2. The treaty article addressing the income.
3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.
4. The type and amount of income that qualifies for the exemption from tax.
5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

Backup Withholding

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 24% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,
2. You do not certify your TIN when required (see the instructions for Part II for details),
3. The IRS tells the requester that you furnished an incorrect TIN,
4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or
5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code*, later, and the separate Instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships*, earlier.

What is FATCA Reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code*, later, and the Instructions for the Requester of Form W-9 for more information.

Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account; for example, if the grantor of a grantor trust dies.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of \$50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a \$500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account (other than an account maintained by a foreign financial institution (FFI)), list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9. If you are providing Form W-9 to an FFI to document a joint account, each holder of the account that is a U.S. person must provide a Form W-9.

a. **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

Note: ITIN applicant: Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040/1040A/1040EZ you filed with your application.

b. **Sole proprietor or single-member LLC.** Enter your individual name as shown on your 1040/1040A/1040EZ on line 1. You may enter your business, trade, or "doing business as" (DBA) name on line 2.

c. **Partnership, LLC that is not a single-member LLC, C corporation, or S corporation.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

d. **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on line 2.

e. **Disregarded entity.** For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a "disregarded entity." See Regulations section 301.7701-2(c)(2)(iii). Enter the owner's name on line 1. The name of the entity entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2, "Business name/disregarded entity name." If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

Line 2

If you have a business name, trade name, DBA name, or disregarded entity name, you may enter it on line 2.

Line 3

Check the appropriate box on line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box on line 3.

IF the entity/person on line 1 is a(n) . . .	THEN check the box for . . .
• Corporation	Corporation
• Individual • Sole proprietorship, or • Single-member limited liability company (LLC) owned by an individual and disregarded for U.S. federal tax purposes.	Individual/sole proprietor or single-member LLC
• LLC treated as a partnership for U.S. federal tax purposes, • LLC that has filed Form 8832 or 2553 to be taxed as a corporation, or • LLC that is disregarded as an entity separate from its owner but the owner is another LLC that is not disregarded for U.S. federal tax purposes.	Limited liability company and enter the appropriate tax classification. (P= Partnership; C= C corporation; or S= S corporation)
• Partnership	Partnership
• Trust/estate	Trust/estate

Line 4, Exemptions

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space on line 4 any code(s) that may apply to you.

Exempt payee code.

- Generally, individuals (including sole proprietors) are not exempt from backup withholding.
- Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.
- Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.
- Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space in line 4.

- 1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)
- 2—The United States or any of its agencies or instrumentalities
- 3—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities
- 4—A foreign government or any of its political subdivisions, agencies, or instrumentalities
- 5—A corporation
- 6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession
- 7—A futures commission merchant registered with the Commodity Futures Trading Commission
- 8—A real estate investment trust
- 9—An entity registered at all times during the tax year under the Investment Company Act of 1940
- 10—A common trust fund operated by a bank under section 584(a)
- 11—A financial institution
- 12—A middleman known in the investment community as a nominee or custodian
- 13—A trust exempt from tax under section 664 or described in section 4947

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 7
Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 4
Payments over \$600 required to be reported and direct sales over \$5,000 ¹	Generally, exempt payees 1 through 5 ²
Payments made in settlement of payment card or third party network transactions	Exempt payees 1 through 4

¹ See Form 1099-MISC, Miscellaneous Income, and its instructions.

² However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

Exemption from FATCA reporting code. The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) written or printed on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B—The United States or any of its agencies or instrumentalities

C—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i)

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i)

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G—A real estate investment trust

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I—A common trust fund as defined in section 584(a)

J—A bank as defined in section 581

K—A broker

L—A trust exempt from tax under section 664 or described in section 4947(a)(1)

M—A tax exempt trust under a section 403(b) plan or section 457(g) plan

Note: You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

Line 5

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns. If this address differs from the one the requester already has on file, write NEW at the top. If a new address is provided, there is still a chance the old address will be used until the payor changes your address in their records.

Line 6

Enter your city, state, and ZIP code.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN.

If you are a single-member LLC that is disregarded as an entity separate from its owner, enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note: See *What Name and Number To Give the Requester*, later, for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at www.SSA.gov. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at www.irs.gov/Businesses and clicking on Employer Identification Number (EIN) under Starting a Business. Go to www.irs.gov/Forms to view, download, or print Form W-7 and/or Form SS-4. Or, you can go to www.irs.gov/OrderForms to place an order and have Form W-7 and/or SS-4 mailed to you within 10 business days.

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note: Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if item 1, 4, or 5 below indicates otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see *Exempt payee code*, earlier.

Signature requirements. Complete the certification as indicated in items 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), ABLE accounts (under section 529A), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account) other than an account maintained by an FFI	The actual owner of the account or, if combined funds, the first individual on the account ¹
3. Two or more U.S. persons (joint account maintained by an FFI)	Each holder of the account
4. Custodial account of a minor (Uniform Gift to Minors Act)	The minor ²
5. a. The usual revocable savings trust (grantor is also trustee) b. So-called trust account that is not a legal or valid trust under state law	The grantor-trustee ¹ The actual owner ¹
6. Sole proprietorship or disregarded entity owned by an individual	The owner ³
7. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulations section 1.671-4(b)(2)(i)(A))	The grantor ⁴
For this type of account:	Give name and EIN of:
8. Disregarded entity not owned by an individual	The owner
9. A valid trust, estate, or pension trust	Legal entity ⁴
10. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
11. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
12. Partnership or multi-member LLC	The partnership
13. A broker or registered nominee	The broker or nominee

For this type of account:	Give name and EIN of:
14. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
15. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulations section 1.671-4(b)(2)(i)(B))	The trust

¹ List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

² Circle the minor's name and furnish the minor's SSN.

³ You must show your individual name and you may also enter your business or DBA name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

⁴ List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships*, earlier.

***Note:** The grantor also must provide a Form W-9 to trustee of trust.

Note: If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Secure Your Tax Records From Identity Theft

Identity theft occurs when someone uses your personal information such as your name, SSN, or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Pub. 5027, Identity Theft Information for Taxpayers.

Victims of identity theft who are experiencing economic harm or a systemic problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes. Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to phishing@irs.gov. You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at spam@uce.gov or report them at www.ftc.gov/complaint. You can contact the FTC at www.ftc.gov/idtheft or 877-IDTHEFT (877-438-4338). If you have been the victim of identity theft, see www.IdentityTheft.gov and Pub. 5027.

Visit www.irs.gov/IdentityTheft to learn more about identity theft and how to reduce your risk.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.

ADDISON KELLWAY LS BY-PASS IMPROVEMENTS BID RESULTS					
Item No.	Item	Quantity	Unit	Rey Mar Construction; Fort Worth, TX	Acadia Services, LLC, Richland Hills, TX
				Item Cost	Item Cost
1	Kellway Lift Station By-Pass Improvements: Installation of a third pump and appurtenances, installation of common suction header, installation of bypass pumping connection, installation of new pre-cast manhole, new piping and wall cores between wetwell and manholes, and electrical work.	1	LS	\$ 375,000.00	\$ 315,000.00
2	Kellway Lift Station By-Pass Pumping: Work and equipment associated with bypass pumping during construction.	1	LS	\$ 150,000.00	\$ 10,000.00
3	Electrical and Control Improvements: Modification of existing control panel for 3 pumps operation, and modification of the existing wetwells for installation of new ultrasonic level transducers	1	LS	\$ 5,500.00	\$ 125,000.00
4	Kellway Lift Station By-Pass I&C Improvements: Work performed by Prime Controls includes reprogramming and modifying the PLC panel to work with 3 pumps operation, and to provide and install Siemens Hydromangers for secondary operation of 3 pumps.	1	LS	\$ 7,500.00	\$ 10,000.00
5	Excavation Protection and Shoring: Excavation and shoring around the wetwell, wetwell connections, installation of the new manhole, existing manhole cores, and new bypass connection area.	1	LS	\$ 137,800.00	\$ 205,000.00
6	Project Sign	1	EA	\$ 2,000.00	\$ 3,500.00
7	Mobilization	1	LS	\$ 39,000.00	\$ 80,000.00
8	Bonds and Insurance	1	LS	\$ 23,300.00	\$ 50,000.00
9	Construction Contingency Allowance	1	LS	\$ 37,000.00	\$ 50,000.00
	Total Bid (Items 1-9)			\$ 777,100.00	\$ 848,500.00

\$ 777,100.00	\$ 848,500.00
----------------------	----------------------

Owner's Allowance

\$ 37,000.00 \$ 50,000.00

Competitive Sealed Proposals Scoring Sheet Summary

SCORE				
Criteria	Max Points	Rey Mar Construction	Acadia Services	Notes:
Pricing 75%	75	75.0	68.7	The Bidder submitting the lowest base price will receive the maximum allowable points. The other bidders will receive a percentage of the allowable points accordingly.
Bidder Qualifications and Proposed Staff 10%	10	10.0	0.0	The Bidder and Proposed Staff with the highest qualifications will receive the maximum allowable points. Has the bidder worked for the Town of Addison or on similar size projects? If yes, please provide information. If no similar projects provided, a 0 score will be given.
Construction Experience 15%	15	15.0	0.0	The Bidder with the most relevant experience will receive the maximum allowable points.
Total	100	100.0	68.7	



**CONTRACT DOCUMENTS
FOR THE CONSTRUCTION OF**

**TOWN OF ADDISON, TX
KELLWAY LIFT STATION BY-PASS**

Client Project # 2021-03C

**PUBLIC WORKS AND ENGINEERING DEPARTMENT
BID NUMBER 21-53**

VOLUME 1 OF 2

MARCH 2021

PREPARED BY



**3010 Gaylord Parkway
Suite 190
Dallas, Texas 75034
(972) 377-7480**



TOWN OF ADDISON, TEXAS

MAYOR

Joe Chow

COUNCIL MEMBERS

Paul Walden

Tom Braun

Ivan Hughes

Guillermo Quintanilla

Lori Ward

Marlin Willesen

CITY MANAGER

Wesley Pierson

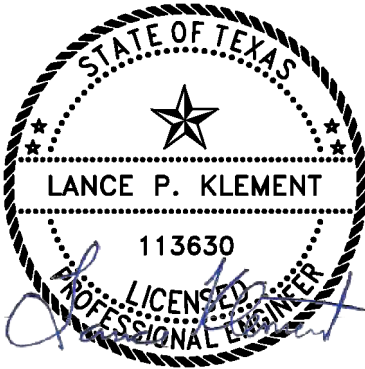
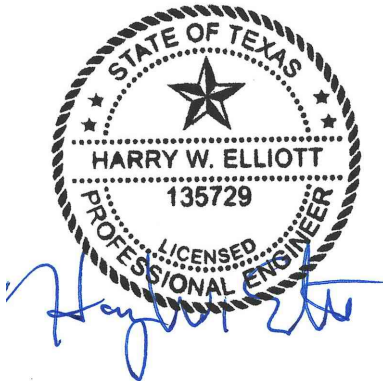
DIRECTOR OF PUBLIC WORKS AND ENGINEERING

Shannon Hicks, P.E.



CERTIFICATIONS

KELLWAY LIFT STATION BY-PASS PROJECT GARVER PROJECT NO. 20W05015

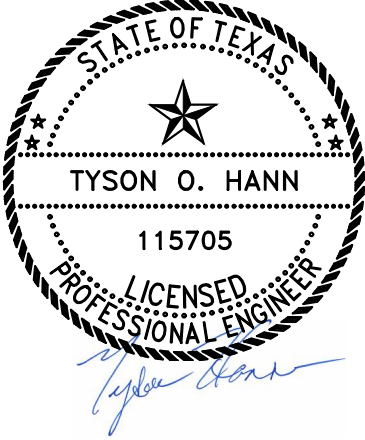
I hereby certify that the applicable portions of this project plans and specifications were prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the laws of the State of TX.

SEAL AND SIGNATURE	APPLICABLE DIVISION OR PROJECT RESPONSIBILITY
<p>Lance Klement, P.E No 113630</p>  <p>Digitally Signed 3/15/2021</p>	<p>Division 00 – Front Ends Division 01 – General Requirements</p>
<p>Harry Elliott, P.E. No. 135729</p>  <p>Digitally Signed 03/15/2021</p>	<p>Division 03 – Concrete</p>

CERTIFICATIONS

SEAL AND SIGNATURE	APPLICABLE DIVISION OR PROJECT RESPONSIBILITY
<p style="text-align: center;">Brian Chong, P.E. No. 108528</p> <div style="text-align: center;">  <p>Digitally Signed 3/15/2021</p> </div>	<p>Division 26 - Electrical</p>
<p style="text-align: center;">Stephen Mobley, P.E. No. 117365</p> <div style="text-align: center;">  </div>	<p>Division 31 – Earthwork Division 32 – Exterior Improvements</p>

CERTIFICATIONS

SEAL AND SIGNATURE	APPLICABLE DIVISION OR PROJECT RESPONSIBILITY
<p style="text-align: center;">Tyson Hann, P.E. No. 115705</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Digitally Signed 03/15/2021</p>	<p>Division 02 – Existing Conditions Division 09 – Finishes Division 22 – Plumbing Division 33 – Utilities Division 40 – Process Integration Division 44 – Pollution Control Equipment</p>

GARVER, LLC CERTIFICATE OF AUTHORIZATION:
<p>TX ENGINEERING FIRM REGISTRATION NO. F-5713</p> <p>Expiration Date: 1/31/2022</p>

**KELLWAY LIFT STATION BY-PASS PROJECT
TABLE OF CONTENTS**

**VOLUME 1 OF 2
CONTRACT DOCUMENTS**

DIVISION 00 – BIDDING AND CONTRACTING REQUIREMENTS

Section C	Certifications
Section ToC	Table of Contents
Section AB	Advertisement for Bids
Section IB	Instructions to Bidders
Section IIF	Information and Instruction Form
Section PF	Proposal Form
Section BB	Bid Bond
Section BQS	Bidder Qualification Statement
Section CA	Contract Agreement
Section PrB	Performance Bond
Section PyB	Payment Bond
Section MB	Maintenance Bond
Section BP	Contractor's Affidavit of Bills Paid
Section GP	General Provisions
Standard Specifications for Public Works Construction – North Central Texas (5 th Edition, 2017)	
Section GTC	Town of Addison General Terms and Conditions
Section SP	Special Provisions
	Indemnification Agreement (Provided in Special Provisions)
Section IS	Additional Insurance Requirements, Town of Addison

**VOLUME 2 OF 2
GENERAL REQUIREMENTS AND TECHNICAL SPECIFICATIONS**

DIVISION 01 - GENERAL REQUIREMENTS

01 11 00	SUMMARY OF WORK
01 11 60	PROJECT MANUAL LANGUAGE
01 14 00	WORK RESTRICTIONS
01 26 00	CONTRACT MODIFICATION PROCEDURES
01 29 00	PAYMENT PROCEDURES
01 31 00	PROJECT MANAGEMENT AND COORDINATION
01 31 19	PROJECT MEETINGS
01 32 00	CONSTRUCTION PROGRESS DOCUMENTATION
01 32 90	SAFETY PLAN
01 33 00	SUBMITTAL PROCEDURES
01 34 00	PHOTOGRAPHIC AND VIDEOGRAPHIC DOCUMENTATION
01 41 00	REGULATORY REQUIREMENTS
01 42 00	REFERENCES
01 42 40	ABBREVIATIONS
01 45 00	QUALITY CONTROL
01 45 24	SPECIAL TESTS AND INSPECTIONS
01 50 00	TEMPORARY FACILITIES AND CONTROLS
01 60 00	PRODUCT REQUIREMENTS
01 72 20	FIELD ENGINEERING
01 73 20	CUTTING AND PATCHING
01 75 60	TESTING, TRAINING, AND FACILITY START-UP
01 77 00	CLOSEOUT PROCEDURES

01 78 23	OPERATION AND MAINTENANCE DATA
01 79 00	DEMONSTRATION AND TRAINING
01 79 00.1	MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION
01 79 00.2	UNIT PROCESS STARTUP FORM
01 79 00.3	FACILITY PERFORMANCE DEMONSTRATION/CERTIFICATION FORM
01 80 01	COMMISSIONING
01 81 00	PROJECT DESIGN CRITERIA
01 81 02	SEISMIC DESIGN CRITERIA

DIVISION 02 - EXISTING CONDITIONS

02 41 00	DEMOLITION
----------	------------

DIVISION 03 - CONCRETE

03 01 00	CONCRETE SURFACE REPAIR
03 15 00	CONCRETE ACCESSORIES
03 30 00	CAST-IN-PLACE CONCRETE
03 60 00	GROUT
03 60 00.1	GROUT SUPPLEMENT

DIVISION 09 - FINISHES

09 90 00	PAINTING AND PROTECTIVE COATINGS
09 97 26.13	INTERIOR COATINGS
09 97 26.23	EXTERIOR COATINGS

DIVISION 22 - PLUMBING

22 05 29	PROCESS SUPPORTS AND ANCHORS
22 05 53	MECHANICAL IDENTIFICATION

DIVISION 26 - ELECTRICAL

26 05 00	COMMON WORK RESULTS FOR ELECTRICAL
26 05 14	WIRING DEVICES
26 05 15	ELECTRIC MOTORS
26 05 19	LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
26 05 26	GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
26 05 33	RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS
26 05 33.13	PVC COATED CONDUIT
26 05 43	UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS
26 05 53	IDENTIFICATION FOR ELECTRICAL SYSTEMS
26 67 05	COMMUNICATION CABLE AND EQUIPMENT
26 90 00	GENERAL INSTRUMENTATION AND CONTROL
26 90 10	PROCESS AND ANALYTICAL INSTRUMENTS

DIVISION 31 - EARTHWORK

31 11 00	SITE PREPARATION
31 22 13	SUBGRADE PREPARATION
31 22 19	GRADING
31 23 16	EXCAVATION
31 23 16.13	TRENCHING FOR SITE UTILITIES
31 23 16.16	TRENCHING FOR WATER AND SEWER LINES
31 23 16.20	ROCK EXCAVATION
31 23 19	DEWATERING

31 23 23.13 FILL AND BACKFILL
31 23 23.16 TRENCH BACKFILL
31 23 23.19 TRENCH BEDDING AND BACKFILL FOR WATER AND SEWER LINES
31 50 00 EXCAVATION SUPPORT SYSTEMS

DIVISION 32 - EXTERIOR IMPROVEMENTS

32 12 16 ASPHALT CONCRETE PAVEMENT
32 91 13 SODDING, SEEDING, FERTILIZING AND MULCHING

DIVISION 33 - UTILITIES

33 31 23 TESTING SANITARY SEWER SYSTEMS
33 34 13 DUCTILE IRON FORCE MAIN PIPE AND FITTINGS
33 39 13.13 PRECAST CONCRETE MANHOLES
33 41 16 DUCTILE IRON GRAVITY SEWER PIPE AND FITTINGS
33 41 19 PIPE LAYING

DIVISION 40 - PROCESS INTEGRATION

40 05 00 PIPING SYSTEMS TESTING
40 23 39 PROCESS PIPING GENERAL
40 23 39.1 PROCESS PIPING SCHEDULE
DATA SHEETS:
40 23 39.13 DUCTILE IRON PIPE AND FITTINGS
40 23 43 PROCESS VALVES
40 24 00 PROCESS PIPING SPECIALTIES

DIVISION 44 - POLLUTION AND WASTE CONTROL EQUIPMENT

44 42 56.46 VERTICAL CLOSE-COUPLED SOLIDS-HANDLING PUMPS
DATA SHEET:
44 42 56.46.1 VERTICAL CLOSE-COUPLED SOLIDS-HANDLING PUMPS

SECTION AB

ADVERTISEMENT FOR BIDS

ADVERTISEMENT FOR BIDS

1. The Town of Addison is requesting bids for the Addison Kellway Lift Station By-Pass project. **Bids will be accepted until 2:00 p.m., Tuesday, April 20th, 2021** at the Finance Building, 5350 Belt Line Rd., Dallas, Texas 75254 – Attention Purchasing Department, at which time responders' names and bids will be publicly read aloud. Late bids will not be considered. The plans, specifications, quantities, pre-bid time and date, and other information are available on www.civcastusa.com. The Town of Addison reserves the right to waive any formalities, to reject any and all bids, and to select the proposal deemed most advantageous to the Town of Addison.
2. The Contractor shall identify his bid on the outside of the envelope by writing the words **PUBLIC WORKS AND ENGINEERING DEPARTMENT BID NUMBER 21-53, ADDISON KELLWAY LIFT STATION BY-PASS PROJECT**. PAPER BIDS SHALL BE REQUIRED. Submit one original, two copies, and one electronic version (thumb drive preferred). FACSIMILIE OR EMAIL TRANSMITTALS WILL NOT BE ACCEPTED.
3. Bids shall be accompanied by a bid bond in an amount not less than five percent (5%) of the total maximum bid price payable without recourse to the Town of Addison, from a surety company licensed to do business in the State of Texas as a guarantee that the bidder will enter into a contract and execute a Performance Bond and Payment Bond within ten (10) calendar days after notice of award of contract to him.
4. Plans, specifications, and bidding documents may be downloaded from www.civcastusa.com. The Town of Addison is a "free buyer", meaning that prospective bidders need only a free registration to sign up for plan updates. Bidders assume all risk for acquiring specs and/or plans from third party sites and plan rooms, as only www.civcastusa.com will be directly updated by Addison.
5. The right is reserved by the Mayor and the City Council as the interests of the City may require to reject any or all bids and to waive any formality in bids received and to select the proposal deemed most advantageous to the City.
6. The Bidder (Proposer) must supply all the information required by the Proposal Form.
7. A Performance Bond, Payment Bond, and Maintenance Bond will be required by the Owner; each Bond shall be in the amount of 100% of the total contract amount. Bonds shall be issued by a surety company licensed by the State of Texas to act as a Surety and be listed on the current U.S. Treasury Listing of Approved Sureties.
8. The Bidder (Proposer) must supply all the information required by the Bidder Qualification Statement.
9. **An optional pre-bid meeting and site visit will be held on Tuesday, April 6th, 2021 at 11:00am at the Addison Kellway Lift Station (4245 Kellway Circle, Addison, TX 75001). All prospective bidders are encouraged to attend. CDC guidelines will be observed at all times.**
10. For information on bidding or work to be performed, please submit all questions on CIVCAST. **All questions must be received by 5:00 pm on Tuesday, April 13th, 2021. All questions received by this deadline will be answered by 5:00 pm on Thursday, April 15th, 2021.**

11. The project consists of the installation of a third vertical close-coupled solids-handling pump and associated valves, fittings, pump pedestal, and pipe supports at Kellway Lift Station. Additionally, the project will install a new manhole with connections to the lift station and existing manhole, new wall cores and valving from the lift station to the manhole, a bypass pumping connection, and common suction header between the three pumps. Bypass pumping during construction will be required.



Interested Parties

In 2015, the Texas Legislature adopted [House Bill 1295](#), which added section 2252.908 of the Government Code. The law states that a governmental entity or state agency may not enter into certain contracts with a business entity unless the business entity submits a disclosure of interested parties to the governmental entity or state agency at the time the business entity submits the signed contract to the governmental entity or state agency. The law applies only to a contract of a governmental entity or state agency that either (1) requires an action or vote by the governing body of the entity or agency before the contract may be signed or (2) has a value of at least \$1 million. The disclosure requirement applies to a contract entered into on or after January 1, 2016.

The Texas Ethics Commission was required to adopt rules necessary to implement that law, prescribe the disclosure of interested parties form, and post a copy of the form on the commission's website. The commission adopted the Certificate of Interested Parties form (Form 1295) on October 5, 2015. The commission also adopted new rules (Chapter 46) on November 30, 2015, to implement the law.

Filing Process

On January 1, 2016, the commission made available on its website a new filing application that must be used to file Form 1295. A business entity must use the application to enter the required information on Form 1295 and print a copy of the completed form, which will include a certification of filing that will contain a unique certification number. An authorized agent of the business entity must sign the printed copy of the form and have the form notarized. The completed Form 1295 with the certification of filing must be filed with the governmental body or state agency with which the business entity is entering into the contract.

The governmental entity or state agency must notify the commission, using the commission's filing application, of the receipt of the filed Form 1295 with the certification of filing not later than the 30th day after the date the contract binds all parties to the contract. The commission will post the completed Form 1295 to its website within seven business days after receiving notice from the governmental entity or state agency.

Information regarding how to use the filing application will be available on this site by January 1, 2016. https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm, please follow Instructional Video for Business Entities.

COVID-19 QUESTIONNAIRE

1. Have you experienced any of the following symptoms in the past 48 hours:

- Fever or Chills
- Cough
- Shortness of Breath or Difficulty Breathing
- Fatigue
- Muscle or Body Aches
- Headache
- New Loss of Taste or Smell
- Sore Throat
- Congestion or Runny Nose
- Nausea or Vomiting
- Diarrhea

2. Within the past 14 days, have you been in close physical contact (6 feet or closer for a cumulative total of 15 minutes) with:

- Anyone who is known to have laboratory-confirmed COVID-19?
- or
- Anyone who has any symptoms consistent with COVID-19?

3. Are you isolating or quarantining because you may have been exposed to a person with COVID-19 or are worried that you may be sick with COVID-19?

4. Are you currently waiting on the results of a COVID-19 test?

PLEASE LET THE TOWN STAFF MEMBER KNOW IF “YES” TO ANY OF THESE QUESTIONS.

SECTION IB

INSTRUCTIONS TO BIDDERS

INSTRUCTIONS TO BIDDERS

- A. PROJECT: ADDISON KELLWAY LIFT STATION BY-PASS**, in the Town of Addison. The bids will be reviewed as stated in Section "O" of these Instructions to Bidders.
- B. PROJECT DESCRIPTION:** The project consists of the installation of a third vertical close-coupled solids-handling pump and associated valves, fittings, pump pedestal, and pipe supports at Kellway Lift Station. Additionally, the project will install a new manhole with connections to the lift station and existing manhole, new wall cores and valving from the lift station to the manhole, a bypass pumping connection, and common suction header between the three pumps. Bypass pumping during construction will be required.
- C. PROPOSALS:** Proposals must be in accordance with these instructions in order to receive consideration.
- D. DOCUMENTS:** Bidding Documents include the Project Manual (consisting of the Advertisement for Bids, these Instructions to Bidders, Proposal Forms, Reference Form, Contract Agreement, Performance Bond, Payment Bond, Maintenance Bond, Contractor's Affidavit of Bills Paid, General Provisions, Special Provisions, Project Sign, Technical Specifications, Terms and Conditions, and Information and Instructions form), a Waiver of Lien, Drawings, and Addenda which may be issued by the Town of Addison during the bidding period. Bidding Documents may be viewed and/or obtained under the terms and conditions set forth in the Advertisement for Bids, Section AB of this Project Manual.
- E. EXAMINATION OF DOCUMENTS AND SITE:** Bidders shall carefully examine the Bidding Documents and the construction site to obtain firsthand knowledge of the scope and the conditions of the Work. Each Contractor, Subcontractor and Sub-subcontractor, by submitting a proposal to perform any portion of the Work, represents and warrants that he has examined the Drawings, Specifications (Project Manual) and the site of the Work, and from his own investigation has satisfied himself as to the scope, accessibility, nature and location of the Work; the character of the equipment and other facilities needed for the performance of the Work; the character and extent of other work to be performed; the local conditions; labor availability, practices and jurisdictions; and other circumstances that may affect the performance of the Work. No additional compensation will be allowed by the Owner for the failure of such Contractor, Subcontractor or Sub-subcontractor to inform himself as to conditions affecting the Work.
- F. INTERPRETATION OF DOCUMENTS:** If any person contemplating submitting a bid for the proposed Contract is in doubt as to the meaning of any part of the Drawings, Specifications (Project Manual) or other proposed Contract Documents, they may submit questions to the Town of Addison, no later than 5:00 pm on Tuesday, April 13th, 2021. All questions received by this deadline will be answered by 5:00pm on Thursday, April 15th, 2021. Bidders should act promptly and allow sufficient time for a reply to reach them before preparing their bids. Any interpretation or clarification will be in the form of an Addendum duly issued. No alleged verbal interpretation or ruling will be held binding upon the Owner.

- G. SUBSTITUTIONS:** Conditions governing the submission of substitutions for specific materials, products, equipment and processes are in the Special Provisions. Requests for substitutions must be received by the Town of Addison seven (7) calendar days prior to the established bid date.
- H. ADDENDA:** Interpretations, clarifications, additions, deletions and modifications to the Documents during the bidding period will be issued in the form of Addenda and a copy of such Addenda will be released through www.civcastusa.com. It will be the responsibility of each person who has been issued a set of bid documents to secure all Addenda from www.civcastusa.com. Addenda will be a part of the Bidding Documents and the Contract Documents, and receipt of them shall be acknowledged in the Bid Form. All such interpretations and supplemental instructions will be in the form of written addenda to the contract documents which, if issued, will be released through www.civcastusa.com not later than three (3) calendar days prior to the date fixed for the opening of bids. If any bidder fails to acknowledge the receipt of such addenda in the space provided in the bid form, his bid will nevertheless be construed as though the receipt of such addenda had been acknowledged.
- I. COMPLETION TIME:** The selected contractor shall use the time period between the awarding of the contract at Town Council and the date of Notice to Proceed to submit materials and shop drawings for approval by Garver. Garver shall review and return these submittals in the most expedient manner possible to accommodate immediate material ordering.
- a. Upon receiving Notice to Proceed, the selected contractor shall **have 120 calendar days** to construct the project and achieve substantial completion. Substantial completion for this project includes the following items:
 - i. Preliminary Punchlist walk-through with the Town performed;
 - b. After substantial completion is reached, the contractor shall have an **additional 10 calendar days** to achieve 100% final completion. Final completion for this project shall include:
 - i. Punchlist items completed and approved by the Town;
 - ii. Site clean-up;
 - iii. Submittal of Record Drawings; and
 - iv. Execution of Maintenance Bond.
- J. PREPARATION OF BIDS:** Prices quoted shall include all items of cost, expense, taxes, fees and charges incurred by, or arising out of, the performance of the work to be performed under the Contract. Bids shall be submitted in duplicate and shall be signed in ink. Any bid on other than the required form will be considered informal and may be rejected. Erasures or other changes in a bid must be explained or noted over the initials of the bidder. Bids containing any conditions, omissions, unexplained erasures and alterations, or irregularities of any kind may be rejected as informal. The prices should be expressed in words and figures or they may be deemed informal and may be rejected. In case of discrepancy between the price written in the bid and that given in the figures, the price in writing will be considered as the bid. In the case of a discrepancy between a unit price and its extension, the unit price will govern. Failure to submit all requested information will make a bid irregular and subject to rejection. Bids shall be signed with name typed or printed below signature, and, if a partnership, give full name of all partners. Where bidder is a corporation, bids must be signed with the legal name of the

corporation followed by the name of the state of incorporation and the legal signature of an officer authorized to bind the corporation to a contract.

An electronic spreadsheet is posted on CIVCAST for contractors' convenience titled, "Bid Schedule Bid 21-53." This spreadsheet may be used in lieu of the manual handwritten proposal form in the specifications and shall be attached to the proposal and made part of the contract documents. Using the spreadsheet option shall not amend or modify any wording in the proposal form or the plans, and the contractor shall be responsible for confirming that the spreadsheet adequately conveys their bid.

SUBMITTAL OF BIDS: Sealed proposals will be received at the time, date and place stated in the Advertisement for Bids. Submit one original, two copies, and one electronic version (thumb drive preferred). FACSIMILE OR EMAIL TRANSMITTALS WILL NOT BE ACCEPTED. Proposals shall be made on unaltered Proposal Forms furnished by the Town of Addison. Bidders shall submit proposals in an opaque, sealed envelope addressed to the Owner and plainly mark on the outside of the envelope the name and address of the bidder. The envelopes shall also be marked with the following project description:

PUBLIC WORKS AND ENGINEERING DEPARTMENT BID NUMBER 21-53

ADDISON KELLWAY LIFT STATION BY-PASS PROJECT

The Bid Bond must be completed and signed by each bidder and submitted with the bid. Submit Bids by mail or in person prior to the time for receiving bids set forth in the Advertisement for Bids issued by the Town.

Electronic bidding on www.civcastusa.com will not be considered for this project. The Town of Addison uses CIVCAST to distribute bids and proposals. There will be NO COST to the contractor for standard bids or proposals. **Bid number 21-53** is considered a standard bid. For Cooperative Bids and Reverse Auctions ONLY, the successful contractor/supplier agrees to pay CIVCAST a transaction fee of one percent (1%) of the total amount of all contracts for goods and/or services. Cooperative Bids and Reverse Auctions will be clearly marked on the bid documents. To assure that all contractors/suppliers are treated fairly, the fee will be payable whether the bid/proposal is submitted electronically, or by paper means. Refer to www.civcastusa.com for further information.

- K. MODIFICATION AND WITHDRAWAL OF BIDS:** Prior to the time set for bid opening, bids may be withdrawn or modified. Bids may be modified only on the official bid form and must be signed by a person legally empowered to bind the bidder. No bidder shall modify, withdraw, or cancel his bid or any part thereof for *ninety (90)* calendar days after the time agreed upon for the receipt of bids.
- L. DISQUALIFICATION:** The Owner reserves the right to disqualify proposals, before or after the opening, upon evidence of collusion with intent to defraud or other illegal practices relating to this proposal upon the part of the bidder.
- M. SUBMISSION OF POST-BID INFORMATION:** Upon notification of acceptance, the selected bidder shall, within twenty-four (24) hours, submit the following:

1. A designation of the portions of the Work proposed to be performed by the bidder with his own force.
2. A list of names of the Subcontractors or other persons or organizations, including those who are to furnish materials and equipment fabricated to a special design proposed for such portions of the Work as may be designated in the Bidding Documents or as may be requested by the Town of Addison. The bidder will be required to establish to the satisfaction of the Owner the reliability and responsibility of the proposed Subcontractors and suppliers to furnish and perform the Work.
3. Other information as required.

N. AWARD: The Owner reserves the right to accept any or to reject any bids without compensation to bidders and to waive irregularities and informalities. The Town of Addison Public Works and Engineering Department, in making its recommendation, will consider the following elements:

1. Whether the bidder is a contractor with experience in the type of work involved.
2. Whether the bidder has adequate plant, equipment and personnel to perform the work properly and expeditiously.
3. Whether the bidder has a suitable financial status and reputation for meeting obligations incident to work of the kind specified.
4. Whether the bidder has complied with the terms and conditions.

Alternate items may or may not be awarded. Addition or deletion of other items or schedules will be governed by the *Standard Specifications for Public Works Construction – North Central Texas, 5th Edition*, (hereinafter called SSPWC) Item 104.2 "Change or Modification of Contract".

O. EXECUTION OF THE CONTRACT: The successful bidder will be required to enter into a contract with the Owner within ten (10) days of notice by the Owner that his bid has been accepted. Failure to enter into a contract within the established time limit shall be considered grounds for forfeiture of the bid bond.

P. CONSTRUCTION SCHEDULE: It is the Owner's desire to have the project completed and operational in as short a time as possible. The number of calendar days for completion of the project will begin with the date specified in the Notice to Proceed. The Notice to Proceed will be issued in a manner to facilitate a smooth construction of the project. The Contractor shall begin construction within ten (10) calendar days of the issuance of the Notice to Proceed.

Q. COST PLUS TIME BIDDING: N/A

R. FORM OF CONTRACT: The contract for the construction of the project will be drawn up by the Owner. A sample form of agreement is included in the Contract Agreement Section.

S. BONDS: A Performance Bond, a Payment Bond and a Maintenance Bond will be required by the Owner. The Performance Bond and Payment Bond shall name the Town of Addison, and others as directed by the Town, as joint obligees. Sample forms have been included in the

Performance Bond, Payment Bond, and Maintenance Bond sections. (Contractor shall confirm the legal names of obligees prior to execution of Bonds.)

- T. BID SECURITY:** Bids shall be accompanied by a bid bond in an amount not less than five percent (5%) of the total maximum bid price payable without recourse to the Town of Addison, from a surety company licensed to do business in the State of Texas as a guarantee that the bidder will enter into a contract and execute a Performance Bond and Payment Bond within ten (10) calendar days after notice of award of contract to him. Such bid bonds will be returned to all except the three lowest bidders within three (3) days after the opening of bids, and the remaining bid bonds will be returned promptly after the Owner has made an award of contract, or, if no award has been made within thirty (30) calendar days after the date of the opening of bids, upon demand of the bidder at any time thereafter, so long as he has not been notified of the acceptance of his bid.
- U. RESOLUTIONS:** If the bidder is a corporation, a copy of the resolution empowering the person submitting the bid to bind the bidder must be included with the bid.
- V. CONSTRUCTION STAKING:** Construction staking and re-staking will not be provided by the Owner. There is no separate bid item for staking, therefore, the contractor must include value for staking in the various bid items as subsidiary to the contract. Any staking or re-staking that is required shall be the responsibility of the Contractor and shall be at no cost to the Owner.
- W. FINAL PAYMENT:** The general provisions for Final Payment shall be as stated in Item 109.5.4 of the SSPWC including all Amendments and Additions. Prior to final payment the Contractor shall provide the Owner with the following items:
1. A Contractor's Affidavit of Bills Paid in accordance with Section BP.
 2. A Consent of Surety Company to Final Payment.
 3. A complete set of record plans which indicate all construction variations from the original construction documents in accordance with the Special Provisions.
 4. A one (1) year Maintenance Bond in accordance with Section MB.
 5. Acknowledgement that the project has been reviewed and accepted by TDLR.
- X. PREVAILING WAGE RATES:** Wage rates paid on this project shall not be less than specified in the schedule of general prevailing rates of per diem wages as attached in the Special Provisions.
- Y. PRIORITY OF CONTRACT DOCUMENTS:** In case of conflict between contract documents, priority of interpretation shall be in the following order: signed agreement; performance and payment bonds; proposal; special provisions (or conditions); technical specifications; general provisions; advertisement for bids; project drawings; Standard Specifications for Public Works Construction (NCTCOG, November 2017); Town of Addison Standard Drawings. This priority list shall take precedence over Item 105.1.1 of the SSPWC.

SECTION IIF

INFORMATION AND INSTRUCTION FORM

INFORMATION AND INSTRUCTION FORM

RESPONSES THAT DO NOT CONTAIN THIS COMPLETED FORM MAY NOT BE COMPLIANT

SECTION I: COMPANY PROFILE

Name of Business:

Business Address:

Contact Name:

Phone#:

Fax#:

Email:

Name(s) Title of Authorized Company Officers:

Federal ID #:

DUN #:

W-9 Form:

A W-9 form will be required from the successful bidder.

Remit Address (if different than your physical address):

SECTION II: INSTRUCTIONS TO BIDDERS:

I. ELECTRONIC BIDS: The Town of Addison uses Civcast to distribute and receive bids and proposals. There will be **NO COST** to the Contractor/Supplier for Standard bids or proposals. For **Cooperative Bids and Reverse Auctions ONLY**, the successful contractor/supplier agrees to pay Civcast a transaction fee of one percent (1%) of the total amount of all contracts for goods and/or services. **Cooperative Bids and Reverse Auctions** will be clearly marked on the bid documents. To assure that all contractors/suppliers are treated fairly, the fee will be payable whether the bid/proposal is submitted electronically, or by paper means. Refer to www.civcastusa.com for further information.

II. CONTRACTOR/SUPPLIER RESPONSIBILITY: It is the contractor/suppliers responsibility to check for any addenda or questions and answers that might have been issued before bid closing date and time. Contractors/Suppliers will be notified of any addenda and Q&A if they are on the invited list, they view the bid, or add themselves to the watch list.

Acknowledgement of Addenda: #1 #2 #3 #4 #5

III. DELIVERY OF BIDS:

For delivery of paper bids our physical address is:

Town of Addison
5350 Beltline Road
Dallas, TX 75254
Attn: Purchasing Department

IV. CONTRACTOR/SUPPLIER EMPLOYEES: No Contractor/Supplier employee shall have a direct or indirect financial interest in any contract with the town or be directly or indirectly financially interested in the sale of land, materials, supplies or services to the town.

V. DELIVERIES: All deliveries will be F.O.B. Town of Addison. All Transportation Charges paid by the contractor/supplier to Destination.

VI. PAYMENT TERMS: A Prompt Payment Discount of % is offered for Payment Made Within Days of Acceptance of Goods or Services. If Prompt Payments are not offered or

accepted, payments shall be made 30 days after receipt and acceptance of goods or services or after the date of receipt of the invoice whichever is later.

VII. DELIVERY DATES: Delivery Dates are to be specified in Calendar Days from the Date of Order.

VIII. BID PRICES: Pre-Award bid prices shall remain Firm and Irrevocable for a Period of _____ Days.

IX. EXCEPTIONS:

☐ Contractor/Supplier does not take Exception to Bid Specifications or Other Requirements of this Solicitation. If neither exceptions box is checked, default shall be “No Exceptions”

☐ Contractor/Supplier take the following Exception(s) to the Bid Specifications or Other Requirements of this Solicitation (Explain in Detail). If box checked but no exceptions are listed, default shall be “No Exceptions”

X. HISTORICALLY UNDERUTILIZED BUSINESS (HUB): It is the policy of the Town of Addison to involve HUBs in the procurement of goods, equipment, services and construction projects. Prime Contractors/Suppliers are encouraged to provide HUBs the opportunity to compete for sub-contracting and other procurement opportunities. A listing of HUBs in this area may be accessed at the following State of Texas Website.
<http://www.window.state.tx.us/procurement/cmb1/cmb1hub.html>.

HUB Owned Business: ☐ Yes ☐ No

Include a current copy of your HUB certification with your response or insert Certification number _____ and expiration date _____.

XI. OTHER GOVERNMENT ENTITIES: Would bidder be willing to allow other local governmental entities to participate in this contract, if awarded under the same Terms and Conditions? ☐ Yes ☐ No

XII. BID BOND:

Is Bid Bond attached if applicable? ☐ Yes ☐ No

XIII. TERMINATION: The town at any time after issuance of this agreement, by 30 days written notice, has the absolute right to terminate this agreement for cause or convenience. Cause shall be the contractor/supplier's refusal or failure to satisfactorily perform or complete the work within the time specified, or failure to meet the specifications, quantities, quality and/or other requirements specified in the contract/purchase order. In such case the supplier shall be liable for any damages suffered by the town. If the agreement is terminated for convenience, the supplier has no further obligation under the agreement. Payment shall be made to cover the cost of material and work in process or "consigned" to the town as of the effective date of the termination.

IVX. BIDDER COMPLIANCE: Bidder agrees to comply with all conditions contained in this Information and Instruction Form and the additional terms and conditions and specifications included in this request. The undersigned hereby agrees to furnish and deliver the articles or services as specified at the prices and terms herein stated and in strict accordance with the specifications and conditions, all of which are made a part of your offer. Your offer is not subject to withdrawal after the award is made.

The Town of Addison reserves the right to reject all or part of the offer and to accept the offer considered most advantageous to the town by item or total bid.

The Town of Addison will award to the lowest responsible bidder or to the bidder who provides goods or services at the best value for the Town.

I hereby certify that all of the information provided in sections I and II are true and accurate to the best of my knowledge.

Signature:

Date:

Title:

Signature certifies no changes have been made to the content of this solicitation as provided by the Town of Addison.

3/10/21

SECTION PF-1

PROPOSAL FORM

PROPOSAL FORM

_____, 20__

TO: The Honorable Mayor and Town Council
Town of Addison, Texas

All:

The undersigned bidder, having examined the plans, specifications and contract documents, and the location of the proposed work, and being fully advised as to the extent and character of the work, proposes to furnish all equipment and to perform labor and work necessary for completion of the work described by and in accordance with the Plans, Specifications and Contract for the following prices, to wit:

Signed by: _____

ACKNOWLEDGMENT OF ADDENDA:

The Bidder acknowledges receipt of the following addenda:

Addendum No. _____ Addendum No. _____

Addendum No. _____ Addendum No. _____

Addendum No. _____ Addendum No. _____

The following pages contain all bid items for:

ADDISON KELLWAY LIFT STATION BY-PASS PROJECT
BID NUMBER 21-53

**TOWN OF ADDISON
KELLWAY LIFT STATION BY-PASS
BID NO. 21-53
UNIT PRICES**

ITEM NO.	QUANTITY	UNIT	DESCRIPTION AND PRICE IN WORDS	UNIT PRICE	TOTAL AMOUNT
----------	----------	------	--------------------------------	------------	--------------

1	1	LS	Kellway Lift Station By-Pass Improvements		
---	---	----	---	--	--

This item consists of all supervision, labor, materials, equipment, tools, incidentals and related items required for Installation of the following:

- A third pump and associated piping, valving, and appurtenances,
- Connection of pump suction lines in the existing lift station,
- Installation of a bypass pumping connection to provide direct connection to the forcemain and bypass the lift station,
- Installation of new pre-cast concrete manhole with piping between the lift station and connection between the new and existing manhole,
- Piping between the existing manhole and the lift station, including valves and new wall cores,
- Electrical work associated with level detection, installation of the third pump, and work to bring the lift station on-line.

Reference project drawing details. This item includes subgrade preparation, grading of concrete, installation of manholes, installation of piping and appurtenances, installation of pump pad and pipe supports, installation or bypass pumping connection, and road repair. Repairs to concrete roads damaged from the construction of the Project are incidental to the Project and are not included in this item. The bid price for this item will not be subject to re-negotiation due to quantity overruns or underrun limitations set forth in the general specifications. Measurement and payment will be per Unit Price as set forth in the Contract; complete and in place, the sum of

_____ DOLLARS

AND

_____ CENTS

ITEM NO.	QUANTITY	UNIT	DESCRIPTION AND PRICE IN WORDS	UNIT PRICE	TOTAL AMOUNT
2	1	LS	Kellway Lift Station By-Pass Pumping		
<p>This item consists of all supervision, labor, materials, equipment, tools, power, incidentals, and related items as required for the project, for providing bypass pumping during the construction phase of this project. This item includes all work associated with bypassing Kellway Lift Station during construction as detailed in the Contract Documents. This work includes all incidental work specified and/or shown on the drawings and specifications not included in other bid items, this includes, but is not limited to, equipment placement, rental, power connection, and all other work, labor, and materials for a complete and operational project not specifically described in other bid items. Payment will be made at the Lump Sum Price as set forth in this contract; complete and in place, the sum of</p>					
				DOLLARS	
AND				CENTS	
3	1	LS	Kellway Lift Station By-Pass Electrical and Control Improvements		
<p>This item consists of all supervision, labor, materials, equipment, tools, incidentals, and related items required for modification of the following:</p> <ul style="list-style-type: none"> • Modify existing Control Panel for 3 pumps operation. Provide and install all additional hardware to include but not limited to: 3 pumps alternator, relays, terminal blocks, lights, switches, wire, conduit, and all required hardware for a complete working system. • Modify existing lift station wet wells for installation of new ultrasonic level transducers. Provide and install new ultrasonic transducers, terminal boxes, wire, conduit, and all required hardware for a complete working system. <p>Reference project drawing details. This item includes electrical controls and control panel upgrades and work to bring the new, third pump on-line. The bid price for this item will not be subject to re-negotiation due to quantity overruns or underrun limitations set forth in the general specifications. Measurement and payment will be per Unit Price as set forth in the Contract; complete and in place, the sum of</p>					
				DOLLARS	
AND				CENTS	

4 1 LS Kellway Lift Station By-Pass I&C Improvements

This item consists of all supervision, labor, materials, equipment, tools, incidentals, and related items required for modification of the following:

- Modify existing PLC panel and reprogram existing PLC for 3 pumps operation. Provide and install relays, I/O expansion modules, terminal blocks, and all required hardware for a complete working system.
- Provide, install, and program Siemens Hydromangers for secondary operation of 3 pumps.
- Work to be performed by Prime Controls, LP.

Reference project drawing details. This item includes electrical controls and control panel upgrades and work to bring the new, third pump on-line. The bid price for this item will not be subject to re-negotiation due to quantity overruns or underrun limitations set forth in the general specifications. Measurement and payment will be per Unit Price as set forth in the Contract; complete and in place, the sum of

_____ DOLLARS
AND _____ CENTS

5 1 LS Excavation Protection and Shoring

This item consists of all supervision, labor, materials, equipment, tools, incidentals and related items required for Installation of the following:

- Excavation and shoring around the wetwell for wetwell connections, installation of new manhole, and existing manhole cores.
- Excavation and shoring around the new bypass pumping connection area.

Reference project drawing details. This item includes shoring and excavation protection for work on this lift station. Benching the excavation will not be allowed. The bid price for this item will not be subject to re-negotiation due to quantity overruns or underrun limitations set forth in the general specifications. Measurement and payment will be per Unit Price as set forth in the Contract; complete and in place, the sum of

_____ DOLLARS
AND _____ CENTS

6 1 EA Project Sign

This item consists of all supervision, labor, materials, equipment, incidentals and related items required for Installation of the project sign as detailed in specification PS – PROJECT SIGN.

Reference project specifications. This item includes construction and installation of one (1) project sign to be displayed at the construction site. The bid price for this item will not be subject to re-negotiation due to quantity overruns or underrun limitations set forth in the general specifications. Measurement and payment will be per Unit Price as set forth in the Contract; complete and in place, the sum of

_____ DOLLARS
AND _____ CENTS

7 1 LS Mobilization

This item consists of all supervision, labor, materials, equipment, incidentals and related items required for construction mobilization.

Reference project specifications. This item includes getting all equipment, sub-contractors, and contractor prepared to begin construction of this project. The bid price for this item will not be subject to re-negotiation due to quantity overruns or underrun limitations set forth in the general specifications. Measurement and payment will be per Unit Price as set forth in the Contract; complete and in place, the sum of

_____ DOLLARS
AND _____ CENTS

8 1 LS Bonds and Insurance

This item consists of all labor, and related items required for to provide performance bond, payment bond, maintenance bond, and insurance as detailed in specifications PrB – PERFORMANCE BOND, PyB – PAYMENT BOND, MB – MAINTENANCE BOND, and IS – INSURANCE REQUIREMENTS, respectively.

Reference project specifications. The bid price for this item will not be subject to re-negotiation due to quantity overruns or underrun limitations set forth in the general specifications. Measurement and payment will be per Unit Price as set forth in the Contract; complete and in place, the sum of

_____ DOLLARS
AND _____ CENTS

9 1 LS Construction Contingency Allowance

This bid item consists of up to 5% of the base-bid subtotal including items 1 through 8 to allow for contingency items during construction. Construction contingency items will consist of labor, materials, equipment, tools, incidentals, and related items as required to furnish and install equipment required for the Addison Kellway Lift Station By-Pass project, as defined in the contract documents.

Payment, for part or in full, for this item will only be made following written authorization by the Town of Addison to perform the work.

_____ DOLLARS
AND _____ CENTS

SUMMARY OF BID ITEMS AND TOTAL AMOUNT FOR AWARD EVALUATION:

ITEM NO.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL BID AMOUNT
1	Kellway Lift Station By-Pass Improvements	LS	1		
2	Lift Station Bypass Pumping	LS	1		
3	Kellway Lift Station By-Pass Electrical and Control Improvements	LS	1		
4	Kellway Lift Station By-Pass I&C Improvements	LS	1		
5	Excavation Protection and Shoring	LS	1		
6	Project Sign	EA	1		
7	Mobilization	LS	1		
8	Bond and Insurance	LS	1		
9	Construction Contingency Allowance	LS	1		
TOTAL BID PRICE IN WORDS					
OWNER'S ALLOWANCE As directed by the Owner. Written approval is required prior to start of work.					
TOTAL BID PRICE					

- NOTES:
1. All items, labor, materials, equipment, facilities, incidentals and work required for construction of the project are to be provided and installed by the Contractor as part of the project and payment for the cost of such shall be included in the price bid for the construction of the project.
 2. Prices must be shown in words and figures for each item listed in the Proposal. In the event of discrepancy, the words shall control.
 3. Materials, which are "tax exempt", are those items which are physically incorporated into the facilities constructed for the Town of Addison, as set forth in the Special Provisions. Materials include, but are not limited to purchased items such as water pipe, sanitary sewer pipe, storm drain pipe, etc.
 4. Services, which are "not tax exempt", are those items which are used by the Contractor but are not physically incorporated into the Town of Addison's facility and/or items which are consumed by

construction, as set forth in the Special Provisions. Services include, but are not limited to, items such as supplies, tools, skill and labor, the purchase, rental or lease of equipment, etc.

Name of Person Signing Bid

Signature of Person Signing Bid

Address

Telephone No.

Fax No.

T.I.N. (Tax Identification or Employer's Number)

If BIDDER is:

AN INDIVIDUAL

By _____ (Seal)
(Individual's Name)

doing business as _____

Business address: _____

Phone No. _____

A PARTNERSHIP

By _____ (Seal)
(Firm Name)

_____ (General Partner)

doing business as _____

Business address: _____

Phone No. _____

A CORPORATION

By _____
(Corporation Name)

(State of Incorporation)

By _____
(Name of Person Authorized to Sign)

(Title)

(Corporate Seal)

Attest _____
(Secretary)

Business address: _____

Phone No. _____



A JOINT VENTURE

By _____
(Name)

(Address)

By _____
(Name)

(Address)

(Each joint venture must sign. The manner of signing for each individual, partnership and corporation that is a party to the joint venture should be in the manner indicated above.)

SECTION BB
BID BOND

BID BOND

Bidder shall submit a bid bond equal to five percent (5%) of the bid price. Failure to submit a bid bond when required may deem the bid non-responsive. Bid Bonds may be submitted electronically with the executed original provided immediately upon request.

SECTION BQS

BIDDER QUALIFICATION STATEMENT

SECTION BQS

ALL BIDDERS ARE NOTIFIED THAT THE FOLLOWING QUALIFICATION STATEMENT MUST BE COMPLETED AND SUBMITTED WITH THE BID PROPOSAL

CONTRACTOR'S QUALIFICATIONS

The Contractor shall show that he has experience with similar projects that require working on water and sanitary sewer projects, working in confined areas and with electrical equipment in close proximity to many physical features (such as: fences, carports, utility poles, guy lines, gas lines and meters, water lines, sewer manholes and cleanouts, etc.) which will require the Contractor to plan his work efforts and equipment needs with these limitations in mind. The Contractor shall submit a complete list of ALL Municipal and Similar Non-Municipal current and completed projects for the past three (3) years for review. This list shall include the names of supervisors and type of equipment used to perform this work.

BIDDERS QUALIFICATION STATEMENT

PUBLIC WORKS AND ENGINEERING DEPARTMENT BID NUMBER 21-53, ADDISON KELLWAY LIFT STATION BY-PASS

Contractor: _____

Indicate One: _____ Sole Proprietor _____ Partnership _____ Other
 _____ Corporation _____ Joint Venture

Name: _____ Partner: _____

Title: _____ Title: _____

Address: _____ Address: _____

City: _____ City: _____

State & Zip: _____ State & Zip: _____

Phone: _____ Phone: _____

State and Date of Incorporation, Partnership, Ownership, Etc. _____

Location of Principal Office: _____

Contact and Phone at Principal Office: _____

Liability Insurance Provider and Limits of Coverage: _____

Workers Compensation Insurance Provider: _____

Surety (Performance and Payment): _____

Address: _____

Contact and Phone: _____

Superintendent and Backup Superintendent: (Work Resume - attach additional sheets.) (Safety Record – attached additional sheets; if needed show all verified safety violations.) The superintendent shall be able to communicate in English and not operate any equipment and have not had any verified job safety violations in the past five years. Any variations shall be reviewed by the OWNER for approval or denial. A job site shall be shut down if proper supervision is not provided.

Superintendent Name

Backup Superintendent Name

Safety Record – List ALL Verified Violations for Superintendent and Backup Superintendent with explanation, date and action taken to correct future safety violations:

Superintendent

Backup Superintendent

Total Number of Employees to be Associated with this Job: _____

Managerial _____ Administrative _____ Professional _____

Skilled _____ Semi-Skilled _____ Other _____

Percentage of work to be done by Bidder's Employees (Based on Dollars Bid): _____

Type(s) of work to be done by Bidder's Employees (examples: concrete paving, structural concrete, waterlines, sanitary sewer lines, storm pipe, storm inlets, excavation, lime, bridge fencing, etc.)

Access to Tools and Equipment: Percent Owned____ Percent Rented____

Number of Years in Business as a Contractor on Above Types of Works:_____

Type(s) of Work to be done by Sub-Contractors

Include Name, Address, and Phone Number of Sub-Contractor.

Use additional sheets if needed.

Type of Work

Sub-Contractor

List Equipment to be used on this project (Make/Model/Age of Major Equipment) Any Equipment not listed shall be reviewed by the OWNER for approval or rejection prior to use of Equipment on this project. (Use additional sheets if necessary)

Type of Equipment

Make

Model

Age (years)

List of ALL Municipal and Similar Non-Municipal current and completed projects for the past three (3) years. (Use additional sheets if necessary.)

1. Project: _____

Current Status: _____

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: _____

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: _____

Project Description: _____

Owner/Agency: _____

Year Built: _____ Contract Price: _____

Contact Person: _____ Phone: _____

2. Project: _____

Current Status: _____

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: _____

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: _____

Project Description: _____

Owner/Agency: _____

Year Built: _____ Contract Price: _____

Contact Person: _____ Phone: _____

3. Project: _____

Current Status: _____

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: _____

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: _____

Project Description: _____

Owner/Agency: _____

Year Built: _____ Contract Price: _____

Contact Person: _____ Phone: _____

4. Project: _____

Current Status: _____

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: _____

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: _____

Project Description: _____

Owner/Agency: _____

Year Built: _____ Contract Price: _____

Contact Person: _____ Phone: _____

5. Project: _____

Current Status: _____

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: _____

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: _____

Project Description: _____

Owner/Agency: _____

Year Built: _____ Contract Price: _____

Contact Person: _____ Phone: _____

6. Project: _____

Current Status: _____

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: _____

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: _____

Project Description: _____

Owner/Agency: _____

Year Built: _____ Contract Price: _____

Contact Person: _____ Phone: _____

7. Project: _____

Current Status: _____

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: _____

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: _____

Project Description: _____

Owner/Agency: _____

Year Built: _____ Contract Price: _____

Contact Person: _____ Phone: _____

8. Project: _____

Current Status: _____

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: _____

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: _____

Project Description: _____

Owner/Agency: _____

Year Built: _____ Contract Price: _____

Contact Person: _____ Phone: _____

9. Project: _____

Current Status: _____

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: _____

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: _____

Project Description: _____

Owner/Agency: _____

Year Built: _____ Contract Price: _____

Contact Person: _____ Phone: _____

10. Project: _____

Current Status: _____

Any Litigation Issues: Yes or No (Circle One) If Yes, explain: _____

Any Verified Safety Violations: Yes or No (Circle One) If Yes, explain: _____

Project Description: _____

Owner/Agency: _____

Year Built: _____ Contract Price: _____

Contact Person: _____ Phone: _____

Trade references (List Company, Address, Contact Person, and Phone):

Bank References (List Institution, Address, Contact Person, and Phone)

Claims and Suits (if the answer to any of the following questions is yes, please attached details):

1. Has your organization ever failed to complete any work awarded to it? _____

2. Are there any judgments, claims, arbitration proceedings, or suits pending or outstanding

against your organization or officers? _____

3. Has your organization filed any lawsuits or requested arbitration with regard to construction contracts within the last five years? _____

4. Within the last five (5) years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? _____

I, _____, being duly sworn deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

Date this _____ day of _____, 20____.

Name of
Organization: _____

By: _____

Title: _____

STATE OF TEXAS

COUNTY OF DALLAS

BEFORE ME the undersigned authority, on this day personally appeared _____
_____, known to me to be the person whose name subscribed to the foregoing instrument, and acknowledged to me that he executed the same for the purposes and considerations therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this ____ day of _____ 20____.

Notary Public in and for _____ County, Texas

SECTION CA

CONTRACT AGREEMENT

CONTRACT AGREEMENT

STATE OF TEXAS

COUNTY OF DALLAS

THIS AGREEMENT is made and entered into this _____ day of _____, 2021, by and between the Town of Addison, of the County of Dallas and State of Texas, acting through its City Manager, thereunto duly authorized so to do, Party of the First Part, hereinafter termed the OWNER, and _____, of the City of _____, County of _____, State of _____, Party of the Second Part, hereinafter termed CONTRACTOR.

WITNESSETH: That for and in consideration of the payment and agreement hereinafter mentioned, to be made and performed by the OWNER, the said CONTRACTOR hereby agrees with the said OWNER to commence and complete construction of certain improvements as follows:

ADDISON KELLWAY LIFT STATION BY-PASS PROJECT PUBLIC WORKS AND ENGINEERING DEPARTMENT BID NUMBER 21-53

and all extra work in connection therewith, under the terms as stated in the General and Specific Conditions of the AGREEMENT; and at his own proper cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance and other accessories and services necessary to complete the said construction, in accordance with the conditions and prices stated in the Proposal attached hereto and in accordance with the Advertisement for Bids, Instructions to Bidders, General Provisions, Special Provisions, Plans, and other drawings and printed or written explanatory matter thereof, and the Technical Specifications and Addenda thereto, as prepared by the OWNER, each of which has been identified by the endorsement of the CONTRACTOR and the OWNER thereon, together with the CONTRACTOR's written Proposal and the General Provisions, all of which are made a part hereof and collectively evidence and constitute the entire AGREEMENT.

The CONTRACTOR hereby agrees to commence work within ten (10) calendar days after the date of written notice to do so shall have been given to him, to complete the work within one hundred and twenty (120) calendar days, after he commences work, subject to such extensions of time as are provided by the General Provisions.

The OWNER agrees to pay the CONTRACTOR _____ Dollars (\$_____) in current funds for the performance of the Contract in accordance with the Proposal submitted thereof for the **Base Bid**, as provided in the General Provisions, and to make payments of account thereof as provided therein.

IN WITNESS WHEREOF, the parties of these presents have executed this AGREEMENT in the year and day first above written.

TOWN OF ADDISON, TEXAS (OWNER)

ATTEST:

By: _____
City Manager

By: _____

(CONTRACTOR)

ATTEST:

By: _____

By: _____

The following to be executed if the CONTRACTOR is a corporation:

I, _____ certify that I am the secretary of the corporation named as CONTRACTOR herein; that _____, who signed this Contract on behalf of the CONTRACTOR is the _____ (official title) of said corporation; that said Contract was duly signed for and in behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

Signed: _____

Corporate Seal

SECTION PrB
PERFORMANCE BOND

PERFORMANCE BOND

STATE OF TEXAS }
COUNTY OF DALLAS }

WHEREAS, _____ as principal ("Contractor") and _____, a corporation organized under the laws of _____ and being duly authorized to do business in the State of Texas, as surety ("Surety") (whether one or more), do hereby expressly acknowledge themselves to be held and bound to pay to the Town of Addison, Texas, a home-rule municipality organized and operating under the Constitution and laws of the State of Texas (the "Town"), its successors and assigns, and to all persons, firms, subcontractors and corporations who may furnish materials or labor under the contract as more fully described below, the sum of _____ Dollars in the lawful currency of the United States of America (\$) for the payment of which Contractor and Surety are liable to the Town, jointly and severally; and

WHEREAS, Contractor has this day entered into a written contract with the Town to build and construct _____

_____ which contract and the plans and specifications therein mentioned (collectively referred to hereinafter as the "Contract") are hereby expressly incorporated into and made a part hereof as though set forth at length; and

WHEREAS, this bond is given pursuant to Chapter 2253 of the Texas Government Code;

NOW, THEREFORE, if Contractor shall well, truly and faithfully perform all of the undertakings, duties, terms, conditions and agreements of the Contract; shall satisfy all claims and demands incurred under the Contract; shall fully indemnify and hold the Town harmless; shall reimburse and repay the Town for any outlay or expense which the Town may incur in making good any default, and shall promptly make payment to all persons, firms, subcontractors and corporations who may furnish materials or labor under the Contract, then this obligation shall be void; otherwise to remain in full force and effect. The obligations of Contractor and Surety under this bond apply both to the original Contract and to any extension or modification of the Contract and Surety agrees that no change, extension of time, addition, expansion or other modification of the Contract, the work to be done under the Contract, or the plans and specifications which are a part of the Contract shall in any manner affect the obligations of Surety under this bond, and Surety waives notice of any such change, extension of time, addition, expansion or other modification. The obligations of Contractor and Surety under this bond are performable and payable in Dallas County, Texas such that exclusive venue for any legal action pertaining to this bond shall lie in Dallas County, Texas. By their signatures below, the persons signing this bond warrant and represent that they are, respectively, duly authorized to sign on behalf of Contractor and Surety.

EXECUTED this the ____ day of _____, 2____.

CONTRACTOR:

SURETY: 1

By: _____

By: _____

Title: _____

Title: _____

ACKNOWLEDGMENTS
[Contractor]

STATE OF TEXAS }
COUNTY OF DALLAS }

Before me _____ (insert the name of the officer) on this day _____ personally appeared _____ known to me (or proved to me on the oath of _____) or through _____ (description of identity card or other document) to be the person whose name is subscribed to the forgoing instrument and acknowledged to me that he/she executed the same for the purpose and consideration therein expressed.

Given under my hand and seal of office this _____ day of _____, 2____.

Notary Public in and for the State of Texas
My Commission Expires: _____

Typed or Printed Name of Notary

[Surety]

STATE OF TEXAS }
COUNTY OF DALLAS }

This instrument was acknowledged before me on the ____ day of _____, 2____ by _____ who is the _____ of the Surety, on behalf of Surety.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the ____ day of _____, 2____.

Notary Public in and for the State of Texas
My Commission Expires: _____

Typed or Printed Name of Notary

Payment and Performance Bond Contact Sheet

(1) Claims:

All notices of claims shall be sent to the surety at the following address:

(Name of surety)

(Mailing address)

(Physical address)

(Phone number)

(2) Texas Department of Insurance Contact Number:

The address and contact information of the surety may otherwise be obtained by contacting the Texas Department of Insurance at the following toll-free telephone number:

1-800-252-3439.

SECTION PyB
PAYMENT BOND

PAYMENT BOND

STATE OF TEXAS }
COUNTY OF DALLAS }

WHEREAS, _____, as principal ("Contractor") and _____, a corporation organized under the laws of _____ and being duly authorized to do business in the State of Texas, as surety ("Surety")(whether one or more), do hereby expressly acknowledge themselves to be held and bound to pay to the Town of Addison, Texas, a home-rule municipality organized and operating under the Constitution and laws of the State of Texas (the "Town"), its successors and assigns, and to all persons, firms, subcontractors and corporations who may furnish materials or labor under the contract as more fully described below, the sum of _____ Dollars in the lawful currency of the United States of America (\$) for the payment of which Contractor and Surety are liable to the Town, jointly and severally; and

WHEREAS, Contractor has this day entered into a written contract with the Town to build and construct _____

which contract and the plans and specifications therein mentioned (collectively referred to hereinafter as the "Contract") are hereby expressly incorporated into and made a part hereof as though set forth at length; and

WHEREAS, this bond is given pursuant to Chapter 2253 of the Texas Government Code;

NOW, THEREFORE, if Contractor shall promptly make payment to all persons, firms, subcontractors and corporations who may furnish materials or labor under the Contract, then this obligation shall be void; otherwise to remain in full force and effect. The obligations of Contractor and Surety under this bond apply both to the original Contract and to any extension of time or modification of the Contract and Surety agrees that no change, extension of time, addition, expansion or other modification of the Contract, the work to be done under the Contract, or the plans and specifications which are a part of the Contract shall in any manner affect the obligations of Surety under this bond, and Surety waives notice of any such change, extension of time, addition, expansion or other modification. The obligations of Contractor and Surety under this bond are performable and payable in Dallas County, Texas such that exclusive venue for any legal action pertaining to this bond shall lie in Dallas County, Texas. By their signatures below, the persons signing this bond warrant and represent that they are, respectively, duly authorized to sign on behalf of Contractor and Surety.

EXECUTED this the _____ day of _____, 2_____.

CONTRACTOR:

SURETY: 1

By: _____

By: _____

Title: _____

Title: _____

ACKNOWLEDGMENTS

[Contractor]

STATE OF TEXAS }
COUNTY OF DALLAS }

Before me _____ (insert the name of the officer) on this day _____ personally appeared _____ known to me (or proved to me on the oath of _____) or through _____ (description of identity card or other document) to be the person whose name is subscribed to the forgoing instrument and acknowledged to me that he/she executed the same for the purpose and consideration therein expressed.

Given under my hand and seal of office this _____ day of _____, 2_____.

Notary Public in and for the State of Texas
My Commission Expires: _____

Typed or Printed Name of Notary

[Surety]

STATE OF TEXAS }
COUNTY OF DALLAS }

This instrument was acknowledged before me on the _____ day of _____, 2_____ by _____ who is the _____ of the Surety, on behalf of Surety.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the _____ day of _____, 2_____.

Notary Public in and for the State of Texas
My Commission Expires: _____

Typed or Printed Name of Notary

1 Please see attached contact sheet for Surety and the Texas Department of Insurance

Payment and Performance Bond Contact Sheet

(1) Claims:

All notices of claims shall be sent to the surety at the following address:

(Name of surety)

(Mailing address)

(Physical address)

(Phone number)

(2) Texas Department of Insurance Contact Number:

The address and contact information of the surety may otherwise be obtained by contacting the Texas Department of Insurance at the following toll free telephone number:

1-800-252-3439.

SECTION MB

MAINTENANCE BOND

MAINTENANCE BOND – TWO YEAR

STATE OF TEXAS ,

COUNTY OF DALLAS ,

WHEREAS, _____, as principal ("Contractor") and _____, a corporation organized under the laws of _____ and being duly authorized to do business in the State of Texas, as surety ("Surety")(whether one or more), do hereby expressly acknowledge themselves to be held and bound to pay to the Town of Addison, Texas, a home-rule municipality organized and operating under the Constitution and laws of the State of Texas (the "Town"), its successors and assigns the sum of _____ Dollars in the lawful currency of the United States of America (\$) for the payment of which Contractor and Surety are liable to the Town, jointly and severally; and

WHEREAS, Contractor has this day entered into a written contract with the Town to build and construct which contract and the plans and specifications therein mentioned (collectively referred to hereinafter as the "Contract") are hereby expressly incorporated into and made a part hereof as though set forth at length; and

WHEREAS, under the Contract it is provided that the Contractor will maintain and keep in good repair all work to be performed and done under the Contract for a period of **two (2) years** from the date of acceptance of the completed work by the Town, and to do and perform all necessary work and repair any defective condition, it being understood that the purpose of this maintenance bond is to insure all warranties, express or implied, made or given by the Contractor to the Town and to cover all defective, inadequate or non-conforming conditions arising by reason of any materials or labor installed, provided, constructed or performed by the Contractor and in case the Contractor shall fail to correct any such conditions it is agreed that the Town may make such corrections and charge the cost of making those corrections against the Contractor and the Surety on this obligation, and the Contractor and Surety shall be subject to the liquidated damages provided in the contract, the plans and the specifications for each day's failure on its part to comply with the terms and provisions of the Contract;

NOW, THEREFORE, if the Contractor shall keep and perform its obligation to maintain the work and keep the work in repair for the full maintenance period of two (2) years as herein provided, then these presents shall be null and void and have no further effect, but if default shall be made by Contractor in the performance of its obligations, then these presents shall have full force and effect, and the Town shall have and recover from the Contractor and its Surety damages in the premises as provided and it is further understood and agreed that this obligation shall be a continuing one against the Contractor and the Surety and that successive recoveries may be had hereon for successive breaches until the full amount of this bond shall have been exhausted; and it is further understood that the obligation under this bond to maintain the work shall continue throughout the maintenance period and shall not be changed, diminished, or in any other manner affected during the term of this bond. The obligations of Contractor and Surety under this bond apply both to the original Contract and to any extension or modification of the Contract and Surety agrees that no change, extension of time, addition, expansion or other modification of the Contract, the work to be done under the Contract, or the plans and specifications which are a part of the Contract shall in any manner affect the obligations of Surety under this bond, and Surety waives notice of any such change, extension of time, addition, expansion or other modification. The obligations of Contractor and Surety under this bond are performable and payable in Dallas County, Texas such that exclusive venue for any legal action pertaining to this bond shall lie in Dallas County, Texas. By their signatures below, the persons signing this bond warrant and represent that they are, respectively, duly authorized to sign on behalf of Contractor and Surety.

EXECUTED this the _____ day of _____, 2_____.
CONTRACTOR: _____ SURETY: _____

By: _____ By: _____
Printed Name: _____ Printed Name: _____
Title: _____ Title: _____

Address of Principal: _____ Address of Surety: _____

ACKNOWLEDGMENTS
[Contractor]

STATE OF TEXAS ,
COUNTY OF DALLAS ,

Before me _____ (insert the name of the officer) on this day _____ personally appeared _____ known to me (or proved to me on the oath of _____) or through _____ (description of identity card or other document) to be the person whose name is subscribed to the forgoing instrument and acknowledged to me that he/she executed the same for the purpose and consideration therein expressed.

Given under my hand and seal of office this _____ day of _____, 2_____.

Notary Public in and for the State of Texas _____ Typed or Printed Name of Notary
My Commission Expires: _____
[Surety]

STATE OF TEXAS ,
COUNTY OF DALLAS ,

This instrument was acknowledged before me on the ____ day of _____, 2____ by _____ who is the _____ of the Surety, on behalf of Surety.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the _____ day of _____, 2_____.

Notary Public in and for the State of Texas _____ Typed or Printed Name of Notary
2-4-13 2 yr

SECTION BP

CONTRACTOR'S AFFIDAVIT OF BILLS PAID

CONTRACTOR'S AFFIDAVIT OF BILLS PAID

STATE OF TEXAS

COUNTY OF DALLAS

Personally, before me the undersigned authority, on this day appeared _____ who, being
duly sworn, on oath, says that he is a legal representative of _____
(full name of Contractor as in contract)

and that the contract for the construction of the project, designated as

**ADDISON KELLWAY LIFT STATION BY-PASS
PUBLIC WORKS AND ENGINEERING DEPARTMENT BID NUMBER 21-53**

has been satisfactorily completed and that all bills for materials, apparatus, fixtures, machinery and labor
used in connection with the construction of this project have, to the best of my knowledge and belief, been
fully paid.

Signature

Title

Sworn to and subscribed before me this _____ day of _____, 20__.

Notary Public in and for

County, Texas

Instructions:

If the contractor is an individual, he shall sign the affidavit. If the contractor is a partnership, any partner may sign the affidavit. If the contractor is a corporation, a person authorized by the by-laws or by the Board of Directors shall sign the affidavit. If the Contractor is a joint-venture of individuals, any of the individuals may sign the affidavit. If the Contractor is a joint-venture of partnerships, or of individuals and partnerships, the affidavit may be signed by the individual or any partner of any partnership. If the contractor is a joint-venture in which a corporation is a party, separate affidavits must be executed in the name of the joint-venture: one by each corporation and one by each individual or partnership. Signatures for corporations should be by a duly authorized officer. If signature is by another, a showing of authority to sign must accompany the affidavit.

SECTION GP

GENERAL PROVISIONS

GENERAL PROVISIONS

The General Provisions of the Contract shall be as stated in the *Standard Specifications for Public Works Construction – North Central Texas, 5th Edition (2017)*, under Division 100, "General Provisions," Items 101.1 through 109.6 inclusive, as amended or supplemented and except as modified by the Special Provisions or Instructions to Bidders.

SECTION GTC

GENERAL TERMS AND CONDITIONS



Town of Addison
GENERAL TERMS AND CONDITIONS

By submitting an Offer in response to the Solicitation, the Contractor/Seller (hereafter called Seller) agrees the Contract/Purchase Order shall be governed by the following terms and conditions for goods and services.

1. **APPLICABILITY:** These General Terms and Conditions and the Terms and Conditions, Specifications, Drawings and other requirements included in the Town of Addison's Request for Bid (collectively, "Terms and Conditions") are applicable to Contracts/Purchase Orders issued by the Town of Addison (hereinafter referred to as the "Town" or "Buyer") and the Seller (herein after referred to as the "Seller"). Any deviations must be in writing and signed by a representative of the Town's Purchasing Department and the Seller. No terms and conditions contained in the Seller's Proposal, Invoice or Statement shall modify the Terms and Conditions. If there is a conflict between the Terms and Conditions and Seller's response to the Town's request for bids or proposals documents (including the provisions of the Seller's form of contract/purchase order), the Terms and Conditions will take precedence and control.
2. **OFFICIAL SOLICITATION NOTIFICATION:** The Town utilizes the following for official notifications of solicitation opportunities: www.civcastusa.com and the Dallas Morning News of Dallas County. These are the only forms of notification authorized by the Town for notifications of solicitation opportunities. The Town is not responsible for receipt of notifications or information from any source other than those listed. It shall be the Seller's responsibility to verify the validity of all solicitation information received from any source other than the Town. There will be NO COST to the Seller for using Civcast to respond to Town of Addison solicitations.
3. **SELLER TO PACKAGE GOODS:** Seller shall package goods in accordance with good commercial practice. Each shipping container, shall be clearly and permanently marked as follows: (a) Seller's name and address; (b) consignee's name, address and purchase order or purchase change order number; (c) container number and total number of containers, e.g., "box 1 of 4 boxes"; and (d) number of the container bearing the packing slip. Seller shall bear cost of packaging unless otherwise provided and agreed to in writing by Buyer. Goods shall be suitably packed to secure lowest transportation costs and to conform to requirements of common carriers and any applicable specifications. Town's count or weight shall be final and conclusive on shipments not accompanied by packing list. Unless otherwise stated in the Town's solicitation, all goods will be new, not used, rebuilt, reconditioned or recycled, will be in first class condition, and will be in containers suitable for site.
4. **SHIPMENT UNDER RESERVATION PROHIBITED:** Seller is not authorized to ship the goods under reservation and no tender of a bill of lading will operate as a tender of goods.

5. **TITLE AND RISK OF LOSS:** Title and risk of loss of the goods will not pass to the Town until the Town actually receives, takes possession of, and inspects and accepts the goods at the point or points of delivery.
6. **DELIVERY TERMS AND TRANSPORTATION CHARGES:** Goods shall be shipped F.O.B. point of delivery; prices bid and quoted shall be F.O.B. point of delivery, and shall include all freight, delivery and packaging costs. Town shall have the right to designate what method of transportation shall be used to ship the goods. Town assumes and shall have no liability for goods damaged while in transit and or delivered in a damaged condition or that otherwise don't conform to the Terms and Conditions. Seller shall be responsible for and handle all claims with carriers, and in case of damaged or non-conforming goods shall ship replacement goods immediately upon notification by the Town of the same, and the Town may return such damaged or non-conforming goods at Seller's sole cost and expense, including costs and expense for freight, delivery, packaging, and shipping.
7. **RIGHT OF INSPECTION AND REJECTION; BACKORDERS:** The Town shall have the right, and expressly reserves all rights under law, including, but not limited to the Uniform Commercial Code, to inspect the goods at delivery before accepting them, and to reject defective or non-conforming goods. Backorders delayed beyond a reasonable period of time, as determined by the Town Purchasing Manager, may be cancelled by the Town without liability of any kind whatsoever, and payment will not be made for such cancellations.
8. **ACCEPTANCE OF INCOMPLETE OR NON-CONFORMING GOODS:** If, instead of requiring immediate correction or removal and replacement of defective or non-conforming goods, Town prefers to accept such goods, Town may do so. Seller shall pay all claims, costs, losses and damages attributable to Town's evaluation of and determination to accept such defective or non-conforming deliverables. If any such acceptance occurs prior to final payment, Town may deduct such amounts as are necessary to compensate Town for the diminished value of the defective or non-conforming deliverables. If the acceptance occurs after final payment, such amount will be refunded to Town by Seller.
9. **SUBSTITUTION:** Every delivery of goods by the Seller must comply with all provisions of this bid including the specifications, delivery schedule, quantity and quality, and the Terms and Conditions. Any delivery which does not conform to the Buyer's requirements shall constitute a breach of contract. Seller does not have authorization to make or tender substitute goods unless it is agreed to in writing by the Buyer and signed by an authorized representative of Buyer.
10. **PAYMENT:**
 - a. All proper invoices received by the Town will be paid within thirty (30) days of the Town's receipt and acceptance of the goods or of the invoice, whichever is later, unless other terms are specified on the face of the purchase order in the original

printing. If payment is not timely made, interest shall accrue on the unpaid balance at the lesser of one percent per month or the maximum lawful rate; except, if payment is not timely made for a reason for which the Town may withhold payment hereunder, interest shall not accrue until ten (10) days after the grounds for withholding payment have been resolved.

- b. If partial shipments or deliveries are authorized by the Town, Seller will be paid for the partial shipment or delivery, as stated above, provided that the invoice matches the shipment or delivery.
 - c. The Town may withhold or set off the entire payment or part of any payment otherwise due Seller to such extent as may be necessary on account of: (i) delivery of defective or non-conforming goods by Seller, or (ii) failure of the Seller to submit proper invoices with all required attachments and supporting documentation, or (iii) failure of Seller to deliver quantity of goods ordered (payment will be made for actual quantities delivered).
 - d. The Town's payment obligations are payable only and solely from funds appropriated, budgeted, and available for the purpose of this purchase. The absence of appropriated and budgeted or other lawfully available funds shall render the Contract/Purchase Order null and void to the extent funds are not appropriated and budgeted or available and any goods delivered but unpaid shall be returned to Seller. The Town shall provide the Seller written notice of the failure of the Town to make an adequate appropriation and budget for any fiscal year to pay the amounts due under the Contract/Purchase Order, or the reduction of any appropriation to an amount insufficient to permit the Town to pay its obligations under the Contract/Purchase Order.
11. **INVOICING:** Send ORIGINAL INVOICE to address indicated on the purchase order. If invoice is subject to cash discounts the discount period will begin on the day invoices are received. So that proper cash discount may be computed, invoice should show amount of freight as a separate item, if applicable; otherwise, cash discount will be computed on total amount of invoice.
12. **TAXES - EXEMPTION:** All quotations are required to be submitted LESS Federal Excise and State Sales Taxes. Tax Exemption Certificate will be provided by the Town for the successful Seller
13. **WARRANTY – PRICE:**
- a. Seller warrants the prices quoted in its bid are no higher than Seller's current prices on orders by others for like goods under similar terms of purchase.
 - b. Seller certifies that the prices in Seller's bid have been arrived at independently without consultation, communication, or agreement for the purpose of restricting

competition, as to any matter relating to such fees with any other firm or with any competitor.

- c. In the event of any breach of this warranty, the prices of the items will be reduced to Seller's current prices on orders by others, or in the alternative, the Town may cancel this Contract/Purchase Order without liability to Seller of any kind whatsoever. In addition to any other remedy available, the Town may deduct from any amounts owed to Seller, or otherwise recover, any amounts paid for items in excess of Seller's current prices on orders by others for like goods under similar terms of purchase.
14. **WARRANTY – TITLE:** Without limiting any provision of law, Seller warrants that it has good and indefeasible title to all goods furnished hereunder, and that the goods are free and clear of all liens, claims, security interests and encumbrances. **Seller shall indemnify and hold the Town harmless from and against all adverse title claims to the goods.**
15. **WARRANTY (GOODS):** If goods are sold and furnished to Seller in connection with these Terms and Conditions, Seller represents and warrants that the goods sold and furnished to the Town will be (i) free from defects in design, manufacture, materials and workmanship, (ii) be of merchantable quality and fit for ordinary use, (iii) be in full conformance with Buyer's specifications, drawings and data, with Seller's samples or models furnished in connection herewith, with Seller's express warranties, and with the terms and conditions of the Town's solicitation, and (iv) conform to all applicable Federal, State, and local laws, ordinances, rules, regulations, codes, and to all applicable standards and industry codes and standards. These warranties are in addition to all others given to the Buyer by the Seller or by law. Seller shall not limit, disclaim, or exclude these warranties or any implied warranties, and any attempt to do so shall render this Contract/Purchase Order voidable at the option of the Buyer, and any such limitations, disclaim, or exclusions shall be void and without force or effect.

Unless otherwise specified in a Contract/Purchase Order and approved by the Town in writing, the warranty period shall be at least one year from the date of acceptance of the goods or from the date of acceptance of any replacement goods. If during the warranty period, one or more of the above warranties are breached, Seller shall promptly upon receipt of demand either repair the defective or non-conforming goods, or replace the non-conforming or defective goods with fully conforming and non-defective goods, at the Town's option and at no additional cost to the Town. All costs incidental to such repair or replacement, including but not limited to, any packaging and shipping costs, shall be borne exclusively by Seller. The Town shall endeavor to give Seller written notice of the breach of warranty within thirty (30) days of discovery of the breach of warranty, but failure to give timely notice shall not impair the Town's rights hereunder.

If Seller is unable or unwilling to repair or replace defective or non-conforming goods as required by Town, then in addition to any other available remedy, Town may reduce the quantity of goods it may be required to purchase under the Contract/Purchase Order from Seller, and purchase conforming goods from other sources. In such event, Seller shall pay

to Town upon demand the increased cost, if any, incurred by the Town to procure such goods from another source.

If Seller is not the manufacturer, and the goods are covered by a separate manufacturer's warranty, Seller shall transfer and assign such manufacturer's warranty to Town. If for any reason the manufacturer's warranty cannot be fully transferred to Town, Seller shall assist and cooperate with Town to the fullest extent to enforce such manufacturer's warranty for the benefit of Town.

16. **WARRANTY (SERVICES):** If services are provided to Seller in connection with these Terms and Conditions, Seller represents and warrants that all services to be provided to the Town will be fully and timely performed in a good and workmanlike manner in accordance with generally accepted industry standards and practices, the terms, conditions, and covenants of this Contract/Purchase Order, and all applicable Federal, State and local laws, ordinances, rules, regulations and codes. These warranties are in addition to all others given to the Buyer by the Seller or by law. Seller shall not limit, disclaim, or exclude these warranties or any implied warranties, and any attempt to do so shall render this Contract/Purchase Order voidable at the option of the buyer, and any such limitations, disclaim, or exclusions shall be void and without force or effect.

Unless otherwise specified in the Contract/Purchase Order, the warranty period shall be at least one year from the date of final acceptance of the services by the Town. If during the warranty period, one or more of the above warranties are breached, Seller shall promptly upon receipt of demand perform the services again in accordance with above standard at no additional cost to the Town. All costs incidental to such additional performance shall be borne by the Seller. The Town shall endeavor to give the Seller written notice of the breach of warranty within thirty (30) calendar days of discovery of the breach warranty, but failure to give timely notice shall not impair the Town's rights under this section.

If the Seller is unable or unwilling to perform its services in accordance with the above standard as required by the Town, then in addition to any other available remedy, the Town may reduce the amount of services it may be required to purchase under the Contract/Purchase Order from the Seller, and purchase conforming services from other sources. In such event, the Seller shall pay to the Town upon demand the increased cost, if any, incurred by the City to procure such services from another source.

17. **RIGHT TO ASSURANCE:** Whenever one party to the Contract/Purchase Order in good faith has reason to question the other party's intent to perform, demand may be made to the other party for written assurance of the intent to perform. In the event that no assurance is given within the time specified after demand is made, the demanding party may treat this failure as an anticipatory repudiation of this Contract/Purchase Order.
18. **DEFAULT:** Seller shall be in default under this Contract/Purchase Order if Seller (a) fails to fully, timely and faithfully perform any of its material obligations under this Contract/Purchase Order (whether or not an obligation is "material" shall be determined by the Town), (b) fails to provide adequate assurance of performance as provided for

herein, (c) becomes insolvent or seeks relief under the bankruptcy laws of the United States, or (d) makes a material misrepresentation in Seller's offer or response to Buyer's solicitation, or in any report or deliverable required to be submitted by Seller to the Town.

19. **TERMINATION FOR CAUSE OR CONVENIENCE:** The Town, at any time, by 30 days written notice to the Seller, has the absolute right to terminate this Contract/Purchase Order, in whole or in part, for cause or for convenience (that is, for any reason or for no reason whatsoever). "Cause" means the Seller's refusal or failure to perform or complete its obligations under this Contract/Purchase Order within the time specified and to the Town's satisfaction, or failure to meet the specifications, quantities, quality and/or other requirements specified in the Contract/Purchase Order. If the Town terminates this Contract/Purchase Order for cause, the Seller shall be liable for any damages suffered by the Town. If the agreement is terminated for convenience, the Seller has no further obligation under this Contract/Purchase Order. Upon receipt of a notice of termination, Seller shall promptly cease all further work pursuant to the Contract/Purchase Order, with such exceptions, if any, specified in the notice of termination. Payment shall be made to cover the cost of goods delivered and services performed and obligations incurred prior to the date of termination in accordance with the terms hereof.
20. **DELAY:** Town may delay scheduled delivery or other due dates by written notice to Seller if the Town deems it is in its best interest. If such delay causes an increase in the cost of the work under the Contract/Purchase Order, the Town and the Seller shall negotiate an equitable adjustment for costs incurred by Seller in the Contract/Purchase Order price and execute an amendment to the Contract/Purchase Order. Seller must assert its right to an adjustment within thirty (30) days from the date of receipt of the notice of delay. Failure to agree on any adjusted price shall be handled under the Dispute Resolution process specified herein. However, nothing in this provision shall excuse Seller from delaying the delivery as notified. For purposes of these Terms and Conditions, "days" means calendar days.
21. **SELLER'S INDEMNITY OBLIGATION:** See attached Town of Addison minimum insurance requirements.
22. **GRATUITY:** Town may, by written notice to Seller, cancel this Contract/Purchase Order without liability to Town if it is determined by Town that any gratuity, in the form of entertainment, gifts, or otherwise, was offered or given by Seller, or any officer, employee, agent or representative of Seller, to any officer, employee, or representative of Town with a view toward securing a contract or securing favorable treatment with regard to the awarding or amending, or the making or any determinations with respect to the performance of, a contract. In the event this Contract/Purchase Order is canceled by the Town pursuant to this provision, the Town shall be entitled, in addition to any other rights and remedies, to recover or withhold the amount of the cost incurred by the Seller in providing such gratuities.
23. **NOTICES:** Unless otherwise specified, all notices, requests, or other communications required or appropriate to be given under this Contract/Purchase Order shall be in writing

and shall be deemed delivered upon being hand-delivered or upon three (3) business days after postmarked if sent by U.S. Postal Service certified or registered mail, return receipt requested. Notices to Seller shall be sent to the address as specified by Seller. Notices to the Town shall be addressed to Town at 5300 Belt Line Road, Dallas, Texas 75254 and marked to the attention of the Town Finance Director.

24. **NO WARRANTY BY TOWN AGAINST INFRINGEMENT:** Seller represents and warrants to the Town that: (i) Seller shall provide the Town good and indefeasible title to all goods being sold and/or supplied to the Town, and (ii) such goods in accordance with the specifications in this Contract/Purchase Order will not infringe, directly or indirectly, any patent, trademark, copyright, trade secret, or any other intellectual property right of any kind of any third party; that no claims have been made by any person or entity with respect to the ownership or operation of such goods and the Seller does not know of any valid basis for any such claims. The Town's specifications regarding the goods shall in no way diminish Seller's warranties or obligations under this paragraph, and the Town makes no warranty that the production, development, or delivery of goods according to the specifications will not give rise to such a claim or will not will not impact such warranties of Seller, and in no event will Town be liable to Seller, its officers, employees, or agents (together, "Seller Parties") for indemnification or otherwise if Seller Parties or any of them is sued on the grounds of infringement or the like. If Seller is of the opinion that an infringement or the like will or may result, Seller shall promptly notify Town of that opinion. If Seller in good faith ascertains, prior to production of the goods, that production of the goods according to the specifications will result in infringement or the like, this Contract/Purchase Order will be null and void, and neither Town nor Seller shall have any liability one to the other.
25. **ASSIGNMENT AND SUCCESSORS:** The successful Seller shall not assign, transfer, pledge, subcontract, or otherwise convey (collectively, "assign" or "assignment"), in any manner whatsoever, any rights, duties, obligations, or responsibilities of Seller under or in connection with this Contract/Purchase Order, in whole or in part, without the prior written consent of the Town of Addison (and any such assignment without the prior written consent of the Town shall be null and void). Any person or entity to whom Seller assigns any right, duty or obligation shall, as a condition of such assignment, agree to comply with and abide by all provisions of this Contract/Purchase Order, and Seller shall promptly give the Town a true and correct copy of such agreement.

This Contract/Purchase Order shall be binding upon and inure to the benefit of the City and the Seller and their respective successors and authorized assigns, provided however, that no right or interest in the Contract/Purchase Order shall be assigned and no obligation shall be delegated by the Contractor without the prior written consent of the City. This Contract/Purchase Order does not and is not intended to confer rights or benefits on any person, firm or entity not a party hereto; it being the intention of the parties that there be no third-party beneficiaries to this Contract/Purchase Order.

26. **WAIVER, RIGHTS, REMEDIES:** All waivers must be in writing and signed by the waiving party. The rights or remedies under this Agreement are cumulative to any other rights or remedies, which may be granted by law.
27. **MODIFICATIONS:** This contract can be modified or amended only by a writing signed by both parties. No pre-printed or similar terms on any Seller invoice, order or other document shall have any force or effect to change the terms, covenants, and conditions of this Contract/Purchase Order.
28. **INDEPENDENT CONTRACTOR:** Seller shall operate hereunder as an independent contractor and not as an officer, agent, servant or employee of the Town. Seller shall have exclusive control of, and the exclusive right to control, the details of its operations hereunder, and all persons performing same, and shall be solely responsible for the acts and omissions of its officers, agents, employees, contractors, subcontractors and consultants.
29. **INTERPRETATION:** This Contract/Purchase Order is intended by the parties as a final, complete and exclusive statement of the terms of their agreement. No course of prior dealing between the parties or course of performance or usage of the trade shall be relevant to supplement or explain any term used in this Contract/Purchase Order. Although the Contract/Purchase Order may have been substantially drafted by one party, it is the intent of the parties that all provisions be construed in a manner to be fair to both parties, reading no provisions more strictly against one party or the other. Whenever a term defined by the Uniform Commercial Code, as enacted by the State of Texas, is used in this contract, the UCC definition shall control, unless otherwise defined in this Contract/Purchase Order.
30. **COMPETITIVE PRICING:** It is the intent of the Town to consider Interlocal Cooperative Agreements and State/Federal contracts in determining the best value for the Town.
31. **INTERLOCAL AGREEMENT:** Successful bidder (Seller) agrees to extend prices for the goods and/or services to be provided by Seller described in this Contract/Purchase Order to all entities that have entered into or will enter into joint purchasing interlocal cooperation agreements with the Town. The Town is a participating member of several interlocal cooperative purchasing agreements. As such, the Town has executed interlocal agreements, as permitted by law, including under Chapter 791 of the Texas Government Code, with certain other political subdivisions, authorizing participation in a cooperative purchasing program. The successful bidder (Seller) may be asked by the Town to provide products/services based upon the bid price to any other participant to a cooperative purchasing agreement, and the Seller agrees to do so (such provision will be pursuant to an agreement between Seller and such other participant, and the Town will have no liability or responsibility in connection therewith).
32. **RIGHT TO AUDIT:** The city shall have the right to examine and audit after reasonable notice any and all books and records. in any form or format whatsoever (including electronic), of Seller that may relate to this Contract/Purchase Order including, without

limitation, the performance of Seller, its employees, agents, and subcontractors. Such books and records will be maintained in accordance with generally accepted accounting principles and shall, upon request and at the Town's request, be made available at a location designated by the Town. Seller shall, except for copying costs, otherwise bear all costs of producing such records for examination and copying by the Town. Unless otherwise agreed by the Town, such books and records must be made available to the Town within five business days after the Seller's receipt of a written notice from the Town requesting the same. The provisions of this paragraph shall survive the termination of this agreement. Seller shall retain all such books and records for a period of three (3) years after final payment on this Contract/Purchase Order or until all audit and litigation matters that the Town has brought to the attention of the Seller are resolved, whichever is longer. The Seller agrees to refund to the Town any overpayments disclosed by any such audit. The Seller shall include a similar audit right on behalf of the Town in all subcontractor agreements entered into in connection with this Contract/Purchase Order.

33. **CORRESPONDENCE:** The Bid number must appear on all correspondence and inquiries pertaining to the Request for Bid or to quotes. The Purchase Order number must appear on all invoices or other correspondence relating to the Contract/Purchase Order.
34. **EASEMENT PERMISSION:** The contractor shall not enter or use private property except as allowed by easements shown on the contract documents or if the contractor obtains specific written permission from the property owner.
35. **ALTERNATES - SAMPLES:** If bidding on other than the item solicited by the Town, Seller's bid must identify the item's Trade Name, Manufacturer's Name and/or Catalog Number, and certify the item offered is equivalent to the item solicited by the Town. Descriptive literature must be submitted with alternate brands. Samples shall be furnished free of expense to the Town and if requested, may be returned at bidder's expense.
36. **ERROR - QUANTITY:** Bids must be submitted in units of quantity specified, extended, and totaled. In the event of discrepancies in extension, the unit prices shall govern.
37. **ACCEPTANCE:** The right is reserved to the Town to accept or reject all or part of the bid, and to accept the offer considered most advantageous to the Town by line item or total bid.
38. **TERM CONTRACTS:** Except as otherwise provided herein, prices must remain firm for the entire Contract/Purchase Order period, including any periods of extension or renewal. At the time of any renewal or extension of the Contract/Purchase Order, the Town or the Seller may request a price adjustment based upon the economy. All requests for a price adjustment must include detailed documentation and rationale to support the requested adjustment. The party to whom a request for price adjustment is made may, in its sole discretion, accept or reject the request. Any price adjustment must be mutually agreed upon in writing by the parties and shall be effective for the applicable renewal term.

39. **TERM CONTRACT QUANTITIES:** The quantities (if any) in the request for bid are estimated requirements and the Town reserves the right to increase or decrease the quantities or cancel any item to be furnished. The successful bidder (Seller) shall have no claim against the Town for anticipated profits for quantities diminished or deleted.
40. **TERM CONTRACT SHIPMENTS:** The Seller will make shipments under this Contract/Purchase Order only when requested and only in the quantities requested. Seller shall comply with minimum shipments or standard packaging requirements (if any) included in the Contract/Purchase Order.
41. **CONTRACT RENEWAL OPTIONS:** In the event a clause for option to renew for an additional period is included in the request for bid, all renewals will be based solely upon the option and agreement between the Town and the Seller. Either party dissenting will terminate the Contract/Purchase Order in accordance with its initial specified term.
42. **ELECTRONIC SIGNATURE – UNIFORM ELECTRONIC TRANSACTIONS ACT:** The Town adopts Texas Business and Commerce Code Chapter 322, Uniform Electronic Transactions Act, allowing individuals, companies, and governmental entities to lawfully use and rely on electronic signatures.
43. **FUNDING OUT CLAUSE:** This Contract/Purchase Order may be terminated by the Town without notice and without penalty or liability in the event that (1) the Town lacks sufficient funds for this Contract/Purchase Order; (2) funds for this Contract/Purchase Order are not appropriated and/or budgeted by the City Council of the Town; and (3) funds for this Contract/Purchase Order that are or were to be provided by grant or through a third party are withheld, denied or are otherwise not available to the Town.
44. **DISPUTE RESOLUTION:** Pursuant to subchapter I, Chapter 271, Texas Local Government Code, Seller agrees that, prior to instituting any lawsuit or other proceeding arising from any dispute or claim of breach under this Contract/Purchase Order (a “Claim”), the parties will first attempt to resolve the Claim by taking the following steps: (i) A written notice substantially describing the factual and legal basis of the Claim shall be delivered by the Seller to the Town within one-hundred eighty (180) days after the date of the event giving rise to the Claim, which notice shall request a written response to be delivered to the Seller not less than fourteen (14) business days after receipt of the notice of Claim; (ii) if the response does not resolve the Claim, in the opinion of the Seller, the Seller shall give notice to that effect to the Town whereupon each party shall appoint a person having authority over the activities of the respective parties who shall promptly meet, in person, in an effort to resolve the Claim; (iii) if those persons cannot or do not resolve the Claim, then the parties shall each appoint a person from the highest tier of managerial responsibility within each respective party, who shall then promptly meet, in person, in an effort to resolve the Claim.
45. **DISCLOSURE OF CERTAIN RELATIONSHIPS:** Chapter 176 of the Texas Local Government Code requires that any person, as defined in the statute, considering doing business with a local government entity disclose in the Questionnaire Form CIQ, the

person's affiliation or business relationship that might cause a conflict of interest with a local government entity. By law, this questionnaire must be filed with the Records Administrator of the Town not later than the 7th business day after the later of (a) the date the person (i) begins discussions or negotiations to enter into a contract with the local governmental entity, or (b) submits to the local governmental entity an application, response to a request for proposals or bids, correspondence, or another writing related to a potential contract with the local governmental entity, or (b) the date the person becomes aware (i) of an employment or other business relationship with a local government officer, or a family member of the officer, described by the statute, or (ii) that the person has given one or more gifts described in the statute. See Section 176.006, Local Government Code. A person commits an offense if the person knowingly violates Section 176.006, Local Government Code. An offense under this section is a Class C misdemeanor. The questionnaire may be found at www.ethics.state.tx.us/forms/CIQ.pdf By submitting a response to this request, Seller represents that it is in compliance with the requirements of Chapter 176 of the Texas Local Government Code.

46. **FORCE MAJEURE:** To the extent either the Town or Seller shall be wholly or partially prevented or delayed from the performance of this Contract/Purchase Order or of any obligation or duty under this Contract/Purchase Order placed on such party, by reason of or through work strikes, stoppage of labor, riot, fire, flood, acts of war, insurrection, court judgment, act of God, or other specific cause reasonably beyond the party's control and not attributable to its malfeasance, neglect or nonfeasance, then in such event, such party shall give notice of the same to the other party (specifying the reason for the prevention) and the time for performance of such obligation or duty shall be suspended until such disability to perform is removed.
47. **BAFO:** During evaluation process Town reserves the right to request a best and final offer upon completion of negotiations.
48. **SILENCE OF SPECIFICATIONS:** The apparent silence of these specifications as to any detail or to the apparent omission from it of a detailed description concerning any point, shall be regarded as meaning that only the best commercial practices are to prevail. All interpretations of these specifications shall be made on the basis of this statement.
49. **APPLICABLE LAW:** This agreement shall be governed by the laws of the State of Texas, including, when applicable, the Uniform Commercial Code as adopted by the State of Texas (excluding any rule or principle that would refer to and apply the substantive law of another state or jurisdiction), as effective and in force on the date of this Contract/Purchase Order, without regard to its conflict of laws rules or the conflict of law rules of any other jurisdiction. The foregoing, however, shall not be construed or interpreted to limit or restrict the right or ability of the City to seek and secure injunctive or any other relief from any competent authority as contemplated herein.
50. **VENUE:** This Contract/Purchase Order is performable in Dallas County, Texas, and venue for any suit, action, or legal proceeding under or in connection with this Contract/Purchase Order shall lie exclusively in Dallas County, Texas. Seller submits to the

exclusive jurisdiction of the courts in Dallas County, Texas for purposes of any such suit, action, or proceeding hereunder, and waives any claim that any such suit, action, or legal proceeding has been brought in an inconvenient forum or that the venue of that proceeding is improper.

51. **COST OF RESPONSE:** Any cost incurred by the Seller in responding to the Request for Proposal is the responsibility of the Seller and cannot be charged to the Town.
52. **PROHIBITION AGAINST PERSONAL INTEREST IN CONTRACTS:** No Town of Addison officer or employee shall have a direct or indirect financial interest in any contract with the Town or be directly or indirectly financially interested in the sale of land, materials, supplies or services to the Town.
53. **PRIOR OR PENDING LITIGATION OR LAWSUITS:** Each Seller must include in its proposal a complete disclosure of any alleged significant prior or ongoing contract failures, any civil or criminal litigation or investigation pending which involves the Seller or in which the Seller has been judged guilty or liable.
54. **SEVERABILITY:** The invalidity, illegality, or unenforceability of any provision of this Contract/Purchase Order shall in no way affect the validity or enforceability of any other portion or provision of this Contract/Purchase Order. Any void or invalid provision shall be deemed severed from this Contract/Purchase Order and the balance of the Contract/Purchase Order shall be construed and enforced as if the Contract/Purchase Order did not contain the particular portion or provision held to be void. The parties further agree to reform the Contract/Purchase Order to replace any stricken provision with a valid provision that comes as close as possible to the intent of the stricken provision. The provisions of this section shall not prevent this entire Contract/Purchase Order from being void should a provision which is the essence of the Contract/Purchase Order be determined to be void.
55. **HEADINGS; "INCLUDES":** The headings of this Contract/Purchase Order are for convenience of reference only and shall not affect in any manner any of the terms and conditions hereof. The words "includes" and "including" are terms of enlargement and not of limitation or exclusive enumeration, and use of the terms does not create a presumption that components not expressed are excluded.
56. **CONFLICT:** When there is a conflict between the this purchase order (including, without limitation, these Terms and Conditions) and the Seller's invoice, this purchase order shall prevail.
57. **RESPONSE CONTRACTUAL OBLIGATION:**

Waiver: This response, submitted documents, and any negotiations, when properly accepted by the Town, shall constitute a contract equally binding between the successful Seller and the Town. No different or additional terms will become part of this Contract/Purchase Order except as properly executed in an addendum or change order. **By**

submitting a bid, Seller waives any claim it has or may have against the Town, its officials, officers, employees, and agents, arising out of or in connection with the administration, evaluation, or recommendation of any bid, acceptance or rejection of any bid, and the award of a contract.

58. **NO WAIVER OF IMMUNITY.** Notwithstanding any other of this Contract/Purchase Order, nothing in this Contract/Purchase Order shall or may be deemed to be, or shall or may be construed to be, a waiver or relinquishment of any immunity, defense, or tort limitation to which the Town, its officials, officers, employees, representatives, and agents are or may be entitled, including, without limitation, any waiver of immunity to suit.
59. **NO BOYCOTTING ISRAEL.** The entity contract with the Town of Addison does not boycott Israel and will not boycott Israel during the term of the contract. Reference HB 89 as it relates to Chapter 2270 of the Texas Government Code. Boycott Israel means refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes.

SECTION SP

SPECIAL PROVISIONS

TABLE OF CONTENTS

1. GENERAL.....	5
2. EXAMINATION OF SITE	5
3. SPECIFICATIONS.....	5
4. SUBSURFACE INVESTIGATION.....	6
5. HISTORICAL, SCIENTIFIC AND ARCHAEOLOGICAL DISCOVERIES	6
ENVIRONMENTAL REQUIREMENTS.....	6
6. COMPLIANCE WITH LAWS.....	9
7. PERMITS, LICENSES. AND REGULATIONS	9
8. RESTRICTED WORK HOURS	9
9. COMPLIANCE WITH IMMIGRATION LAWS:.....	9
10. NON-DISCRIMINATION POLICY.....	9
11. ANTITRUST LAWS.....	9
12. ABANDONMENT	10
13. DISCREPANCIES	10
14. PREPARATION OF STORM WATER POLLUTION PREVENTION PLAN:.....	10
15. ADDENDA.....	10
16. PAY ITEMS	10
17. INCREASE OR DECREASE IN QUANTITIES.....	10
18. SUBSIDIARY WORK	11
19. QUALIFICATION OF BIDS	11
AWARD AND EXECUTION OF CONTRACT.....	11
20. EXPLANATION OF CONTRACT TIME.....	12
21. COPIES OF PLANS FURNISHED	13
22. PRE-CONSTRUCTION CONFERENCE.....	13

23. GENERAL SEQUENCE OF CONSTRUCTION.....	13
24. PROJECT REPRESENTATIVE	13
25. COORDINATION WITH OTHERS.....	13
26. INSURANCE	13
WORKERS' COMPENSATION INSURANCE COVERAGE:.....	15
27. RESOLUTION OF DISPUTES	18
28. SHOP DRAWINGS.....	18
29. PROJECT VIDEO	19
30. INSPECTION	19
31. ACCESS ROUTES, STAGING AREAS AND STORAGE AREAS.....	20
32. PROPERTY ACCESS.....	20
33. PLANT, PROCEDURES, METHODS AND EQUIPMENT	20
34. PARKING OF CONSTRUCTION EQUIPMENT	20
35. ZONING REQUIREMENTS	20
36. IN PUBLIC ROADS AND PRIVATE DRIVES	21
37. HAULING ON TOWN OF ADDISON STREETS	21
38. EXISTING POWER POLES & GUY WIRES	21
39. SAFETY RESTRICTIONS - WORK NEAR HIGH VOLTAGE LINES	21
40. PROTECTION OF EXISTING UTILITIES AND STRUCTURES.....	22
41. PUBLIC UTILITIES AND OTHER PROPERTY TO BE CHANGED	22
42. MAINTENANCE AND REPAIRS	23
43. PROTECTION OF WORK	23
44. PUBLIC CONVENIENCE AND SAFETY	23
45. PROTECTION OF PERSONS AND PROPERTY	25
46. SUSPENSION OF WORK RELATED TO DANGER.....	25

47. PROPERTY LINES AND MONUMENTS	26
48. DURING CONSTRUCTION.....	26
49. CONTRACTOR’S CONTINUING OBLIGATION	26
50. IRRIGATION AND SPRINKLER REPAIR	26
51. REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK	26
52. DISPOSITION AND DISPOSAL OF MATERIALS	27
53. CLEAN-UP FOR FINAL ACCEPTANCE.....	27
54. STARTUP TESTING REQUIREMENTS	27
55. CLAIMS FOR DAMAGES OR INJURY	27
56. WAIVER OF CLAIMS	28
57. MECHANICS AND MATERIALMEN’S LIEN.....	28
58. CONTRACTOR’S AFFIDAVIT OF BILLS PAID:.....	28
59. PRODUCT RECORD DOCUMENTS.....	28
60. OWNERSHIP OF WORK AND MATERIALS	29
61. DRAWINGS AND OTHER DATA.....	30
62. TOWN OF ADDISON APPROVAL	30
63. USE OF EXPLOSIVES:.....	30
64. POWER FOR CONSTRUCTION.....	31
65. LIQUIDATED DAMAGES	31
66. CONTRACT DELAY	31
67. SUBCONTRACTORS	31
68. PAYMENTS TO SUBCONTRACTORS	31
69. USE OF COMPLETED PORTIONS OF THE WORK	32
70. COMPLETE AGREEMENT.....	32
71. WAIVER	33

72. EXECUTION OF THE CONTRACT	33
73. DEFINITIONS	33
74. MODIFICATIONS TO THE LANGUAGE OF THE GENERAL PROVISIONS	33
75. CONTRACTOR REPRESENTATIONS	42
76. PREVAILING WAGE RATES.....	43
77. BID ITEMS/REFERENCE SPECIFICATIONS.....	48

SPECIAL PROVISIONS

1. **GENERAL:** This Work shall conform to the requirements of the Specifications and the details as shown on the Plans. These Contract Documents are intended to be complementary. The Contractor shall do all work as provided in the plans, specifications, special provisions, bid and contract, and shall do such additional Extra work as may be considered necessary to complete the work in a satisfactory and acceptable manner. The Contractor shall furnish all labor, tools, materials, machinery, equipment, and incidentals necessary to the satisfactory prosecution and completion of the Work. Requirements of any of the Contract Documents are as binding as if called for by all. In the event of conflict between the Plans and the Specifications, the Contractor will be deemed to have assumed the more expensive way of doing the Work unless, before submitting a bid, the Contractor shall have asked for and obtained (by addendum) a written decision as to which method or material is intended.

In cases of discrepancies, calculated dimensions shall govern over scaled dimensions; Special Provisions and special Specifications shall govern over both General Provisions and standard Specifications; and quantities shown on the Plans shall govern over those shown in the proposal.

2. **EXAMINATION OF SITE:** The Contractor acknowledges that he has investigated and satisfied itself as to the conditions affecting the Work, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, or similar physical conditions at the site, conditions of the ground, the character of equipment and facilities needed preliminary to and during execution of the Work. The Contractor acknowledges that he has inspected the site of the Work and is familiar with the soil conditions to be encountered. Any failure by the Contractor to acquaint himself with the available information will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the Work. The Town of Addison assumes no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available by the Town and the Engineer.

3. **SPECIFICATIONS:** Construction improvements shall be governed by the following published specifications and details (except as modified by these Special Provisions):

Standard Specifications for Public Works Construction, North Central Texas - North Central Texas Council of Governments (latest edition);

Town of Addison Standard Construction Details;

The specifications included in this document;

The Contractor shall keep copies of applicable Specifications on the Project site at all times.

Where reference is made to specifications compiled by other agencies, organizations or departments, such referenced specifications are hereby made a part of the Project Specifications.

4. **SUBSURFACE INVESTIGATION:** Contractor is responsible for anticipating subsurface investigations for excavation.
5. **HISTORICAL, SCIENTIFIC AND ARCHAEOLOGICAL DISCOVERIES:** Contractor shall immediately give an oral and written report to the Town of Addison of the discovery of any articles of historical, scientific, or archaeological significance. Contractor shall take all necessary steps to preserve the article and shall cease operations, which would affect the find until otherwise directed by the Town of Addison but continue with all other unaffected operations. The future operations of Contractor with respect to the discovery, including disposition of the articles, shall be decided by the Town of Addison. The Town of Addison shall have sole and exclusive title to any discovered articles.

The Town of Addison shall investigate the site conditions promptly after receiving the notice. If the conditions do materially so differ and cause an increase or decrease in Contractor's cost of, or the time required for performing any part of the work under the Contract, whether or not changed as a result of conditions, an equitable adjustment will be made and the Contract modified in writing accordingly.

No request by Contractor for an equitable adjustment to the Contract under this Section shall be allowed unless Contractor has given the written notice required. No request by Contractor for an equitable adjustment of the Contract for differing site conditions will be allowed or shall be made after final payment under the Contract.

ENVIRONMENTAL REQUIREMENTS: In addition to requirements set forth in other sections of the Contract, including the Plans and Specifications, Contractor shall ensure that the requirements of this Section are fulfilled and incorporated into its procedures and processes as well as those of any Subcontractors. All materials utilized by Contractor on the Project shall comply with all applicable local, state and federal laws and regulations.

A. Contractor is responsible for compliance with any requirements included in the Contract Documents regarding Hazardous Materials. If Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by Contractor, Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Town of Addison in writing.

1. The term "Hazardous Materials" means any substance or compound, whether solid, liquid or gaseous: (i) which is listed, defined or regulated as a "hazardous substance", "hazardous waste", "extremely hazardous waste", "solid waste", "toxic substance", "hazardous substance", "hazardous material" or "regulated substance" or otherwise classified as hazardous or toxic, in or pursuant to any Environmental Law; or (ii) which is

or contains asbestos, radon, any polychlorinated biphenyl, urea formaldehyde foam insulation, explosive or radioactive material, lead, or motor fuel or other volatile organic compounds; or (iii) which causes or poses a threat to cause a contamination or nuisance on the Project Site or any adjacent property, or (iv) which causes or poses a threat to cause a hazard to the environment or to the health, safety or welfare of persons on or about the Project Site.

2. The term “Environmental Law” means any federal, state or local law, statute, guidance or policy statement, ordinance, code, rule, regulation, license, authorization, decision, order, injunction or decree, which pertains to health, safety or the environment (including, but not limited to, ground, air, water or noise pollution or contamination, and underground or aboveground tanks) and shall include without limitation, the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, the Resource Conservation and Recovery Act of 1976, as amended, the Occupational Health and Safety Act, the Toxic Substances Control Act, the Texas Water Code and the Texas Solid Waste Disposal Act and any other state or federal environmental statutes.

B. If the material or substance was on the site prior to the issuance of the Notice to Proceed, the Town of Addison shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by Contractor and, in the event such material or substance is found to be present, to verify that it has been remediated to levels required by the Texas Commission on Environmental Quality. When the material or substance has been remediated, Work in the affected area shall resume upon written direction of the Town of Addison.

C. Except as provided in Subparagraph B., Contractor (with the Town of Addison’s prior written approval of the laboratory) shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by Contractor and, in the event such material or substance is found to be present, the Town of Addison shall determine whether Contractor or the Town of Addison shall have the substance remediated to levels required by the Texas Commission on Environmental Quality. When the material or substance has been remediated, Work in the affected area shall resume upon written direction of the Town of Addison. The Contract time shall not be extended and the Contract Price shall not be increased, unless the material or substance to be remediated were not introduced to the Work Site by Contractor, and Contractor shall then pay for (or reimburse the Town of Addison for) the testing and remediation.

D. The Town of Addison shall not be responsible under this Section for materials or substances Contractor brings or introduces to the Project Site. Contractor shall be responsible for the fault or negligence in the use and handling of materials or substances of Contractor, Subcontractor, Sub-subcontractor, or anyone directly or indirectly employed by any of them.

E. Contractor shall indemnify the Town of Addison and its affiliates for any and all damages incurred by the Town of Addison as a result of Contractor’s actions with respect

to all applicable state and federal environmental laws related to materials or substances Contractor brings to the Project Site, including but not limited to fines, penalties, costs of remediation and reasonable attorney's fees. No time extension shall be granted for breach of this provision.

F. Contractor agrees that it shall not transport to, use, generate, dispose of, or install at the Project Site any Hazardous Materials, except in accordance with applicable environmental laws. Further, in performing the Work, Contractor shall not cause any release of Hazardous Materials into, or contamination of, the environment, including the soil, the atmosphere, any water course or ground water unless required by the Contract Documents. In the event Contractor engages in any of the activities prohibited in this Section or fails to stop Work as provided in this Section, to the fullest extent permitted by law, Contractor hereby indemnifies and holds the Town of Addison, its affiliates and their respective officers, agents, employees and tenants harmless from and against any and all claims, damages, losses, causes of action, suits and liabilities of every kind, including but not limited to, expenses of litigation, court costs, punitive damages and attorneys' fees, arising out of, incidental to or resulting from the activities prohibited in this Section or Contractor's failure to stop Work as required. Contractor shall obtain from manufacturers and furnish to the Town of Addison Materials Safety Data Sheets (OSHA Form 20) for all materials incorporated into the Project by Contractor. The Town of Addison hereby agrees that, as between the Town of Addison and Contractor, the Town of Addison will be responsible for Hazardous Materials on site which existed prior to Contractor performing Work on the Project Site or which are introduced to the Project Site by the Town of Addison, except as provided in this Section. Contractor will not be considered the generator of Hazardous Materials on site which existed prior to Contractor performing Work on the Work Site or which are introduced to the Project Site by the Town of Addison. If the Hazardous Materials were on the Project Site prior to Contractor's presence on the Project Site or were introduced to the Project Site by the Town of Addison, then, if appropriate, the Town of Addison will make an equitable adjustment to the Contract.

G. Include in all construction subcontracts exceeding \$100,000, the following requirement: "Contractor is responsible for compliance with all applicable standards, orders, or requirements issued under Section 306 of the Clean Air Act, Section 505 of the Clean Water Act, Executive Order 11738, and Environmental Protection Agency regulations."

H. No request by Contractor for an equitable adjustment to the Contract under this Section shall be allowed unless Contractor has given the written notice required.

I. No request by Contractor for an equitable adjustment of the Contract for Hazardous Materials will be allowed or shall be made after final payment under the Contract.

6. **COMPLIANCE WITH LAWS:** The Contractor shall familiarize himself with the nature and extent of the Specifications, Plans, Project Site conditions, traffic and safety requirements, and shall fully comply with all local, state and federal laws, including all codes, ordinances, rules and regulations applicable to this Contract and the Work to be

done hereunder, which exist or which may be enacted later by governmental bodies having jurisdiction or authority for such enactment. The Contractor shall comply with all federal, state and local laws, rules and regulations of every kind and nature applicable to the performance of its Work hereunder and shall hold the Town of Addison and the Engineer harmless therefrom. No plea of ignorance or misunderstanding thereof will be considered.

7. **PERMITS, LICENSES. AND REGULATIONS:** Permits and licenses for the prosecution of the Work shall be secured and paid for by the Contractor. Any required permit fees will still be paid by the Contractor. Wherever the Work under this contract requires the obtaining of permits from the Town of Addison or other public authorities, duplicate copies of such permits shall be furnished to the Engineer by the Contractor hereunder before the Work covered thereby is started. **NO WORK WILL BE ALLOWED TO PROCEED BEFORE SUCH PERMITS ARE OBTAINED.**
8. **RESTRICTED WORK HOURS:** Per the Town of Addison Building Regulations, “It shall be unlawful for a person, firm or corporation to excavate, erect, build, construct, alter, repair or demolish any building or structure which has been issued or which is required to be issued a building permit by the Town of Addison between the hours of 7:00 p.m. and 7:00 a.m. Monday through Friday, and between the hours of 7:00 p.m. and 8:00 a.m. on Saturday and Sunday, if such activity is performed within a residential, apartment, or townhouse zoned area, or within three hundred (300) feet of an occupied residence, except in cases of urgent necessity or in the interest of public safety and convenience, and then only by permit of the City Manager.”

It is in the interest of the public safety and convenience for the Work under this Project to occur outside the standard Work hours. However, the contractor will must present a detailed Work schedule and obtain written approval from the Town.
9. **COMPLIANCE WITH IMMIGRATION LAWS:** Contractor shall take all steps necessary to ensure that all of the Contractor’s employees are authorized to work in the United States as required by the Immigration Reform and Control Act of 1986.
10. **NON-DISCRIMINATION POLICY:** It is the policy of the Town of Addison to afford all people an equal opportunity to bid on any contract being let by the Town. The Town of Addison has a policy that prohibits discrimination against any person because of race, color, sex, or national origin, in the award or performance of any contract. The Town of Addison will require its employees, agents, and Contractors to adhere to this policy.
11. **ANTITRUST LAWS:** The Contractor hereby assigns to the Town of Addison any and all claims for overcharges associated with this contract which arise under the antitrust laws of the United States 15 U.S.C.A. Sec. 1, et seq. (1973).
12. **ABANDONMENT:** The Town of Addison reserves the right to abandon, without obligation to the Contractor, any part of the Project, or the entire Project, at any time before the Contractor begins any construction Work authorized by the Town of Addison. In case of total abandonment of the Project, the Contract becomes void. The Town of Addison may abandon portions of the Project at any time during the Project duration. In case of

such partial abandonment, the Contractor shall not be due any payment for lost or unrealized profits on the abandoned portions of the Project.

13. **DISCREPANCIES:** If the Contractor, in the course of the Work, finds any discrepancy between the Contract Documents and the physical conditions of the Project, or any errors or omissions in Plans or in the layout as given by survey points and instructions, or if it appears that any Plan, Specification or other Contract Document is or may not be in compliance with any building code or other requirement of any governmental body, he shall immediately inform the Town of Addison and the Engineer in writing, and the Town of Addison and the Engineer shall promptly verify the same. Any Work done after such discovery, until authorized, will be done at the Contractor's risk.
14. **PREPARATION OF STORM WATER POLLUTION PREVENTION PLAN:** A Storm Water Pollution Prevention Plan (SW3P) will not be required for this project.
15. **ADDENDA:** Bidders desiring further information, or interpretation of the Plans and Specifications, must make written request for such information to the Engineer not later than six (6) working days prior to the date set for the Bid opening. The ability to ask questions will close at **5:00 pm on Tuesday, April 13th, 2021**. Answers to all such requests will be issued in the form of Addenda and a copy of such Addenda will be released through www.civcastusa.com. It will be the responsibility of each person who has been issued a set of Bidding Documents to secure all Addenda from www.civcastusa.com. Addenda will be bound with and made a part of the Contract Documents. No other explanation or interpretation will be considered official or binding. Should a Bidder find discrepancies in, or omissions from, the Plans, Specifications or Contract Documents, or should it be in doubt as to their meaning, it shall at once notify the Engineer in writing in order that a written addendum may be sent to all Bidders.
16. **PAY ITEMS:** Pay items provided are intended to be all-inclusive of the Work required on this Project. Work required by the Plans or Specifications but not provided with a specific pay item shall be considered incidental to other items of Work. Final payment to the construction Contractor shall not be made until all Work has been finally completed and verified in accordance with the construction contract, Plans and Specifications and have been finally accepted by the Town of Addison.

See bid item descriptions/reference specifications for details.

17. **QUANTITIES:** The quantities shown in the proposal are approximate. Final payment will be based on quantities determined by measurement methods described for each work item.
18. **SUBSIDIARY WORK:** Any and all Work specifically governed by documentary requirements for the Project, such as conditions imposed by the Plans or these Special Provisions, in which no specific item for bid has been provided for in the Proposal, shall be considered as a subsidiary item of Work, the cost of which shall be included in the various bid items in the Proposal. Costs of permits, inspection fees, traffic control, construction staking, surface restoration and cleanup are general items of Work which fall in the category of subsidiary Work. Any repairs or replacement of items damaged during

demolition or as a result of new construction will be considered subsidiary. Limits of all Work requiring repair will be determined by the Town of Addison staff or the inspector. Extreme care should be taken during all demolition and construction operations.

19. **QUALIFICATION OF BIDS:** The Town of Addison reserves the right to reject any and all Bids, to waive any and all informalities not involving price, time or changes in the Work, and the right to disregard all nonconforming, non-responsive, unbalanced, or conditional Bids. The Town reserves the right to reject the Bid of any Bidder if the Town believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by the Town. Discrepancies in the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

To be considered responsive, the apparent three lowest Bidders are required to submit the Statement of Experience per Section BQS “Bidder Qualification Statement” within 5 days.

The apparent low three Bidders will be notified by the Engineer to request the information.

AWARD AND EXECUTION OF CONTRACT: For the purpose of award, each bid submitted shall consist of the correct summation of the products of the estimated quantities shown in the proposal, multiplied by their bid unit prices for the following parts:

- **Base Bid Items 1 through 8**
- **Bid Item 9**

Bidders must fill bid proposal for all base bids and all additive alternates, if any. The method of Award will be based on the lowest qualified bidder for **base bid items and any combination of alternatives, if applicable, depending on the availability of funds.**

The Town reserves the right to accept whichever bid is determined to be in the best interest of the public and to reject all bids.

All payments will be based on actual quantities and bid unit prices.

20. **EXPLANATION OF CONTRACT TIME:** The term “Contract Time” as used in this Provision will mean the **120 calendar days, regardless of the base bid schedule awarded**, for completion of the Work of the Contract from the date the Contract was executed. The term “calendar day” as used in this Article will mean every day shown on the calendar. Calendar days will be consecutively counted from commencement of Contract Time regardless of weather, weekends, holidays, suspensions of Contractor’s operations, delays or other events as described herein.

In the event of a catastrophic event (i.e., war, invasion, riot, declared state of emergency, national strike, or other situations as declared by the Town of Addison) directly and substantially affecting the Contractor's operations on the Contract, the Contractor and the Town shall agree as to the number of calendar days to extend the Contract Time. In the event the Contractor and Town are unable to agree to the number of calendar days to extend the Contract Time, the Town shall unilaterally determine the number of calendar days to extend the Contract Time reasonably necessary and due solely to such catastrophic event and the Contractor shall have no right whatsoever to contest such determination, save and except that the Contractor establishes that the number of calendar days determined by the Town were arbitrary or without any reasonable basis.

Should the Contractor fail to complete the Contract on or before expiration of the Allowable Contract Time, as adjusted in accordance with the provisions above, the Town shall deduct from the moneys due the Contractor the Daily Value as shown in provision 99 for each calendar day completion exceeds the Allowable Contract Time. The term "Allowable Contract Time" as used in this Article shall mean the Original Contract Time plus adjustments pursuant to the statements above. This deduction shall be the disincentive for the Contractor's failing to timely complete the Contract. **This shall be strictly enforced.**

21. **COPIES OF PLANS FURNISHED:** One (1) electronic copy of the Plans shall be furnished to the successful Contractor, at no charge, for construction purposes.
22. **PRE-CONSTRUCTION CONFERENCE:** The successful Contractor, Engineer, and Town of Addison shall meet for a pre-construction conference before any of the Work begins on this Project. At this time, details of sequencing of the Work, contact individuals for each party, testing requirements, submittals, and pay requests will be covered. Prior to the meeting, the Contractor shall prepare schedules showing the sequencing and progress of their Work and its effect on others. A final composite schedule will be prepared during this conference to allow an orderly sequence of Project construction.
23. **GENERAL SEQUENCE OF CONSTRUCTION:** Prior to the start of Work, the Contractor shall develop a detailed construction and sequence of construction schedule using the critical path method (CPM) and submit to the Town of Addison and Engineer for approval. The CPM shall reflect all definable features of Work and activities that shall cause minimum interference with water operations during construction. If the schedule or sequence becomes unworkable or unsatisfactory as Work proceeds, adjustments shall be made. During all phases of construction access to all existing businesses must be maintained at all times unless otherwise authorized in writing by the Town of Addison.

The Contractor must comply with all work area restrictions as indicated in the Plans unless specifically authorized in writing by the Town of Addison.

24. **PROJECT REPRESENTATIVE:** The Town of Addison, the Engineer, the Contractor(s), and any applicable public utilities shall designate a single individual within their organization to act as liaison for the Project. This individual shall be aware of the day to day activities on the Project, have authority to make decisions binding on the party, and

serve as single point for coordination of activities with the other team members. The Contractor's representative must be available to meet and discuss construction related issues on site or at the Town's offices within 20 minutes of a request during working hours and throughout the entire construction period. Upon repeated failure of attendance at requested meetings, Contractor will be required to have a Project representative on-site at all times.

25. COORDINATION WITH OTHERS: In the event that other Contractors are doing Work in the same area simultaneously with this Project, the Contractor shall coordinate his proposed construction with that of the other Contractors. The Town of Addison and/or the Engineer shall mediate any disputes, and the Contractors shall comply with their decisions.

26. INSURANCE: Each insurance policy that the Contractor must furnish in accordance with these contract documents shall name the Town of Addison and the Engineer as additional insured. Contractor shall include in their bid package, a copy of their certificate of insurance showing compliance to the limits established by the Town of Addison.

1.0 The Contractor shall agree to furnish and maintain continuously during the period of this agreement, any renewals or extension, insurance coverage meeting all of the following requirements:

- a. Commercial General Liability Insurance at minimum combined single limits of \$1,000,000 per occurrence and \$2,000,000 general aggregate for Bodily Injury and Property Damage, which coverage shall include Products/Completed Operations, and XCU Hazards. Coverage for product/completed operations must be maintained for at least two (2) years after the construction Work has been completed. Coverage must be amended to provide for an each-project aggregate limit of insurance. Contractual Liability must be included.
- b. Workers Compensation Insurance at statutory limits, including employer's liability coverage at minimum limits of \$1,000,000 each occurrence-each accident, \$1,000,000 by disease-each occurrence and \$1,000,000 by disease aggregate
- c. Commercial Automobile Liability Insurance at minimum combined single limits of \$1,000,000 per occurrence for bodily injury and property damage, including owned, non-owned, and hired car coverage.
- d. Umbrella Liability at minimum limits of \$1,000,000 each-occurrence \$4,000,000 aggregate with respect to primary commercial general liability, automobile liability and employer's liability policies.
- e. Any Subcontractor(s) hired by the Contractor shall maintain insurance coverage equal to that required by the Contractor. It is the responsibility of the Contractor to assure compliance with this provision. The Town accepts no responsibility arising from the conduct, or lack of conduct, of the Subcontractor.

- f. A comprehensive general liability insurance form may be used in lieu of a commercial general liability form. In this event, coverage must be written on an occurrence basis, at limits of \$1,000,000 each-occurrence, combined single limit and coverage must include a broad form comprehensive general liability endorsement, products/completed operations, XCU hazards and contractual liability.
- 2.0 With reference to the foregoing insurance requirements, Contractor shall specifically endorse applicable insurance policies as follows:
 - a. The Town shall be named as an additional insured with respect to general liability and automobile liability.
 - b. All liability policies shall contain no cross liability exclusions or insured versus insured restrictions.
 - c. A waiver of subrogation in favor of the Town of Addison shall be contained in the workers compensation and all liability policies.
 - d. All insurance policies shall be endorsed to require the insured to immediately notify the Town of Addison of any material changes in the insurance coverage.
 - e. All insurance policies shall be endorsed to the effect that the Town will receive at least thirty (30) days notice prior to cancellation or non-renewal of the insurance.
 - f. All certificates shall be mailed to Town of Addison, Purchasing Dept., P.O. Box 9010, Addison, Texas 75001 or emailed to purchasing@addisontx.gov.
 - g. All insurance policies, which name the Town as an additional insured, must be endorsed to read as primary coverage regardless of the application of other insurance.
 - h. Required limits may be satisfied by any combination of primary and umbrella liability insurances.
 - i. Contractor may maintain reasonable and customary deductibles, subject to approval by the Town.
- 3.0 All insurance shall be purchased from an insurance company who meets the following requirements:
 - a. Must be issued by a carrier, which is rated “A-” VII or better by A.M. Best’s Key Rating Guide.
 - b. Licensed and admitted to do business in the State of Texas and is a subscriber to the Texas Guaranty Fund.
- 4.0 All insurance must be written on forms filed with and approved by the Texas State Board of Insurance. Certificates of insurance shall be prepared and executed by the insurance

company or its authorized agent and shall contain provisions representing and warranting the following:

- a. Set forth all endorsements and insurance coverages according to requirements and instruction contained herein.
- b. Shall specifically set forth the notice-of-cancellation or termination provisions to the Town.

5.0 Upon request, Contractor shall furnish the Town of Addison with certified copies of all insurance policies.

WORKERS' COMPENSATION INSURANCE COVERAGE:

A. Definitions.

Certificate of Coverage ("certificate") - A copy of a certificate of insurance, a certificate of authority to self insure issued by the Texas Workers' Compensation Commission (the "TWCC"), or a coverage agreement (TWCC-81, TWCC-82, TWCC-83 or TWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a Project, for the duration of the Project.

Duration of the Project - includes the time from the beginning of the Work on the Project until the Contractor's/person's Work on the Project has been completed and accepted by the governmental entity.

Persons Providing Services on the Project ("Subcontractor" in Section 406.096 of the Texas Labor Code) - includes all persons or entities performing all or part of the services the Contractor has undertaken to perform on the Project, regardless of whether that person contracted directly with the Contractor and regardless of whether that person has employees. This includes, without limitation, independent Contractors, Subcontractors, leasing companies, motor carriers, Town-operators, employees of any such entity or employees of any entity which furnishes persons to provide services on the Project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a Project. "Services" does not include activities unrelated to the Project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

- B. The Contractor shall provide coverage, based on property reporting of classification codes and payroll amounts and filing of any coverage agreement, which meets the statutory requirements of Texas Labor Code, 401.011(44) for all employees of the Contractor providing services on the Project, for the duration of the Project.
- C. The Contractor must provide a certificate of coverage to the Town of Addison prior to being awarded the contract.

- D. If the coverage period shown on the Contractor's current certificate of coverage ends during the duration of the Project, the Contractor must, prior to the end of the coverage period, file a new certificate of coverage with the Town of Addison, showing that the coverage has been extended.
- E. The Contractor shall obtain from each person providing services on the Project, and provide to the Town of Addison:
 - 1. A certificate of coverage, prior to that person beginning Work on the Project, so that the Town of Addison will have on file certificates of coverage showing coverage for all persons providing services on the Project; and,
 - 2. No later than seven days after receipt by the Contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;
- F. The Contractor shall retain all required certificates of coverage on file for the duration of the Project and for one year thereafter.
- G. The Contractor shall notify the Town of Addison in writing by certified mail or personal delivery, within 10 days after the Contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project.
- H. The Contractor shall post on each Project site a notice, in the text, form and manner prescribed by the TWCC, informing all persons providing services on the Project that they are required to be covered, and stating how a person may verify current coverage and report failure to provide coverage.
- I. The Contractor shall contractually require each person with whom it contracts to provide Services on a Project to:
 - 1. Provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Codes 401.011 (44) for all its employees providing services on the Project, for the duration of the Project;
 - 2. Provide to the Contractor, prior to that person beginning Work on the Project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the Project, for the duration of the Project;
 - 3. Provide the Contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;
 - 4. Obtain from each person with whom it contracts, and provide to the Contractor;
 - a. A certificate of coverage, prior to the other person beginning Work on the Project; and,

- b. A new certificate of coverage showing extension of the coverage period, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the Project.
- 5. Retain all required certificates of coverage on file for the duration of the Project and for one year thereafter;
- 6. Notify the Town of Addison in writing by certified mail or personal delivery, within 10 days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project; and
- 7. Contractually require each other person with whom it contracts to perform as required by paragraphs (1) - (7) with the certificate of coverage to be provided to the person for whom they are providing services.
- J. By signing this contract or providing or causing to be provided a certificate of coverage, the Contractor is representing to the Town of Addison that all employees of the Contractor who will provide services on the Project will be covered by worker's compensation coverage for the duration of the Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the TWCC's Division of Self-Insurance Regulation. Providing false or misleading information may subject the Contractor to administrative penalties, criminal penalties, civil penalties or other civil actions.
- K. The Contractor's failure to comply with any of these provisions is a breach of contract by the Contractor which entitles the Town of Addison to declare the contract void if the Contractor does not remedy the breach within ten days after receipt of notice of breach from the Town.

The following is the form of notice of workers' compensation coverage prescribed by the TWCC. Pursuant to Section 110.110 (d) (7), this notice must be printed with a title in at least 30-point bold type, and text in at least 19-point nominal type, and shall be in both English and Spanish and any other language common to the worker population.

REQUIRED WORKERS' COMPENSATION COVERAGE

"The law requires that each person working on this site or providing services related to this construction Project must be covered by workers' compensation insurance. This includes persons providing, hauling or delivering equipment or materials, or providing labor or transportation or other service related to the Project, regardless of the identity of their employer or status as an employee.

"Call the Texas Workers' Compensation Commission (TWCC) at (512) 440-3789 to receive further information on the legal requirements for coverage, to verify whether your employer has provided the required coverage, or to report an employer's failure to provide coverage."

27. **RESOLUTION OF DISPUTES:** The parties hereby covenant and agree that in the event of any controversy, dispute, or claim, of whatever nature arising out of, in connection with or in relation to the interpretation, performance or breach of this Contract, including but not limited to any claims based on contract, tort or statute, before filing a lawsuit, the parties agree to submit the matter to Alternative Dispute Resolution pursuant to the laws of the State of Texas. The parties shall select a third party arbitrator or mediator from the current list of neutrals on file with the Alternative Dispute Resolution Administrator of the Dallas County District Courts or other mutually agreeable mediator or arbitrator. All forms of Alternative Dispute Resolution may be used except binding arbitration. The proceedings shall be conducted in accordance with the laws of the State of Texas.
28. **SHOP DRAWINGS:** The Contractor shall provide, review, approve and submit all shop drawings, product data and samples required by the Town of Addison, the Engineer and the Contract Documents in accordance with Item 1.28 of the Standard Specifications for Public Works Construction, North Central Texas Council of Governments. The Contractor shall furnish a minimum of four and a maximum of six copies of shop drawings for review by the Engineer, who will review, approve and forward to the Town of Addison for acceptance. Approved submittals will be returned as follows:
- Two (2) – Town of Addison
 - One (1) – Contractor
 - One (1) – Garver
- Maximum size of submittals shall be 11 x 17 inch. No fax copies are acceptable. Shop drawings shall include all items to be installed in the Project, including but not limited to:
- ☐ A third pump and associated piping, valving, and appurtenances,
 - ☐ Connection of pump suction lines in the existing lift station,
 - ☐ Installation of a bypass pumping connection to provide direct connection to the forcemain and bypass the lift station,
 - ☐ Installation of new pre-cast concrete manhole with piping between the lift station and connection between the new and existing manhole,
 - ☐ Piping between the existing manhole and the lift station, and a new wall core
29. **PROJECT VIDEO:** Prior to the start of construction, Contractor shall video the construction area and property adjacent to construction in the presence of the City Inspector. The format shall be DVD. The video shall be narrated. The Contractor shall furnish the Town of Addison a copy of the video in DVD format prior to commencement of Project. This shall be subsidiary to Project.
30. **INSPECTION:** The Town of Addison and the Engineer reserve the right to inspect, test, measure or verify the construction Work for this Project as they deem necessary to ascertain that the Work is being accomplished in accordance with the standards and requirements set forth in the Contract Documents. Notwithstanding such reviews, the Contractor will be held responsible for the finished Work and any acceptance of the Work by the Town or governmental agencies will not relieve the Contractor from responsibility

for the Work. The Town reserves the right to place full-time construction inspectors at the site of the Work. Costs for inspection services will be paid by the Town of Addison. The Contractor shall provide assistance to the Town of Addison and the Engineer by providing excavation, trench safety, or other Work necessary to facilitate inspection activities, and shall give sufficient notice well in advance of pending construction activities for scheduling of inspection services.

If the Specifications, the Town's instructions, laws, ordinances, or any public authority require any Work to be specially tested, the Contractor shall give the Town timely notice of its readiness for testing, and if the testing is by an authority other than the Town, of the date fixed for such testing. Tests by the Town shall be made promptly, and where practicable at the source of supply.

31. **ACCESS ROUTES, STAGING AREAS AND STORAGE AREAS:** All haul roads and access routes and the location of job site trailers, staging areas, and storage areas shall be subject to the approval of the Town and the Engineer. The Contractor shall be responsible for maintaining and repairing all roads and other facilities used during construction. Upon completion of the Project all existing roads and other disturbed areas shall be left in a condition equal to that at the time the Contractor commences Work on this Project.
32. **PROPERTY ACCESS:** Access to the pump stations shall be maintained at all times unless otherwise directed by the Engineer and/or Town of Addison.
33. **PLANT, PROCEDURES, METHODS AND EQUIPMENT:** The Contractor shall determine the methods to be employed, the procedures to be followed, and equipment to be used on the Work under this contract, subject to the requirements of these Specifications and approval of the Engineer and Town of Addison. Only adequate and safe procedures, methods and equipment shall be used.

The Contractor shall so arrange his Work and provide such plant and equipment as is necessary in order to meet the progress requirements of the approved time schedule and to complete the Work within the period of time as specified in the Contract. Only such materials and equipment as are necessary for the construction of the Work under this contract shall be placed, stored or allowed to occupy any space at the site of the Work.

It is expressly agreed that the acceptance or approval of any order of procedure, methods or equipment submitted or employed by the Contractor shall not in any manner relieve the Contractor of responsibility for the safety, maintenance and repairs of any Work, or for the construction maintenance and safety of the Work hereunder, or from any liability whatsoever on account of any procedure or method employed by the Contractor.

Where the Work under this contract requires permits from the Town of Addison, the State of Texas, or other public authorities, duplicate copies of such permits shall be furnished to the Engineer by the Contractor before the Work covered thereby is started. **NO WORK WILL BE ALLOWED TO PROCEED BEFORE REQUIRED PERMITS ARE OBTAINED AND DISTRIBUTED.**

34. **PARKING OF CONSTRUCTION EQUIPMENT:** At night and during all other periods of time when equipment is not being actively used on the construction Work, the Contractor shall park the equipment at locations which are approved by the Town of Addison. The Contractor shall provide adequate barricades, markers and lights to protect the Town of Addison, the Engineer, the public and other Work. All barricades, lights, and markers must meet the requirements of the Town of Addison, State and Federal regulations.
35. **ZONING REQUIREMENTS:** During the construction of this Project, the Contractor shall comply with the present zoning requirements of the Town of Addison in the use of vacant property for storage purposes.
36. **IN PUBLIC ROADS AND PRIVATE DRIVES:** No public road shall be entirely closed overnight. It shall be the responsibility of the Contractor to build and maintain all weather bypasses and detours, if necessary, and to properly light, barricade and mark all bypasses and detours that might be required on and across the roads involved in the Work included in this Contract.

The Contractor shall make every effort to complete construction and allow immediate access to adjacent property at driveway entrances located along the roadways. Towns or tenants of improvements where access and/or entrance drives are located shall be notified at least twenty-four (24) hours prior to the time the construction will be started at their driveways or entrances and informed as to the length of time driveways will be closed. Contractor shall at all times maintain at least one point of access into all properties, unless obtaining written permission from property Town to do otherwise with such written permission being provided to the Town's inspector.

The Contractor shall be responsible for all road and entrance reconstruction and repairs and maintenance of same for a period of two years from the date of Town of Addison's acceptance of the Work. In the event the repairs and maintenance are not made immediately to the satisfaction of the Town, and it becomes necessary for the Town to make such repairs, the Contractor shall reimburse the Town for the cost of such repairs.

The Contractor shall, at all times, keep a sufficient width of the roadway clear of dirt and other material to allow the free flow of traffic. The Contractor shall assume any and all responsibility for damage, personal or otherwise, that may be caused by the construction along roads and private drives.

37. **HAULING ON TOWN OF ADDISON STREETS:** The Contractor shall receive approval of its haul routes and type of equipment to be used prior to beginning construction. The Contractor shall be responsible for maintaining the cleanliness of existing paved roadways and shall provide equipment and manpower for that purpose.
38. **EXISTING POWER POLES & GUY WIRES:** The Contractor shall have the responsibility of coordinating with the proper authorities for the bracing, replacing or relocating of all utility poles and guy wires which interfere with the Work on this Project prior to beginning its construction operations. The Contractor will also be responsible for

all damage to poles, guy wires, etc. that are damaged or destroyed by Contractor's operations.

39. SAFETY RESTRICTIONS - WORK NEAR HIGH VOLTAGE LINES: The following procedures shall be followed for Work near high voltage lines on this contract:

- a) A warning sign not less than five (5) inches by seven (7) inches, painted yellow with black letters that are legible at twelve (12) feet shall be placed inside and outside vehicles such as cranes, derricks, power shovels, drilling rigs, pile driver, hoisting equipment or similar apparatus. The warning sign shall read as follows: "Warning - Unlawful to Operate This Equipment Within Six Feet of High Voltage Lines."
- b) Equipment that may be operated within ten (10) feet of high voltage lines shall have an insulating cage guard protecting the boom or arm, except backhoes or dippers, and insulator links on lift hook connections.
- c) When necessary to Work within six (6) feet of high voltage electric lines, notify the power company who will erect temporary mechanical barriers, de-energize the line, or raise or lower the line. All such Work done by the power company shall be at the expense of the Contractor. The Contractor shall maintain an accurate log of all such calls to the power company.
- d) The Contractor is required to make arrangements with the power company for the temporary relocation or raising of high voltage lines at the Contractor's sole expense.
- e) No person shall Work within six (6) feet of high voltage lines without protection measures having been taken as outlined in Paragraph c.

40. PROTECTION OF EXISTING UTILITIES AND STRUCTURES: The location and dimensions shown on the Plans relative to existing utilities and subsurface structures are based on the best records and/or field information available and are not guaranteed by the Town of Addison or the Engineer to be accurate as to location and depth. It shall be the Contractor's responsibility to verify locations of adjacent and conflicting utilities sufficiently in advance of its activities in order that he may negotiate such restrictive locations with the Town of Addison of the conflicting utility and/or make local adjustments to provide adequate clearances. The Contractor shall take all necessary precautions in order to protect all utilities and services encountered, whether or not they are indicated on the Plans. All damage to utilities resulting from Contractor's operations shall be restored at its expense. The Town of Addison and the Engineer assume no responsibility for failure to show any or all of these utilities or structures on the Plans, or to show them in their exact locations. It is mutually agreed that such failure shall not be considered sufficient basis for claims for additional compensation for Extra Work or for increasing the pay quantities in any manner whatsoever, unless the obstruction encountered is such as to necessitate changes in the lines or grades, or requires the building of special Work, provisions for

which are not made in the Plans, in which case, provisions in these Specifications for Extra Work shall apply.

41. **PUBLIC UTILITIES AND OTHER PROPERTY TO BE CHANGED:** In case it is necessary to change or move the property of a public utility, such property shall not be moved or interfered with until authorized by the Town of Addison or the Engineer. The right is reserved for the Owner of public utilities to enter upon the limits of the Project for the purpose of making such changes or repairs of their property that may be made necessary by performance of the Contract. The Contractor shall be responsible for coordination with the Town of Addison and the Engineer, and all utility companies whose utility lines or streets may be affected by the proposed improvements. The Contractor shall observe the following:
- a) Prior to any excavation, the Contractor shall determine the locations of all existing water, gas, sewer, electric, telephone, telegraph, television, pipelines and other underground utilities and structures.
 - b) After commencing Work, the Contractor shall use every precaution to avoid interference with existing underground and surface utilities and structures, and protect them from damage.
 - c) Where the locations of existing underground and surface utilities and structures are indicated, these locations are generally approximate, and all items which may be encountered during the Work are not necessarily indicated. The Contractor shall determine the exact locations of all items indicated, and the existence and locations of all items not indicated.
 - d) The Contractor shall repair or pay for all damage caused by its operations to all existing utility lines, public property, and private property, whether it is below ground or above ground, and he shall defend and settle in total the cost of all lawsuits which may arise as a result of its operations.
 - e) To avoid unnecessary interferences or delays, the Contractor shall coordinate all utility removals, replacements and construction with the appropriate utility company, and then request written authorization from the Town of Addison or the Engineer. The Town of Addison and the Engineer will not be liable for damages due to delay as a result of the above.
42. **MAINTENANCE AND REPAIRS:** The Contractor shall maintain and keep in good repair all Work contemplated under these Plans, Specifications, and Plans which shall include the maintenance and repair of all existing streets, storm sewer crossings, utility crossings, temporary crossings for access to adjacent property, barricades, lights, and danger signals, and all Work which is necessary for the well being of the general public. In the event the Contractor fails in its obligations to properly maintain the Work, the Town of Addison shall make such repairs as are necessary and the cost of such repairs shall be deducted from payment due the Contractor.
43. **PROTECTION OF WORK:** During performance and up to date of final acceptance, the Contractor shall be under the absolute obligation to protect the finished Work against damage, loss or injury. In the event of damage, loss or injury, the Contractor shall promptly

replace or repair such Work, whichever the Town of Addison shall determine to be preferable. The obligation to deliver finished Work in strict accordance with the contract prior to final acceptance shall be absolute and shall not be affected by the Town of Addison's approval of or failure to prohibit means and methods of construction used by the Contractor. All risk of loss or damage to the Work shall be borne solely by the Contractor until final acceptance of all Work by the Town of Addison, as evidenced by the Town of Addison's issuance of a certificate of acceptance.

- 44. PUBLIC CONVENIENCE AND SAFETY:** In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for conditions of the Project site, including safety of all persons and property during performance of the Work. This requirement shall apply continuously and not be limited to normal Work hours.

Materials stored about the Work site shall be so placed, and the Work shall at all times be so conducted, as to cause no greater obstruction to the traveling public than is considered necessary by the Town of Addison. The materials excavated shall be placed so as not to endanger the Work or prevent free access to all fire hydrants, water valves, gas valves, manholes (telephone, telegraph or electrical conduits, and sanitary sewers) and fire alarm or police call boxes in the vicinity.

The Town of Addison reserves the right to remedy any neglect on the part of the Contractor as regards to the public convenience and safety which may come to the Town of Addison's attention, after 24 hours notice in writing to the Contractor, save in cases of emergency, when the Town of Addison shall have the right to remedy any neglect without notice; and, in either case, the cost of such Work done by the Town of Addison shall be deducted from the monies due or to become due the Contractor. The Contractor shall notify the Town of Addison and the Engineer when any street is to be closed or obstructed. The Contractor shall provide for emergency vehicle access at all times.

Where the Work passes over or through private property, the Town of Addison shall provide such right-of-way. The Contractor shall notify the proper representatives of any public utility, corporation, company or individual, not less than 48 hours in advance of Work which might damage or interfere with the operation of their property along or adjacent to the Work. The Contractor shall be responsible for all damage or injury to property of any character (except such as may be required by the provisions of the Contract Documents, or caused by agents or employees or the Town of Addison) by reason of any negligent act or omission on the part of the Contractor, its employees, agents or Subcontractors, or at any time due to defective Work or materials, or due to its failure to reasonably or properly prosecute the Work, and said responsibility shall not be released by the fact that the Work shall have been completed and accepted.

When and where any such damage or injury is done to public or private property on the part of the Contractor, he shall restore or have restored at its own cost and expense such property to a condition similar or equal to that existing before such damage was done, by repairing, rebuilding or otherwise restoring as he may be directed, or he shall make good

such damage or injury in a manner acceptable to the property Town of Addison and the Engineer. In case of failure on the part of the Contractor to restore such property or make good such damage or injury, the Town of Addison may, upon 48 hour written notice under ordinary circumstances, and without notice when a nuisance or hazardous condition results, proceed to repair, rebuild or otherwise restore such property as may be determined necessary, and the cost thereof shall be deducted from any monies due or to become due to the Contractor under this contract; or where sufficient contract funds are unavailable for this purpose, the Contractor or its surety shall reimburse the Town of Addison for all such costs.

45. **PROTECTION OF PERSONS AND PROPERTY:** The Contractor shall have the responsibility to provide and maintain all warning devices and take all precautionary measures required by law or otherwise necessary to protect the Work and persons and property while said persons or property are approaching, leaving or within the Work site or any area adjacent to said Work site. No separate compensation shall be paid to the Contractor for the installation or maintenance of any protective measures, warning devices, barricades, lights, signs, or any other precautionary measures required by law or otherwise necessary for the protection of persons or property.

The Contractor shall assume all responsibilities to the general public in connection with the general public's immediate approach to and travel through the Work site and the area adjacent to said Work site.

Where the Work is in or adjacent to any street, alley, sidewalk, public right-of-way or public place, the Contractor shall at its own cost and expense provide such flagmen and watchmen and furnish, erect and maintain such warning devices, barricades, lights, signs, and other precautionary measures for the protection of persons or property as may be prudent or necessary, or as required by law. The Contractor's responsibility for providing and maintaining flagmen, watchmen, warning devices, barricades, signs and lights and other precautionary measures shall not cease until the Project shall have been completed and accepted by the Town of Addison, and shall cease when the Town of Addison notifies the Contractor in writing of final Project acceptance.

If the Town of Addison discovers that the Contractor has failed to comply with applicable federal or state laws (by failing to furnish the necessary flagmen, warning devices, barricades, lights, signs or other precautionary measures for the protection of persons or property), the Town of Addison may order the Contractor to take such additional precautionary measures as required by law to protect persons and property. In addition, the Contractor shall be held responsible for all damages to the Work and other public or private property due to the failure of warning devices, barricades, signs, lights or other precautionary measures in protecting said property; and whenever evidence is found of such damage, the Town of Addison may order the damaged portion immediately removed and replaced by and at the cost and expense of the Contractor.

46. **SUSPENSION OF WORK RELATED TO DANGER:** In addition to the other remedies for suspension of the Work as provided for in the General Provisions and Special

Provisions, the Town of Addison has the authority to suspend all work immediately if, in the Town of Addison's opinion, there is imminent danger to workers or the general public. If there is no imminent danger to workmen or the general public, but trench conditions are not in compliance with Federal Regulations 29 C.F.R. 1926.650-1926.652, the Town of Addison shall warn the Contractor who shall then immediately order all workmen in and adjacent to the trench away from the area. The Contractor must then bring the trench into compliance with the regulations. If the Contractor does not make the required corrections, all work on the Contract shall cease and the Town of Addison will issue a letter of Temporary Suspension of Work. The only work authorized after issuance of this letter is work approved by the regulations. Other work shall not be permitted until the Town of Addison issues a letter of Release of Temporary Suspension of Work. The Contractor shall not be entitled to additional compensation, an extension of time or payment of damages as a result of a temporary suspension of work under this provision.

47. **PROPERTY LINES AND MONUMENTS:** The Contractor shall protect all property corner markers, and when any such markers or monuments are in danger of being disturbed, they shall be properly referenced and if disturbed shall be reset at expense of the Contractor.
48. **DURING CONSTRUCTION:** During construction of the Work, the Contractor shall, at all times, keep the site of the Work and adjacent premises as free from material, debris and rubbish as is practicable and shall remove same from any portion of the site if, in the opinion of the Town of Addison or the Engineer, such material, debris or rubbish constitutes a nuisance or is objectionable. In case of failure on the part of the Contractor to maintain a clean site, the Town of Addison may, upon 24 hour written notice, clean the site, and the cost thereof shall be deducted from any monies due or to become due to the Contractor under its contract; or where sufficient contract funds are unavailable for this purpose, the Contractor or its surety shall reimburse the Town of Addison for all such costs.
49. **CONTRACTOR'S CONTINUING OBLIGATION:** Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by the Town of Addison, nor the issuance of a certificate of Substantial Completion, nor any payment by Town of Addison to Contractor under the Contract Documents, nor any use or occupancy of the Work or any part thereof by Town of Addison, nor any act of acceptance by Town of Addison nor any failure to do so, nor any review and approval of a Shop Drawing or sample submission, nor the issuance of a notice of acceptability by the Town of Addison pursuant to final payment nor any correction of defective Work by Town of Addison will constitute an acceptance of Work not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents.
50. **IRRIGATION AND SPRINKLER REPAIR:** The Contractor shall maintain all existing irrigation systems within the limits of the Project during the duration of the contract. The Contractor shall employ a licensed irrigator who is responsible for the repair or replacement of any damage to irrigation lines, valves, controllers, sprinklers, wiring and appurtenances which are damaged during construction. This repair is subsidiary to the various other items

bid. The Contractor will be responsible for any vegetation that dies as a result of damage to the irrigation system and replace it with equal vegetation at its own cost.

51. **REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK:** All Work which has been rejected or condemned shall be repaired; or if it cannot be repaired satisfactorily, it shall be removed and replaced at the Contractor's expense. Defective materials shall be immediately removed from the Work site. Work done without line and grade having been provided; Work done beyond the line or not in conformity with the grades shown on the Plans or as provided, Work done without proper inspection; or any Extra or unclassified Work done without written authority and prior agreement in writing as to prices, shall be at the Contractor's risk and will be considered unauthorized, and at the option of the Town of Addison may not be measured and paid for and may be ordered removed at the Contractor's expense. Upon failure of the Contractor to repair satisfactorily or to remove and replace, if so directed, rejected, unauthorized or condemned Work or materials immediately after receiving notice from the Town of Addison, the Town will, after giving written notice to the Contractor, have the authority to cause defective Work to be remedied or removed and replaced, or to cause unauthorized Work to be removed and to deduct the cost thereof from any monies due or to become due the Contractor.
52. **DISPOSITION AND DISPOSAL OF MATERIALS:** The Town will have first rights of refusal for all existing property. Any items which the Town does not wish to keep shall become the property of the Contractor and shall be disposed of outside the limits of the Project. Contractor shall also comply with all applicable laws governing the spillage of debris while transporting to a disposal site.
53. **CLEAN-UP FOR FINAL ACCEPTANCE:** The Contractor shall make a final cleanup of all parts of the Work before acceptance by the Town of Addison. This cleanup shall include removal of all objectionable rock and other construction materials, and in general preparing the site of the Work in an orderly manner and appearance.
54. **STARTUP TESTING REQUIREMENTS:** Testing shall be conducted in accordance with Town of Addison Specifications except as modified in the Special Provisions, Technical Specifications, or as on the plans.
55. **CLAIMS FOR DAMAGES OR INJURY:** General Provision Item 1.24.3 - SMALL CLAIMS FOR DAMAGE OR INJURY is amended to read as follows: "If any person files a claim against the Town of Addison or Contractor for personal injury or property damage resulting from, arising out of, or caused by, the operations of the Contractor, or any Work within the limits of the Project, the Contractor must either submit to the Town of Addison, a duly executed full release within thirty (30) days from the date of written claim, or immediately report the claim to its liability insurance carrier for their action in adjusting the claim. If the Contractor fails to comply with this provision within the stipulated time limit, it will be automatically deemed that the Contractor has appointed the Town as it's irrevocably Attorney-In-Fact authorizing the Town to report the claim directly with the liability insurance carrier. This provision is in and of itself a Power-of-Attorney from the Contractor to the Town which authorizes the Town to take said action on behalf

of the Contractor without the necessity of the execution of any other document. If the Contractor fails to comply with the provisions of this item the Town, at its own discretion, may terminate this contract or take any other actions it deems appropriate. Any payment or portion thereof due the Contractor, whether it is a final payment, progress payment, payment out of retainage or refund payment may be withheld by the Town as is authorized by Item 109.4. Bankruptcy, insolvency or denial of liability by the insurance carrier shall not exonerate the Contractor from liability.

As a result of the additional Work created to Town of Addison due to un-responded claims for damages by Contractor to third parties, Contractor shall incur penalties for failure to abide by this Special Provision.

Contractor shall respond to the claimant in writing regarding the status of the claim, including whether Contractor disputes the claim, wishes to settle, or will notify its liability insurance carrier regarding the claim. Contractor will be assessed a penalty by the Town of \$75.00 per claim, for its failure to respond to the claimant as described above within thirty days of its written notice of claim by the Town.

To ensure Contractor compliance, the Town of Addison shall be notified, by copied correspondence of responses or settlement by Contractor.”

56. WAIVER OF CLAIMS: The making and acceptance of final payment will constitute:

A. A waiver of all claims by Town of Addison against Contractor, except claims arising from unsettled Liens, from defective Work appearing after final inspection or failure to comply with the Contract Documents or the terms of any special guarantees specified therein; however, it will not constitute a waiver by Town of Addison of any rights in respect of Contractor’s continuing obligations under the Contract Documents.

B. A waiver of all claims by Contractor against Town of Addison other than those previously made in writing and still unsettled.

57. MECHANICS AND MATERIALMEN’S LIEN: The Contractor shall be required to execute a release of mechanics and materialmen’s liens upon receipt of payment and shall ensure that the Project remains free and clear of all liens related to the Work. The Contractor shall have all liens removed by obtaining releases acceptable to the Town of Addison or shall bond around such liens by obtaining a discharge of all liens.

58. CONTRACTOR’S AFFIDAVIT OF BILLS PAID: The Contractor shall be required to execute the form provided in Section BP prior to the acceptance of the Project.

59. PRODUCT RECORD DOCUMENTS: The Contractor shall maintain record Plans and legibly annotate shop drawings to record changes made after review. A red felt-tip marking pen shall be used for all recording.

Maintenance of Documents: The Contractor shall maintain at the job site one record copy of the Contract Plans, Specifications, Shop Drawings, Change Orders, other modification

to the Contract, field test records and other documents submitted by Contractor in compliance with specification requirements. These documents shall be maintained at the job site apart from documents used for construction. These documents are not to be used for construction purposes. The documents shall be maintained in clean, legible condition. The documents shall be made available at all times for inspection by the Town.

Recording: Each document shall be labeled Project Record Copy in 2-inch high printed letters. The record documents shall be kept current. No Work shall be covered until required information has been recorded.

Contract Plans: The appropriate drawing shall be legibly marked to record, where applicable:

- a. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
- b. Field changes of dimension and detail made during construction process.
- c. Changes made by Change Order or Supplemental Agreement.
- d. Details not on original Contract Plans.
- e. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
- f. Changes made by Change Order or Supplemental Agreement.
- g. Other matters not originally specified.

Shop Drawing: The Contractor shall maintain the Shop Drawings as record drawings and legibly annotate shop drawings to record changes made after review.

Submittal: At the completion of the Project, the Contractor shall deliver record Plans to the Town. The transmittal letter shall be accompanied, in duplicate, with:

- a. Date, Project title and number.
- b. Contractor's name and address.
- c. Title and number of each record document.
- d. Certification that each document as submitted is complete and accurate.
- e. Signature of Contractor or its authorized representative.

- 60. OWNERSHIP OF WORK AND MATERIALS:** All Work performed by Contractor pursuant to the Contract shall be the property of the Town of Addison. The Town of Addison shall own all construction, and any data, documents, plans, specifications, working papers, computer programs, photographs, or other material produced by

Contractor pursuant to the Contract, and Contractor hereby assigns and transfers to the Town of Addison any and all copyrights for such material. To the extent that such programs used are internal, proprietary programs used by Contractor in the performance of the Work, Contractor will provide the Town of Addison such access to the programs as is necessary for the Town of Addison to be able to use the products and documents generated by the program, but Contractor is not required to transfer the copyrights or other intellectual property rights to the program to the Town of Addison. As security for partial, progress, or other payments, title to work for which such payments are made shall pass to the Town of Addison at the time of the payment. To the extent that title has not previously been vested in the Town of Addison by reason of payments, full title shall pass to the Town of Addison at delivery of the Work at the location specified in the Contract.

Unincorporated Work to which the Town of Addison has received title by reason of progress, partial or other payments shall be segregated from other Contractor or Subcontractor materials and clearly identified as the Town of Addison property. The Contractor shall be responsible for all materials until they have been incorporated into the Work and the Work has been finally accepted by the Town of Addison. The title transferred as above shall in each case be good, and free and clear of any and all security interests, liens, or other encumbrances. The Contractor promises and agrees that it will not pledge, hypothecate, or otherwise encumber the items in any way that would result in any lien, security interest, charge, or claim upon or against said items. The transfer of title as provided above shall not imply acceptance by the Town of Addison, nor relieve Contractor from the responsibility to strictly comply with the Contract, and shall not relieve Contractor of responsibility for any loss of or damage to such items.

The Contractor shall insert provisions in its subcontracts sufficient to ensure compliance with the content of this Section.

61. **DRAWINGS AND OTHER DATA:** All documents developed by Contractor in the performance of the Contract shall become the sole property of the Town of Addison and may be used by the Town of Addison on any other project without additional compensation to Contractor. Use by the Town of Addison of these documents on other projects does not confer any liability on Contractor.

The Town of Addison shall be considered the “person for whom the work was prepared” for the purpose of authorship in any copyrightable work under 17 U.S.C. § 201(b). With respect thereto, Contractor agrees not to assert or authorize others to assert any rights or establish any claim under the design related patent and copyright laws. All design drawings, as-built drawings and specifications, in any form, shall contain a copyright mark of the Town of Addison.

62. **TOWN OF ADDISON APPROVAL:** This Project is subject to final approval and acceptance by the Town of Addison. Final approval acceptance will not be given until the punch list items are completed to the Town’s satisfaction and as-built Plans are given to the Town of Addison.

63. **USE OF EXPLOSIVES:** The use of explosives by the Contractor to complete the Work shall be prohibited.
64. **POWER FOR CONSTRUCTION:** The Contractor shall contract with the local power provider and make the necessary arrangements for securing power required for the construction, including power required for temporary offices. There will be no separated pay item for connection into the existing power system or for the power required for construction purposes.
65. **LIQUIDATED DAMAGES:** If the Contractor fails to complete the Work within the time specified in the contract, the Contractor shall pay liquidated damages to the Town of Addison in the amount of \$500 for each calendar day of delay until the Work is completed or accepted.
66. **CONTRACT DELAY:** The parties anticipate that delays may be caused by or arise from any number of events during the course of the Contract, including, but not limited to, Work performed, disruptions, permitting issues, actions of subcontractors, suppliers, or other contractors, actions by third parties, weather, weekends, holidays, or other such events, forces or factors sometimes experienced in construction work. Such delays or events and their potential impacts on performance by the Contractor are specifically contemplated and acknowledged by the parties in entering into this Contract, and shall not extend the Contract time for completion. Further, any and all costs or impacts whatsoever incurred by the Contractor in accelerating the Work to overcome or absorb such delays or events in an effort to complete the Contract prior to expiration of the Contract time to complete, regardless of whether the Contractor does so or not, shall be the sole responsibility of the Contractor in every instance.
67. **SUBCONTRACTORS:** No subcontract shall relieve Contractor of any of Contractor's obligations or liabilities under the Contract. Contractor shall be fully responsible and liable for the acts or omissions of all Subcontractors, including persons directly or indirectly employed by them, their guests and invitees. Contractor shall have sole responsibility for managing and coordinating the operations of its Subcontractors, including the settlement of disputes with or between them. Nothing contained in the Contract shall be deemed to create a contractual relationship between any Subcontractor, and the Town of Addison.

Contractor shall provide to the Town of Addison one (1) copy of all executed subcontracts associated with the Contract, including any changes or modifications to the subcontracts, within three (3) days of their execution. No Subcontractor shall be permitted to perform work associated with the subcontract until the Subcontractor (or Contractor on the Subcontractor's behalf) is in compliance with the insurance requirements specified elsewhere in the Contract, and has furnished satisfactory evidence of insurance to the Town of Addison.

68. **PAYMENTS TO SUBCONTRACTORS:** Contractor shall comply with the provisions of applicable laws and regulations relating to Contractor's relations with Subcontractors. Payments by Contractor to Subcontractors associated with the Town of Addison Contracts

are subject to the time periods established in the Texas “Prompt Payment Act”, contained in Chapter 2251 of the Texas Government Code.

All persons employed in the performance of the Work under the Contract, or any subcontracts hereunder, shall be paid not less than the general rates of per diem, holiday, and overtime wages prevailing in the locality of the Work of a similar character as detailed in the Special Provisions. Failure to comply with this provision shall subject Contractor to the penalties prescribed in Chapter 2258 of the Texas Government Code, as amended.

Contractor will include in each subcontract for property or services entered into by Contractor and a Subcontractor, including a supplier, for purposes of performing the Work under the Contract a payment clause that obligates Contractor to pay the Subcontractor for satisfactory performance under its subcontract within seven (7) days out of such amounts as are paid to Contractor by the Town of Addison under the Contract. A false certification to the Town of Addison under the provisions of the Payments clause may be a principal offense in violation of Section 37.10 of the Texas Penal Code.

69. **USE OF COMPLETED PORTIONS OF THE WORK:** Whenever, as determined by the Town of Addison, any portion of the Work performed by Contractor is in a condition suitable for use, and the best interests of the Town of Addison requires such use the Town of Addison may take possession of or use such portion of the Work. Such use by the Town of Addison shall in no case be construed as final acceptance and shall neither relieve Contractor of any of its responsibilities under the Contract, nor act as a waiver by the Town of Addison of any of the conditions thereof. Contractor shall not be liable for the cost of repairs, rework, or renewals, which may be required due to ordinary wear and tear resulting from such use. However, if such use increases the cost or delays the completion of remaining portions of the Work, Contractor shall notify the Town of Addison in writing as required by the Contract and shall be entitled to such additional compensation or extension of time, or both, as determined in accordance with the Contract.

If in the course of such use, the Work proves to not be in compliance with the Contract, the Town of Addison shall have the right to continue such use until such portion of the Work can, without injury to the Town of Addison, be taken out of service for correction of defects, errors, omissions, or replacement of unsatisfactory materials, as necessary for such portions of the Work to comply with the Contract. Contractor shall correct the Work as soon as practical, but not later than one (1) month after notification by the Town of Addison.

Contractor shall not use any permanently incorporated materials unless such use is approved in writing by the Town of Addison. Where Contractor’s request is granted for the use of certain materials, Contractor shall properly use and maintain and, upon completion of its use and at its own expense, recondition such materials to the satisfaction of the Town of Addison.

70. **COMPLETE AGREEMENT:** The Contract (including Attachments, the Special Provisions, other documents and manuals incorporated herein) is the full and complete

agreement between the Town of Addison and Contractor with respect to the subject matter herein and supersedes any and all prior agreements between the parties hereto.

71. **WAIVER:** The waiver by the Town of Addison of the breach of any provision of the Contract by Contractor shall in no way impair the right of the Town of Addison to enforce the provision for any subsequent breach thereof. All remedies provided hereunder are cumulative and are in addition to all other remedies available at law or in equity.

72. **EXECUTION OF THE CONTRACT:** The Contract may be executed in multiple counterparts, each of which shall, for all purposes, be deemed an original but which together shall constitute one and the same instrument, and the signature pages from any counterpart may be appended to any other counterpart to assemble fully executed documents, and counterparts of the Contract may also be exchanged via electronic facsimile machines and any electronic facsimile of any party's signature shall be deemed to be an original signature for all purposes.

73. **DEFINITIONS:** The following definitions are added to the General Provisions and Special Provisions:

BIDDER: Any person, persons, partnership, company, firm, association, or corporation acting directly or through a duly authorized representative submitting a bid for the work contemplated.

PROJECT: The Town of Addison's overall objective and endeavor of which the Contract forms a part and ultimately creates, which encompasses all Contract Documents constructed to final completion and final acceptance.

WORKING DAY: A working day is defined as a calendar day not including Saturdays, Sundays, or legal holidays authorized in the list prepared by the City of Dallas for contract purposes, in which weather or other conditions not under the control of the Contractor shall permit the performance of the principal units of work underway for a continuous period of not less than 7 hours between 7 A.M. and 6 P.M. A principle unit of work shall be that unit which controls completion time of the contract. Nothing in this definition shall be construed as prohibiting the Contractor from working on Saturdays, if the Contractor so desires and permission of the Town of Addison has been granted. Work on Sundays shall not be permitted except in cases of extreme emergency and then only with the written permission of the Town of Addison. If Saturday or Sunday work is permitted, working time shall be charged on the same basis as weekdays. Where the working time is expressed as calendar days or a specific date, the concept of working days shall no longer be relevant to the contract.

74. **MODIFICATIONS TO THE LANGUAGE OF THE GENERAL PROVISIONS:** The General Provisions are modified as follows:

- A. Add the following words to the General Provisions before the word "Certificates" found on the fourth line of Section 103.4.1:

“When permitted by law,”

- B. Delete the sentence “A model Certificate of Insurance is illustrated in Model Form A.6 in Appendix A.” beginning on the ninth line of Section 103.4.1 of the General Provisions and replace with the following:

“Certificates of Insurance shall be provided on a state approved form.”

- C. Delete the following sentence beginning on the second line of the fifth subparagraph of Section 104.2.1 of the General Provisions:

“The foregoing notwithstanding, the total original Contract amount shall not be increased more than 25 percent; the CONTRACTOR, by submission of a bid and execution of the Contract, is deemed to consent to the OWNER’S right to reduce the total original Contract amount by more than 25 percent.”

- D. Add the following word before the word “decide” found on the second line of Section 105.7.1 of the General Provisions:

“initially”

- E. Add the following word after the word “work” found on the fifth line of Section 105.7.1 of the General Provisions:

“, subject to the agreement of the Owner”

- F. Delete the following sentence beginning on the sixth line of Section 105.7.1 of the General Provisions:

“Engineer shall determine the amount and quality of work performed and materials furnished, and Engineer’s decision and estimates shall be final.”

- G. Delete Section 105.9.3 of the General Provisions titled “Inspection Overtime” in its entirety.

- H. Delete Section 107.2 of the General Provisions titled “Indemnification” in its entirety and replace with the following:

“THE CONTRACTOR AGREES TO INDEMNIFY, SAVE, PROTECT, DEFEND, AND HOLD HARMLESS THE OWNER, ITS AFFILIATES AND THEIR OFFICERS, DIRECTORS, AGENTS, INVITEES, AND EMPLOYEES (“INDEMNIFIED PARTIES”) FROM AND AGAINST ANY AND ALL LIABILITY, COST, DAMAGE, EXPENSES, FINES AND ALL REASONABLE LEGAL FEES AND

COURT COSTS, CLAIMS, LOSSES, CAUSES OF ACTION, SUITS, AND LIABILITY OF ANY KIND, INCLUDING ALL EXPENSES OF LITIGATION AGAINST THE INDEMNIFIED PARTIES, WHETHER OR NOT CAUSED IN PART BY ANY ACT OR OMISSION OF A PERSON OR ENTITY INDEMNIFIED HEREUNDER, OR WHETHER LIABILITY IS IMPOSED UPON SUCH PERSON OR ENTITY, FOR ANY LOSS, INJURY, DAMAGE OR DEATH ARISING FROM OR OUT OF THE CONTRACTOR'S ACTS OR OMISSIONS, INCLUDING, BUT NOT LIMITED TO CONTRACTOR'S NEGLIGENT OR GROSSLY NEGLIGENT PERFORMANCE OF THE WORK; NEGLIGENT OR GROSSLY NEGLIGENT USE OR MISUSE OF OWNER'S PROPERTY; NEGLIGENT OR INTENTIONAL ACTIONS, ERRORS OR OMISSIONS AND THOSE OF ITS EMPLOYEES, OFFICERS, DIRECTORS, AGENTS OR SUBCONTRACTORS; VIOLATION OF ANY FEDERAL, STATE OR MUNICIPAL LAWS, REGULATIONS AND/OR ORDINANCES; CONTRACTOR'S OR ITS SUBCONTRACTOR'S USE OF PROPERTY, EQUIPMENT, VEHICLES, OR MATERIALS; DEFECTIVE WORKMANSHIP; NEGLIGENT OR GROSSLY NEGLIGENT USE OR MISUSE OF UTILITIES; OR SUBCONTRACTORS', EMPLOYEES', AGENTS', OFFICERS', OR DIRECTORS' NEGLIGENCE OR INTENTIONAL TORTS. IT IS THE EXPRESS INTENT OF CONTRACTOR TO INDEMNIFY THE INDEMNIFIED PARTIES FROM THE CONSEQUENCES OF THEIR JOINT AND/OR CONCURRENT NEGLIGENCE AND/OR SOLE NEGLIGENCE. IN THE EVENT OF FAILURE BY THE CONTRACTOR TO FULLY PERFORM IN ACCORDANCE WITH THIS INDEMNIFICATION PARAGRAPH, EACH OF THE INDEMNIFIED PARTIES, AT ITS OPTION, AND WITHOUT RELIEVING CONTRACTOR OF ITS OBLIGATIONS HEREUNDER, MAY SO PERFORM, BUT ALL COSTS AND EXPENSES SO INCURRED BY ANY OF THE INDEMNIFIED PARTIES IN THAT EVENT SHALL BE REIMBURSED BY CONTRACTOR TO THE INDEMNIFIED PARTIES, OR ANY OF THEM, AND UNTIL REIMBURSED BY CONTRACTOR SHALL BEAR INTEREST, AT THE RATE OF INTEREST PROVIDED TO BE PAID ON JUDGMENT UNDER THE LAWS OF THE STATE OF TEXAS. THIS INDEMNIFICATION SHALL NOT BE LIMITED TO DAMAGES, COMPENSATION OR BENEFITS PAYABLE UNDER INSURANCE POLICIES, WORKERS'

**COMPENSATION ACTS, DISABILITY BENEFIT ACTS OR
OTHER EMPLOYEE BENEFIT ACTS.**

IN THE EVENT THIS CONTRACT RELATES TO A PROJECT OTHER THAN A SINGLE FAMILY HOUSE, TOWNHOUSE, DUPLEX, OR LAND DEVELOPMENT DIRECTLY RELATED THERETO OR A PUBLIC WORKS PROJECT OF A MUNICIPALITY THEN THE INDEMNITY PROVISIONS INCLUDED HEREIN SHALL BE LIMITED SUCH THAT SUBCONTRACTOR SHALL NOT BE REQUIRED TO INDEMNIFY, HOLD HARMLESS OR DEFEND CONTRACTOR OR ANY THIRD PARTIES AGAINST A CLAIM CAUSED BY THE NEGLIGENCE OR FAULT, THE BREACH OR VIOLATION OF A STATUTE, ORDINANCE, GOVERNMENTAL REGULATION, STANDARD, OR RULE, OR THE BREACH OF CONTRACT OF AN INDEMNIFIED PARTY, ITS AGENT OR EMPLOYEE, OR ANY THIRD PARTY UNDER THE CONTROL OR SUPERVISION OF THE INDEMNIFIED PARTY, OTHER THAN SUBCONTRACTOR OR ITS AGENT, EMPLOYEE, OR SUBCONTRACTOR OF ANY TIER EXCEPT THAT SUBCONTRACTOR SHALL INDEMNIFY, HOLD HARMLESS AND DEFEND THE INDEMNIFIED PARTY AGAINST ANY CLAIMS FOR THE BODILY INJURY OR DEATH OF AN EMPLOYEE OF SUBCONTRACTOR, ITS AGENTS, OR ITS SUBCONTRACTORS OF ANY TIER.

NOTWITHSTANDING ANYTHING HEREIN TO THE CONTRARY, THE INDEMNITY PROVISIONS INCLUDED HEREIN SHALL BE LIMITED SUCH THAT CONTRACTOR SHALL NOT BE REQUIRED TO INDEMNIFY, HOLD HARMLESS OR DEFEND OWNER OR ANY THIRD PARTIES AGAINST A CLAIM CAUSED BY THE NEGLIGENCE OR FAULT, THE BREACH OR VIOLATION OF A STATUTE, ORDINANCE, GOVERNMENTAL REGULATION, STANDARD, OR RULE, OR THE BREACH OF CONTRACT OF THE INDEMNIFIED PARTIES, ITS AGENT OR EMPLOYEE, OR ANY THIRD PARTY UNDER THE CONTROL OR SUPERVISION OF THE INDEMNIFIED PARTIES, OTHER THAN CONTRACTOR OR ITS AGENT, EMPLOYEE, OR SUBCONTRACTOR OF ANY TIER EXCEPT THAT CONTRACTOR SHALL INDEMNIFY, HOLD HARMLESS AND DEFEND THE INDEMNIFIED PARTIES AGAINST ANY CLAIMS FOR THE BODILY INJURY OR DEATH OF

**AN EMPLOYEE OF CONTRACTOR, ITS AGENTS, OR ITS
SUBCONTRACTORS OF ANY TIER.”**

- I. Add the following language after Section 103.3.1.4 of the General Provisions:

“103.3.1.5. Maintenance Bond. A good and sufficient bond in an amount not less than 100-percent of the approximate total of the Contract, as evidenced by the proposed tabulation, or conditioned on the full and proper maintenance and repair of the Work to be done and performed for a period of one year from the date of final acceptance of the Work and the Contractor will do all necessary backfilling that may arise on account of sunken conditions in ditches, or otherwise, and do and perform the necessary Work and repair any defective condition growing out of or arising from the improper laying or construction of same, or on account of any breaking of same caused by the Contractor in construction of same, or on account of any defect arising in any of the Work laid or constructed by the Contractor or on account of improper excavation or backfilling, it being understood that the purpose of this Section is to cover all defective conditions arising by reason of defective materials, Work, or labor performed by the Contractor.”

- J. Add the following language after Section 104.2.5. of the General Provisions:

“104.2.6. Change Orders. A Change Order is a written instrument and signed by the Owner, Contractor and Engineer stating their agreement upon all of the following:

- (1) the change in the Work;
- (2) the amount of the adjustment, if any, in the Contract Sum;
and
- (3) the extent of the adjustment, if any, in the Contract Time.

In the event the Contractor proposes a Change Order, the Contractor shall provide sufficient detail for such Change Order to allow analysis and review by the Engineer.

Agreement on any Change Order shall constitute final agreement on the Work which is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contract Sum and the Contract Time. In the event a Change Order increases the Contract Sum, the Contractor shall include the Work covered by such Change Orders in Applications for Payment as if such Work were originally part of the Contract Documents.

The Contractor, upon receipt of written notification by the Owner or the Engineer of a proposed item or change in Work, shall prepare as

soon as possible a Change Order on the form provided by the Owner. If the Change Order is returned to the Contractor for additional information or if the scope of the proposed change in the Work is modified by additions, deletions or other revisions, the Contractor shall revise the Change Order accordingly and resubmit the revised Change Order to the Owner and Engineer.”

- K. Delete the language in Section 105.2.1 of the General Provisions and replace it with the following language:

“105.2.1. WORKMANSHIP: If the OWNER notifies the CONTRACTOR in writing of defective work, the CONTRACTOR shall correct the deficiencies within five (5) calendar days of the Notice at no additional cost to the OWNER. If the defective work is not corrected within five (5) calendar days, or the CONTRACTOR is not making satisfactory progress (in the opinion of the OWNER) to correct the deficiencies, the OWNER may withhold future payments for All Work until the defective work has been corrected to the satisfaction of the OWNER.”

- L. Add the following language after Section 105.10 of the General Provisions:

“105.10.2. GUARANTEE AFTER COMPLETION: Unless otherwise specified in the technical section of these specifications, the CONTRACTOR shall, after test and acceptance, and for a period of one year from date of final written acceptance by the OWNER or within such longer or shorter period of time as may be prescribed by law or by the terms of any other applicable special warranty on designated equipment or portions of work as required by the Contract Documents, rebuild, repair, or replace any and all items which have proven defective due to unsatisfactory material and/or workmanship. Upon written notice from the OWNER, the CONTRACTOR shall immediately make any repairs that may be ordered, or such repairs will be made by the Owner at the expense of the CONTRACTOR or the CONTRACTOR’S Surety. In case of an emergency where delay would cause serious loss or damage, the Owner may undertake to have the defects repaired without previous notice. The expense of all repairs, including all emergency repairs, shall be borne by the CONTRACTOR or the CONTRACTOR’S Surety, at no cost to the Owner. This obligation shall survive termination of the Contract.

105.10.3. OFFSET PROGRESS PAYMENTS: OWNER may, at its option, offset any progress payment or final payment under the Contract Documents against any debt (including taxes) lawfully due to OWNER from Contractor, regardless of whether the

amount due arises pursuant to the terms of the Contract Documents or otherwise and regardless of whether or not the debt due to OWNER has been reduced to judgment by a court.

105.10.4. FINAL ACCEPTANCE AND PAYMENT: This Project is subject to final inspection and final acceptance by the Owner. Whenever the Work provided for by the Contract shall have been completely performed on the part of the CONTRACTOR, including, but not limited to compliance with North Central Texas Council of Governments Standard Specifications for Public Works Construction, October 2004 Section 202.6.4.6., the CONTRACTOR shall notify the OWNER that the Work is ready for final inspection. The OWNER will then make such final inspection and if the work is satisfactory and in accordance with the specifications and contract documents, the OWNER shall issue a certificate of acceptance to the CONTRACTOR and submit a request to accept the Work performed by the CONTRACTOR and payment of a final estimate under the terms of which the OWNER will release 100% of the retainage, plus the unpaid portions of the final estimate as the OWNER deems advisable.

Whenever the improvements provided for by the Contract shall have been completely performed on the part of the Contractor, as evidenced in the certificate of acceptance, and all required submissions provided to the OWNER, a final estimate showing the value of the Work shall be prepared by the OWNER as soon as the necessary measurements and computations can be made. All prior estimates upon which payments have been made are subject to necessary corrections or revisions in the final payment. The amount of this final estimate, less any sums that have been previously paid, deducted or retained under the provisions of the contract, shall be paid the CONTRACTOR within 30 days after the final acceptance by the OWNER, provided the CONTRACTOR has furnished to the OWNER a consent of Surety and satisfactory evidence that all indebtedness connected with the Work and all sums of money due for any labor, materials, apparatus, fixtures, or machinery furnished for and used in the performance of the Work have been paid or otherwise satisfied, or that the person or persons to whom the same may respectively be due have consented to such final payment. This requirement is not intended and shall not be construed to recognize subcontractors for the purpose of privity of contract, and no third party benefit rights shall be obtained through these provisions for final payment. The acceptance by the CONTRACTOR of the final payment as aforesaid shall operate as and shall be a release to the OWNER from all claims or liabilities under the Contract, including all subcontractor claims, for anything done or furnished or relating

to the Work under the Contract or for any act or neglect of said OWNER relating to or connected with the Contract.

All warranties and guarantees shall commence from the date of the certificate of acceptance. No interest shall be due the CONTRACTOR on any partial or final payment, or on the retainage.

105.10.5. RIGHT TO AUDIT CONTRACTOR'S RECORDS:

By execution of the Contract, CONTRACTOR grants the OWNER the right to audit, at Owner's election, all of CONTRACTOR'S records and billings relating to the performance of the Work under the Contract. CONTRACTOR agrees to retain such records for a minimum of three (3) years following completion of the Work under this Contract. OWNER agrees that it will exercise the right to audit only at reasonable hours."

- M. Add the following language after Section 107.5 of the General Provisions:

"107.5.1. COMPENSATION AND ACKNOWLEDGEMENT OF WORK: The CONTRACTOR shall receive and accept compensation, as herein provided, as full payment for furnishing all labor, tools, material, equipment and incidentals; for performing all Work contemplated and embraced under the Contract; for all loss or damage arising out of the nature of the Work, or from the action of the elements; for any unforeseen defects or obstruction which may arise or be encountered during the prosecution of the Work and before its final acceptance by the OWNER; for all risks of whatever description connected with the prosecution of the Work; for all expense incurred by or in consequence of suspension or discontinuance of such prosecution of the Work as herein specified; for any infringement of patents, trademarks or copyrights; and for completing the Work in an acceptable manner according to the Plans and Specifications."

- N. Add the following language after Section 107.11 of the General Provisions:

"107.11.1. COOPERATION OF THE CONTRACTOR: The CONTRACTOR shall give to the work the consistent attention necessary to facilitate the progress thereof, and the CONTRACTOR shall cooperate with the OWNER, and with other CONTRACTORS in every way possible.

The OWNER and the OWNER'S representatives shall at all times have free access to the Work whenever it is in preparation or progress and the contractor shall provide safe, convenient and proper facilities for such access and inspection."

- O. Delete Section 107.4 of the General Provisions and replace it with the following:

“107.4. VENUE AND CHOICE OF LAW

The Owner, the Contractor, and the Contractor’s sureties agree that this Contract shall be performed in Dallas, Dallas County, Texas, and if legal action is necessary in connection therewith, exclusive venue shall lie in Dallas County, Texas. The terms and provisions of the Contract Documents shall be construed in accordance with the laws and court decisions of the State of Texas.”

- P. Delete the following language (which is the first paragraph) from Section 109.5.1. of the General Provisions:

“Between the 25th day and the last day of each month, the Owner shall make an approximate estimate of the value of the work done during the month under the specifications. Whenever the said estimate or estimates of work done since the last previous estimate exceeds \$100 in amount, a percentage of such estimate sum shall be paid the Contractor on or before the 15th day of the month next following. The monthly estimate may include acceptable nonperishable materials delivered to the work; such payment shall be allowed on the same percentage basis of the net invoice value as provided hereinafter. The percent retained by the owner shall normally be up to 10 percent at completion, unless otherwise stated. At the midpoint, or at any subsequent time, if the owner determines that the progress of the Contract is satisfactory in all respects, it may at its discretion cease to retain additional funds until the completion of the project, or until progress ceases to be satisfactory. The owner shall make the sole determination in this matter.”

- Q. Add the following language after Section 109.5.1. of the General Provisions:

“109.5.1.1. Applications for Payment. Applications for progress payment (“Application for Payment”) will be submitted no more often than monthly and shall be submitted on the dates set forth in the Agreement. Each Application for Payment shall be (1) sworn to and notarized, (2) supported by such data substantiating the Contractor’s right to payment as the Owner or Engineer may require, such as copies of requisitions from Subcontractors and material suppliers, and reflecting retainage if provided for in the Contract Documents, and (3) submitted by the Contractor for review to the Engineer in form and substance as mandated by the Owner. The Contractor’s Application for Payment shall be segregated and detailed in a manner satisfactory to the Owner.

In each Application for Payment, the Contractor shall certify that such Application for Payment represents a just estimate of portion of the Work that is complete as of the last day covered by the Application for Payment and shall also certify by sworn affidavit as follows:

‘There are no known mechanics’ or materialmen’s liens outstanding at the date of this Application, all due and payable bills with respect to the Work have been paid to date or shall be paid from the proceeds of this Application for Payment, there is no known basis for filing of any mechanics’ or materialmen’s liens on the Work, and waivers from all subcontractors and materialmen have been or, at the time of payment, will be obtained in such form as to constitute an effective waiver of lien under the applicable laws of the State of Texas.’

109.5.1.2. Lien Waivers. Concurrent with each Application for Payment, the Contractor shall execute and furnish a waiver and release of its lien rights current through the effective date of such Application for Payment conditioned upon receipt of the payment that is the subject of the application. Beginning with the second Application for Payment, the Contractor shall also deliver with each such Application as a condition precedent to payment thereof, waivers of lien from each of the Subcontractors, Sub-subcontractors, and suppliers current through the effective date of the previous Application of Payment. The Contractor shall also execute and obtain any other reasonable forms as the Owner may require in order to assure an effective waiver and release of mechanics’ and materialmen’s liens in compliance with the laws of the State of Texas. The Contractor shall, if any Subcontractor, Sub-subcontractor or supplier refuses to furnish a release in full, furnish a bond satisfactory to the Owner to indemnify against any lien.”

R. Delete Section 109.5.2 of the General Provisions and replace with the following:

“Five-percent (5%) retainage shall be withheld until 40 days after Final Completion.”

75. CONTRACTOR REPRESENTATIONS: By entering into the Contract, the Contractor makes the following representations to the Town of Addison:

- A. Contractor has examined and carefully studied the Bidding Documents and the related data identified in the Bidding Documents.
- B. The Contractor has visited the Project site where the goods are to be installed or services will be provided and become familiar with and is satisfied as to the

observable local conditions that may affect cost, progress, or the furnishing of goods and services, if required to do so by the Bidding Documents, or if, in the Contractor's judgment, any local condition may affect cost, progress, or the furnishing of goods and services.

- C. The Contractor is familiar with and is satisfied as to all Laws and Regulations in effect as of the date of the bid that may affect cost, progress, and the furnishing of goods and services.
- D. The Contractor has carefully studied, considered, and correlated the information known to the Contractor; information commonly known to sellers of similar goods doing business in the locality of the Project site where the goods will be installed or where services will be provided; information and observations obtained from the Contractor's visits, if any, to the Project site where the goods will be installed or services will be provided; and any reports and drawings identified in the Bidding Documents regarding the Project site where the goods will be installed or where services will be provided, with respect to the effect of such information, observations, and documents on the cost, progress, and performance of the Contractor's obligations under the Bidding Documents.
- E. The Contractor has given the Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that the Contractor has discovered in the Bidding Documents, and the written resolution (if any) thereof by the Engineer is acceptable to the Contractor.
- F. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for furnishing the goods and services for which the bid is submitted
- G. The Contractor acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of bids, and final payment for all unit price bid items will be based on actual quantities, determined as provided in the Contract Documents. The Contractor also acknowledges that each unit price includes an amount considered by the Contractor to be adequate to cover the Contractor's overhead and profit for each separately identified item.

76. PREVAILING WAGE RATES: Wage rates paid on this Project shall not be less than specified in the schedule of general prevailing rates of per diem wages as set forth below in the Davis Bacon Act General Decision No. TX170028:

General Decision Number: TX180028 01/05/2018 TX28

Superseded General Decision Number: TX20170028

State: Texas

Construction Type: Heavy

Counties: Collin, Dallas, Denton, Ellis, Kaufman and Rockwall
Counties in Texas.

Water and Sewer Lines/Utilities (Including Related Tunneling
Where the Tunnel is 48" or Less in Diameter)

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.35 for calendar year 2018 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.35 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number Publication Date
 0 01/05/2018

* PLUM0100-002 11/01/2017

	Rates	Fringes
Plumbers and Pipefitters.....	\$ 30.84	11.51

SUTX1991-004 09/23/1991		

	Rates	Fringes
--	-------	---------

Laborers:

Common.....\$ 7.25

Utility.....\$ 7.467

Pipelayer.....\$ 7.828

Power equipment operators:

Backhoe.....\$ 10.804

Crane.....\$ 10.942

Front End Loader.....\$ 9.163

Tunneling Machine (48" or
less).....\$ 9.163

TRUCK DRIVER.....\$ 8.528

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union, which prevailed in the survey for this classification, which in this example would be Plumbers. 0198n indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour

Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

=====

END OF GENERAL DECISION

77. **BID ITEMS/REFERENCE SPECIFICATIONS:** The requirements of NCTCOG standard specifications for Public Works construction 5th Edition dated 2017.

SPECIAL PROVISIONS

Note: The series of numbers shown after the description are for the North Central Texas Council of Governments (NCTCOG) Standard Specifications for Public Works Construction, Fifth Edition (November 2017), or technical specifications number provided with this document.

SP.1 PROJECT

The project covered by these specifications consists of the furnishing and installation of all material, supplies, appurtenances, equipment and labor and any other necessary items required to construct, test and complete, ready for use and operation by the Owner. Final clean up before acceptance by the Owner is included as a part of the project.

SP.2 NCTCOG CONSTRUCTION SPECIFICATIONS

NCTCOG shall be utilized for these areas:

- | | |
|---|--------------|
| • Site Protection & Preparation | Division 200 |
| • Roadway Construction | Division 300 |
| • Roadway Maintenance & Rehabilitation | Division 400 |
| • Structures | Division 700 |
| • Misc. Construction & Materials | Division 800 |

The specifications included with this document govern if there are any discrepancies between them and the listed specifications.

SP.3 DISPOSAL OF SURPLUS MATERIAL

The Town will have first rights-of-refusal for existing equipment that will be disposed. Surplus material not required for other parts of the work and not otherwise specifically covered by the drawings or specifications shall become the property of the Contractor for proper disposal by him.

SECTION PS

PROJECT SIGN

PROJECT SIGN

1. **QUANTITY:** One Project Designation sign will be constructed and installed on the project site as directed by the Owner. It will be the responsibility of the Contractor to maintain the sign in a presentable condition at all times during construction. Maintenance will include painting and repairs as directed by the Public Works and Engineering Services Department. The location of the sign will be given to the Contractor by the Town of Addison at the Pre-Construction Conference.
2. **MATERIAL:** Sign shall be constructed of ¾-inch thick smooth finish fir plywood (Grade A-C, exterior or better). Sign will be securely mounted to 6-inch x 6-inch square posts. Nuts and bolts will not protrude from face of sign. Posts will be mounted to a support system that will provide adequate stabilization to ensure the sign will not fall over in heavy winds. Sand bags or other techniques may be necessary to protect sign.
3. **DIMENSIONS:** Size of sign will be 4-feet tall and 6-feet wide. The height and arrangement of the lettering shall be in accordance with the attached detail.
4. **PAINT:** Sign will be one-sided and will have a white background. Text will be black, except for the Addison logo which will be a blue color approved by the Public Works and Engineering Services Department. The paint will be an outdoor paint and will be maintained throughout the project in proper order. The quality of the paint, painting, and lettering on the signs shall be approved by the Infrastructure & Development Services Department.
5. **PAYMENT:** Project Sign will be a separate pay item. This will include all labor, equipment, tools, and incidentals necessary to complete and install the work.



The Town of

**PLEASE PARDON THE TEMPORARY
INCONVENIENCE DURING THIS PROJECT**

KELLWAY LIFT STATION BY-PASS PROJECT

CONTRACTOR: _____

ESTIMATED COMPLETION DATE:

AN ADDISON PROJECT

FOR MORE INFORMATION, PLEASE CALL (972) 450-2871

SECTION IS

ADDITIONAL INSURANCE REQUIREMENTS

TOWN OF ADDISON, TEXAS
ADDISON KELLWAY LIFT STATION BY-PASS

REQUIREMENTS

Contractors performing work on TOWN OF ADDISON property or public right-of-way shall provide the TOWN OF ADDISON a certificate of insurance or a copy of their insurance policy(s) (and including a copy of the endorsements necessary to meet the requirements and instructions contained herein) evidencing the coverages and coverage provisions identified herein within ten (10) days of request from TOWN OF ADDISON. Contractors shall provide TOWN OF ADDISON evidence that all subcontractors performing work on the project have the same types and amounts of coverages as required herein or that the subcontractors are included under the contractor's policy. Work shall not commence until insurance has been approved by TOWN OF ADDISON.

All insurance companies and coverages must be authorized by the Texas Department of Insurance to transact business in the State of Texas and must have a A.M. Best's rating A-:VII or greater.

Listed below are the types and minimum amounts of insurances required and which must be maintained during the term of the contract. TOWN OF ADDISON reserves the right to amend or require additional types and amounts of coverages or provisions depending on the nature of the work.

TYPE OF INSURANCE	AMOUNT OF INSURANCE	PROVISIONS
1. Workers' Compensation Employers' Liability to include: (a) each accident (b) Disease Policy Limits (c) Disease each employee	Statutory Limits per occurrence Each accident \$1,000,000 Disease Policy Limits \$1,000,000 Disease each employee \$1,000,000	TOWN OF ADDISON, and Garver, LLC to be provided a <u>WAIVER OF SUBROGATION AND 30 DAY NOTICE OF CANCELLATION</u> or material change in coverage. Insurance company must be A-:VII rated or above.
2. Commercial General (Public) Liability to include coverage for: a) Bodily Injury b) Property damage c) Independent Contractors d) Personal Injury e) Contractual Liability	Bodily Injury/Property Damage per occurrence \$1,000,000, General Aggregate \$2,000,000 Products/Completed Aggregate \$2,000,000, Personal Advertising Injury per occurrence \$1,000,000, Medical Expense 5,000	TOWN OF ADDISON, and Garver, LLC to be listed as <u>ADDITIONAL INSURED and provided 30 DAY NOTICE OF CANCELLATION</u> or material change in coverage. Insurance company must be A-:VII rated or above.
3. Business Auto Liability to include coverage for: a) Owned/Leased vehicles b) Non-owned vehicles c) Hired vehicles	Combined Single Limit \$1,000,000 per occurrence for bodily injury and property damage	TOWN OF ADDISON, and Garver, LLC to be listed as <u>ADDITIONAL INSURED and provided 30 DAY NOTICE OF CANCELLATION</u> or material change in coverage. Insurance company must be A-:VII-rated or above.
4. Umbrella or Excess Liability Policy over Commercial General Liability and Automobile Liability limits of \$1 million per occurrence	Minimum \$4 million per occurrence excess \$1 million underlying per occurrence	TOWN OF ADDISON, and Garver, LLC to be listed as <u>ADDITIONAL INSURED and provided 30 DAY NOTICE OF CANCELLATION</u> or material change in coverage. Insurance company must be A-:VII-rated or above.

Certificate of Liability Insurance forms (together with the endorsements necessary to meet the requirements and instructions contained herein) may be **faxed** to the Purchasing Department: **972-450-7074** or **emailed to: purchasing@addisontx.gov**. Questions regarding required insurance should be directed to the Purchasing Manager.

With respect to the foregoing insurance,

1. All liability policies shall contain no cross liability exclusions or insured versus insured restrictions applicable to the claims of the Town of Addison.
2. All insurance policies shall be endorsed to require the insurer to immediately notify the Town of Addison, Texas of any material change in the insurance coverage.
3. All insurance policies shall be endorsed to the effect that the Town of Addison, Texas will receive at least thirty (30) days' notice prior to cancellation or non-renewal of the insurance.
4. All insurance policies, which name the Town of Addison and Garver, LLC, Inc. as an additional insured, must be endorsed to read as primary coverage regardless of the application of other insurance.
5. Insurance must be purchased from insurers that are financially acceptable to the Town of Addison and licensed to do business in the State of Texas.

All insurance must be written on forms filed with and approved by the Texas Department of Insurance. Upon request, Contractor shall furnish the Town of Addison with complete copies of all insurance policies certified to be true and correct by the insurance carrier.

This form must be signed and returned with your quotation. You are stating that you do have the required insurance and if selected to perform work for TOWN OF ADDISON, will provide the certificates of insurance (and endorsements) with the above requirements to TOWN OF ADDISON within 10 working days.

A CONTRACT/PURCHASE ORDER WILL NOT BE ISSUED WITHOUT EVIDENCE AND APPROVAL OF INSURANCE.

AGREEMENT

I agree to provide the above described insurance coverages within 10 working days if selected to perform work for TOWN OF ADDISON. I also agree to require any subcontractor(s) to maintain insurance coverage equal to that required by the Contractor. It is the responsibility of the Contractor to assure compliance with this provision. The Town accepts no responsibility arising from the conduct, or lack of conduct, of the Subcontractor.

Project/Bid# _____

Company: _____

Printed Name: _____

Signature: _____ **Date:** _____



**TECHNICAL SPECIFICATIONS
FOR THE CONSTRUCTION OF**

**TOWN OF ADDISON, TX
KELLWAY LIFT STATION BY-PASS**

Client Project # 2021-03C

**PUBLIC WORKS AND ENGINEERING DEPARTMENT
BID NUMBER 21-53**

VOLUME 2 OF 2

MARCH 2021

PREPARED BY



**3010 Gaylord Parkway
Suite 190
Dallas, Texas 75034
(972) 377-7480**



TOWN OF ADDISON, TEXAS

MAYOR

Joe Chow

COUNCIL MEMBERS

Paul Walden

Tom Braun

Ivan Hughes

Guillermo Quintanilla

Lori Ward

Marlin Willesen

CITY MANAGER

Wesley Pierson

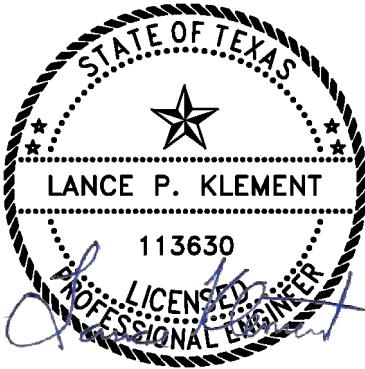
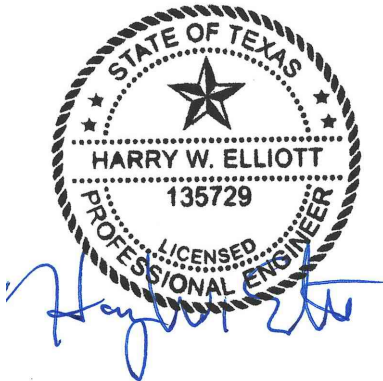
DIRECTOR OF PUBLIC WORKS AND ENGINEERING

Shannon Hicks, P.E.



CERTIFICATIONS

KELLWAY LIFT STATION BY-PASS PROJECT GARVER PROJECT NO. 20W05015

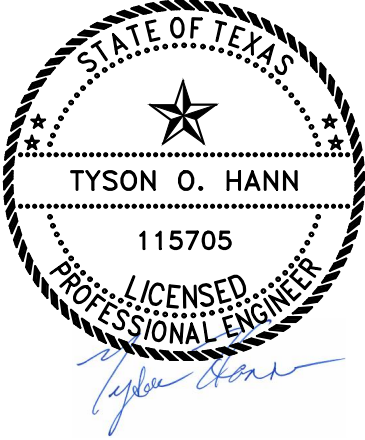
I hereby certify that the applicable portions of this project plans and specifications were prepared by me or under my direct supervision and that I am a duly Licensed Engineer under the laws of the State of TX.

SEAL AND SIGNATURE	APPLICABLE DIVISION OR PROJECT RESPONSIBILITY
<p>Lance Klement, P.E No 113630</p>  <p>Digitally Signed 3/15/2021</p>	<p>Division 00 – Front Ends Division 01 – General Requirements</p>
<p>Harry Elliott, P.E. No. 135729</p>  <p>Digitally Signed 03/15/2021</p>	<p>Division 03 – Concrete</p>

CERTIFICATIONS

SEAL AND SIGNATURE	APPLICABLE DIVISION OR PROJECT RESPONSIBILITY
<p style="text-align: center;">Brian Chong, P.E. No. 108528</p> <div style="text-align: center;">  <p style="text-align: center;">Digitally Signed 3/15/2021</p> </div>	<p>Division 26 - Electrical</p>
<p style="text-align: center;">Stephen Mobley, P.E. No. 117365</p> <div style="text-align: center;">  </div>	<p>Division 31 – Earthwork Division 32 – Exterior Improvements</p>

CERTIFICATIONS

SEAL AND SIGNATURE	APPLICABLE DIVISION OR PROJECT RESPONSIBILITY
<p style="text-align: center;">Tyson Hann, P.E. No. 115705</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Digitally Signed 03/15/2021</p>	<p>Division 02 – Existing Conditions Division 09 – Finishes Division 22 – Plumbing Division 33 – Utilities Division 40 – Process Integration Division 44 – Pollution Control Equipment</p>

GARVER, LLC CERTIFICATE OF AUTHORIZATION:
<p>TX ENGINEERING FIRM REGISTRATION NO. F-5713</p> <p>Expiration Date: 1/31/2022</p>

**KELLWAY LIFT STATION BY-PASS PROJECT
TABLE OF CONTENTS**

**VOLUME 1 OF 2
CONTRACT DOCUMENTS**

DIVISION 00 – BIDDING AND CONTRACTING REQUIREMENTS

Section C	Certifications
Section ToC	Table of Contents
Section AB	Advertisement for Bids
Section IB	Instructions to Bidders
Section IIF	Information and Instruction Form
Section PF	Proposal Form
Section BB	Bid Bond
Section BQS	Bidder Qualification Statement
Section CA	Contract Agreement
Section PrB	Performance Bond
Section PyB	Payment Bond
Section MB	Maintenance Bond
Section BP	Contractor's Affidavit of Bills Paid
Section GP	General Provisions
Standard Specifications for Public Works Construction – North Central Texas (5 th Edition, 2017)	
Section GTC	Town of Addison General Terms and Conditions
Section SP	Special Provisions
	Indemnification Agreement (Provided in Special Provisions)
Section IS	Additional Insurance Requirements, Town of Addison

**VOLUME 2 OF 2
GENERAL REQUIREMENTS AND TECHNICAL SPECIFICATIONS**

DIVISION 01 - GENERAL REQUIREMENTS

01 11 00	SUMMARY OF WORK
01 11 60	PROJECT MANUAL LANGUAGE
01 14 00	WORK RESTRICTIONS
01 26 00	CONTRACT MODIFICATION PROCEDURES
01 29 00	PAYMENT PROCEDURES
01 31 00	PROJECT MANAGEMENT AND COORDINATION
01 31 19	PROJECT MEETINGS
01 32 00	CONSTRUCTION PROGRESS DOCUMENTATION
01 32 90	SAFETY PLAN
01 33 00	SUBMITTAL PROCEDURES
01 34 00	PHOTOGRAPHIC AND VIDEOGRAPHIC DOCUMENTATION
01 41 00	REGULATORY REQUIREMENTS
01 42 00	REFERENCES
01 42 40	ABBREVIATIONS
01 45 00	QUALITY CONTROL
01 45 24	SPECIAL TESTS AND INSPECTIONS
01 50 00	TEMPORARY FACILITIES AND CONTROLS
01 60 00	PRODUCT REQUIREMENTS
01 72 20	FIELD ENGINEERING
01 73 20	CUTTING AND PATCHING
01 75 60	TESTING, TRAINING, AND FACILITY START-UP
01 77 00	CLOSEOUT PROCEDURES

01 78 23	OPERATION AND MAINTENANCE DATA
01 79 00	DEMONSTRATION AND TRAINING
01 79 00.1	MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION
01 79 00.2	UNIT PROCESS STARTUP FORM
01 79 00.3	FACILITY PERFORMANCE DEMONSTRATION/CERTIFICATION FORM
01 80 01	COMMISSIONING
01 81 00	PROJECT DESIGN CRITERIA
01 81 02	SEISMIC DESIGN CRITERIA

DIVISION 02 - EXISTING CONDITIONS

02 41 00	DEMOLITION
----------	------------

DIVISION 03 - CONCRETE

03 01 00	CONCRETE SURFACE REPAIR
03 15 00	CONCRETE ACCESSORIES
03 30 00	CAST-IN-PLACE CONCRETE
03 60 00	GROUT
03 60 00.1	GROUT SUPPLEMENT

DIVISION 09 - FINISHES

09 90 00	PAINTING AND PROTECTIVE COATINGS
09 97 26.13	INTERIOR COATINGS
09 97 26.23	EXTERIOR COATINGS

DIVISION 22 - PLUMBING

22 05 29	PROCESS SUPPORTS AND ANCHORS
22 05 53	MECHANICAL IDENTIFICATION

DIVISION 26 - ELECTRICAL

26 05 00	COMMON WORK RESULTS FOR ELECTRICAL
26 05 14	WIRING DEVICES
26 05 15	ELECTRIC MOTORS
26 05 19	LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
26 05 26	GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
26 05 33	RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS
26 05 33.13	PVC COATED CONDUIT
26 05 43	UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS
26 05 53	IDENTIFICATION FOR ELECTRICAL SYSTEMS
26 67 05	COMMUNICATION CABLE AND EQUIPMENT
26 90 00	GENERAL INSTRUMENTATION AND CONTROL
26 90 10	PROCESS AND ANALYTICAL INSTRUMENTS

DIVISION 31 - EARTHWORK

31 11 00	SITE PREPARATION
31 22 13	SUBGRADE PREPARATION
31 22 19	GRADING
31 23 16	EXCAVATION
31 23 16.13	TRENCHING FOR SITE UTILITIES
31 23 16.16	TRENCHING FOR WATER AND SEWER LINES
31 23 16.20	ROCK EXCAVATION
31 23 19	DEWATERING

31 23 23.13 FILL AND BACKFILL
31 23 23.16 TRENCH BACKFILL
31 23 23.19 TRENCH BEDDING AND BACKFILL FOR WATER AND SEWER LINES
31 50 00 EXCAVATION SUPPORT SYSTEMS

DIVISION 32 - EXTERIOR IMPROVEMENTS

32 12 16 ASPHALT CONCRETE PAVEMENT
32 91 13 SODDING, SEEDING, FERTILIZING AND MULCHING

DIVISION 33 - UTILITIES

33 31 23 TESTING SANITARY SEWER SYSTEMS
33 34 13 DUCTILE IRON FORCE MAIN PIPE AND FITTINGS
33 39 13.13 PRECAST CONCRETE MANHOLES
33 41 16 DUCTILE IRON GRAVITY SEWER PIPE AND FITTINGS
33 41 19 PIPE LAYING

DIVISION 40 - PROCESS INTEGRATION

40 05 00 PIPING SYSTEMS TESTING
40 23 39 PROCESS PIPING GENERAL
40 23 39.1 PROCESS PIPING SCHEDULE
DATA SHEETS:
40 23 39.13 DUCTILE IRON PIPE AND FITTINGS
40 23 43 PROCESS VALVES
40 24 00 PROCESS PIPING SPECIALTIES

DIVISION 44 - POLLUTION AND WASTE CONTROL EQUIPMENT

44 42 56.46 VERTICAL CLOSE-COUPLED SOLIDS-HANDLING PUMPS
DATA SHEET:
44 42 56.46.1 VERTICAL CLOSE-COUPLED SOLIDS-HANDLING PUMPS

DIVISION 1
GENERAL REQUIREMENTS

SECTION 01 11 00 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes description and requirements of:
 - 1. Work covered by Contract Documents.
 - 2. Activities of others within Project area.
 - 3. Coordination of Work required by Contractor.
 - 4. Provisions for future Work.
- B. Work covered by Contract Documents: The completed Work will provide Owner with various lift station improvements. More specifically, the Project includes, but is not limited to, construction of the following:
 - 1. Installation of a third pump and associated piping, valving, and appurtenances.
 - 2. Connection of pump suction lines in the existing lift station
 - 3. Installation of a bypass pumping connection to provide direct connection to the forcemain and bypass the lift station
 - 4. Installation of new pre-cast concrete manhole and piping between the lift station
 - 5. Connection between the new and existing manhole, piping between the existing manhole and the lift station, and a new wall core
 - 6. Bypass pumping during construction
- C. Except as specifically noted otherwise, provide and pay for:
 - 1. Insurance and bonds.
 - 2. Labor, materials, and equipment.
 - 3. Tools, equipment, and machinery required for construction.
 - 4. Utilities required for construction.
 - 5. Temporary facilities including sheeting and shoring.
 - 6. Traffic control and dust control measures.
 - 7. Other facilities and services necessary for proper execution and completion of the Work.
- D. Secure and pay for all permits including all Town of Addison permits, OSHA excavation permits, Department of Transportation permits, and any other government fees and licenses.
- E. Comply with codes, ordinances, regulations, orders, and other legal requirements of public authorities having bearing on the performance of the Work.

1.2 ACTIVITIES BY OTHERS

- A. Owner, utilities, and others may perform activities within Project area while the Work is in progress.
 - 1. Schedule the Work with Owner, utilities, and others to minimize mutual interference.
- B. Cooperate with others to minimize interference and delays.
 - 1. When cooperation fails, submit recommendations and perform Work in coordination with work of others as directed.
- C. Other on-going and potential projects that parallel the schedule of this project:
 - 1. None

1.3 COORDINATION OF WORK

- A. Maintain overall coordination of the Work.

- B. Obtain construction schedules from each subcontractor, and require each subcontractor to maintain schedules and coordinate modifications.
- C. Alternates: Alternates, if included, are specified in detail in the Bid Form and only those alternates that were selected by the Owner, as evidenced in the Agreement, are made a part of this Contract.

1.4 PROVISIONS FOR FUTURE WORK

- A. Provisions for future construction are as shown as detailed on drawings and in the specifications.

1.5 LOCATION OF WORK

- A. The Project is located at the Kellway Lift Station, 4245 Kellway Circle Addison, TX 75001.

1.6 OWNER FURNISHED EQUIPMENT

- A. For this project's delivery, the Owner shall not be providing and/or delivering any associated equipment.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 11 60 – PROJECT MANUAL LANGUAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes description and requirements of:
 - 1. Explanation of Project Manual arrangement.
 - 2. Explanation of Project Manual language.
 - 3. Reference standards.
 - 4. Method of resolving conflicts of referenced standards between Contract Documents.
- B. Related Documents and Sections:
 - 1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
 - 2. It is the CONTRACTOR's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of CONTRACTOR's Work.

1.2 REFERENCES

- A. Construction Specifications Institute (CSI):
 - 1. Manual of Practice - MasterFormat™.
 - 2. Manual of Practice - SectionFormat™.
 - 3. Manual of Practice - PageFormat™.

1.3 PROJECT MANUAL ARRANGEMENT

- A. Document and Section numbers used in Project Manual, and Project Manual arrangement are in accordance with CSI MasterFormat™, except where departures have been deemed necessary.
- B. Sections are written in accordance with CSI SectionFormat™, Three-Part Section Format, except where departures have been deemed necessary.
- C. Page format for Sections in the Project Manual is in accordance with CSI Page Format, except where departures have been deemed necessary.

1.4 PROJECT MANUAL LANGUAGE

- A. Specification Section Paragraphs entitled "Section Includes" summarizes briefly what is generally included in the section. Requirements of Contract Documents are not limited by "Section Includes" paragraphs. Specifications have been partially streamlined by intentionally omitting words and phrases, such as "the CONTRACTOR shall," "in conformity therewith," "shall be" following "as indicated," "a," "an," "the" and "all". Assume missing portions by inference.
- B. Phrase "by ENGINEER" modifies words such as "accepted," "directed," "selected," "inspected," and "permitted," when they are unmodified.
- C. Phrase "to ENGINEER" modifies words such as "submit," "report," and "satisfactory," when they are unmodified.
- D. Colons (:) are used to introduce a list of particulars, an appositive, an amplification, or an illustrative quotation:
 - 1. When used as an appositive after designation of product, colons are used in place of words "shall be."

- E. Word "provide" means to manufacture, fabricate, deliver, furnish, install, complete, assemble, erect in place, test, render ready for use or operation, including necessary related material, labor, appurtenances, services, and incidentals.
- F. Words "CONTRACTOR shall" are implied when direction is stated in imperative mood.
- G. Term "products" includes materials and equipment as specified in Section 01 60 00.

1.5 REFERENCE STANDARDS

- A. Use only applicable portions of referenced standards, ignoring payment stipulations and other provisions which change the duties of the ENGINEER or OWNER.
- B. Equate terms relating to designer to "ENGINEER."
- C. Notify ENGINEER when referenced standard, code, or specification conflicts with Contract Documents.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 14 00 – WORK RESTRICTIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes description and requirements of:
 - 1. General constraints for sequencing and scheduling the Work.
 - 2. Interruption of lift station operations
 - 3. Work affected by existing site and facility.
 - 4. Work restrictions and coordination between construction operations and plant operations, including:
 - a. Access to site
 - b. Use of site and premises.
 - c. Utilities.
 - d. Work by Others.
 - e. Work Sequence.
 - f. Temporary Services, Materials and Equipment.
- B. Related sections:
 - 1. Section 01 11 00 - Summary of Work.
 - 2. Section 01 26 00 - Contract Modification Procedures.
 - 3. Section 01 50 00 - Temporary Facilities and Controls.

1.2 GENERAL CONSTRAINTS ON SEQUENCE AND SCHEDULING OF WORK

- A. Water Projects:
 - 1. The existing Kellway Lift Station for the Town of Addison is an important facility in the process of pumping wastewater for the Town. Impairing the operational capabilities of this facility will result in serious financial damage to the Town.
 - 2. Conduct work in a manner that will not impair the operational capabilities of essential elements or reduce the capacity of the pump station.
 - 3. The status of the lift station shall be defined as “operational” during construction when the bypass connection is installed and existing pumping capacity is restored via bypass pumping.
- B. Work Sequence and Constraints:
 - 1. Utilize description of critical events in work sequence in this Section as a guideline for scheduling and undertaking the Work.
 - 2. Work sequence and constraints presented do not include all items affecting completion of the Work, but are intended to describe critical events necessary to minimize disruption of the existing facilities and to ensure compliance to the water quality standards as mandated by the Texas Department of Health.

1.3 INTERRUPTION OF FACILITY PROCESSES

- A. Execute the Work while the existing facility is in operation.
- B. Indicate required shutdowns of existing facilities or interruptions of existing operations on Progress Schedule. Shutdowns will be permitted to the extent that existing operation will not be jeopardized and identified constraints are satisfied.
- C. Submit written notification of required shutdowns of existing facilities at least 14 days prior to the planned date of shutdown.

- D. The ENGINEER and the Facility Personnel will evaluate the request based on the lift station's ability to reliably meet capacity demands.
- E. Do not begin alterations until ENGINEER's written permission has been received.
- F. Minimize shutdown times by thorough advanced planning. Have required equipment, materials, and labor on hand at time of shutdown.
- G. Where required to minimize process interruptions while complying with specified sequencing constraints, provide temporary pumping, power, lighting, controls, instrumentation, and safety devices.

1.4 REQUIREMENTS FOR OPERATION OF LIFT STATION AND MAINTAINING CONTINUOUS OPERATION OF EXISTING FACILITIES

- A. Facilities or conditions required to keep the existing lift station operational include, but are not limited to, the following:
 1. Electrical power, including transformers, distribution wiring, and motor control centers.
 2. Piping for conveyance of potable water.
 3. All existing pumps.
 4. Fencing and gates.
 5. Lighting.
 6. Heating, ventilation, and air conditioning equipment.
 7. Instrumentation, meters, controls, and telemetry equipment.
 8. Safety equipment and features.
 9. Parking for City employees and vehicles required for operation and maintenance of the existing pump stations.
 10. Telephone system.
 11. Storm drainage.
 12. Other incidentals necessary to continually operate the facilities.
- B. Conduct the Work and provide temporary facilities required to keep the existing plant continuously operational.
- C. Do not remove or demolish existing facilities required to keep the existing lift station operational at the capacities specified until the existing facilities are replaced by temporary or new facilities equipment. The replacement facilities shall have been tested and demonstrated to be operational prior to removing or demolishing existing facilities.

1.5 OPERATIONS AND MAINTENANCE ACCESS

- A. Provide safe, continuous access to process control equipment for plant operations personnel.

1.6 SHUTDOWN CONSTRAINTS

- A. Comply with Shutdown Constraints as described in Section 01 31 00, PROJECT MANAGEMENT AND COORDINATION, and described in General Terms as Follows:
 1. Provide 14 days advance notice to Engineer and Owner of need for a minor shutdown.
 2. Provide 30 days advance notice to Engineer and Owner of need for a major shutdown.
 3. Shutdowns will be allowed, but will be limited to low demand periods from 10:00 PM to 5:00 AM.
 4. Any shutdowns shall require a shutdown plan, including detailed schedule, backup tools and equipment, personnel involved, contingency plan, and any procedures involved in restarting the facility. Owner's approval of the Shutdown Plan is required prior to any shutdowns.

5. Contractor shall coordinate continuous 24-hour temporary pumping as necessary if the lift station needs to be offline for more than 2 hours during construction.

1.7 UTILITIES

- A. Provide advance notice to and utilize services of 811 for location and marking of underground utilities operated by utility agencies other than the OWNER. Contact information: Call 811 for marking of utilities.
- B. Maintain electrical, telephone, water, gas, sanitary facilities, and other utilities within existing facilities in service. Provide temporary utilities when necessary.

1.8 WORK BY OTHERS

- A. Where proper execution of the Work depends upon work by others, inspect and promptly report discrepancies and defects.

1.9 WORK SEQUENCE

- A. The project assumes that all project efforts will be delivered in a concurrent, logical fashion. The following sequences does not detail the integration of all work included in the Contract. The Contractor is responsible to perform all required work and coordinate that work with the continuing appropriate operation of the existing facilities. This possible sequence is included for informational purposes only. It is intended that Construction be performed in multiple phases as follows:
 1. The anticipated sequence of events at the lift station is as follows:
 - a. Install lift station bypass connection and temporary bypass pumping.
 - b. Drain and clean the wetwells.
 - c. Complete the following work concurrently.
 - d. Core the wetwells and install new wall pipes, valves, manhole, and manhole connections.
 - e. Install the common suction header, valves, new piping, and third pump, valves, spools, and appurtenances.
 - f. Install new electrical conduit, connections to the control panel, ultrasonic level detection, and stilling wells.

1.10 TEMPORARY SERVICES, MATERIALS, AND EQUIPMENT

- A. Locate temporary facilities in a manner that minimizes interference to OWNER's operation and maintenance personnel.
- B. Unless otherwise specified, install temporary pipelines of the same size as its connection to the existing facility at the downstream end of the pipeline.
- C. Provide piping of suitable material for the material being conveyed.
- D. Provide submittals on proposed temporary electrical and instrumentation components necessary to maintain existing facilities.
- E. Dewater and promptly clean basins and channels temporarily removed from service.
- F. Dimensions for all existing structures, piping, paving, and other nonstructural items are approximate. The CONTRACTOR shall field verify all dimensions and conditions and report any discrepancies to the ENGINEER a minimum of 14 days in advance of any construction in the area.

- G. Discrepancies between coordinates, bearings and lengths, and stationing shall be resolved in the following order of precedence:
1. Coordinates.
 2. Bearings and lengths.
 3. Stationing.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 26 00 – CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes description and requirements of:
 - 1. Proposal Requests.
 - 2. Claims.
 - 3. Change Orders and Written Amendments.
 - 4. Field Order Procedures.

1.2 PROPOSAL REQUEST

- A. Owner may, in anticipation of ordering an addition, deletion, or revision to the Work, request Contractor to prepare a detailed proposal of cost and times to perform contemplated change.
- B. Proposal request will include reference number for tracking purposes and detailed description of and reason for proposed change, and such additional information as appropriate and as may be required for Contractor to accurately estimate cost and time impact on the Project.
- C. Proposal request is for information only; Contractor is neither authorized to execute proposed change nor to stop Work in progress as result of such request.
- D. Contractor's written proposal shall be transmitted to Engineer promptly, but not later than 14 days after Contractor's receipt of Owner's written request. Proposal shall remain firm for a maximum period of 45 days after receipt by Engineer.
- E. Owner's request for proposal or Contractor's failure to submit such proposal within the required time period will not justify a claim for an adjustment in Contract Price or Contract Times (or Milestones).

1.3 CLAIMS

- A. Include, at a minimum:
 - 1. Specific references including:
 - a. Drawing numbers.
 - b. Specification section and article/paragraph number.
 - c. Submittal type, Submittal number, date reviewed, Engineer's comment, as applicable, with appropriate attachments.
 - 2. Stipulated facts and pertinent documents, including photographs and statements.
 - 3. Interpretations relied upon.
 - 4. Description of:
 - a. Nature and extent of claim.
 - b. Who or what caused the situation.
 - c. Impact to the Work and work of others.
 - d. Discussion of claimant's justification for requesting a change to price or times or both.
 - 5. Estimated adjustment in price claimant believes it is entitled to with documentation and justification.
 - 6. Requested Change in Contract Times: Include at least;
 - a. Progress schedule documentation showing logic diagram for request.
 - b. Documentation that float times available for Work have been used.
 - c. Revised activity logic with durations including sub-network logic revisions, duration changes, and other interrelated schedule impacts, as appropriate.

7. Documentation as may be necessary as set forth below for Work Change Directive, and as Engineer may otherwise require.

1.4 WORK CHANGE DIRECTIVES

A. Procedures:

1. Upon completion of Work covered by the Work Change Directive or when final Contract Times and Contract Price is determined, Contractor shall submit documentation for inclusion in a Change Order via the **Info Exchange** project website.
2. Engineer will:
 - a. Initiate, including a description of the Work involved and any attachments.
 - b. Affix signature, demonstrating Engineer's recommendation.
 - c. Engineer will update Owner monthly on the status of the Work Change Directives.
3. Owner will:
 - a. Affix signature, demonstrating approval of the changes involved.
 - b. Return one electronic copy to Engineer. Engineer will retain one electronic copy, send one electronic copy to the Resident Project Representative or other field representative, and forward one electronic copy to Contractor.
4. Contractor's documentation shall include but not be limited to:
 - a. Appropriately detailed records of Work performed to enable determination of value of the Work.
 - b. Full information required to substantiate resulting change in Contract Times and Contract Price for Work. On request of Engineer, provide additional data necessary to support documentation.
 - c. Support data for Work performed on a unit price or Cost of the Work basis with additional information such as:
 - 1). Dates Work was performed, and by whom.
 - 2). Time records, wage rates paid, and equipment rental rates.
 - 3). Invoices and receipts for materials, equipment, and subcontracts, all similarly documented.
 - d. Claim for additional cost must be made within 10 days of the directive by the Engineer. Claims on work made after 10 days will not be considered.

- B. Effective Date of Work Change Directive: Date of signature by Owner, unless otherwise indicated thereon.

1.5 CHANGE ORDERS OR WRITTEN AMENDMENTS

A. Procedure:

1. Engineer will prepare the proposed Change Order or Written Amendment and transmit an electronic copy of such with Engineer's written recommendation (Change Order only) and request to Contractor for signature.
2. Contractor shall, upon receipt, either:
 - a. Promptly execute the document, retaining one electronic copy for its file, and return one electronic copy via the **Info Exchange** project website to Engineer for Owner's signature, or
 - b. Return unsigned one electronic copy with written justification via **Info Exchange** project website for not executing Change Order or Written Amendment.
3. Engineer will, upon receipt of Contractor-executed copy, promptly forward Engineer's written recommendation and partially executed copy for Owner's signature, or if Contractor fails to execute the Change Order or Written Amendment, Engineer will promptly so notify Owner and transmit Contractor's justification to Owner.
4. Upon receipt of Contractor-executed Change Order or Written Amendment, Owner will promptly either:
 - a. Execute Change Order or Written Amendment, retaining one copy for its file and returning one electronic copy to Engineer, or

- b. Return to Engineer unsigned copy with written justification for not executing Change Order or Written Amendment.
 - 5. Upon receipt of Owner-executed Change Order or Written Amendment, Engineer will transmit one electronic copy to Contractor, one copy to Resident Project Representative or other field representative, and retain one electronic copy, or if Owner fails to execute the Change Order or Written Amendment, Engineer will promptly so notify Contractor and transmit Owner's justification to Contractor.
 - 6. Upon receipt of Owner-executed Change Order, Contractor shall:
 - a. Perform Work covered by Change Order or Written Amendment.
 - b. Revise Schedule of Values to adjust Contract Price and submit with next Application for Payment.
 - c. Revise progress schedule to reflect changes in Contract Times, if any, and to adjust times for other items of Work affected by change.
 - d. Enter changes in Project record documents after completion of change related Work.
- B. In signing a Change Order or Written Amendment, Owner and Contractor acknowledge and agree that:
- 1. Stipulated compensation (Contract Price or Contract Times, or both) set forth includes payment for:
 - a. The Cost of the Work covered by the Change Order or Written Amendment.
 - b. Contractor's fee for overhead and profit.
 - c. Interruption of progress schedule.
 - d. Delay and impact, including cumulative impact, on other Work under the Contract Documents, and
 - e. Extended overheads.
 - 2. Change Order or Written Amendment constitutes full mutual accord and satisfaction for the change to the Work.
 - 3. Unless otherwise stated in the Change Order or Written Amendment, all requirements of the original Contract Documents apply to the Work covered by the Change Order or Written Amendment.

1.6 FIELD ORDER PROCEDURES

- A. Engineer will issue Field Orders, with one electronic copy to Contractor.
- B. Effective date of the Field Order shall be the date of signature by Engineer, unless otherwise indicated thereon.
- C. Contractor shall acknowledge receipt by signing and returning one electronic copy to Engineer.
- D. Field Orders will be incorporated into subsequent Change Orders, as a no-cost change to the Contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 29 00 – PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes description and requirements of:
 - 1. Submittals Related to Payment Procedures.
 - 2. Cash Allowances.
 - 3. Schedule of Values.
 - 4. Schedule of Estimated Progress Payments.
 - 5. Payment.
 - 6. Nonpayment for Rejected or Unused Products.
 - 7. Partial Payment for Stored Materials and Equipment.
 - 8. Partial Payment for Undelivered, Project Specific Manufactured or Fabrication Equipment.
- B. Related sections:
 - 1. Section 01 50 00 – Temporary Facilities and Controls.

1.2 SUBMITTALS

- A. Informational Submittals:
 - 1. Schedule of Values: Submit on Contractor's standard form.
 - 2. Schedule of Estimated Progress Payments:
 - a. Submit with initially acceptable Schedule of Values.
 - b. Submit adjustments thereto with Application for Payment.
 - 3. Application for Payment.
 - 4. Final Application for Payment.

1.3 CASH ALLOWANCES

- A. Consult with Engineer in selection of products or services. Obtain proposals from Suppliers and installers and offer recommendations.
- B. Cash allowances will be administered in accordance with the General Conditions and as specified herein.
- C. Contractor Agrees:
 - 1. The Lump Sum Work includes the allowances specified and includes all Work to perform such items covered by the Cash Allowance as approved by Owner and Engineer.
 - 2. The Allowances include the cost of material and equipment required by the allowances to be delivered to the Site and applicable taxes.
 - 3. Contractor's cost for unloading, handling, labor, installation cost, overhead, profit, and other expenses for the allowance have been included in the Lump Sum Work and not in the allowance.
 - 4. Accept payment equal to the amount of the actual invoices for services and products without markup.
- D. Expenditure of any portion of Cash Allowances shall only be done with authorization by Owner and Engineer. Cash Allowances are estimated amounts and final payment shall be based on actual costs as authorized by Change Order and the Contract Price shall be correspondingly adjusted. The Cash Allowances are specifically for the purpose of the following items:

- E. Independent Testing Cash Allowance: This allowance is to cover costs of specified Quality Assurance testing to be provided by an independent testing laboratory, agency, and special inspectors retained by the Owner. Contractor shall hire independent testing laboratory, agency, and special inspectors as acceptable to the Owner. Authorization will only be given for independent testing services performed as part of field quality assurance specified to be provided by the Owner. Any re-testing or other testing desired or specified by the Contractor shall be the responsibility of the Contractor.
- F. Submit, with application for payment, invoice showing date of purchase, from which the purchase was made, the date of delivery of the product or service, and the price, including delivery to the Site and applicable taxes.

1.4 SCHEDULE OF VALUES

- A. Prepare a separate Schedule of Values for each schedule of the Work under the Agreement.
- B. Upon request of Engineer, provide support documentation to support the accuracy of the Schedule of Values.
- C. Unit Price Work: Reflect unit price quantity and price breakdown from conformed Bid Form.
- D. Lump Sum Work:
 - 1. Reflect Schedule of Values format included in conformed Bid Form, specified allowances, alternates, and equipment selected by Owner, as applicable.
 - 2. List bonds and insurance premiums, mobilization, demobilization, preliminary and detailed progress schedule preparation, facility startup, and contract closeout separately.
 - 3. Break down by Division 2 through 44 with appropriate subdivision of each Specification for each Project facility. The apparent "low bidder" is required to deliver a Bid breakdown by specification within 2 working days after Bid opening.
- E. An unbalanced or front-end loaded schedule will not be acceptable.
- F. Summation of the complete Schedule of Values representing all the Work shall equal the Contract Price.
- G. Submit Schedule of Values in a spreadsheet format compatible with latest version of Excel.

1.5 SCHEDULE OF ESTIMATED PROGRESS PAYMENTS

- A. Show estimated payment requests throughout Contract Times aggregating initial Contract Price.
- B. Base estimated progress payments on initially acceptable progress schedule. Adjust to reflect subsequent adjustments in progress schedule and Contract Price as reflected by modifications to the Contract Documents.

1.6 APPLICATION FOR PAYMENT

- A. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment for each schedule and include Request for Payment of Materials and Equipment on Hand as applicable. Execute certification by authorized officer of Contractor.
- B. Use detailed Application for Payment Form suitable to Engineer.
- C. Provide separate form for each schedule as applicable.

- D. Include accepted Schedule of Values for each schedule or portion of Work, the unit price breakdown for the Work to be paid on unit price basis, a listing of Owner-selected equipment, if applicable, and allowances, as appropriate.
- E. Preparation:
 - 1. Round values to nearest dollar.
 - 2. List each Change Order executed prior to date of submission as separate line item. The totals will equal those shown on the Transmittal Summary Form for each schedule as applicable.
 - 3. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form(s) for each schedule as applicable, a listing of materials on hand for each schedule as applicable, and such supporting data as may be requested by Engineer.
 - 4. Prior to submitting each request for progress payment, request Engineer's review and approval of current status of record documents as required by SC-7.11.B. Failure to properly maintain, update, and submit record documents may result in a deferral by Engineer to recommend whole or any part of Contractor's Application for Payment, either partial or final.

1.7 PAYMENT

- A. General:
 - 1. Progress payments will be made monthly.
 - 2. The date for Contractor's submission of monthly Application for Payment shall be established at the Preconstruction Conference.
 - 3. Progress payment is contingent upon applications and Contractor progress, which is subject to withholdings by Owner.
- B. Payment for all the Work shown or specified in Contract Documents is included in the Contract Price. No measurement or payment will be made for individual items.
- C. Payment for Lump Sum Work covers all Work specified or shown in the Contract Documents.

1.8 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

- A. Payment will not be made for following:
 - 1. Loading, hauling, and disposing of rejected material.
 - 2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
 - 3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.
 - 4. Material not unloaded from transporting vehicle.
 - 5. Defective Work not accepted by Owner.
 - 6. Material remaining on hand after completion of Work.

1.9 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

- A. Partial Payment: No partial payments will be made for materials and equipment delivered or stored unless Shop Drawings and preliminary operation and maintenance manuals are accepted by Engineer. Thereafter, partial payment for materials and equipment delivered and stored, but not yet incorporated in work, shall not exceed 90% of the equipment or material value.
- B. Final Payment: Will be made only for products incorporated in Work and following approval of final operations and maintenance manuals; remaining products, for which partial payments have

been made, shall revert to Contractor unless otherwise agreed, and partial payments made for those items will be deducted from final payment.

1.10 PARTIAL PAYMENT FOR UNDELIVERED, PROJECT-SPECIFIC MANUFACTURED OR FABRICATED EQUIPMENT

A. Notwithstanding above provisions, partial payments for undelivered (not yet delivered to Site or not stored in the vicinity of Site) products specifically manufactured for this Project, excluding off the shelf or catalog items, will be made for products listed below when all following conditions exist:

1. Partial payment request is supported by written acknowledgment from Suppliers that invoice requirements have been met.
2. Equipment is adequately insured, maintained, stored, and protected by appropriate security measures.
3. Each equipment item is clearly marked and segregated from other items to permit inventory and accountability.
4. Authorization has been provided for access to storage Site for Engineer and Owner.
5. Equipment meets applicable Specifications of these Contract Documents.

B. Applicable Items:

Specification Section	Specific Product
44 42 56.46.1	Vertical Dry-Pit Centrifugal Pumps

C. Payment shall not exceed 15% of the equipment value, not including shipping and handling charges for undelivered, Project-specific manufactured equipment and will only be made following Shop Drawing approval.

D. Failure of Contractor to continue compliance with above requirements shall give cause for Owner to withhold payments made for such equipment from future partial payments.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 31 00 – PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes description and requirements of:
 - 1. Submittals Related to Project Management and Coordination.
 - 2. Utility Notification and Coordination.
 - 3. Work Sequencing /Constraints.
 - 4. Facility Operations.
 - 5. Adjacent Facilities and Properties.
 - 6. Owner's Occupancy.
 - 7. Partial Utilization by the Owner.
 - 8. Physical Conditions.
 - 9. Construction Photographs.
 - 10. Audio-Video Recordings.
 - 11. Cutting, Fitting and Patching.
- B. Related sections:
 - 1. Section 01 32 00 – Construction Progress Documentation.

1.2 SUBMITTALS

- A. Informational:
 - 1. Statement of Qualification (SOQ) for land surveyor or civil engineer.
 - 2. Photographs and other records of examination.
 - 3. Video Recordings: Submit one copy, including updated copy of project video log, within 5 days of being taken.

1.3 UTILITY NOTIFICATION AND COORDINATION

- A. Coordinate the Work with various utilities within Project limits. Notify applicable utilities prior to commencing Work, if damage occurs, or if conflicts or emergencies arise during Work.
- B. Before excavation contact, Texas One Call System, Inc., ph 811 to arrange for field location of known utilities.

1.4 WORK SEQUENCING/CONSTRAINTS

- A. Include the following work sequences in the Progress Schedule required under Section 01 32 00, CONSTRUCTION PROGRESS DOCUMENTATION.
- B. This Section identifies several construction constraints that must be reflected in the Contractor project coordination. An overall outline is presented in this Section for the Construction coordination, demolition, and seasonal/process constraints that shall be considered during construction. The sequence of Work for this Project must reflect the constraints identified herein.
- C. Definitions:
 - 1. Dry weather periods shall, in general, be from June 15 through October 1. Actual dry weather periods shall be as determined by the Owner based on weather, flows entering plant, and plant operation requirements.
 - 2. Wet weather periods shall be any time period which is not within the defined dry weather periods.

3. Low flow period shall be from 2:00 a.m. to 6:00 a.m.
4. Minor Shutdown: Any shutdown requiring less than 8 hours.
5. Major Shutdown: Any shutdown other than a minor shutdown.

D. Shutdown of Pump Station Operations:

1. Provide 14 days advance notice to Engineer and Owner of need for a minor shutdown.
2. Provide 30 days advance notice to Engineer and Owner of need for a major shutdown.
3. Contractor shall schedule a shutdown coordination meeting with Owner and Engineer one week prior to each shutdown.
4. Do not proceed with work affecting a facility's operation without obtaining Owner and Engineer advance approval of the need for, and duration of, such work. The Owner will endeavor to grant Contractor requests where possible. However, because Owner's primary responsibility is to treat wastewater, the requested timing may not be possible.
5. Any and all plant shutdowns shall require a shutdown plan, including detailed schedule, backup tools and equipment, personnel involved, contingency plan, and any procedures involved in restarting the process or facility. Owner's approval of the Shutdown Plan is required prior to any shutdowns.
6. Shutdowns will be allowed but shall only be allowed in dry weather periods and with at least one flow equalization basin in operation. Shutdowns may be limited to low flow periods.
7. No minor or major shutdowns allowed within 7 days of a previous shutdown.

1.5 FACILITY OPERATIONS

- A. Continuous operation of Owner's facilities is of critical importance. Schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified, and to minimize the number of shutdowns of the plant and existing unit processes.
- B. Perform Work continuously during critical connections and changeovers, as required, to prevent interruption of Owner's operations.
- C. Conduct Work outside regular working hours on prior written consent of Owner to meet Project schedule and avoid undesirable conditions.
- D. Be responsible for planning, designing, and providing various temporary services, utilities, connections, temporary piping, bypass facilities and temporary connections, and similar items to maintain continuous operations of Owner's facility. Sequences other than those specified will be considered upon written request to Owner and Engineer, provided they afford equivalent continuity of operations.
- E. Do not close lines, open or close valves, or take other action which would affect the operation of existing systems, except as specifically required by the Contract Documents and after authorization by Owner and Engineer. Such authorization will be considered within 48 hours after receipt of Contractor's written request.
- F. Any tanks or pipelines requiring drainage prior to construction will be drained by the Owner's staff to the maximum extent possible utilizing existing piping and drains where they exist. Contractor shall provide temporary pumping and effort to complete drainage of tank or pipeline as required. Provide minimum 7 days' notice to Engineer and Owner of need to drain a facility, unless otherwise specified.
- G. Power outages will be considered upon 48 hours written request to Owner and Engineer. Describe the reason, anticipated length of time, and areas affected by the outage in the written request. Provide temporary provisions for continuous power supply to critical existing facility components, is requested by Owner.

- H. Coordinate proposed work with Engineer and Owner before implementing unit shutdowns. Under no circumstances shall Work end if such actions may inadvertently cause a cessation of any facility operation. In such cases, remain onsite until necessary repairs are complete and facility is brought back online.
- I. Relocation of Existing Facilities:
 - 1. During construction, it is expected that minor relocations of Work will be necessary.
 - 2. Provide complete relocation of existing structures and Underground Facilities, including piping, utilities, equipment and structures, electrical conduit wiring, electrical duct bank, and other necessary items.
 - 3. Use only new materials for relocated facility. Match materials of existing facility, unless otherwise shown or specified.
 - 4. Perform relocations to minimize downtime of existing facilities.
 - 5. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by Engineer.

1.6 ADJACENT FACILITIES AND PROPERTIES

- A. Examination:
 - 1. After Effective Date of the Agreement and before Work at Site is started Contractor, Engineer, and affected property owners and utility owners shall make a thorough examination of pre-existing conditions including existing buildings, structures, and other improvements in vicinity of Work, as applicable, which could be damaged by construction operations.
 - 2. Periodic reexamination shall be jointly performed to include, but not limited to, cracks in structures, settlement, leakage, and similar conditions.
- B. Documentation:
 - 1. Record and submit documentation of observations made on examination inspections for signature of Engineer and Contractor and in accordance with paragraph Construction Photographs and Audio-Video Recordings.
 - 2. Upon receipt, Engineer will review, sign, and return one record copy of documentation to Contractor to be kept on file in field office. Such documentation shall be used as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of Contractor's operations, and is for the protection of adjacent property owners, Contractor, and Owner.

1.7 OWNER'S OCCUPANCY

- A. Owner will occupy the premises during the period of construction for the conduct of its normal operations. Cooperate with Owner in all construction operations to minimize conflict and to facilitate Owner usage.

1.8 PARTIAL UTILIZATION BY THE OWNER

- A. Schedule operations for completion of portions of the Work, as designated under Work Sequence/Constraints, herein, for Owner's occupancy or separate operation prior to Substantial Completion of the entire Work.
- B. Unless agreed in writing prior to Owner's use, the following conditions shall apply:
 - 1. Contractor's Responsibilities:
 - a. Allow access for Owner's personnel.
 - b. Allow operation of ventilation and electrical systems.
 - c. All other responsibilities as specified in the General Conditions.
 - 2. Owner's Responsibilities:

- a. Operate ventilating systems and pay cost of same.
 - b. Assume responsibility of power requirements.
 - c. Assume responsibility for security and fire protection in utilized areas, but not extending to Contractor's materials and equipment in utilized areas.
 - d. Assume responsibility for property insurance of utilized areas.
3. Other Conditions of Owner's Use: The correction period for the occupied or separately operated portion of Work shall commence at the date of Substantial Completion for that separate part.

1.9 PHYSICAL CONDITIONS

- A. Exercise reasonable care to verify locations of existing subsurface facilities and utilities.
- B. Areas immediate and adjacent to planned excavations shall be thoroughly checked by means of visual examination and with electronic metal and pipe detection equipment for indications of underground utilities and facilities.
- C. Make exploratory excavation where existing underground facilities or utilities may potentially conflict with proposed excavations and facilities or where there is reasonable cause to verify the presence or absence of, or to obtain physical information regarding underground facilities or utilities. Conduct exploratory excavations as acceptable to and in the presence of Engineer prior to proceeding with major excavation in the area and sufficiently in advance of construction to avoid possible delays to Contractor's Work. Promptly take measurements, photographs, and obtain survey data.

1.10 CONSTRUCTION PHOTOGRAPHS

- A. Photographically document all phases of the project including preconstruction, construction progress, and post-construction.
- B. Engineer shall have the right to select the subject matter and vantage point from which photographs are to be taken.
- C. Photograph Format: Reference Section 01 34 00 for photograph requirements.
- D. Preconstruction and Post-Construction:
 - 1. After Effective Date of the Agreement and before Work at Site is started, and again upon issuance of Substantial Completion, take photographs of all areas of the Construction Site and property adjacent to perimeter of Construction Site.
 - 2. Particular emphasis shall be directed to structures both inside and outside the Site.
- E. Construction Progress Photos:
 - 1. Photographically demonstrate progress of construction, showing every aspect of Site and adjacent properties as well as interior and exterior of new or impacted structures.
 - 2. Take photos as frequent as required to document all major aspects of construction. Coordinate with Engineer.

1.11 AUDIO-VIDEO RECORDINGS

- A. Prior to beginning Work on Construction Site or of a particular area of the Work, and again within 10 days following date of Substantial Completion, video-graph Construction Site and property adjacent to Construction Site.
- B. In the case of preconstruction recording, no Work shall begin in the area prior to Engineer's review and approval of content and quality of video for that area.

- C. Particular emphasis shall be directed to physical condition of existing vegetation, structures, and pavements within Construction Site and areas adjacent to and within the right-of-way or easement, and on Contractor storage and staging areas.
- D. Engineer shall have right to select subject matter and vantage point from which videos are to be taken.
- E. Video Format and Quality:
 - 1. Video:
 - a. Produce bright, sharp, and clear images with accurate colors, free of distortion and other forms of picture imperfections. Make sure sound is clear and free of distortion.
 - b. Electronically, and accurately display the month, day, year, and time of day of the recording.
 - 2. Audio:
 - a. Audio documentation shall be done clearly, precisely, and at a moderate pace.
 - b. Indicate date, project name, and a brief description of the location of taping, including:
 - 1). Facility name.
 - 2). Street names or easements.
 - 3). Addresses of private property.
 - 4). Direction of coverage, including engineering stationing, if applicable.
 - 3. Documentation:
 - a. Electronic File Name:
 - 1). Date of coverage in year-month-day-time format followed by a short description of video coverage.
 - 4. Transmission of Files:
 - a. Transmit electronic files via Info Exchange, or;
 - b. Place electronic files on flash drive with enough storage size to hold all videos being transmitted and deliver to Engineer via acceptable method to Engineer.
 - 5. Project Video Log: Maintain an ongoing log that incorporates above noted information for videos on Project.
 - 6. Reference specification Section 01 34 00 for additional requirements.

1.12 REFERENCE POINTS AND SURVEYS

- A. Location and elevation of benchmarks are shown on Drawings.
- B. Dimensions for lines and elevations for grades of structures, appurtenances, and utilities are indicated on the Drawings, together with the other pertinent information required for laying out Work. If conditions vary from those indicated, immediately notify Engineer.
- C. Any existing survey points or other control markers destroyed without proper authorization will be replaced by Owner of the survey points or control markers at the Contractor's expense.
- D. Contractor's Responsibilities:
 - 1. Provide additional survey and layout required to layout the Work.
 - 2. Locate and protect reference points prior to starting site preparation.
 - 3. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.
 - 4. In event of discrepancy in data or staking provided by Owner, request clarification before proceeding with Work.
 - 5. Retain professional land surveyor or civil engineer registered in state of Project who shall perform or supervise engineering surveying necessary for additional construction staking and layout.
 - 6. Maintain complete accurate log of survey Work as it progresses as a Record Document.

7. On request of Engineer, submit documentation.
8. Provide competent employee(s), tools, stakes, and other equipment and materials as Engineer may require to:
 - a. Establish control points, lines, and easement boundaries.
 - b. Check layout, survey, and measurement Work performed by others.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CUTTING, FITTING, AND PATCHING

- A. Cut, fit, adjust, or patch Work and work of others, including excavation and backfill as required, to make Work complete.
- B. Obtain prior written authorization of Engineer and Owner before commencing work to cut or otherwise alter:
 1. Structural or reinforcing steel, structural column or beam, elevated slab, trusses, or other structural member.
 2. Weather- or moisture-resistant elements.
 3. Efficiency, maintenance, or safety of element.
 4. Work of others.
- C. Refinish surfaces to provide an even finish.
 1. Refinish continuous surfaces to nearest intersection.
 2. Refinish entire assemblies.
 3. Finish restored surfaces to such planes, shapes, and textures that no transition between existing work and Work is evident in finished surfaces.
- D. Restore existing work, Underground Facilities, and surfaces that are to remain in completed Work including concrete-embedded piping, conduit, and other utilities as specified and as shown.
- E. Make restorations with new materials and appropriate methods as specified for new Work of similar nature; if not specified, use recommended practice of manufacturer or appropriate trade association.
- F. Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces and fill voids.
- G. Remove specimens of installed Work for testing when requested by Engineer.

END OF SECTION

SECTION 01 31 19 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Requirements for conducting conferences and meetings for the purposes of addressing issues related to the Work, reviewing and coordinating progress of the Work and other matters of common interest, and includes the following:
 - 1. General Requirements.
 - 2. Qualifications of Meeting Participants.
 - 3. Preconstruction Conference.
 - 4. Progress Meetings.
 - 5. Pre-Installation Meetings.
 - 6. Post Construction Meeting.

1.2 GENERAL REQUIREMENTS

- A. Contractor will schedule physical arrangements for meetings throughout progress of Work, prepare meeting agenda with regular participant input and distribute with written notice of each meeting, preside at meetings, record minutes to include significant proceedings and decisions, and reproduce and distribute copies of minutes within 5 days after each meeting to participants and parties affected by meeting decisions.

1.3 QUALIFICATIONS OF MEETING PARTICIPANTS

- A. Representatives of entities participating in meetings shall be qualified and authorized to act on behalf of entity each represents.

1.4 PRECONSTRUCTION CONFERENCE

- A. Contractor shall be prepared to discuss the following subjects, as a minimum:
 - 1. Required schedules.
 - 2. Status of Bonds and insurance.
 - 3. Sequencing of critical path work items.
 - 4. Progress payment procedures.
 - 5. Project changes and clarification procedures.
 - 6. Use of site, access, office and storage areas, security and temporary facilities.
 - 7. Major product delivery and priorities.
 - 8. Contractor's safety plan and representative.
- B. Attendees will include:
 - 1. Owner's representatives.
 - 2. Contractor's office representative.
 - 3. Contractor's resident superintendent.
 - 4. Contractor's quality control representative.
 - 5. Subcontractor's representatives whom Contractor may desire or Engineer may request to attend.
 - 6. Engineer's representatives.
 - 7. Others as appropriate.
- C. Upon issuance of Notice to Proceed, or earlier when mutually agreeable, Engineer will arrange a preconstruction conference in a convenient place for most persons invited, in accordance with the General Conditions.

- D. Attending Preconstruction Conference: Contractor's superintendent, Owner, Engineer, representatives of utilities, major subcontractors and others involved in performance of the Work, and others necessary to agenda.
- E. Contractor will preside at conference.
- F. Purpose of conference: To establish working understanding between parties and to discuss Construction Schedule, shop drawing and other submittals, cost breakdown of major lump sum items, processing of submittals and applications for payment, and other subjects pertinent to execution of the Work.
- G. Agenda will include:
 - 1. Adequacy of distribution of Contract Documents.
 - 2. Distribution and discussion of list of major subcontractors and suppliers.
 - 3. Proposed progress schedules and critical construction sequencing.
 - 4. Major equipment deliveries and priorities.
 - 5. Project coordination.
 - 6. Designation of responsible personnel.
 - 7. Procedures and processing of:
 - a. Field decisions.
 - b. Proposal requests.
 - c. Submittals.
 - d. Change Orders.
 - e. Applications for Payment.
 - f. Record Documents.
 - 8. Use of premises:
 - a. Office, construction, and storage areas.
 - b. Owner's requirements.
 - 9. Construction facilities, controls, and construction aids.
 - 10. Shoring requirements and submittal of Contractor's geotechnical report.
 - 11. Temporary utilities.
 - 12. Safety and first aid procedures.
 - 13. Security procedures.
 - 14. Housekeeping procedures.
- H. Engineer will record minutes of meeting and distribute copies of minutes within 5 days of meeting to participants and interested parties.

1.5 PROGRESS MEETINGS

- A. Contractor will schedule regular progress meetings at site, conducted weekly, to review the Work progress, progress schedule, Shop Drawing and Sample submissions schedule, Application for Payment, contract modifications, and other matters needing discussion and resolution. At one meeting each month the Contractor's updated narrative progress report and overall schedule will be a topic of discussion.
- B. Attendees will include:
 - 1. Owner's representative(s), as appropriate.
 - 2. Contractor, Subcontractors, and Suppliers, as appropriate.
 - 3. Engineer's representative(s).
 - 4. Others as appropriate.
- C. Contractor shall:
 - 1. Conduct progress meetings at least once every week in Contractor's field office, Engineer's field office, or other mutually agreed upon place.

2. Distribute to each anticipated participant written notice and agenda of each meeting at least 2 days before meeting.
 3. Require attendance of Contractor's superintendent and subcontractors who are or are proximate to be actively involved in the Work, or who are necessary to agenda.
 4. Invite Owner, Engineer, utility companies when the Work affects their interests, and others necessary to agenda.
 5. Complete and bring Application for Payment and Progress Schedule to progress meeting.
 6. Prepare and distribute agenda.
- D. Contractor will preside at meetings.
- E. Purpose of progress meetings:
1. To expedite work of subcontractors or other organizations that are not meeting scheduled progress, resolve conflicts, and coordinate and expedite execution of the Work.
 2. Review progress of the Work, Progress Schedule, narrative report, Application for Payment, record documents, and additional items of current interest that are pertinent to execution of the Work.
 3. Verify:
 - a. Actual start and finish dates of completed activities since last progress meeting.
 - b. Durations and progress of activities not completed.
 - c. Reason, time, and cost data for Change Order Work that will be incorporated into Progress Schedule and application for payment.
 - d. Percentage completion of items on Application for Payment.
 - e. Reasons for required revisions to Progress Schedule and their effect on Contract Time and Contract Price.
- F. Discuss potential problems that may impede scheduled progress and corrective measures.
- G. Contractor will record minutes of meeting and distribute copies of minutes within 7 days of meeting to participants and interested parties.
- 1.6 QUALITY CONTROL AND COORDINATION MEETINGS
- A. Scheduled by Engineer on regular basis and as necessary to review test and inspection reports, and other matters relating to quality control of Work and work of other contractors.
- B. Attendees will include:
1. Contractor.
 2. Contractor's designated quality control representative.
 3. Subcontractors and Suppliers, as necessary.
 4. Engineer's representatives.
- 1.7 FACILITY STARTUP MEETINGS
- A. Schedule and attend a minimum of 2 facility startup meetings. The first of such meetings shall be held prior to submitting the Facility Startup Plan, as specified in Section 01 79 00, DEMONSTRATION AND TRAINING, and shall include preliminary discussions regarding such plan.
- B. Agenda items shall include, but not be limited to, content of Facility Startup Plan, coordination needed between various parties in attendance, and potential problems associated with startup.
- C. Attendees will include:
1. Contractor.

2. Contractor's designated quality control representative.
3. Subcontractors and equipment Manufacturer's representatives whom Contractor deems to be directly involved in facility startup.
4. Engineer's representatives.
5. Owner's operations personnel.
6. Others as required by Contract Documents or as deemed necessary by Contractor.

1.8 POST CONSTRUCTION MEETING

- A. Meet with and inspect the Work at 11 months after date of Substantial Completion with Owner and Engineer.
- B. Arrange meeting at least 7 days before meeting.
- C. Meet in Owner's office or other mutually agreed upon place.
- D. Inspect the Work and draft list of items to be completed or corrected.
- E. Review service and maintenance contracts and take appropriate corrective action when necessary.
- F. Complete or correct defective work and extend correction period accordingly.
- G. Require attendance of Superintendent, appropriate manufacturers and installers of major units of constructions, and affected subcontractors.

1.9 OTHER MEETINGS

- A. In accordance with Contract Documents and as may be required by Owner and Engineer.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 00 – CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Preparation, submittal, and maintenance of computerized progress schedule and reports, contract time adjustments, and payment requests, including the following:
 - 1. Preliminary Schedule.
 - 2. Detailed Progress Schedule.
 - 3. Schedule Updates.
 - 4. Schedule Revisions.

1.2 SUBMITTALS

- A. Informational Submittals:
 - 1. Preliminary Progress Schedule: Submit at least 7 days prior to preconstruction conference.
 - 2. Detailed Progress Schedule:
 - a. Submit initial Detailed Progress Schedule within 45 days after Effective Date of the Agreement.
 - b. Submit an Updated Progress Schedule at each update, in accordance with Article Detailed Progress Schedule.
 - 3. Submit with Each Progress Schedule Submission:
 - a. Contractor's certification that Progress Schedule submission is actual schedule being utilized for execution of the Work.
 - b. Electronic files compatible with latest version of the Contractor's selected software, or compatible with Microsoft Project, or compatible with Microsoft Excel.
 - c. Progress Schedule: Legible copies.
 - d. Narrative Progress Report: Same number of copies as specified for Progress Schedule.
 - 4. Prior to final payment, submit a final Updated Progress Schedule.

1.3 PRELIMINARY PROGRESS SCHEDULE

- A. In addition to basic requirements outlined in General Conditions, show a detailed schedule, beginning with Notice to Proceed, for minimum duration of 90 days, and a summary of balance of Project through Final Completion.
- B. Show activities including, but not limited to the following:
 - 1. Notice to Proceed.
 - 2. Permits.
 - 3. Submittals, with review time. Contractor may use Schedule of Submittals specified in Section 01 33 00, SUBMITTAL PROCEDURES.
 - 4. Early procurement activities for long lead equipment and materials.
 - 5. Initial Site work.
 - 6. Earthwork.
 - 7. Specified Work sequences and construction constraints.
 - 8. Contract Milestone and Completion Dates.
 - 9. Owner-furnished products delivery dates or ranges of dates.
 - 10. Major structural, mechanical, equipment, electrical, architectural, and instrumentation and control Work.
 - 11. System startup summary.
 - 12. Project close-out summary.
 - 13. Demobilization summary.

- C. Update Preliminary Progress Schedule monthly; as part of progress payment process. Failure to do so may result in the Owner withholding all or part of the monthly progress payment until the Preliminary Progress Schedule is updated in a manner acceptable to Engineer.
- D. Format: In accordance with Article Progress Schedule Critical Path Network.
- E. Update monthly to reflect actual progress and occurrences to date, including weather delays.

1.4 DETAILED PROGRESS SCHEDULE

- A. General: Comprehensive computer-generated schedule using a "Critical Path Method" (CPM), generally as outlined in Associated General Contractors of America (AGC) 580, "Construction Project Planning and Scheduling Guidelines." If a conflict occurs between the AGC publication and this Specification, this Specification shall govern. Adjust or confirm schedules in accordance with General Conditions on a monthly basis and submit to Engineer.
- B. Contents:
 - 1. Schedule shall begin with the date of Notice to Proceed and conclude with the date of Final Completion.
 - 2. Identify Work calendar basis using days as a unit of measure.
 - 3. Show complete interdependence and sequence of construction and Project-related activities reasonably required to complete the Work.
 - 4. Identify the Work of separate stages and other logically grouped activities, and clearly identify critical path of activities.
 - 5. Reflect sequences of the Work, restraints, delivery windows, review times, Contract Times and Project Milestones set forth in the Agreement and Section 01 31 00, PROJECT MANAGEMENT AND COORDINATION.
 - 6. Include as applicable, at a minimum:
 - a. Obtaining permits, submittals for early product procurement, and long lead time items.
 - b. Mobilization and other preliminary activities.
 - c. Initial Site work.
 - d. Specified Work sequences, constraints, and Milestones, including
 - e. Substantial Completion date(s) Subcontract Work.
 - f. Major equipment design, fabrication, factory testing, and delivery dates.
 - g. Delivery dates for Owner-furnished products, as specified in Section 01 11 00, SUMMARY OF WORK.
 - h. Site work.
 - i. Concrete Work.
 - j. Structural steel Work.
 - k. Architectural features Work.
 - l. Conveying systems Work.
 - m. Equipment Work.
 - n. Mechanical Work.
 - o. Electrical Work.
 - p. Instrumentation and control Work.
 - q. Interfaces with Owner-furnished equipment.
 - r. Other important Work for each major facility.
 - s. Equipment and system startup and test activities.
 - t. Project closeout and cleanup.
 - u. Demobilization.
 - 7. No activity duration exclusive of those for Submittals review and product fabrication/delivery, shall be less than 1 day and not more than 14 days, unless otherwise approved.
 - 8. Activity duration for Submittal review shall not be less than review time specified unless clearly identified and prior written acceptance has been obtained from Engineer.

9. If Contractor provides an accepted schedule with an early completion date, Owner reserves the right to reduce Contract Times to match the early completion date by issuing a deductive Change Order at no change in Contract Price.

C. Network Graphical Display:

1. Plot or print on paper not greater than 30" x 42" or smaller than 22" x 34", unless otherwise approved.
2. Title Block: Show name of Project, Owner, date submitted, revision or update number, and the name of the scheduler. Updated schedules shall indicate data date.
3. Identify horizontally across top of schedule the time frame by year, month, and day.
4. Identify each activity with a unique number and a brief description of the Work associated with that activity.
5. Indicate the critical path.
6. Show, at a minimum, the controlling relationships between activities.
7. Plot activities on a time-scaled basis, with the length of each activity proportional to the current estimate of the duration.
8. Plot activities on an early start basis unless otherwise requested by Engineer.
9. Provide a legend to describe standard and special symbols used.

D. Schedule Report:

1. 8-1/2" x 11" white paper, unless otherwise approved.
2. List information for each activity in tabular format, including, at a minimum:
 - a. Activity Identification Number.
 - b. Activity Description.
 - c. Original Duration.
 - d. Remaining Duration.
 - e. Early Start Date (Actual start on Updated Progress Schedules).
 - f. Early Finish Date (Actual finish on Updated Progress Schedules).
 - g. Late Start Date.
 - h. Late Finish Date.
 - i. Total Float.
3. Sort reports, in ascending order, as listed below:
 - a. Activity number sequence with predecessor and successor activity.

E. Cost -Loading:

1. Note the estimated cost to perform each Work activity, with the exception of Submittals or Submittal reviews, in the network in a tabular listing.
2. The sum of all activity costs shall equal the Contract Price. An unbalanced or front-end-loaded schedule will not be acceptable.
3. The accepted cost-loaded Progress Schedule shall constitute the Schedule of Values specified in Section 01 29 00, PAYMENT PROCEDURES.

1.5 PROGRESS OF THE WORK

A. Updated Progress Schedule shall reflect:

1. Progress of Work to within 5 working days prior to submission.
2. Approved changes in Work scope and activities modified since submission.
3. Delays in Submittals or re-submittals, deliveries, or Work.
4. Adjusted or modified sequences of Work.
5. Other identifiable changes.
6. Revised projections of progress and completion.
7. Report of changed logic.

- B. Produce detailed sub schedules during Project, upon request of Owner or Engineer, to further define critical portions of the Work such as facility shutdowns.

- C. If Contractor fails to complete activity by its latest scheduled completion date and this Failure is anticipated to extend Contract Times (or Milestones), Contractor shall, within 7 days of such failure, submit a written statement as to how Contractor intends to correct nonperformance and return to acceptable current Progress Schedule. Actions by Contractor to complete the Work within Contract Times (or Milestones) will not be justification for adjustment to Contract Price or Contract Times.
- D. Owner may order Contractor to increase plant, equipment, labor force or working hours if Contractor fails to:
 - 1. Complete an activity by its completion date.
 - 2. Satisfactorily execute Work as necessary to prevent delay to overall completion of Project, at no additional cost to Owner.

1.6 SCHEDULE ACCEPTANCE

- A. Engineer's acceptance will demonstrate agreement that:
 - 1. Proposed schedule is accepted with respect to:
 - a. Contract Times, including Final Completion are within the specified times.
 - b. Specified Work sequences and constraints are shown as specified.
 - c. Access restrictions are accurately reflected.
 - d. Startup and testing times are as specified.
 - e. Submittal review times are as specified.
 - f. Startup testing duration is as specified and timing is acceptable.
 - 2. In all other respects, Engineer's acceptance of Contractor's schedule indicates that in the Engineer's judgment, the schedule represents reasonable plan for constructing Project in accordance with the Contract Documents. Engineer's review will not make any change in Contract requirements. Lack of comment on any aspect of schedule that is not in accordance with the Contract Documents will not thereby indicate acceptance of that change, unless Contractor has explicitly called the nonconformance to Engineer's attention in submittal. Schedule remains Contractor's responsibility and Contractor retains responsibility for performing all activities, for activity durations, and for activity sequences required to construct Project in accordance with the Contract Documents.
- B. Unacceptable Preliminary Progress Schedule:
 - 1. Make requested corrections; resubmit within 10 days.
 - 2. Until acceptable to Engineer as Baseline Progress Schedule, continue review and revision process, during which time Contractor shall update schedule on a monthly basis to reflect actual progress and occurrences to date.
- C. Unacceptable Detailed Progress Schedule:
 - 1. Make requested corrections; resubmit within 10 days.
 - 2. Until acceptable to Engineer as Baseline Progress Schedule, continue review and revision process.
- D. Narrative Report: All changes to activity duration and sequences, including addition or deletion of activities subsequent to Engineer's acceptance of Baseline Progress Schedule shall be delineated in Narrative Report current with proposed Updated Progress Schedule.

1.7 ADJUSTMENT OF CONTRACT TIMES

- A. Reference the General Conditions and Section 01 26 00, CONTRACT MODIFICATION PROCEDURES.

- B. Evaluation and reconciliation of Adjustments of Contract Times shall be based on the Updated Progress Schedule at the time of proposed adjustment or claimed delay.
- C. Float:
1. Float time is a Project resource available to both parties to meet contract Milestones and Contract Times.
 2. Use of float suppression techniques, such as preferential sequencing or logic, special lead/lag logic restraints, and extended activity times are prohibited. Use of float time disclosed or implied by use of alternate float-suppression techniques shall be shared to proportionate benefit of Owner and Contractor.
 3. Pursuant to above float-sharing requirement, no time extensions will be granted nor delay damages paid until a delay occurs, which:
 - a. Impacts Project's critical path,
 - b. Consumes all available float or contingency time, and
 - c. Extends Work beyond contract completion date.
- D. Claims Based on Contract Times:
1. Where Engineer has not yet rendered formal decision on Contractor's Claim for adjustment of Contract Times, and parties are unable to agree as to amount of adjustment to be reflected in Progress Schedule, Contractor shall reflect an interim adjustment in the Progress Schedule as acceptable to Engineer.
 2. It is understood and agreed that such interim acceptance will not be binding on either Contractor or Owner, and will be made only for the purpose of continuing to schedule Work until such time as formal decision has been rendered as to an adjustment, if any, of the Contract Times.
 3. Contractor shall revise Progress Schedule prepared thereafter in accordance with Engineer's formal decision.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 90 – SAFETY PLAN

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Development and maintenance of a Construction Safety Plan.

1.2 REFERENCES

- A. OSHA.

1.3 CONSTRUCTION SAFETY PLAN

- A. Detail the Methods and Procedures to comply with Federal, and Local Health and Safety Laws, Rules and Requirements for the duration of the Contract Times. Include the following:
 - 1. Identification of the Certified or Licensed Safety Consultant, who will prepare, initiate, maintain and supervise safety programs, and procedures.
 - 2. Procedures for providing workers with an awareness of safety and health hazards expected to be encountered in the course of construction.
 - 3. Safety equipment appropriate to the safety and health hazards expected to be encountered during construction. Include warning devices, barricades, safety equipment in public right-of-way and protected areas, and safety equipment used in multi-level structures.
 - 4. Methods for minimizing employees' exposure to safety and health hazards expected during construction.
 - 5. Procedures for reporting safety or health hazards.
 - 6. Procedures to follow to correct a recognized safety and health hazard.
 - 7. Procedures for investigation of accidents, injuries, illnesses and unusual events that have occurred at the construction site.
 - 8. Periodic and scheduled inspections of general work areas and specific work stations.
 - 9. Training for employees and workers at the jobsite.
 - 10. Methods of communication of safe working conditions, work practices and required personal protection equipment.
- B. Assume responsibility for every aspect of Health and Safety on the jobsite, including the health and safety of subcontractors, suppliers, and other persons on the jobsite:
 - 1. Forward available information and reports to the Safety Consultant who shall make the necessary recommendations concerning worker health and safety at the jobsite.
 - 2. Employ additional health and safety measures specified by the Safety Consultant, as necessary, for workers in accordance with OSHA guidelines.
- C. Transmit to OWNER and ENGINEER copies of reports and other documents related to accidents or injuries encountered during construction.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes description and requirements of:
 - 1. Submittals Related to Project Submittals as related to:
 - a. Action Submittals
 - b. Informational Submittals
- B. Related sections:
 - 1. 01 29 00 – Payment Procedures.
 - 2. 01 31 00 – Project Management and Coordination.
 - 3. 01 32 00 – Construction Progress Documentation.
 - 4. 01 77 00 – Closeout Procedures.
 - 5. 01 78 23 – Operation and Maintenance Data.
 - 6. 01 79 00 – Demonstration and Training.

1.2 DEFINITIONS

- A. Action Submittal: Written and graphic information submitted by Contractor that requires Engineer's approval.
- B. Informational Submittal: Information submitted by Contractor that does not require Engineer's approval.

1.3 PROCEDURES

- A. Direct Submittals to Engineer.
- B. Contractor will submit all submittals electronically using the **Info Exchange** project website to facilitate the transfer of submittals and related files.
- C. Transmittal of Submittal:
 - 1. Contractor shall:
 - a. Review each submittal and check for compliance with Contract Documents.
 - b. Stamp each submittal with uniform approval stamp before submitting to Engineer.
 - 1). Stamp to include Project name, submittal number, Specification number, Contractor's reviewer name, date of Contractor's approval and statement certifying that submittal has been reviewed, checked, and approved for compliance with Contract Documents.
 - 2). Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
 - 2. Complete, sign, and transmit with each submittal package, one Transmittal of Contractor's Submittal form. A blank Transmittal of Contractor's Submittal form may be provided by Engineer.
 - 3. Identify Each Submittal with the Following:
 - a. Numbering and Tracking System:
 - 1) Submittal No. 8300-001, etc.
 - b. Sequentially number each submittal.
 - c. Resubmission of submittal shall have original number with sequential alphabetic suffix (ie: Resubmittal No. 8300-001-A).
 - 1). Specification section and paragraph to which submittal applies.
 - 2). Project title and Engineer's project number.

- 3). Date of transmittal.
 - 4). Names of Contractor, subcontractor or Supplier and Manufacturer as appropriate.
 4. Identify and describe each deviation or variation from Contract Documents.
- D. Format:
1. Do not base Shop Drawings on reproductions of Contract Documents.
 2. Package submittal information by individual Specification section. Do not combine different Specification sections together in submittal package, unless otherwise directed in Specification.
 3. Present in a clear and thorough manner and in sufficient detail to show kind, size, arrangement, and function of components, materials, and devices, and compliance with Contract Documents.
 4. Index with labeled tab dividers in orderly manner.
- E. Timeliness: Schedule and submit in accordance Schedule of Submittals, and requirements of individual Specification sections.
- F. Processing Time:
1. Time for review shall commence on Engineer's receipt of submittal.
 2. Engineer will act upon Contractor's submittal and transmit response to Contractor not later than 30 days after receipt, unless otherwise specified.
 3. Re-submittals will be subject to same review time.
 4. No adjustment of Contract Times or Price will be allowed due to delays in progress of Work caused by rejection and subsequent re-submittals.
- G. Re-submittals: Clearly identify each correction or change made.
- H. Incomplete Submittals:
1. Engineer will return entire submittal for Contractor's revision if preliminary review deems it incomplete.
 2. When any of the following are missing, submittal will be deemed incomplete:
 - a. Contractor's review stamp completed and signed.
 - b. Transmittal of Contractor's Submittal completed and signed.
 3. Submittals not required by Contract Documents will not be reviewed and will be returned stamped "Not Reviewed."
 4. Engineer will keep one electronic copy and return one electronic copy to Contractor.
- I. Coordination with Project:
1. It is the Contractor's responsibility to coordinate all equipment furnished with project elevations and dimensions. Approval of the submittal does not relieve the Contractor of the responsibility.
 2. Contractor shall be responsible for coordinating all project aspects and project changes with all submittals.
- 1.4 ACTION SUBMITTALS
- A. Prepare and submit Action Submittals required by individual Specification sections.
- B. Contractor will submit all submittals electronically using the **Info Exchange** project website to facilitate the transfer of submittals and related files.
- C. Shop Drawings:
1. Identify and Indicate:

- a. Applicable Contract Drawing and Detail number, products, units and assemblies, and system or equipment identification or tag numbers.
 - b. Equipment and Component Title: Identical to title shown on Drawings.
 - c. Critical field dimensions and relationships to other critical features of Work. Note dimensions established by field measurement.
 - d. Project-specific information drawn accurately to scale.
 - 2. Manufacturer's standard schematic drawings and diagrams as follows:
 - a. Modify to delete information that is not applicable to the Work.
 - b. Supplement standard information to provide information specifically applicable to the Work.
 - 3. Product Data: Provide as specified in individual Specifications.
 - 4. Foreign Manufacturers: When proposed, include following additional information:
 - a. Names and addresses of at least two companies that maintain technical service representatives close to Project.
 - b. Complete list of spare parts and accessories for each piece of equipment.
- D. Samples:
- 1. Copies: One, unless otherwise specified in individual Specifications.
 - 2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of quality. Attach label on unexposed side that includes the following:
 - a. Manufacturer name.
 - b. Model number.
 - c. Material.
 - d. Sample source.
 - 3. Manufacturer's Color Chart: Units or sections of units showing full range of colors, textures, and patterns available.
 - 4. Full-size Samples:
 - a. Size as indicated in individual Specification section.
 - b. Prepared from same materials to be used for the Work.
 - c. Cured and finished in manner specified.
 - d. Physically identical with product proposed for use.
- E. Action Submittal Dispositions: Engineer will review, mark, and stamp as appropriate, and distribute marked-up copies as noted:
- 1. Furnish as Submitted:
 - a. Contractor may incorporate product(s) or implement Work covered by submittal.
 - b. Distribution
 - 1). One electronic copy furnished to Resident Project Representative.
 - 2). One electronic copy retained in Engineer's file.
 - 3). One electronic copy returned to Contractor appropriately annotated.
 - 2. Furnish as Corrected or Noted:
 - a. Contractor may incorporate product(s) or implement Work covered by submittal, in accordance with Engineer's notations.
 - b. Distribution:
 - 1). One electronic copy furnished to Resident Project Representative.
 - 2). One electronic copy retained in Engineer's file.
 - 3). One electronic copy to Contractor appropriately annotated.
 - 3. Revise and Resubmit:
 - a. Make corrections or obtain missing portions, and resubmit.
 - b. Except for portions indicated, Contractor may begin to incorporate product(s) or implement Work covered by submittal, in accordance with Engineer's notations.
 - c. Distribution:
 - 1). One electronic copy furnished to Resident Project Representative.
 - 2). One electronic copy retained in Engineer's file.
 - 3). One electronic copy to Contractor appropriately annotated.
 - 4. Rejected:

- a. Contractor may not incorporate product(s) or implement Work covered by submittal.
- b. Distribution:
 - 1). One electronic copy furnished to Resident Project Representative.
 - 2). One electronic copy retained in Engineer's file.
 - 3). One electronic copy returned to Contractor appropriately annotated.

1.5 INFORMATIONAL SUBMITTALS

A. General:

- 1. Contractor will submit all submittals electronically using the **Info Exchange** project website to facilitate the transfer of submittals and related files.
- 2. Refer to individual Specification sections for specific submittal requirements.
- 3. Engineer will review each submittal. If submittal meets conditions of the Contract, Engineer will forward electronic copies to appropriate parties. If Engineer determines submittal does not meet conditions of the Contract and is therefore considered unacceptable, Engineer will retain one electronic copy and return one electronic copy with review comments to Contractor, and require that submittal be corrected and resubmitted.
- 4. Application for Payment: In accordance with Section 01 29 00, PAYMENT PROCEDURES.
- 5. Certificates:
 - a. General:
 - 1). Provide notarized statement that includes signature of entity responsible for preparing certification.
 - 2). Signed by officer or other individual authorized to sign documents on behalf of that entity.
- 6. Welding: In accordance with individual Specification sections.
- 7. Installer: Prepare written statements on Manufacturer's letterhead certifying that installer complies with requirements as specified in individual Specification sections.
- 8. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- 9. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in individual Specification sections.
- 10. Manufacturer's Certificate of Compliance: In accordance with Section 01 79 00, DEMONSTRATION AND TRAINING.
- 11. Manufacturer's Certificate of Proper Installation: In accordance with Section 01 79 00, DEMONSTRATION AND TRAINING.

B. Construction Photographs and Video: In accordance with Section 01 31 00, PROJECT MANAGEMENT AND COORDINATION, and as may otherwise be required in Contract Documents.

C. Contract Closeout Submittals: In accordance with Section 01 77 00, CLOSEOUT PROCEDURES.

D. Contractor-Design Data:

- 1. Written and graphic information.
- 2. List of assumptions.
- 3. List of performance and design criteria.
- 4. Summary of loads or load diagram, if applicable.
- 5. Calculations.
- 6. List of applicable codes and regulations.
- 7. Name and version of software.
- 8. Information requested in individual Specification section.

- E. Manufacturer's Instructions: Written or published information that documents Manufacturer's recommendations, guidelines, and procedures in accordance with individual Specification sections.
- F. Operation and Maintenance Data: As required in Section 01 78 23, OPERATION AND MAINTENANCE DATA.
- G. Schedules:
 - 1. Schedule of Submittals: Prepare separately or in combination with Progress Schedule as specified in Section 01 32 00, CONSTRUCTION PROGRESS DOCUMENTATION.
 - a. Show for Each, at a Minimum, the Following:
 - 1). Specification section number.
 - 2). Identification by numbering and tracking system as specified under Paragraph "Transmittal of Submittal".
 - 3). Estimated date of submission to Engineer, including reviewing and processing time.
 - b. On a monthly basis, submit updated schedule to Engineer if changes have occurred or re-submittals are required.
 - 2. Schedule of Values: In accordance with Section 01 29 00, PAYMENT PROCEDURES.
 - 3. Schedule of Estimated Progress Payments: In accordance with Section 01 32 00, CONSTRUCTION PROGRESS DOCUMENTATION.
 - 4. Progress Schedules: In accordance with Section 01 32 00, CONSTRUCTION PROGRESS DOCUMENTATION.
- H. Special Guarantee: Supplier's written guarantee as required in individual Specification sections.
- I. Statement of Qualification: Evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty Subcontractor, trade, Specialist, consultant, installer, and other professionals.
- J. Submittals Required by Laws, Regulations, and Governing Agencies:
 - 1. Submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable Federal, State, or local governing agency or their representative.
 - 2. Transmit to Engineer for Owner's records one electronic copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.
- K. Test and Inspection Reports:
 - 1. General: Shall contain signature of person responsible for test or report.
 - 2. Factory:
 - a. Identification of product and Specification section, type of inspection or test with referenced standard or code.
 - b. Date of test, Project title and number, and name and signature of authorized person.
 - c. Test results.
 - d. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
 - e. Provide interpretation of test results, when requested by Engineer.
 - f. Other items as identified in individual Specification sections.
 - 3. Field: As a minimum, include the following:
 - a. Project title and number.
 - b. Date and time.
 - c. Record of temperature and weather conditions.
 - d. Identification of product and Specification section.

- e. Type and location of test, Sample, or inspection, including referenced standard or code.
 - f. Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
 - g. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
 - h. Provide interpretation of test results, when requested by Engineer.
 - i. Other items as identified in individual Specification sections.
- 4. Testing and Startup Data: In accordance with Section 01 79 00, DEMONSTRATION AND TRAINING.
 - 5. Training Data: In accordance with Section 01 79 00, DEMONSTRATION AND TRAINING.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 34 00 – PHOTOGRAPHIC AND VIDEOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes Requirements for:
 - 1. Pre-construction photographs.
 - 2. Pre-construction videos.
 - 3. Post-construction photographs.
 - 4. Post-construction videos.
- B. The purpose of the photographs and videos is to document the condition of the facilities prior to the CONTRACTOR beginning work at the Project site and after Substantial Completion of the Work.
- C. Areas to be photographed and videoed shall include the site of the Work and all existing facilities either on or adjoining the Project site, including the interior of existing structures, that could be damaged as a result of the CONTRACTOR's Work.
- D. The scope of the photographic and videographic documentation shall be the sole responsibility of the CONTRACTOR, but shall be acceptable to the ENGINEER.
- E. Related sections:
 - 1. Section 01 31 00 – Project Management and Coordination
 - 2. Section 01 31 19 – Project Meetings.
 - 3. Section 01 33 00 – Submittal Procedures.
 - 4. Section 01 77 00 – Closeout Procedures.

1.2 SUBMITTALS

- A. Key Plan: Submit key plan of Project site with notation of vantage points marked for location and direction of each photograph. Include the same label information as the corresponding set of photographs.
- B. Photographs:
 - 1. Digital Media:
 - a. Provide photos as individual, indexed JPG files with the following characteristics:
 - 1) Compression shall be set to preserve quality over file size.
 - 2) Highest resolution JPG images shall be submitted. Resizing to a smaller size when high resolution JPGs are available shall not be permitted.
 - 3) JPG image resolution shall be 4000 by 3000 or higher.
 - 4) Images shall have rectangular clean images. Artistic borders, beveling, drop shadows, etc. are not permitted.
- C. Videos:
 - 1. Submit 4 copies of each video within 7 days of recording.
 - 2. Videos shall be submitted in a digital color video format on a DVD suitable for playback on a standard DVD player.
 - 3. Identification: On each copy provide a label with the following information:
 - a. Name of project.
 - b. Date video was recorded.

- D. Pre-Construction Photographs and Videos: Submit prior to beginning work at the Project site or prior to the Preconstruction Conference specified in Section 01 31 19, whichever occurs earlier. Reference Section 01 31 00 for additional requirements.
- E. Post-Construction Photographs and Videos: Submit with project closeout documents as specified in Section 01 77 00. Reference Section 01 31 00 for additional requirements.

PART 2 - PRODUCTS

2.1 MEDIA

- A. Paper Media:
 - 1. Commercial grade, glossy surface, acid-free photographic paper.
- B. Digital Media:
 - 1. One hundred and twenty millimeters, 700-MB, 80-minute CD compatible with latest version of Microsoft Windows.
- C. Videos:
 - 1. One hundred and twenty millimeters, DVD compatible with standard DVD players.

PART 3 - EXECUTION

3.1 GENERAL

- A. Photographs (Paper and Digital Media):
 - 1. Date Stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.
- B. Videos:
 - 1. Display continuous running time.
 - 2. At start of each video recording, record weather conditions from local newspaper or television and the actual temperature reading at Project Site.

END OF SECTION

SECTION 01 41 00 – REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Regulatory requirements:
 - 1. Building code.
 - 2. Electrical code.
 - 3. Energy code.
 - 4. Fire code.
 - 5. Mechanical code.
 - 6. Plumbing code.

1.2 REFERENCES

- A. International Code Council (ICC):
 - 1. International Building Code (IBC), 2015.
 - 2. International Existing Building Code (IEBC), 2015.
 - 3. International Energy Conservation Code (IECC), 2015.
 - 4. International Fire Code (IFC), 2015.
 - 5. International Mechanical Code (IMC), 2015.
 - 6. International Plumbing Code (IPC), 2015.
- B. National Fire Protection Association (NFPA):
 - 1. NFPA 70: National Electrical Code, 2011.
- C. National Electric Code Council:
 - 1. National Electric Code (NEC), NFPA 70, 2011

1.3 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Building code:
 - a. International Building Code.
 - 2. Electrical code:
 - a. NFPA 70: National Electric Code.
 - 3. Energy conservation code:
 - a. International Energy Conservation Code.
 - 4. Fire code:
 - a. International Fire Prevention Code.
 - 5. Mechanical codes:
 - a. International Mechanical Code.
 - 6. Plumbing code:
 - a. International Plumbing Code.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES

- A. Reference to standards and specifications of technical societies and reporting and resolving discrepancies associated therewith shall be as provided in the General Conditions, and as may otherwise be required herein and in the individual Specification sections.
- B. Work specified by reference to published standard or specification of government agency, technical association or trade association, professional society or institute, testing agency, or other organization shall meet requirements or surpass minimum standards of quality for materials and workmanship established by designated standard or specification.
- C. Where so specified, products or workmanship shall also meet or exceed additional prescriptive or performance requirements included within Contract Documents to establish a higher or more stringent standard of quality than required by referenced standard.
- D. Where two or more standards are specified to establish quality, product and workmanship shall meet or exceed requirements of most stringent.
- E. Where both a standard and a brand name are specified for a product in Contract Documents, proprietary product named shall meet or exceed requirements of specified reference standard.
- F. Copies of Standards and Specifications of Technical Societies:
 - 1. Copies of applicable referenced standards have not been bound in these Contract Documents.
 - 2. Where copies of standards are needed by Contractor, obtain a copy or copies directly from publication source and maintain in an orderly manner at the Site as Work Site records, available to Contractor's personnel, Subcontractors, Owner, and Engineer.

1.2 ABBREVIATIONS

- A. Abbreviations for trade organizations and government agencies: Following is a list of construction industry organizations and government agencies to which references may be made in the Contract Documents, with abbreviations used.
 - 1. AA Aluminum Association
 - 2. AABC Associated Air Balance Council
 - 3. AAMA American Architectural Manufacturers Association
 - 4. AASHTO American Association of State Highway and Transportation Officials
 - 5. ABMA American Bearing Manufacturers' Association
 - 6. ACI American Concrete Institute
 - 7. AEIC Association of Edison Illuminating Companies
 - 8. AGA American Gas Association
 - 9. AGMA American Gear Manufacturers' Association
 - 10. AI Asphalt Institute
 - 11. AISC American Institute of Steel Construction
 - 12. AISI American Iron and Steel Institute
 - 13. AITC American Institute of Timber Construction
 - 14. ALS American Lumber Standards
 - 15. AMCA Air Movement and Control Association
 - 16. ANSI American National Standards Institute
 - 17. APA The Engineered Wood Association
 - 18. API American Petroleum Institute

19.	APWA	American Public Works Association
20.	ARI	Air-Conditioning and Refrigeration Institute
21.	ASAE	American Society of Agricultural Engineers
22.	ASCE	American Society of Civil Engineers
23.	ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
24.	ASME	American Society of Mechanical Engineers
25.	ASNT	American Society for Nondestructive Testing
26.	ASTM	ASTM International
27.	AWI	Architectural Woodwork Institute
28.	AWPA	American Wood Preservers' Association
29.	AWPI	American Wood Preservers' Institute
30.	AWS	American Welding Society
31.	AWWA	American Water Works Association
32.	BHMA	Builders Hardware Manufacturers' Association
33.	CBM	Certified Ballast Manufacturer
34.	CDA	Copper Development Association
35.	CGA	Compressed Gas Association
36.	CIS PI	Cast Iron Soil Pipe Institute
37.	CMAA	Crane Manufacturers' Association of America
38.	CRSI	Concrete Reinforcing Steel Institute
39.	CS	Commercial Standard
40.	CSA	Canadian Standards Association
41.	CSI	Construction Specifications Institute
42.	DIN	Deutsches Institute für Normung e.V.
43.	DIPRA	Ductile Iron Pipe Research Association
44.	EIA	Electronic Industries Alliance
45.	EJCDC	Engineers Joint Contract Documents' Committee
46.	ETL	Electrical Test Laboratories
47.	FAA	Federal Aviation Administration
48.	FCC	Federal Communications Commission
49.	FDA	Food and Drug Administration
50.	FEMA	Federal Emergency Management Agency
51.	FIPS	Federal Information Processing Standards
52.	PM	Factory Mutual
53.	Fed. Spec.	Federal Specifications (FAA Specifications)
54.	FS	Federal Specifications and Standards (Technical Specifications)
55.	GA	Gypsum Association
56.	GANA	Glass Association of North America
57.	ID	Hydraulic Institute
58.	HMI	Hoist Manufacturers' Institute
59.	IBC	International Building Code
60.	ICBO	International Conference of Building Officials
61.	ICC	International Code Council
62.	ICEA	Insulated Cable Engineers' Association
63.	IFC	International Fire Code
64.	IEEE	Institute of Electrical and Electronics Engineers, Inc.
65.	IESNA	Illuminating Engineering Society of North America
66.	IFI	Industrial Fasteners Institute
67.	IGMA	Insulating Glass Manufacturer's Alliance
68.	IMC	International Mechanical Code
69.	INDA	Association of the Non-woven Fabrics Industry
70.	IPC	International Plumbing Code
71.	ISA	Instrumentation, Systems, and Automation
72.	ISO	International Organization for Standardization
73.	ITL	Independent Testing Laboratory

74.	JIC	Joint Industry Conferences of Hydraulic Manufacturers
75.	MIA	Marble Institute of America
76.	Mil.	Military Specifications
77.	MMA	Monorail Manufacturers' Association
78.	NAAMM	National Association of Architectural Metal Manufacturers
79.	NACE	NACE International
80.	NEBB	National Environmental Balancing Bureau
81.	NEC	National Electrical Code
82.	NECA	National Electrical Contractors Association
83.	NEMA	National Electrical Manufacturers' Association
84.	NESC	National Electrical Safety Code
85.	NETA	International Electrical Testing Association
86.	NFPA	National Fire Protection Association
87.	NHLA	National Hardwood Lumber Association
88.	NICET	National Institute for Certification in Engineering Technologies
89.	NIST	National Institute of Standards and Technology
90.	NRCA	National Roofing Contractors Association
91.	NRTL	Nationally Recognized Testing Laboratories
92.	NSF	NSF International
93.	NSPE	National Society of Professional Engineers
94.	NTMA	National Terrazzo and Mosaic Association
95.	NWWDA	National Wood Window and Door Association
96.	OSHA	Occupational Safety and Health Act (both Federal and State)
97.	PCI	Pre-cast/Pre-stressed Concrete Institute
98.	PEI	Porcelain Enamel Institute
99.	PPI	Plastic Pipe Institute
100.	PS	Product Standards Section-U.S. Department of Commerce
101.	RMA	Rubber Manufacturers' Association
102.	RUS	Rural Utilities Service
103.	SAE	Society of Automotive Engineers
104.	SDI	Steel Deck Institute
105.	SDI	Steel Door Institute
106.	SJI	Steel Joist Institute
107.	SMACNA	Sheet Metal and Air Conditioning Contractors National Association
108.	SPI	Society of the Plastics Industry
109.	SSPC	The Society for Protective Coatings
110.	SWI	Steel Window Institute
111.	TEMA	Tubular Exchanger Manufacturers' Association
112.	TCA	Tile Council of North America
113.	TIA	Telecommunications Industry Association
114.	UBC	Uniform Building Code
115.	UFC	Uniform Fire Code
116.	UL	Underwriters Laboratories Inc.
117.	UMC	Uniform Mechanical Code
118.	USBR	U.S. Bureau of Reclamation
119.	WCLIB	West Coast Lumber Inspection Bureau
120.	WWPA	Western Wood Products Association

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 42 40 – ABBREVIATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Abbreviations and meanings.

1.2 INTERPRETATIONS

- A. Interpret abbreviations by context in which abbreviations are used.

1.3 ABBREVIATIONS

- A. Abbreviations Used to Identify Reference Standards:

1.	AA	Aluminum Association
2.	AAMA	Architectural Aluminum Manufacturers Association
3.	AAN	American Association of Nurserymen
4.	AASHTO	American Association of State Highway and Transportation Officials
5.	ABC	Associated Air Balance Council
6.	ABPA	Acoustical and Board Products Association
7.	ACI	American Concrete Institute
8.	ACIL	American Council of Independent Laboratories
9.	ADC	Air Diffusion Council
10.	ABMA	American Bearing Manufacturers' Association (formerly AFBMA, Anti-Friction Bearing Manufacturers' Association)
11.	AGA	American Gas Association
12.	AGC	Associated General Contractors
13.	AGMA	American Gear Manufacturers' Association
14.	AI	Asphalt Institute
15.	AIA	American Institute of Architects
16.	AIMA	Acoustical and Insulating Materials Association
17.	AISC	American Institute of Steel Construction
18.	AISI	American Iron and Steel Institute
19.	AITC	American Institute of Timber Construction
20.	AMCA	Air Moving and Conditioning Association
21.	AMG	Arizona Masonry Guild
22.	ANSI	American National Standards Institute
23.	APA	American Plywood Association
24.	API	American Petroleum Institute
25.	ARI	Air Conditioning and Refrigeration Institute
26.	ASAHC	American Society of Architectural Hardware Consultants
27.	ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
28.	ASME	American Society of Mechanical Engineers
29.	ASTM	ASTM International (Former name American Society for Testing and Materials. Still used in specifications.)
30.	AWI	Architectural Woodwork Institute
31.	AWPA	American Wood Preservers Association
32.	AWPI	American Wood Preservers Institute
33.	AWS	American Welding Society
34.	AWSC	American Welding Society Code
35.	AWWA	American Water Works Association
36.	BHMA	Builders Hardware Manufacturers Association
37.	BIA	Brick Institute of America
38.	BSI	Building Stone Institute

39.	CLFMI	Chain Link Fence Manufacturers Institute
40.	CPSC	U.S. Consumer Product Safety Commission
41.	CRA	California Redwood Association
42.	CRI	Carpet and Rug Institute
43.	CRSI	Concrete Reinforcing Steel Institute
44.	CS	Commercial Standards
45.	CSI	Construction Specifications Institute
46.	CTI	Ceramic Tile Institute
47.	DHI	Door and Hardware Institute
48.	EIFS	Exterior Insulation and Finish System
49.	EJCDC	Engineers Joint Contract Documents Committee
50.	FGMA	Flat Glass Marketing Association
51.	FIA	Factory Insurance Association
52.	FM	Factory Mutual
53.	FS	Federal Specifications
54.	FTI	Facing Tile Institute
55.	GA	Gypsum Association
56.	IAPMO	International Association of Plumbing and Mechanical Officials
57.	IBC	International Building Code
58.	ICBO	International Conference of Building Officials
59.	ICC	International Code Council
60.	IEEE	Institute of Electrical and Electronics Engineers
61.	MAG	Maricopa Association of Governments
62.	MIA	Marble Institute of America
63.	ML/SFA	Metal Lath/Steel Framing Association
64.	MS	Military Specifications
65.	NAAMM	National Association of Architectural Metal Manufacturers
66.	NAPA	National Asphalt Pavement Association
67.	NBHA	National Builders Hardware Association
68.	NCMA	National Concrete Masonry Association
69.	NEC	National Electrical Code
70.	NECA	National Electrical Contractors Association
71.	NETA	International Electrical Testing Association
72.	NEMA	National Electrical Manufacturers Association
73.	NFPA	National Fire Protection Association
74.	NFPA	National Forest Products Association
75.	NIST	National Institute of Standards and Technology
76.	NMWIA	National Mineral Wood Insulation Association
77.	NPCA	National Paint and Coatings Association
78.	NRCA	National Roofing Contractors Association
79.	NTMA	National Terrazzo and Mosaic Association
80.	NWMA	National Woodwork Manufacturer's Association
81.	PCA	Portland Cement Association
82.	PCI	Prestressed Concrete Institute
83.	PDCA	Paint and Decorating Contractors of America
84.	PDI	Plumbing and Drainage Institute
85.	PEI	Porcelain Enamel Institute
86.	PS	Product Standard
87.	RTI	Resilient Tile Institute
88.	SAE	Society of Automotive Engineers
89.	SCPA	Structural Clay Products Association
90.	SDI	Steel Door Institute
91.	SIGMA	Sealed Insulating Glass Manufacturers Association
92.	SJI	Steel Joist Institute
93.	SMACNA	Sheet Metal and Air Conditioning Contractors National Association
94.	SSPC	Society for Protective Coatings-Steel Structures Painting Council

95.	TCA	Tile Council of America
96.	UBC	Uniform Building Code (ICBO)
97.	UL	Underwriters Laboratories, Inc.
98.	UNS	Unified Numbering System
99.	USDA	United States Department of Agriculture
100.	VA	Vermiculite Association
101.	WCLA	West Coast Lumberman's Association
102.	WCLIB	West Coast Lumber Inspection Bureau
103.	WPA	Western Pine Association
104.	WPOA	Western Plumbing Officials Association
105.	WRC	Welding Research Council
106.	WSCPA	Western States Clay Products Association
107.	WWPA	Western Wood Products Association

B. B. Abbreviations Used in Specifications:

1.	a	year or years (metric unit)
2.	A	ampere or amperes
3.	am	ante meridian (before noon)
4.	ac	alternating current
5.	ac-ft	acre-foot or acre-feet
6.	atm	atmosphere
7.	AWG	American Wire Gauge
8.	bbl	barrel or barrels
9.	bd	board
10.	bhp	brake horsepower
11.	bil gal	billion gallons
12.	BOD	biochemical oxygen demand
13.	Btu	British thermal unit or units
14.	Btuh	British thermal units per hour
15.	bu	bushel or bushels
16.	C	degrees Celsius
17.	cal	calorie or calories
18.	cap	capita
19.	cd	candela or candelas
20.	cfm	cubic feet per minute
21.	Ci	curie or curies
22.	cm	centimeter or centimeters
23.	cmu	concrete masonry unit
24.	CO	carbon monoxide
25.	Co.	Company
26.	CO ₂	carbon dioxide
27.	COD	chemical oxygen demand
28.	Corp.	Corporation
29.	counts/min	counts per minute
30.	cu	cubic
31.	cu cm	cubic centimeter or centimeters
32.	cu ft	cubic foot or feet
33.	cu ft/day	cubic feet per day
34.	cu ft/hr	cubic feet per hour
35.	cu ft/min	cubic feet per minute
36.	cu ft/sec	cubic feet per second
37.	cu in	cubic inch or inches
38.	cu m	cubic meter or meters
39.	cu yd	cubic yard or yards
40.	d	day (metric units)
41.	day	day (English units)

42.	db	decibels
43.	DB	dry bulb (temperature)
44.	dc	direct current
45.	diam	diameter
46.	DO	dissolved oxygen
47.	DS	dissolved solids
48.	emf	electromotive force
49.	fpm	feet per minute
50.	F	degrees Fahrenheit
51.	ft	feet or foot
52.	fc	foot-candle or foot candles
53.	ft/day	feet per day
54.	ft/hr	feet per hour
55.	ft/min	feet per minute
56.	ft/sec	feet per second
57.	g	gram or grams
58.	G	gravitational force
59.	gal	gallon or gallons
60.	gal/day	gallons per day
61.	gal/min	gallons per minutes
62.	gal/sec	gallons per second
63.	gfd	gallons per square foot per day
64.	g/L	grams per liter
65.	gpd	gallons per day
66.	gpd/ac	gallons per day per acre
67.	gpd/cap	gallons per day per capita
68.	gpd/sq ft	gallons per day per square foot
69.	gph	gallons per hour
70.	gpm	gallons per minute
71.	gps	gallons per second
72.	h	hour or hours (metric units)
73.	ha	hectare or hectares
74.	hp	high point
75.	hp	horsepower
76.	hp-hr	horsepower-hour or horsepower-hours
77.	hr	hour or hours (English units)
78.	Hz	hertz
79.	ID	inside diameter
80.	ihp	indicated horsepower
81.	Inc.	Incorporated
82.	inch	inch
83.	inches	inches
84.	inches/sec	inches per second
85.	J	joule or joules
86.	JTU	Jackson turbidity unit or units
87.	k	kips
88.	K	kelvin
89.	K	thermal conductivity
90.	kcal	kilocalorie or kilocalories
91.	kcmil	thousand circular mils
92.	kg	kilogram or kilograms
93.	km	kilometer or kilometers
94.	kN	kilonewton or kilonewtons
95.	kPa	kilopascal or kilopascals
96.	ksi	kips per square inch
97.	kV	kilovolt or kilovolts

98.	kVA	kilovolt-ampere or kilovolt-amperes
99.	kW	kilowatt or kilowatts
100.	kWh	kilowatt hour
101.	L	liter or liters
102.	lb/1000 cu ft	pounds per thousand cubic foot
103.	lb/acre-ft	pounds per acre-foot
104.	lb/ac	pounds per acre
105.	lb/cu ft	pounds per cubic foot
106.	lb/day/cu ft	pounds per day per cubic foot
107.	lb/day/acre	pounds per day per acre
108.	lb/sq ft	pounds per square foot
109.	lin	linear, lineal
110.	lin ft	linear foot or feet
111.	lm	lumen or lumens
112.	log	logarithm (common)
113.	ln	logarithm (natural)
114.	lx	lux
115.	m	meter or meters
116.	M	molar (concentration)
117.	mA	milliampere or milliamperes
118.	max	maximum
119.	mCi	millicurie or millicuries
120.	meq	milliequivalent
121.	μF	microfarad or microfarads
122.	MFBM	thousand feet board measure
123.	mfr	manufacturer
124.	mg	milligram or milligrams
125.	mgd/ac	million gallons per day per acre
126.	mgd	million gallons per day
127.	mg/L	milligrams per liter
128.	μg/L	micrograms per liter
129.	μm	micrometer or micrometers
130.	mile	mile
131.	mil. gal	million gallons
132.	miles	miles
133.	min	minimum
134.	min	minute or minutes
135.	MLSS	mixed liquor suspended solids
136.	MLVSS	mixed liquor volatile suspended solids
137.	mm	millimeter or millimeters
138.	mol wt	molecular weight
139.	mol	mole
140.	Mpa	megapascal or megapascals
141.	mph	miles per hour
142.	MPN	most probable number
143.	mR	milliroentgen or milliroentgens
144.	Mrad	megarad or megarads
145.	mV	millivolt or millivolts
146.	MW	megawatt or megawatts
147.	N	newton or newtons
148.	N	normal (concentration)
149.	No.	number
150.	Nos	numbers
151.	NRC	noise reduction coefficient
152.	NTU or ntu	nephelometric turbidity unit
153.	oc	on center

154.	OD	outside diameter
155.	ORP	oxidation-reduction potential
156.	OT	ortho-tolidine
157.	OTA	ortha-tolidine-arsenite
158.	oz	ounce or ounces
159.	oz/sq ft	ounces per square foot
160.	Pa	pascal or pascals
161.	pl	plate or property line
162.	pm	post meridiem (afternoon)
163.	ppb	parts per billion
164.	ppm	parts per million
165.	ppt	parts per thousand
166.	pr	pair
167.	psf/hr	pounds per square foot per hour
168.	psf	pounds per square foot
169.	psi	pounds per square inch
170.	psia	pounds per square inch absolute
171.	psig	pounds per square inch gauge
172.	PVC	polyvinyl chloride
173.	qt	quart or quarts
174.	R	radius
175.	R	roentgen or roentgens
176.	rad	radiation absorbed dose
177.	RH	relative humidity
178.	rpm	revolutions per minute
179.	rps	revolutions per second
180.	S	second (metric units)
181.	S	Siemens (mho)
182.	SDI	sludge density index or silt density index
183.	sec	second (English units)
184.	SI	International System of Units
185.	sp	static pressure
186.	sp gr	specific gravity
187.	sp ht	specific heat
188.	sq	square
189.	cm ² or sq cm	square centimeter or centimeters
190.	sq ft	square feet or foot
191.	sq inch	square inch
192.	sq inches	square inches
193.	km ² or sq km	square kilometer or kilometers
194.	m ² or sq m	square meter or meters
195.	mm ² or sq mm	square millimeter or millimeters
196.	sq yd	square yard or yards
197.	SS	suspended solids
198.	STC	Sound Transmission Class
199.	SVI	sludge volume index
200.	TDS	total dissolved solids
201.	TKN	total Kjeldahl nitrogen
202.	TLM	median tolerance limit
203.	TOC	total organic carbon
204.	TOD	total oxygen demand
205.	TOW	top of weir
206.	TS	total solids
207.	TSS	total suspended solids
208.	TVS	total volatile solids

209.	U	U Factor/U Value
210.	U	Coefficient of Heat Transfer
211.	U	heat transfer coefficient
212.	UNS	Uniform Numbering System
213.	US	United States
214.	V	volt or volts
215.	VA	volt-ampere or volt-amperes
216.	W	watt or watts
217.	WB	wet bulb
218.	wg	water gauge
219.	wk	week or weeks
220.	wt	weight
221.	yd	yard or yards
222.	yr	year or years (English unit)

C. Abbreviations Used on Drawings: As listed on Drawings or in Specifications.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 45 00 – QUALITY CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Quality control and control of installation.
 - 2. Tolerances.
 - 3. References.
 - 4. Mock-up requirements.
 - 5. Authority and duties of Owner's representative or inspector.
 - 6. Sampling and testing.
 - 7. Testing and inspection services.
 - 8. Contractor's responsibilities.
- B. Related sections:
 - 1. Section 01 45 24 - Special Tests and Inspections.

1.2 QUALITY CONTROL AND CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. When manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons qualified to produce required and specified quality.
- F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
- H. When specified, products will be tested and inspected either at point of origin or at Work site:
 - 1. Notify Engineer in writing well in advance of when products will be ready for testing and inspection at point of origin.
 - 2. Do not construe that satisfactory tests and inspections at point of origin is final acceptance of products. Satisfactory tests or inspections at point of origin do not preclude retesting or re-inspection at Work site.
- I. Do not ship products which require testing and inspection at point of origin prior to testing and inspection.

1.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

- B. Comply with manufacturers' tolerances. When Manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

- A. American Society for Testing and Materials (ASTM): E 329 - Standard for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.
- B. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.
- C. Conform to reference standard by date of issue current on date of Contract Documents, except where specific date is established by code.
- D. Obtain copies of standards where required by product specification sections.
- E. When specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

1.5 MOCK-UP REQUIREMENTS

- A. Tests will be performed under provisions identified in this Section and identified in respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be comparison standard for remaining Work.
- D. Where mock-up has been accepted by Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so by Engineer.

1.6 AUTHORITY AND DUTIES OF OWNER'S REPRESENTATIVE OR INSPECTOR

- A. Owner's Project Representative employed or retained by Owner is authorized to inspect the Work.
- B. Inspections may extend to entire or part of the Work and to preparation, fabrication, and manufacture of products for the Work.
- C. Deficiencies or defects in the Work which have been observed will be called to Contractor's attention.
- D. Inspector will not:
 - 1. Alter or waive provisions of Contract Documents.
 - 2. Inspect Contractor's means, methods, techniques, sequences, or procedures for construction.
 - 3. Accept portions of the Work, issue instructions contrary to intent of Contract Documents, or act as foreman for Contractor.
 - 4. Supervise, control, or direct Contractor's safety precautions or programs; or inspect for safety conditions on Work site, or of persons thereon, whether Contractor's employees or others.

- E. Inspector will:
1. Conduct on-site observations of the Work in progress to assist Engineer in determining when the Work is, in general, proceeding in accordance with Contract Documents.
 2. Report to Engineer whenever Inspector believes that Work is faulty, defective, does not conform to Contract Documents, or has been damaged; or whenever there is defective material or equipment; or whenever Inspector believes the Work should be uncovered for observation or requires special procedures.

1.7 SAMPLING AND TESTING

- A. General:
1. Prior to delivery and incorporation in the Work, submit listing of sources of materials, when specified in sections where materials are specified.
 2. When specified in sections where products are specified:
 - a. Submit sufficient quantities of representative samples of character and quality required of materials to be used in the Work for testing or examination.
 - b. Test materials in accordance with standards of national technical organizations.
- B. Sampling:
1. Furnish specimens of materials when requested.
 2. Do not use materials which are required to be tested until testing indicates satisfactory compliance with specified requirements.
 3. Specimens of materials will be taken for testing whenever necessary to determine quality of material.
 4. Assist Engineer in preparation of test specimens at site of work, such as soil samples and concrete test cylinders.
- C. Testing:
1. Owner will employ and pay for services of independent testing laboratory to perform routine tests of materials to confirm compliance with requirements of Contract Documents:
 - a. Mill tests, soil compaction test, and other specified tests shall be paid for by Contractor.
 2. When protesting failed tests of material in place or to be used, take additional specimens and have specimens tested:
 - a. When original test proves to have been in error, file claim for reimbursement of direct costs for sampling and testing.
- D. Test standards:
1. Perform sampling, specimen preparation, and testing of materials in accordance with specified standards, and when no standard is specified, in accordance with standard of nationally recognized technical organization.
 2. Physical characteristics of materials not particularly specified shall conform to standards published by ASTM, where applicable.
 3. Standards and publication references in Contract Documents shall be edition or revision in effect on date stipulated in the Contract Documents.

1.8 TESTING AND INSPECTION SERVICES

- A. Contractor will employ and pay for specified services of an independent firm; known as Contractor's independent testing firm, to perform Contractor quality control testing as required in the technical specifications for various work and materials.
- B. Owner will employ and pay for specified services of an "Owner's independent testing firm" to perform testing and inspection as required in the technical specifications for various work and

materials or stipulated in Section 01 45 24 to confirm Contractor's compliance with Contract Documents. If Engineer or Owner's independent testing firm is not properly certified to perform specialty inspections required by the building department, Owner will employ and pay for a quality specialty inspection firm to perform required testing and inspection.

- C. The Contractor's independent testing firm will perform tests, inspections and other services specified in individual specification sections and as required by Owner and requested by the Engineer.
- D. The qualifications of laboratory that will perform the testing, contracted by the Owner or by the Contractor, shall be as follows:
 - 1. Has authorization to operate in the state where the project is located.
 - 2. Meets "Recommended Requirements for Independent Laboratory Qualification," published by American Council of Independent Laboratories.
 - 3. Meets requirements of ASTM E 329.
 - 4. Laboratory Staff: Maintain full time specialist on staff to review services.
 - 5. Testing Equipment: Calibrated at reasonable intervals with devices of accuracy traceable to National Bureau of Standards (NBS) or accepted values of natural physical constants.
 - 6. Will submit copy of report of inspection of facilities made by Materials Reference Laboratory of NBS during most recent tour of inspection, with memorandum of remedies of deficiencies reported by inspection.
- E. Testing, inspections and source quality control may occur on or off project site. Perform off-site testing inspections and source quality control as required by Engineer or Owner.
- F. Reports will be submitted by Contractor's independent testing firm and by Owner's independent testing firm to Engineer, Contractor, and Owner in triplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents. Each report shall include:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Testing laboratory name, address, and telephone number.
 - 4. Name and signature of laboratory inspector.
 - 5. Date and time of sampling or inspection.
 - 6. Record of temperature and weather conditions.
 - 7. Date of test.
 - 8. Identification of product and specification section.
 - 9. Location of sample or test in Project.
 - 10. Type of inspection or test.
 - 11. Results of tests and compliance with Contract Documents.
 - 12. Interpretation of test results, when requested by Engineer.
- G. Contractor shall cooperate with Owner's independent testing firm, furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - 1. Notify Engineer and Owner's independent testing firm 48 hours prior to expected time for operations requiring testing.
 - 2. Make arrangements with Owner's independent testing firm and pay for additional samples and tests required for Contractor's use.
- H. Limitations of authority of testing Laboratory: Owner's independent testing firm or Laboratory is not authorized to:
 - 1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency or laboratory may not approve or accept any portion of the Work.
 - 3. Agency or laboratory may not assume duties of Contractor.

4. Agency or laboratory has no authority to stop the Work.
 - I. Testing and employment of an Owner's independent testing firm or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
 - J. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same Owner's independent testing firm on instructions by Engineer. Payment for re-testing or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.
 - K. The Owner's independent testing firm responsibilities will include:
 1. Test samples of mixes submitted by Contractor.
 2. Provide qualified personnel at site. Cooperate with Engineer and Contractor in performance of services.
 3. Perform specified sampling and testing of products in accordance with specified standards.
 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 5. Promptly notify Engineer and Contractor of observed irregularities or non-conformance of Work or products.
 6. Perform additional tests required by Engineer.
 7. Attend preconstruction meetings and progress meetings.
 - L. Owner's independent testing firm individual test reports: After each test, Owner's independent testing firm will promptly submit electronically and three hard copies of report to Engineer and to Contractor. When requested by Engineer, the Owner's independent testing firm will provide interpretation of test results. Include the following:
 1. Date issued.
 2. Project title and number.
 3. Name of inspector.
 4. Date and time of sampling or inspection.
 5. Identification of product and specifications section.
 6. Location in Project.
 7. Type of inspection or test.
 8. Date of test.
 9. Certified test results stamped and signed by a registered Engineer in the state that the project is located.
 10. Summary of conformance with Contract Documents.
 - M. Owner's independent testing firm will provide monthly report of certification to identify all work performed for special inspections and other contract requirements on this project. The following certified monthly report at a minimum will include but not limited to:
 1. Results of testing.
 2. Testing logs.
 3. Outstanding deficiencies.
 4. Various statistical data.
 5. Testing curves (up to 4 types) as required by the Engineer.
- 1.9 CONTRACTOR'S RESPONSIBILITIES
- A. Cooperate with Owner's independent testing firm or laboratory personnel and provide access to construction and manufacturing operations.
 - B. Secure and deliver to Owner's independent testing firm or laboratory adequate quantities of representative samples of materials proposed to be used and which require testing.

- C. Provide to Owner's independent testing firm or laboratory and Engineer preliminary mix design proposed to be used for concrete, and other materials mixes which require control by testing laboratory.
- D. Furnish electronically and 5 hard copies of product test reports.
- E. Furnish incidental labor and facilities:
 - 1. To provide access to construction to be tested.
 - 2. To obtain and handle samples at Work site or at source of product to be tested.
 - 3. To facilitate inspections and tests.
 - 4. For storage and curing of test samples.
- F. Notify Owner's independent testing firm or laboratory 48 hours in advance of when observations, inspections and testing is needed for laboratory to schedule and perform in accordance with their notice of response time.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 45 24 – SPECIAL TESTS AND INSPECTIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: This Section describes the requirements for providing special tests and inspections.
- B. Related sections:
 - 1. Section 01 45 00 - Quality Control.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM C140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
 - 2. ASTM C270, Standard Specification for Mortar for Unit Masonry.
 - 3. ASTM C780, Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
 - 4. ASTM C1019, Standard Test Method for Sampling and Testing Grout.
 - 5. ASTM C1314, Standard Test Method for Compressive Strength of Masonry Prisms.
- B. International Building Code (IBC).

1.3 DESCRIPTION

- A. This Section describes special tests and inspections of structural assemblies and components to be performed in compliance with IBC.
- B. These special tests and inspections are in addition to the requirements specified in Section 01 45 00, and by the individual Sections.
- C. The OWNER will employ one or more inspectors who will provide special inspections during construction.

1.4 INSPECTION

- A. Duties of Special Inspector:
 - 1. General: Required duties of the Special Inspector are described in IBC.

1.5 TESTS

- A. Selection of the material required to be tested shall be by the OWNER's Testing Laboratory and not the CONTRACTOR.

1.6 SPECIAL TESTING AND INSPECTIONS

- A. Testing laboratory: Special tests will be performed by the OWNER's testing laboratory as specified in Section 01 45 00.
- B. OWNER reserves the right to positive material identification tests.
 - 1. Contractor must make materials available for testing.

- C. The following types of work require special inspection as described in IBC. Refer to the following verification, testing and inspection schedules.
 - 1. Appendix A, Cast-In-Place Concrete Special Inspection Schedule.
 - 2. Appendix B, Essential Architectural, Mechanical and Electrical Inspection Schedule.
 - 3. Appendix C, Essential Masonry Special Inspection Schedule.
 - 4. Appendix D, Soils Verification And Inspection Schedule.
 - 5. Appendix E, Structural Steel Special Inspection Schedule.
 - 6. Appendix F. Other Special Inspection.

1.7 OTHER SPECIFIC TESTS

- A. Masonry shall be tested in accordance with IBC.
 - 1. Minimum strength of units shall be tested in accordance with ASTM C140.
 - 2. Minimum strength of grout shall be tested in accordance with ASTM C1019.
 - 3. Prior to construction, obtain samples of the aggregates, additives, and water; mix and test in laboratory in accordance with ASTM C270.
 - 4. During construction, sample and test masonry for consistency prior to use on each structure in accordance with ASTM C780.
 - 5. When approved by the building official, if installed masonry does not meet requirements, conduct prism tests in accordance with ASTM C1314.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SCHEDULE

- A. The CONTRACTOR shall allow time necessary for Special Inspections as listed above.
- B. Sufficient notice shall be given so that the Special Inspections can be performed. This includes time for off-site Special Inspectors to plan the inspection and travel to site.

3.2 PROCEDURE

- A. The Special Inspector will immediately notify the ENGINEER of any corrections required and follow notification with appropriate documentation.
- B. The CONTRACTOR shall not proceed until the work is satisfactory to the ENGINEER.

END OF SECTION

APPENDIX A
CAST-IN-PLACE CONCRETE SPECIAL INSPECTION SCHEDULE

Verification and Inspection	Reference Standard	Frequency of Inspection	
		Continuous During Task Listed	Periodic During Task Listed
1. Inspection of reinforcing steel, including prestressing tendons, and placement.		–	X
2. Inspection of reinforcing steel welding.	IBC Table 1704.3, Item 5B	X	–
3. Inspect bolts to be installed in concrete prior to and during placement of concrete.		X	–
4. Verifying use of required design mix.		–	X
5. At the time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.		X	–
6. Inspection of concrete and shotcrete placement for proper application techniques.		X	–
7. Inspection for maintenance of specified curing temperature and techniques.		–	X

APPENDIX B
ESSENTIAL ARCHITECTURAL, MECHANICAL AND ELECTRICAL
INSPECTION SCHEDULE

Verification and Inspection	Reference Standard	Frequency of Inspection	
		Continuous During Task Listed	Periodic During Task Listed
1. Suspended ceiling system including anchorage.		–	X
2. Anchorage of electrical equipment for emergency standby power.		–	X
3. Anchorage of other electrical or mechanical equipment on floors or roofs.		–	X
4. Anchorage of ducts.		–	X
5. Anchorage of pipes.		–	X
6. Steel storage racks supporting pipelines.		–	X
7. Elevator installation.		–	X

APPENDIX C
ESSENTIAL MASONRY SPECIAL INSPECTION SCHEDULE

Verification and Inspection	Reference Standard	Frequency of Inspection	
		Continuous During Task Listed	Periodic During Task Listed
1. From the beginning of masonry construction, the following shall be verified for compliance:			
a. Proportions of site-prepared mortar and grout.		–	X
b. Placement of masonry units and construction of mortar joints.		–	X
c. Placement of reinforcement and connectors.		–	X
d. Grout space prior to grouting.		X	–
e. Placement of grout.		X	–
2. The inspection program shall verify:			
a. Size and location of structural elements.		–	X
b. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.		X	–
c. Specified size, grade and type of reinforcement.			X
d. Welding of reinforcing couplers.		X	–
e. Protection of masonry during cold weather (temperature below 40° F) or hot weather (temperature above 90° F).		–	X
3. Preparation of any required grout specimens, mortar specimens and/or prisms shall be observed.		X	–
4. Compliance with required inspection provisions of the construction documents and the approved submittals shall be verified.		–	X

APPENDIX D
SOILS VERIFICATION AND INSPECTION SCHEDULE

Verification and Inspection	Reference Standard	Frequency of Inspection	
		Continuous During Task Listed	Periodic During Task Listed
1. Verify materials below footings are adequate to achieve the design bearing capacity.		–	X
2. Verify excavations are extended to proper depth and have reached proper material.		–	X
3. Perform classification and testing of controlled fill materials.		–	X
4. Verify use of proper materials, densities, and lift thicknesses during placement and compaction of controlled fill.		X	–
5. Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly.		–	X

APPENDIX E
STRUCTURAL STEEL SPECIAL INSPECTION SCHEDULE

Verification and Inspection	Reference Standard	Frequency of Inspection	
		Continuous During Task Listed	Periodic During Task Listed
1. Material verification of high-strength bolts, nuts and washers:			
a. Identification markings to conform to ASTM standards specified in the approved construction documents.		–	X
b. Manufacturer's certificate of compliance required.		–	X
2. Inspection of high-strength bolting:			
a. Bearing-type connections.		–	X
b. Slip-critical connections.		X	X
3. Material verification of structural steel:			
a. Identification markings to conform to ASTM standards specified in the approved construction documents.		–	X
b. Manufacturers' certified mill test reports.		X	–
4. Material verification of weld filler materials:			
a. Identification markings to conform to AWS specification in the approved construction documents.		–	X
b. Manufacturer's certificate of compliance required.		–	X
5. Inspection of welding:			
a. Structural steel:		–	–
1) Complete and partial penetration groove welds.		X	–
2) Multi-pass fillet welds.		X	–
3) Single-pass fillet welds > 5/16".		X	–
4) Single-pass fillet welds ≤ 5/16".		–	X
5) Floor and deck welds.		–	X
b. Reinforcing steel:		–	–
1) Verification of weldability of reinforcing steel other than ASTM A706.		–	X
2) Reinforcing steel-resisting flexural and axial forces in boundary elements of special reinforced concrete shear walls and shear reinforcement.		X	–
3) Shear reinforcement.		X	–
4) "Form Saver" (reinforcing couplers).		X	–
6. Inspection of steel frame joint details for compliance with approved construction documents:			X
a. Details such as bracing and stiffening.		X	–
b. Member locations.		X	–
c. Application of joint details at each connection.		X	–
7. Seismic force resisting systems identified on structural plans.		X	–

**APPENDIX F
OTHER SPECIAL INSPECTION SCHEDULE**

Verification and Inspection	Reference Standard	Frequency of Inspection	
		Continuous During Task Listed	Periodic During Task Listed
1. Shoring of Excavations.		–	X
2. Reinforced gypsum concrete.		–	X
3. Shotcrete.		–	X
4. Smoke control system.		–	X
5. Special grading, excavating, and filling.		–	X
6. Spray applied fire resistive material.		–	X
7. Special seismic resistance details.		–	X

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Furnishing, maintaining, and removing construction facilities and temporary controls, including temporary utilities, construction aids, barriers and enclosures, security, access roads, temporary controls, project sign, field offices and sheds, and removal after construction.
- B. Related sections:
 - 1. Section 01 14 00 – Work Restrictions.
 - 2. Section 01 32 00 – Construction Progress Documentation
 - 3. Section 01 33 00 – Submittal Procedures
 - 4. Section 01 34 00 – Photographic and Videographic Documentation

1.2 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Association of Nurserymen: American Standards for Nursery Stock.
 - 2. Federal Emergency Management Agency.
 - 3. NFPA, National Fire Prevention Standard for Safeguarding Building Construction Operations.
 - 4. Telecommunications Industry Association (TIA); Electronic Industries Alliance (EIA): 568B, Commercial Building Telecommunications Cabling Standard.
 - 5. U.S. Department of Agriculture: Urban Hydrology for Small Watersheds.
 - 6. U.S. Weather Bureau: Rainfall-Frequency Atlas of the U.S. for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years.

1.3 SUBMITTALS

- A. Informational Submittals:
 - 1. General: For products specified to be furnished under this Section, submit product data in accordance with Section 01 33 00, SUBMITTAL PROCEDURES.
 - 2. For Temporary Piping Systems:
 - a. Submit layout drawings showing proposed routing of piping, including proposed pipe support and pipe restraint locations.
 - b. Submit product data for piping, fittings, appurtenances, restraints, supports, and all other components of the temporary piping system.
 - c. Submit all information at least 28 days prior to when each temporary piping system is scheduled to be installed and allow 14 days for review and comment by ENGINEER and OWNER.
 - 3. For Temporary Pumping Systems:
 - a. Submit pump data, performance curves, and other operating information as specified in Section 01 32 00, SAFETY PLAN.
 - b. Submit sketches showing layout of temporary pumping system, including pump quantity, configuration in wet well, and proposed piping layout specified in Paragraph 1.02 B.
 - c. Submit piping headloss calculations based on proposed temporary piping system layout.
 - d. Submit all information at least 28 days prior to when the temporary pumping system is scheduled to be installed and allow 14 days for review and comment by ENGINEER and OWNER.

4. Copies of permits and approvals for construction as required by Laws and Regulations and governing agencies.
5. Temporary Utility Submittals:
 - a. Electric power supply and distribution plans.
 - b. Water supply and distribution plans.
 - c. Drainage plans.
 - d. Sanitary sewer.
6. Temporary Construction Submittals:
 - a. Access Roads: Routes, cross-sections, and drainage facilities.
 - b. Parking area plans.
 - c. Contractor's field office, storage yard, and storage building plans, including gravel surfaced area.
 - d. Fencing and protective barrier locations and details.
 - e. Engineer's field office plans.
 - f. Staging area location plan.
 - g. Traffic and Pedestrian Control and Routing Plans: As specified herein, and proposed revisions thereto.
7. Temporary Control Submittals:
 - a. Noise control plan.
 - b. Plan for disposal of waste materials and intended haul routes.

1.4 MOBILIZATION

- A. Mobilization shall Include, but Not be Limited to, these Principal Items:
 1. Obtaining required permits.
 2. Moving Contractor's field office and equipment required for first month operations onto Site.
 3. Installing temporary construction power, wiring, and lighting facilities.
 4. Providing onsite communication facilities, including telephones.
 5. Providing onsite sanitary facilities and potable water facilities as specified and as required by Laws and Regulations, and governing agencies.
 6. Arrange for and erection of Contractor's work and storage yard.
 7. Posting OSHA required notices and establishing safety programs and procedures.
 8. Have Contractor's superintendent at Site full time.
- B. Use area designated for Contractor's temporary facilities as shown on Drawings.

1.5 PROTECTION OF WORK AND PROPERTY

- A. Comply with Owner's safety rules while on Owner's property.
- B. Keep Owner informed of serious onsite accidents and related claims.
- C. Use of Explosives: No blasting or use of explosives will be allowed onsite.

1.6 VEHICULAR TRAFFIC

- A. Traffic Routing Plan: Show sequences of construction affecting use of roadways, time required for each phase of the Work, provisions for decking over excavations and phasing of operations to provide necessary access, and plans for signing, barricading, and striping to provide passages for pedestrians and vehicles.

1.7 TEMPORARY UTILITIES

- A. Temporary Electrical Power:
 1. Arrange with local utility to provide adequate temporary electrical service.

2. Provide and maintain adequate jobsite power distribution facilities conforming to applicable Laws and Regulations.
 3. Provide, maintain, and pay for electric power for performance of the Work except for power required for the final 7-day operational test:
 - a. When using permanent facilities, provide separate meter and reimburse OWNER for power used in connection with performance of the Work.
- B. Temporary Electrical Lighting:
1. In work areas, provide temporary lighting sufficient to maintain lighting levels during working hours not less than lighting levels required by Occupational Safety and Health Administration (OSHA) and state agency which administers OSHA regulations where Project is located.
 2. When available, permanent lighting facilities may be used in lieu of temporary facilities:
 - a. Prior to Substantial Completion of the Work, replace bulbs, lamps, or tubes used by CONTRACTOR for lighting.
- C. Temporary Heating, Cooling, and Ventilating:
1. Heat and ventilate work areas to protect the Work from damage by freezing, high temperatures, weather, and to provide safe environment for workers.
 2. Permanent heating system may be utilized when sufficiently completed to allow safe operation.
- D. Temporary Water:
1. Pay for and construct facilities necessary to furnish potable water for human consumption and non-potable water for use during construction.
 2. Remove temporary piping and connections and restore affected portions of the facility to original condition before Substantial Completion.
 3. Pay for water used for construction prior to Substantial Completion. OWNER will provide water for 7-day final test.
- E. Temporary Sanitary Facilities:
1. Provide suitable and adequate sanitary facilities that are in compliance with applicable Laws and Regulations.
 2. At completion of the Work, remove sanitary facilities and leave site in neat and sanitary condition.
- F. Temporary Fire Protection: Provide sufficient number of fire extinguishers of type and capacity required to protect the Work and ancillary facilities.
- G. First Aid: Post first aid facilities and information posters conforming to requirements of OSHA and other applicable Laws and Regulations in readily accessible locations.
- H. Utilities in Existing Facilities: See Section 01 14 00, WORK RESTRICTIONS.
- 1.8 CONSTRUCTION AIDS
- A. Provide railings, kick plates, enclosures, safety devices, and controls required by Laws and Regulations and as required for adequate protection of life and property.
- B. Use construction hoists, elevators, scaffolds, stages, shoring, and similar temporary facilities of ample size and capacity to adequately support and move loads.
- C. Design temporary supports with adequate safety factor to assure adequate load bearing capability:

1. When requested, submit design calculations by professional registered engineer prior to application of loads.
 2. Submitted design calculations are for information and record purposes only.
- D. Accident Prevention:
1. Exercise precautions throughout construction for protection of persons and property.
 2. Observe safety provisions of applicable Laws and Regulations.
 3. Guard machinery and equipment, and eliminate other hazards.
 4. Make reports required by authorities having jurisdiction, and permit safety inspections of the Work.
 5. Before commencing construction work, take necessary action to comply with provisions for safety and accident prevention.
- E. Barricades:
1. Place barriers at ends of excavations and along excavations to warn pedestrian and vehicular traffic of excavations.
 2. Provide barriers with flashing lights after dark.
 3. Keep barriers in place until excavations are entirely backfilled and compacted.
 4. Barricade excavations to prevent persons from entering excavated areas in streets, roadways, parking lots, treatment plants, or other public or private areas.
- F. Warning Devices and Barricades: Adequately identify and guard hazardous areas and conditions by visual warning devices and, where necessary, physical barriers:
1. Devices shall conform to minimum requirements of OSHA and State agency which administers OSHA regulations where Project is located.
- G. Hazards in Public Right-of-Way:
1. Mark at reasonable intervals, trenches and other continuous excavations in public right-of-way, running parallel to general flow of traffic, with traffic cones, barricades, or other suitable visual markers during daylight hours:
 - a. During hours of darkness, provide markers with torches, flashers, or other adequate lights.
 2. At intersections or for pits and similar excavations, where traffic may reasonably be expected to approach head on, protect excavations by continuous barricades:
 - a. During hours of darkness, provide warning lights at close intervals.
- H. Hazards in Protected Areas: Mark or guard excavations in areas from which public is excluded, in manner appropriate for hazard.
- I. Above Grade Protection: On multi-level structures, provide safety protection that meets requirements of OSHA and State agency which administers OSHA regulations where Project is located.
- J. Protect existing structures, trees, shrubs, and other items to be preserved on Project site from injury, damage or destruction by vehicles, equipment, worker or other agents with substantial barricades or other devices commensurate with hazards.
- K. Fences:
1. Enclose site of the Work with fence adequate to protect the Work against acts of theft, violence and vandalism.
 2. Enclose temporary offices and storage areas with fence adequate to protect temporary facilities against acts of theft, violence and vandalism.
 3. When entire or part of site is to be permanently fenced, permanent fence may be built to serve for both permanent and temporary protection of the work site, provided that damaged or defaced fencing is replaced prior to Substantial Completion.

4. Protect temporary and permanent openings and close openings in existing fences to prevent intrusion by unauthorized persons. Bear responsibility for protection of plant and material on site of the Work when openings in existing fences are not closed.
5. During night hours, weekends, holidays, and other times when no work is performed at site, provide temporary closures or enlist services of security guards to protect temporary openings.
6. Fence temporary openings when openings are no longer necessary.

1.9 SECURITY

- A. Make adequate provision for protection of the work area against fire, theft, and vandalism, and for protection of public against exposure to injury.

1.10 ACCESS ROADS

- A. General:
 1. Build and maintain access roads to and on site of the Work to provide for delivery of material and for access to existing and operating plant facilities on site.
 2. Build and maintain dust free roads which are suitable for travel at 20 miles per hour.
- B. Off-Site Access Roads:
 1. Build and maintain graded earth roads.
 2. Build roads only in public right-of-way or easements obtained by OWNER.
 3. Obtain rights-of-way or easements when electing to build along other alignment.
- C. On-Site Access Roads:
 1. Maintain access roads to storage areas and other areas to which frequent access is required.
 2. Maintain similar roads to existing facilities on site of the Work to provide access for maintenance and operation.
 3. Protect buried vulnerable utilities under temporary roads with steel plates, wood planking, or bridges.
 4. Maintain on-site access roads free of mud. Under no circumstances shall vehicles leaving the site track mud off the site onto the public right-of-way.

1.11 TEMPORARY CONTROLS

- A. Dust Control:
 1. Prevent dust nuisance caused by operations, unpaved roads, excavation, backfilling, demolition, or other activities.
 2. Control dust by sprinkling with water, use of dust palliatives, modification of operations, or other means acceptable to agencies having jurisdiction.
- B. Noise Control:
 1. In inhabited areas, particularly residential, perform operations in manner to minimize noise.
 2. In residential areas, take special measures to suppress noise during night hours.
- C. Mud Control:
 1. Prevent mud nuisance caused by construction operations, unpaved roads, excavation, backfilling, demolition, or other activities.

1.12 PROJECT SIGN

- A. Provide and maintain Project identification sign consisting of painted 8 foot wide by 4 foot high exterior grade plywood and minimum 10 foot long 4 by 4 lumber posts, set in ground at least 3 feet, with exhibit lettering by professional sign painter using no more than 5 sign colors:
 - 1. List at least the title of the Project, and names of the OWNER, ENGINEER, and CONTRACTOR.
- B. Erect Project identification sign where directed.

1.13 REMOVAL

- A. Remove temporary buildings and furnishings before inspection for Substantial Completion or when directed.
- B. Clean and repair damage caused by installation or use of temporary facilities.
- C. Remove underground installations to minimum depth of 24 inches and grade to match surrounding conditions.
- D. Restore existing facilities used during construction to specified or original condition.

1.14 TEMPORARY PROCESS PIPING

- A. CONTRACTOR shall provide all piping, appurtenances, and other materials as required to provide temporary piping systems as specified herein, as indicated on the Drawings, and as needed to perform the Work.
- B. CONTRACTOR shall field route piping as needed and as field conditions dictate, unless otherwise indicated on the Drawings, and determine appropriate lengths of piping and quantity/type of pipe fittings needed to construct temporary piping system. Do not block access points such as stairs, doors, and walkways to existing facilities unless approved in writing by the OWNER.
- C. Restrain piping at valves and at fittings where piping changes direction, changes sizes, and at ends:
 - 1. When piping is buried, use concrete thrust block or mechanical restraints.
 - 2. When piping is exposed or under water, use mechanical or structural restraints.
 - 3. Determine thrust forces by multiplying the nominal cross sectional area of the piping by the operating pressure of the piping.
- D. Temporary piping systems shall be installed in a manner that will not damage existing or new facilities.
- E. Unless indicated otherwise, piping material, including gaskets, shall be suitable for the process fluid requiring temporary piping.
- F. After Temporary Piping System is no longer required:
 - 1. Remove temporary piping system.
 - 2. Clean and repair damage caused by installation or use of temporary piping system.
 - 3. Restore existing facilities to original condition.

1.15 TEMPORARY PROCESS PUMPING

- A. To achieve the Contractor's plan to complete the work, Contractor may require and shall provide temporary pumping system to pump flow as required to complete the work.

1. Anticipated pressure will vary based on headlosses developed and the final length of installed temporary piping. CONTRACTOR shall calculate headlosses and provide pump with sufficient pressure to meet flow requirements. Calculations shall be sealed and signed by a professional engineer registered in the state in which the project is located.
 2. Pump(s) shall be capable of passing a solid with a sphere size of 3 inches.
 3. Temporary pumps shall be capable of matching plant flow rates through the use of variable flow rate pumping. The use of cycled pumping (i.e, on/off) is not acceptable. Provide all wiring and controls necessary to match plant flow rate based on 4-20 mA signal available at the Operations Building.
 4. Provide and pay for all power required to operate temporary pumps.
 5. All electrical and instrumentation components will comply with applicable code requirements for the area where the temporary pump is located.
 6. Temporary pumping will be required 24 hours per day during the time period when pumping is required and is critical to the proper operation of the OWNER'S treatment plant. Provide 24-hour on-site supervision of pumps to ensure that pumps are always operational and performing as required. Notify the OWNER immediately if temporary pumping cannot be provided.
 7. CONTRACTOR shall be responsible for repairing any damage or reimbursing the OWNER for any regulatory fines or additional plant staff time resulting from the CONTRACTOR'S failure to maintain temporary pumping.
 8. Provide 100 percent backup (a.k.a., standby, redundant, etc.) pumping capacity equal to the required process flow rate. Backup system shall be capable of providing required pumping capacity immediately upon failure of primary pumping system.
 9. All necessary spare equipment and appurtenances shall be available on-site to allow immediate repair and/or replacement of any pumping system component that is not functioning properly.
- B. Providing temporary piping systems as specified in Paragraph 1.14.
- C. Temporary pumping of other process flows is not allowed unless approved in writing by the OWNER.
- D. After Temporary Process Pumping System is no Longer Required:
1. Remove temporary process pumping system.
 2. Clean and repair damage caused by installation or use of temporary process pumping system.
 3. Restore existing facilities to original condition.

PART 2 - PRODUCTS

2.1 FIELD OFFICES AND SHEDS

- A. CONTRACTOR's Field Office:
1. Maintain on Project Site weathertight space in which to keep copies of Contract Documents, progress schedule, shop drawings, and other relevant documents.
 2. Provide field office with adequate space to examine documents, and provide lighting and telephone service in that space.
- B. ENGINEER's Field Office:
1. Provide separate field office on project site for the exclusive use of the ENGINEER, as follows:
 - a. Size: Approximately 12 feet by 56 feet, including a toilet room, with 8-foot minimum ceiling height.
 - b. Construction: Weathertight building constructed at the site, pre-manufactured building, or trailer, with a toilet room containing a water closet and lavatory,

- partitioned off from the working area. The water closet may be of the chemical type provided that it is a flush type with an approved holding tank.
 - c. Walls and Ceiling: Insulated with finished interior surfaces.
 - d. Openings: At least 6 windows and 2 entrance doors, each with cylinder lock and 4 keys.
 - e. Exterior lighting over entrance door.
 - f. Twenty 110 volts AC duplex receptacles with at least 2 in each office.
- 2. Arrange and Pay For:
 - a. Janitorial service, including daily dusting, floor cleaning, and trash removal, and monthly comprehensive cleaning, including windows.
 - b. Heating, ventilating, and air conditioning equipment in operating condition.
 - c. Electric wiring, power, and lighting fixtures capable of providing at least 75 foot candles of light on work surfaces.
 - d. A continuous supply of toilet paper, paper hand towels and hand soap for each restroom.
 - e. Private telephone line.
 - f. Dedicated telephone line for facsimile (fax) machine.
 - g. Dedicated telephone line for computer modem.
 - h. Bottled drinking water service with dispenser.
 - i. Suitable restroom facilities with sinks with hot and cold water.
- 3. Provide Following Furnishings and Equipment:
 - a. Four office desks with 6 drawers (2 with locks) and padded, upholstered swivel chairs.
 - b. One plan table not less than 36 inches by 96 inches.
 - c. One drafting table not less than 36 inches by 60 inches.
 - d. Two metal drafting stools with backs.
 - e. Twelve straight chairs.
 - f. Four swivel chairs.
 - g. Six metal filing cabinet, 18 inches by 30 inches by 52 inches, 4 drawers with locks.
 - h. One supply cabinet with not less than 15 square feet of shelves.
 - i. Four bookcases with not less than 12 linear feet of shelves for each bookcase.
 - j. One plan hold rolling stand of 12 binders, with binders.
 - k. Six wastebaskets.
 - l. Dry erase board 96 by 48 inches, magnetic.
 - m. Refrigerator, 6.0 cubic feet capacity.
 - n. Microwave oven, 1.0 cubic feet.
 - o. Field Office Data Service and Equipment: Provide one of the following data services (listed in order of preference and increasing cost) for the duration of the project. CONTRACTOR is responsible for all maintenance of service and hardware. Data service will be dedicated to the ENGINEER and not shared with any other party. The CONTRACTOR shall provide a durable and weather tight system for connecting the ENGINEER's trailer to the service provider's facilities at the jobsite boundary:
 - 1) Provide high-speed Internet access (DSL or cable modem); with a minimum 2.4 gigabit per second download/2.4 gigabit per second upload. This access must have a minimum of 8 (5 usable) IP addresses. In addition, it must provide an average round-trip delay of less than 150 ms to the ENGINEER's Internet gateway.
 - 2) Provide 1 ISDN BRI, coded for data use, and all associated usage charges. This BRI will be used to direct dial to the ENGINEER's remote access gateway located in the local area code where the project is located.
 - 3) Provide private line or frame-relay Internet access with a minimum 2.4 gigabit per second download/2.4 gigabit upload. This access must have a minimum of 8 (5 usable) IP addresses. In addition, it must provide an average round-trip delay of less than 150 ms to the ENGINEER's Internet gateway.
 - p. Provide new data service hardware corresponding with above options. CONTRACTOR is responsible for all maintenance of service and hardware:

- 1) For option 1 above, provide appropriate DSL or cable modem device. In addition, provide one Cisco ASA 5505 firewall with 3DES software, part number ASA5505-50-BUN-K9 and Cisco 4 hour response onsite Smartnet Maintenance for duration of project.
- 2) For option 2 above, provide one Cisco 804 ISDN router, part number CISCO-804 and Cisco 4 hour response onsite Smartnet Maintenance for duration of project.
- 3) For Option 3 Above, Provide the Following:
 - a) Visual Networks IP Enterprise central office T1 drop-and-insert CSU/DSU.
 - b) Cisco 2651 VPN router bundle, Cisco part number C2651-2FE/VPN/K9 and Cisco 4 hour response onsite Smartnet Maintenance for duration of project.
 - c) Serial interface card, Cisco part number WIC-1T.
 - d) Serial cable, Cisco part number CAB-V35MT.
- q. Field Office Local Area Network: Provide the following to create a local area network for the ENGINEER:
 - 1) Install Category 5e cabling to support all specified computers, printers, and other network device. This cabling should be home-run to a patch panel and meet all applicable installation standards for CAT5e. Patch panel and jack locations to be coordinated with ENGINEER.
 - 2) Provide 10/100 Ethernet Switch sized to support all specified network devices for ENGINEER with an allowance for 50 percent growth/spare ports.
 - 3) Provide APC SmartUPS RT 1500 uninterruptable power supply, model SURTA1500XL.
 - 4) Provide Category 5e patch cables for all networking equipment; both for patch panel to switch connection and for wall jack to network device connection.
- r. Field Office Computer Systems: Furnish and install 4 new complete computer systems. CONTRACTOR is responsible for all maintenance of hardware and software. Each system shall consist of, as a minimum:
 - 1) Motherboard or ENGINEER-approved alternate.
 - 2) Intel® Core I5 Quatro processor.
 - 3) Minimum 500 GB hard disk.
 - 4) Minimum 8 GB RAM.
 - 5) One parallel and 2 serial ports (not including modem).
 - 6) Minimum 4 USB ports.
 - 7) Fifty-six kilobit per second voice/data internal modem.
 - 8) Nineteen-inch color LCD monitor, 1280 x 1024, 0.25mm dot pitch, non-interlaced. Brand should be ViewSonic or Engineer-approved equivalent.
 - 9) Minimum 128 MB video card.
 - 10) One hundred and one key keyboard
 - 11) MS mouse and mouse pad
 - 12) Sony DRU-840A (20x max, dual format, DVD +/-R) drive, or equivalent sound card and speakers.
 - 13) Intel Etherexpress 10/100/1000 RJ-45 PCI network card.
 - 14) High definition graphics.
 - 15) Cables, connectors, and controller cards, as necessary, to provide a functioning system, including computer accessories.
 - 16) A/C surge suppressor with telephone line protection sized for computer system.
 - 17) Uninterruptable power supply, APC model SmartUPS 700 or equivalent.
 - 18) Four GB USB flash media storage device
 - 19) One hundred DVD-R media.
 - 20) Microsoft Windows 7 operating system.
 - 21) Microsoft Office 2013 Professional.
 - 22) Adobe Acrobat, latest version (full package, not just the free reader).

- 23) McAfee Virus Scan, latest version.
- 24) Current version of Business and Legal Reports Safety Training Presentations, Product Code 11006100.
- s. Field Office Printer:
 - 1) Provide a multifunctional printer with the capability of printing, copying, and scanning. The CONTRACTOR is responsible for all maintenance of equipment and related hardware and software. The printer shall consist of, as a minimum:
 - a) Double-sided printing capability.
 - b) Copy speed: 33 copies per minute.
 - c) Print speed: 30 prints per minute.
 - d) Up to 600 x 600 dpi resolution.
 - e) Original scan/copy paper size: up to 11" x 17".
 - f) Printer paper size: up to 11" x 17"
 - g) Dry, dual component toner.
 - h) Scan-to-File/ Folder/URL/FTP/Email functionality.
 - i) Full-Color VGA Touch Screen Control Panel.
 - j) 1.5 GB RAM + 250 GB HDD
 - k) Paper, toner, and other supplies for duration of project.
 - 2) Manufacturers:
 - a) Ricoh
 - b) Or equal
- t. AutoCAD LT for Windows by AutoDesk latest version.
- u. Digital Camera
 - 1) See Section 01 34 00 Photographic and Videographic Documentation for requirements.
 - 2) Two Spare batteries and chargers.
 - 3) Two 4 GB compact flash cards.
- v. One telephone answering machine.
- w. One facsimile (Fax) machine capable of providing the following functions:
 - 1) Unattended receiving operation for plain paper, commercial grade, 250 sheet cassette, programmable memory, and document feeder.
 - 2) Digital Modem Speed: 9,600 bits per second with automatic fallback to 7,200, 4,800, or 2,400 bits per second.
 - 3) The Terminal shall have the Following Features:
 - a) Resolution: 196 vertical by 203 horizontal lines per inch (lpi) resolution.
 - b) CCITG3, CCITG2 compatibility.
 - c) RJ11 series modular jack line connection.
 - d) Solid-state flatbed scanner.
 - e) Electro thermal recorder.
 - 4) Obtain and pay for a service contract with a local representative of the facsimile vendor or manufacturer for availability of a service representative to perform on-site service and repair.
 - 5) Provide all necessary paper and other materials required for proper operation of the facsimile.
- 4. Locate field office where directed.
- 5. Have field office ready for occupancy within 2 weeks after start of sitework.

PART 3 - EXECUTION

3.1 TEMPORARY UTILITIES

- A. Power:
 - 1. Electric power will be available at or near Site. Determine type and amount available and make arrangements for obtaining temporary electric power service, metering equipment,

- and pay all costs for electric power used during contract period, except for portions of the Work designated in writing by Engineer as substantially complete.
2. Cost of electric power will be borne by Contractor.
- B. Lighting: Provide temporary lighting to meet applicable safety requirements to allow erection, application, or installation of materials and equipment, and observation or inspection of the Work.
- C. Heating, Cooling, and Ventilating:
1. Provide as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for installation of materials, and to protect materials, equipment, and finishes from damage due to temperature or humidity. Costs for temporary heat shall be borne by Contractor.
 2. Provide adequate forced air ventilation of enclosed areas to cure installed materials, to dispense humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases.
 3. Pay all costs of installation, maintenance, operation, removal, and fuel consumed.
 4. Provide portable unit heaters, complete with controls, oil- or gas-fired, and suitably vented to outside as required for protection of health and property.
- D. Water:
1. Potable water is available at the site. Secure written permission for connection and use from Owner and meet requirements for use. Contractor shall pay cost to connect water during construction. Owner shall pay cost to for water used during construction.
 2. Include costs to connect and transport water to construction areas in Contract Price.
 3. Provide a means to prevent water used for testing from flowing back into source pipeline.
- E. Sanitary and Personnel Facilities:
1. Provide and maintain facilities for Contractor's employees, Subcontractors, and all other onsite employers' employees. Service, clean, and maintain facilities and enclosures.
- F. Telephone Service:
1. Contractor: Arrange and provide onsite telephone service for use during construction by Contractor. Pay costs of installation and monthly bills.
 2. Engineer: Arrange and provide onsite telephone system for use during construction. Pay for all installation and basic monthly billing charges.
 3. No incoming calls allowed to Owner's plant telephone system.
- G. Fire Protection: Furnish and maintain on Site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241).

3.2 PROTECTION OF WORK AND PROPERTY

- A. General:
1. Where completion of the Work requires temporary or permanent removal or relocation of existing utility, coordinate all activities with owner of said utility and perform all work to their satisfaction.
 2. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground utility construction uncovered or otherwise affected by construction operations.
 3. In areas where Contractor's operations are adjacent to or near a utility, such as gas, telephone, television, electric power, water, sewer, or irrigation system, and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection have been made by Contractor.
 4. Notify property owners and utility offices that may be affected by construction operation at least 2 days in advance: Before exposing a utility, obtain utility owner's permission. Should

- service of a utility become interrupted due to Contractor's operation, notify proper authority immediately. Cooperate with said authority in restoring service as promptly as possible and bear costs incurred.
5. Do not impair operation of existing sewer system. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and other debris from entering sewers, pump stations, or other sewer structures.
 6. Maintain original Site drainage wherever possible.
- B. Site Security:
1. Erect a temporary security fence for protection of existing facilities. Maintain fence throughout construction period. Obtain Engineer's written permission before removal of temporary security fencing.
 2. Provide and maintain additional temporary security fences as necessary to protect the Work and Contractor-furnished products not yet installed.
- C. Barricades, Lights, Signs, and Equipment:
1. Provide as required by the Department of Transportation in the state having jurisdiction and in sufficient quantity to safeguard public and the Work.
 2. Provide as necessary to prevent unauthorized entry to construction areas and affected roads, streets, and alleyways, inside and outside of fenced area, and as required to ensure public safety and the safety of Contractor's employees, other employer's employees, and others who may be affected by the Work.
 3. Provide to protect existing facilities and adjacent properties from potential damage.
 4. Locate to enable access by facility operators and property owners.
 5. Protect streets, roads, highways, and other public thoroughfares that are closed to traffic by effective barricades with acceptable warning signs.
 6. Locate barricades at the nearest intersecting public thoroughfare on each side of the blocked section.
 7. Illuminate barricades and obstructions with warning lights from sunset to sunrise.
- D. Trees and Plantings:
1. Protect from damage and preserve trees, shrubs, and other plants outside limits of the Work and within limits of the Work, which are designated on the Drawings to remain undisturbed.
- E. Existing Structures:
1. Where Contractor contemplates removal of small structures such as mailboxes, signposts, and culverts that interfere with Contractor's operations, obtain approval of property owner and Engineer.
 2. Move mailboxes to temporary locations accessible to postal service.
 3. Replace items removed in their original location and a condition equal to or better than original.
- F. Finished Construction: Protect finished floors and concrete floors exposed as well as those covered with composition tile or other applied surfacing.
- G. Waterways: Keep ditches, culverts, and natural drainages continuously free of construction materials and debris.
- H. Dewatering: Construct, maintain, and operate cofferdams, channels, flume drains, sumps, pumps, or other temporary diversion and protection works. Furnish materials required, install, maintain, and operate necessary pumping and other equipment for the environmentally safe removal and disposal of water from the various parts of the Work. Maintain foundations and parts of the Work free from water.

3.3 TEMPORARY CONTROLS

A. Air Pollution Control:

1. Minimize air pollution from construction operations.
2. Burning: Of waste materials, rubbish, or other debris will not be permitted on or adjacent to Site.
3. Conduct operations of dumping rock and of carrying rock away in trucks to cause a minimum of dust. Give unpaved streets, roads, detours, or haul roads used in construction area a dust-preventive treatment or periodically water to prevent dust. Strictly adhere to applicable environmental regulations for dust prevention.
4. Provide and maintain temporary dust-tight partitions, bulkheads, or other protective devices during construction to permit normal operation of existing facilities. Construct partitions of plywood, insulating board, plastic sheets, or similar material. Construct partitions in such a manner that dust and dirt from demolition and cutting will not enter other parts of existing building or facilities. Remove temporary partitions as soon as need no longer exists.

B. Noise Control:

1. Noise Control Plan: Propose plan to mitigate construction noise and to comply with noise control ordinances, including method of construction, equipment to be used, and acoustical treatments.

C. Water Pollution Control:

1. Divert sanitary sewage and non-storm waste flow interfering with construction and requiring diversion to sanitary sewers. Do not cause or permit action to occur which would cause an overflow to existing waterway.
2. Prior to commencing excavation and construction, obtain Engineer's agreement with detailed plans showing procedures intended to handle and dispose of sewage, groundwater, and storm water flow, including dewatering pump discharges.
3. Comply with procedures outlined in U.S. Environmental Protection Agency manuals entitled, "Guidelines for Erosion and Sedimentation Control Planning," "Implementation, Processes, Procedures, and Methods to Control Pollution Resulting from All Construction Activity," and "Erosion and Sediment Control- Surface Mining in Eastern United States."
4. Do not dispose of volatile wastes such as mineral spirits, oil, chemicals, or paint thinner in storm or sanitary drains. Disposal of wastes into streams or waterways is prohibited. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.

- D. Erosion, Sediment, and Flood Control: Provide, maintain, and operate temporary facilities to control erosion and sediment releases, and to protect the Work and existing facilities from flooding during construction period.

3.4 STORAGE YARDS AND BUILDINGS

- A. Coordinate requirements with Section 01 60 00, PRODUCT REQUIREMENTS.

- B. Temporary Storage Yards: Construct temporary storage yards for storage of products that are not subject to damage by weather conditions.

C. Temporary Storage Buildings:

1. Provide environmental control systems that meet recommendations of manufacturers of equipment and materials stored.
2. Arrange or partition to provide security of contents and ready access for inspection and inventory.
3. Store combustible materials (paints, solvents, fuels) in a well-ventilated and remote building meeting safety standards.

4. Provide, at a minimum, one temporary storage building or storage trailer to house specified spare part during the duration of construction and until spare parts are accepted by Owner and Engineer.

3.5 ACCESS ROADS

- A. Construct access roads as required and within easements, rights-of-way, or Project limits. Obtain Engineer's approval of access roads.
- B. Maintain drainage ways. Install and maintain culverts to allow water to flow beneath access roads. Provide corrosion-resistant culvert pipe of adequate strength to resist construction loads.
- C. Provide gravel, crushed rock, or other stabilization material to permit access by all motor vehicles at all times.
- D. Maintain road grade and crown to eliminate potholes, rutting, and other irregularities that restrict access.
- E. Coordinate with Engineer detours and other operations affecting traffic and access. Provide at least 72 hours notice to Engineer of operations that will alter access to the Site.
- F. Where access road crosses existing fences, install and maintain gates.
- G. Upon completion of construction, restore ground surface disturbed by access road construction to original grade. Replace damaged or broken culverts with new culvert pipe of same diameter and material.

3.6 PARKING AREAS

- A. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Owner's operations, or construction operations.
- B. Provide parking facilities for personnel working on the Project. No employee or equipment parking will be permitted on Owner's existing parking areas, except as specifically designated for Contractor's use.

3.7 VEHICULAR TRAFFIC

- A. Comply with Laws and Regulations regarding closing or restricting use of public streets or highways. No public or private road shall be closed, except by written permission of proper authority. Assure the least possible obstruction to traffic and normal commercial pursuits.
- B. Conduct the Work to interfere as little as possible with public travel, whether vehicular or pedestrian.
- C. Whenever it is necessary to cross, close, or obstruct roads, driveways, and walks, whether public or private, provide and maintain suitable and safe bridges, detours, or other temporary expedients for accommodation of public and private travel.
- D. Coordinate traffic routing with that of others working in same or adjacent areas.

3.8 CLEANING DURING CONSTRUCTION

- A. In accordance with General Conditions, as may be specified in other Specification sections, and as required herein.

- B. Wet down exterior surfaces prior to sweeping to prevent blowing of dust and debris. At least weekly, sweep all floors (basins, tunnels, platforms, walkways, roof surfaces), and pick up all debris and dispose.
- C. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least at weekly intervals, dispose of such waste materials, debris, and rubbish offsite.
- D. At least weekly, brush sweep entry drive and roadways, and all other streets and walkways affected by the Work and where adjacent to the Work.

END OF SECTION

SECTION 01 60 00 – PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 DEFINITIONS

- A. Products:
 - 1. New items for incorporation in the Work whether purchased by Contractor or Owner for the Project, or taken from previously purchased stock and may also include existing materials or components required for reuse.
 - 2. Includes the terms material, equipment, machinery, components, subsystem, system, hardware, software, and terms of similar intent and is not intended to change meaning of such other terms used in Contract Documents, as those terms are self-explanatory and have well recognized meanings in construction industry.
 - 3. Items identified by Manufacturer's product name, including make or model designation, indicated in Manufacturer's published product literature, that is current as of the date of the Contract Documents.

1.2 DESIGN REQUIREMENTS

- A. Where Contractor design is specified, design of installation, systems, equipment, and components, including supports and anchorage, shall be in accordance with provisions of latest edition of International Building Code (IBC) by International Code Council.

1.3 ENVIRONMENTAL REQUIREMENTS

- A. Altitude: Provide materials and equipment suitable for installation and operation under rated conditions at elevations shown on Drawings.
- B. Provide equipment and devices installed outdoors or in unheated enclosures capable of continuous operation within an ambient temperature range of 0 °F to 104 °F.

1.4 PREPARATION FOR SHIPMENT

- A. When practical, have the factory assemble products, mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with strippable protective coating.
- B. Package products to facilitate handling and protect from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of Project and Contractor, equipment number, and approximate weight. Include complete packing list and bill of materials with each shipment.
- C. Extra Materials, Special Tools, Test Equipment, and Expendables:
 - 1. Furnish as Required by Individual Specifications.
 - 2. Schedule:
 - a. Ensure that shipment and delivery occur concurrently with shipment of associated equipment.
 - b. Transfer to Owner shall occur immediately subsequent to Contractor's acceptance of equipment from Supplier.
 - 3. Packaging and Shipment:
 - a. Package and ship extra materials and special tools to avoid damage during long term storage in original cartons insofar as possible, or in appropriately sized, hinged-cover, wood, plastic, or metal box.
 - b. Prominently Displayed on Each Package, the Following:

- 1). Manufacturer's part nomenclature and number, consistent with Operation and Maintenance Manual identification system.
 - 2). Applicable equipment description.
 - 3). Quantity of parts in package.
 - 4). Equipment manufacturer.
 4. Deliver materials to the site.
 5. Notify Engineer upon arrival for transfer of materials.
 6. Replace extra materials and special tools found to be damaged or otherwise inoperable at time of transfer to Owner.
- D. Request a minimum 7-day advance notice of shipment from manufacturer. Upon receipt of Manufacturer's advance notice of shipment, promptly notify Engineer of anticipated date of equipment arrival.
- E. Factory Test Results: Reviewed and accepted by Engineer before product shipment as required in individual Specification sections.

1.5 DELIVERY AND INSPECTION

- A. Deliver products in accordance with accepted current Progress Schedule and coordinate to avoid conflict with the Work and conditions at Site. Deliver anchor bolts and templates sufficiently early to permit setting prior to placement of structural concrete.
- B. Deliver products in undamaged condition, in Manufacturer's original container or packaging, with identifying labels intact and legible. Include on label, date of manufacture and shelf life, where applicable.
- C. Unload products in accordance with Manufacturer's instructions for unloading or as specified, and record receipt of products at Site. Promptly inspect for completeness and evidence of damage during shipment.
- D. Remove damaged products from Site, and expedite delivery of identical new undamaged products, and remedy incomplete or lost products to provide that specified, so as not to delay progress of the Work.

1.6 HANDLING, STORAGE, AND PROTECTION

- A. Handle and store products in accordance with Manufacturer's written instructions and in a manner to prevent damage. Store in approved storage yards or sheds provided in accordance with Section 01 50 00, TEMPORARY FACILITIES AND CONTROLS. Provide Manufacturer's recommended maintenance during storage, installation, and until products are accepted for use by Owner.
- B. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered, but not installed in the Work.
- C. Store electrical, instrumentation, and control products, and equipment with bearings in weather-tight structures maintained above 60 °F. Protect electrical, instrumentation, and control products, and insulation against moisture, water, and dust damage. Connect and operate continuously all space heaters furnished in electrical equipment.

- D. Store fabricated products above ground on blocking or skids, prevent soiling or staining, and store loose granular materials in well-drained area on solid surface to prevent mixing with foreign matter. Cover products that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.
- E. Store finished products that are ready for installation in dry and well-ventilated areas. Do not subject to extreme changes in temperature or humidity.
- F. After installation, provide coverings to protect products from damage due to traffic and construction operations. Remove coverings when no longer needed.
- G. Hazardous Materials: Prevent contamination of personnel, storage building, and Site. Meet requirements of product specification, codes, and manufacturer's instructions.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide the Manufacturers standard materials suitable for service conditions unless otherwise specified in the individual Specifications.
- B. Where product specifications include a named Manufacturer, with or without model number, and also include performance requirements, named Manufacturer's products must meet the performance specifications.
- C. Like items of products furnished and installed in the Work shall be end products of one Manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare parts and replacement, Manufacturer's services, and implement same or similar process instrumentation and control functions in same or similar manner.
- D. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.
- E. Provide interchangeable components of the same Manufacturer, for similar components, unless otherwise specified.
- F. Equipment, components, systems, sub-systems: Design and manufacture with due regard for health and safety of operation, maintenance, and accessibility, durability of parts, and shall comply with applicable OSHA, State, and local health and safety regulations.
- G. Regulatory Requirement: Coating materials shall meet Federal, State, and local requirements limiting the emission of volatile organic compounds and for worker exposure.
- H. Safety Guards: Provide for all belt or chain drives, fan blades, couplings, or other moving or rotary parts. Cover rotating part on all sides. Design for easy installation and removal. Use 16-gauge or heavier; galvanized steel, aluminum coated steel, or galvanized or aluminum coated ½" mesh expanded steel. Provide galvanized steel accessories and supports, including bolts. For outdoors application, prevent entrance of rain and dripping water.
- I. Authority Having Jurisdiction (AHJ):
 - 1. Provide the Work in accordance with the Texas Fire Code that incorporates the 2015 International Building Code [with Texas Amendments]. Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing

- laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.
- J. Equipment Finish:
1. Provide Manufacturer's standard finish and color, except where specific color is indicated.
 2. If Manufacturer has no standard color, provide equipment with gray finish as approved by Engineer.
- K. Special Tools and Accessories: Furnish to Owner, upon acceptance of equipment, all accessories required to place each item of equipment in full operation. These accessory items include, but are not limited to, adequate oil and grease (as required for first lubrication of equipment after field testing), light bulbs, fuses, hydrant wrenches, valve keys, hand wheels, chain operators, special tools, and other spare parts as required for maintenance.
- L. Lubricant: Provide initial lubricant recommended by equipment Manufacturer in sufficient quantity to fill lubricant reservoirs and to replace consumption during testing, startup, and operation until final acceptance by Owner.

2.2 FABRICATION AND MANUFACTURE

- A. General:
1. Manufacture parts to U.S.A. standard sizes and gauges.
 2. Two or more items of the same type shall be identical, by the same Manufacturer, and interchangeable.
 3. Design structural members for anticipated shock and vibratory loads.
 4. Use 1/4" minimum thickness for steel that will be submerged, wholly or partially, during normal operation.
 5. Modify standard products as necessary to meet performance Specifications.
- B. Lubrication System:
1. Require no more than weekly attention during continuous operation.
 2. Convenient and accessible. Oil drains with bronze or stainless steel valves and fill-plugs easily accessible from the normal operating area or platform.
 3. Locate drains to allow convenient collection of oil during oil changes without removing equipment from its installed position.
 4. Provide constant-level oilers or oil level indicators for oil lubrication systems.
 5. For grease type bearings, which are not easily accessible, provide and install stainless steel tubing; protect and extend tubing to convenient location with suitable grease fitting.

2.3 SOURCE QUALITY CONTROL

- A. Where Specifications call for factory testing to be witnessed by Engineer, notify Engineer not less than 14 days prior to scheduled test date, unless otherwise specified.
- B. Calibration Instruments: Bear the seal of a reputable laboratory certifying instrument has been calibrated within the previous 12 months to a standard endorsed by the National Institute of Standards and Technology (NIST).
- C. Factory Tests: Perform in accordance with accepted test procedures and document successful completion.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Inspect materials and equipment for signs of pitting, rust decay, or other deleterious effects of storage. Do not install material or equipment showing such effects. Remove damaged material or equipment from the Site and expedite delivery of identical new material or equipment. Delays to the Work resulting from material or equipment damage that necessitates procurement of new products will be considered delays within Contractor's control.

3.2 INSTALLATION

- A. Equipment Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.
- B. No shimming between machined surfaces is allowed.
- C. Install the Work in accordance with NECA Standard of Installation, unless otherwise specified.
- D. Repaint painted surfaces that are damaged prior to equipment acceptance.
- E. Do not cut or notch any structural member or building surface without specific approval of Engineer.
- F. Handle, install, connect, clean, condition, and adjust products in accordance with Manufacturer's instructions, and as may be specified. Retain a copy of Manufacturers' instruction at Site, available for review at all times.
- G. For material and equipment specifically indicated or specified to be reused in the Work:
 - 1. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed Work.
 - 2. Arrange for transportation, storage, and handling of products that require offsite storage, restoration, or renovation. Include costs for such Work in the Contract Price.

3.3 FIELD FINISHING

- A. In accordance with Section 09 90 00, PAINTING AND PROTECTIVE COATINGS and individual Specification sections.

3.4 ADJUSTMENT AND CLEANING

- A. Perform required adjustments, tests, operation checks, and other startup activities.

3.5 LUBRICANTS

- A. Fill lubricant reservoirs and replace consumption during testing, startup, and operation prior to acceptance of equipment by Owner.

END OF SECTION

SECTION 01 72 20 – FIELD ENGINEERING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes description and requirements of the required closeout procedures for the project:
 - 1. Providing and delivering informational submittals.
 - 2. Preparing, maintaining, providing and delivering Record Documents.
 - 3. Furnishing Releases from Agreements.
 - 4. Furnishing Evidence of Compliance with Requirements of Governing Authorities.
 - 5. Providing Warranties and Bonds.
 - 6. Providing Certificate of Final Completion.
- B. Related sections:
 - 1. Section 01 77 00 – Closeout Procedures.

1.2 QUALITY ASSURANCE

- A. Qualifications of Surveyor or Engineer: Registered civil engineer or land surveyor in state where Project is located.
- B. Accuracy of stakes, alignments, and grades may be checked randomly by ENGINEER:
 - 1. Notice of when checking will be conducted will be given.
 - 2. When notice of checking is given, postpone parts of the Work affected by stakes, alignments or grades to be checked until checked.
 - 3. Do not assume that ENGINEER's check substitutes or complements required field quality control procedures.

1.3 CONSTRUCTION STAKES, LINES, AND GRADES

- A. Execute the Work in accordance with the lines and grades indicated.
- B. Make distances and measurements on horizontal planes, except elevations and structural dimensions.

1.4 SURVEY REFERENCE POINTS

- A. Basic reference line, a beginning point on basic reference line, and a benchmark will be provided, by OWNER.
- B. From these reference points, establish other control and reference points as required to properly lay out the Work.
- C. Locate and protect control points prior to starting site work, and preserve permanent reference points during construction:
 - 1. Make no changes or relocations without prior written notice.
 - 2. Replace Project control point, when lost or destroyed, in accordance with original survey control.
- D. Set monuments for principal control points and protect them from being disturbed and displaced;
 - 1. Re-establish disturbed monuments.
 - 2. When disturbed, postpone parts of the Work that are governed by disturbed monuments until such monuments are re-established.

1.5 PROJECT SURVEY REQUIREMENTS

- A. Establish minimum of 2 permanent benchmarks on site referenced to data established by survey control points.
- B. Record permanent benchmark locations with horizontal and vertical data on Project Record Documents.
- C. Assume responsibility for accuracy of stakes, alignments, and grades by performing verifications and checking in accordance with standard surveying practice.

1.6 RECORD DOCUMENTS

- A. Prepare and submit Record Documents as specified in Section 01 77 00.
- B. Maintain complete, accurate log of control points and survey.
- C. Affix civil engineer's or land surveyor's signature and registration number to Record Drawing to certify accuracy of information shown.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 73 20 – CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Cutting and patching existing and new construction.
- B. Related sections:
 - 1. Section 01 33 00 – Submittal Procedures.
 - 2. Section 01 60 00 – Product Requirements.

1.2 SUBMITTALS

- A. Submit in accordance with Section 01 33 00.
- B. Cutting and Patching Plan:
 - 1. Submit details of proposed construction before cutting and patching construction commences affecting:
 - a. Work of OWNER or of others.
 - b. Structural integrity of element of Project.
 - 2. Cutting and Patching Plan shall include the following:
 - a. Identification of Work.
 - b. Description of affected construction.
 - c. Necessity for cutting, patching, alteration, or excavation.
 - d. Description of proposed construction.
 - e. Scope of cutting, patching, alteration, or excavation. Verify locations of utilities and facilities which may exist by consulting with the OWNER, utility companies, and the Arkansas One Call System or other service available in area of Project (see dig/call information on the Drawings):

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Comply with specifications and standards for products involved.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Provide adequate temporary support as necessary to ensure structural integrity of affected portion of Work.
- B. Provide devices and methods to protect other portions of Project from damage and persons from injury.
- C. Provide protection from elements for that portion of Project which may be exposed by cutting and patching, and maintain excavations free from water.

3.2 CUTTING AND PATCHING

- A. Cut, Fit, and Patch when Required to:

1. Make its several parts fit together properly.
 2. Remove and replace construction not conforming to Contract Documents.
 3. Remove samples of installed construction as specified for testing.
 4. Provide routine penetrations of nonstructural surfaces for installation of piping and electrical conduit.
- B. Execute cutting and demolition by methods which will prevent damage and will provide proper surfaces to receive installation of repairs.
- C. Openings in Existing Concrete and Masonry:
1. Create Openings by:
 - a. Saw cutting completely through concrete or masonry, or
 - b. Scoring edges of opening with saw to at least 1 inch depth on both surfaces (when accessible) and removing concrete or masonry by chipping.
 2. Do not allow saw cuts to extend beyond limits of opening.
 3. Make corners square and true by combination of core drilling and grinding or chipping.
 4. Prevent debris from falling into adjacent tanks or channels in service or from damaging existing equipment and other facilities.
- D. Sizing of Openings in Existing Concrete or Masonry:
1. Make openings sufficiently large to permit final alignment of pipe and fittings without deflections.
 2. Allow adequate space for packing around pipes and conduit to ensure watertightness.
- E. Grouting Pipes in Place:
1. Sandblast concrete surfaces and thoroughly clean sand and other foreign material from surfaces prior to placing grout.
 2. Grout pipes, sleeves, castings, and conduits in place by pouring grout under a head of at least 4 inches. Vibrate grout into place. Completely fill the spaces occupied by pipes, sleeves, castings, and conduits.
 3. Water cure the grout.
- F. Connections to Existing Pipes:
1. Cut existing pipe square.
 2. Properly prepare the ends for the connection indicated on the Drawings.
 3. Repair any damage to existing lining and coating.
- G. Rehabilitate all areas affected by removal of existing equipment, equipment pads and bases, piping, supports, electrical panels, electric devices, and conduits such that little or no evidence of the previous installation remains:
1. Fill areas in existing floors, walls, and ceilings from removed piping, conduit and fasteners with non-shrink grout and finish smooth.
 2. Remove Concrete Bases for Equipment and Supports by:
 - a. Saw cutting clean, straight lines with a depth equal to the concrete cover over reinforcement minus 1/2 inch below finished surface. Do not cut existing reinforcement on floors.
 - b. Chip concrete within scored lines and cut exposed reinforcing steel and anchor bolts.
 - c. Patch with non-shrink grout to match adjacent grade and finish.
 3. Terminate abandoned piping and conduits with blind flanges, caps, or plugs.
- H. Treat Existing Concrete Reinforcement as Follows:

1. Where existing reinforcement is to remain, protect, clean, and extend into new concrete.
2. Where Existing Reinforcement is not to be Retained, Cut Off as Follows:
 - a. Where new concrete joins existing concrete at the removal line, cut reinforcement flush with concrete surface at the removal line.
 - b. Where concrete surface at the removal line is the finished surface, cut reinforcement 2 inches below the surface, paint ends with epoxy, and patch holes with dry pack mortar.

END OF SECTION

SECTION 01 75 60 – TESTING, TRAINING, AND FACILITY START-UP

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for equipment and system testing and facility start up, including the following:
 - 1. Start-Up Plan.
 - 2. Performance Testing.
 - 3. General Start-Up and Testing Procedures.
 - 4. Functional Testing.
 - 5. Clean Water Testing.
 - 6. Operational Testing.
 - 7. Certificate of Proper Installation.
 - 8. Services of manufacturer's representatives.
 - 9. Training of OWNER's personnel.
 - 10. Final testing requirements for the complete facility.
- B. Related sections:
 - 1. Section 01 32 00 – Construction Progress Documentation.
 - 2. Division 26 Electrical Sections.

1.2 GENERAL TESTING, TRAINING, AND START-UP REQUIREMENTS

- A. Contract Requirements: Testing, training, and start-up are requisite to the satisfactory completion of the Contract.
- B. Perform clean water testing on all constructed facilities.
- C. Complete testing, training, and start-up within the Contract Times.
- D. Allow realistic durations in the Progress Schedule for testing, training, and start-up activities.
- E. Furnish labor, power, chemicals, tools, equipment, instruments, and services required for and incidental to completing functional testing, performance testing, and operational testing.
- F. Provide competent, experienced technical representatives of equipment manufacturers for assembly, installation and testing guidance, and operator training.

1.3 START-UP PLAN

- A. Submit start-up plan for each piece of equipment and each system not less than 3 weeks prior to planned initial start-up of equipment or system.
- B. Provide detailed sub-network of Progress Schedule with the following activities identified:
 - 1. Manufacturer's services.
 - 2. Installation certifications.
 - 3. Operator training.
 - 4. Submission of Operation and Maintenance Manual.
 - 5. Functional testing.
 - 6. Performance testing.
 - 7. Operational testing.

- C. Provide testing plan with test logs for each item of equipment and each system when specified. Include testing of alarms, control circuits, capacities, speeds, flows, pressures, vibrations, sound levels, and other parameters.
- D. Provide summary of shutdown requirements for existing systems which are necessary to complete start-up of new equipment and systems.
- E. Revise and update start-up plan based upon review comments, actual progress, or to accommodate changes in the sequence of activities.

1.4 PERFORMANCE TESTING

- A. Test equipment for proper performance at point of manufacture or assembly when specified.
- B. When Source Quality Control Testing is Specified:
 - 1. Demonstrate equipment meets specified performance requirements.
 - 2. Provide certified copies of test results.
 - 3. Do not ship equipment until certified copies have received written acceptance from ENGINEER. Written acceptance does not constitute final acceptance.
 - 4. Perform testing as specified in the equipment specification sections.
- C. Include costs associated with witnessing performance tests in the bid price. Include costs for one (1) OWNER's representative for travel, lodging, transportation to and from lodging, and \$50 (50 Dollars) for meal allowance per person per day.

1.5 GENERAL START-UP AND TESTING PROCEDURES

- A. Mechanical Systems: As specified in the individual equipment specification sections:
 - 1. Remove rust preventatives and oils applied to protect equipment during construction.
 - 2. Flush lubrication systems and dispose of flushing oils. Recharge lubrication system with lubricant recommended by manufacturer.
 - 3. Flush fuel system and provide fuel for testing and start-up.
 - 4. Install and adjust packing, mechanical seals, O-rings, and other seals. Replace defective seals.
 - 5. Remove temporary supports, bracing, or other foreign objects installed to prevent damage during shipment, storage, and erection.
 - 6. Check rotating machinery for correct direction of rotation and for freedom of moving parts before connecting driver.
 - 7. Perform cold alignment and hot alignment to manufacturer's tolerances.
 - 8. Adjust V-belt tension and variable pitch sheaves.
 - 9. Inspect hand and motorized valves for proper adjustment. Tighten packing glands to insure no leakage, but permit valve stems to rotate without galling. Verify valve seats are positioned for proper flow direction.
 - 10. Tighten leaking flanges or replace flange gasket. Inspect screwed joints for leakage.
 - 11. Install gratings, safety chains, handrails, shaft guards, and sidewalks prior to operational testing.
- B. Electrical Systems: As specified in Division 26 and the individual equipment specification sections:
 - 1. Perform insulation resistance tests on wiring except 120 volt lighting, wiring, and control wiring inside electrical panels.
 - 2. Perform continuity tests on grounding systems.
 - 3. Test and set switchgear and circuit breaker relays for proper operation.
 - 4. Perform direct current high potential tests on all cables that will operate at more than 2,000 volts. Obtain services of independent testing lab to perform tests.

5. Check motors for actual full load amperage draw. Compare to nameplate value.

- C. Instrumentation Systems: As specified in Division 26 and the individual equipment specification sections:
1. Bench or field calibrate instruments and make required adjustments and control point settings.
 2. Leak test pneumatic controls and instrument air piping.
 3. Energize transmitting and control signal systems, verify proper operation, ranges and settings.

1.6 FUNCTIONAL TESTING

- A. Perform checkout and performance testing as specified in the individual equipment specification sections.
- B. Functionally test mechanical and electrical equipment, and instrumentation and controls systems for proper operation after general start-up and testing tasks have been completed.
- C. Demonstrate proper rotation, alignment, speed, flow, pressure, vibration, sound level, adjustments, and calibration. Perform initial checks in the presence of and with the assistance of the manufacturer's representative.
- D. Demonstrate proper operation of each instrument loop function including alarms, local and remote controls, instrumentation and other equipment functions. Generate signals with test equipment to simulate operating conditions in each control mode.
- E. Conduct continuous 8-hour test under full load conditions. Replace parts which operate improperly.

1.7 CLEAN WATER TESTING

- A. Perform checkout and performance testing as specified in the individual equipment specification sections.
- B. Fill all facilities with clean water or secondary effluent.
1. Contractor shall coordinate with Owner for availability of water source. Generally, this water shall be available at the plant's effluent. Contractor shall be responsible for transporting clean water from the plant's effluent to the facility to be tested.
 2. Contractor shall be responsible for providing all temporary piping, hoses, pumps and temporary power to pump clean water to the facility to be tested.
- C. Operate facilities successfully for 72 hours (3 days) continuously.
- D. Contractor shall be responsible for providing, installing, and removing all temporary piping and valving required to perform Clean Water Testing for each facility.
- E. Functionally test mechanical and electrical equipment, and instrumentation and controls systems for proper operation after general start-up and testing tasks have been completed.
- F. Demonstrate proper rotation, alignment, speed, flow, pressure, vibration, sound level, adjustments, and calibration. Perform initial checks in the presence of and with the assistance of the manufacturer's representative.

- G. Demonstrate proper operation of each instrument loop function including alarms, local and remote controls, instrumentation, and other equipment functions. Generate signals with test equipment to simulate operating conditions in each control mode.
- H. Conduct continuous 24-hour test under full load conditions. Replace parts which operate improperly.
- I. Following successful testing, Contractor shall coordinate removal of test water from tested facilities with Owner, develop a mutually acceptable schedule to bleed the test water in the existing plant stream. Contractor shall provide and operate all equipment and piping required to remove the test water from the tested facilities. Contractor shall not direct test water to the plant's process stream without the Owner's authorization. Contractor shall not direct test water to the plant's process stream in such a manner to provide an upset, an overloading or disruption to the plant's operations without the Owner's authorization.

1.8 OPERATIONAL TESTING

- A. After completion of operator training, conduct operational test of the entire facility. Demonstrate satisfactory operation of equipment and systems in actual operation.
- B. Conduct operational test for continuous 7-day period.
- C. OWNER will provide operations personnel, power, fuel, and other consumables for duration of each specified test.
- D. Immediately correct defects in material, workmanship, or equipment which became evident during operational test.
- E. Repeat operational test when malfunctions or deficiencies cause shutdown or partial operation of the facility or results in performance that is less than specified.

1.9 CERTIFICATE OF PROPER INSTALLATION

- A. At completion of Functional Testing, furnish written report prepared and signed by manufacturer's authorized representative, certifying equipment:
 - 1. Has been properly installed, adjusted, aligned, and lubricated.
 - 2. Is free of any stresses imposed by connecting piping or anchor bolts.
 - 3. Is suitable for satisfactory full-time operation under full load conditions.
 - 4. Operates within the allowable limits for vibration.
 - 5. Controls, protective devices, instrumentation, and control panels furnished as part of the equipment package are properly installed, calibrated, and functioning.
 - 6. Control logic for start-up, shutdown, sequencing, interlocks, and emergency shutdown have been tested and are properly functioning.
- B. Furnish written report prepared and signed by the electrical and/or instrumentation subcontractor certifying:
 - 1. Motor control logic that resides in motor control centers, control panels, and circuit boards furnished by the electrical and/or instrumentation subcontractor has been calibrated and tested and is properly operating.
 - 2. Control logic for equipment start-up, shutdown, sequencing, interlocks and emergency shutdown has been tested and is properly operating.
 - 3. Co-sign the reports along with the manufacturer's representative and subcontractors.

1.10 TRAINING OF OWNER'S PERSONNEL

- A. Provide operations and maintenance training for items of mechanical, electrical and instrumentation equipment. Utilize manufacturer's representatives to conduct training sessions.
- B. Coordinate training sessions to prevent overlapping sessions. Arrange sessions so that individual operators and maintenance technicians do not attend more than 2 sessions per week.
- C. Provide Operation and Maintenance Manual for specific pieces of equipment or systems 1 month prior to training session for that piece of equipment or system.
- D. Satisfactorily complete functional testing before beginning operator training.
- E. Provide training sessions for each work shift listed below during the time periods shown. Pooling of shifts will not be permitted unless accepted by OWNER.

Shift		
Day	Tuesday, 7 a.m.-11 a.m.	Thursday, 7 a.m.-11 a.m.
Swing	Wednesday, 3 p.m.-7 p.m.	Thursday, 3 p.m.-7 p.m.
Graveyard	Not required	Not required

- F. Training Sessions: Provide training sessions for equipment as specified in the individual equipment specification sections.
- G. The CONTRACTOR shall video all training sessions and provide a copy for the OWNER.
- H. The CONTRACTOR shall designate and provide one or more persons to be responsible for coordinating and expediting his/her training duties. The person or persons so designated shall be present at all training coordination meetings with the OWNER.
- I. The CONTRACTOR's coordinator shall coordinate the training periods with OWNER personnel and manufacturer's representatives, and shall submit a training schedule for each piece of equipment or system for which training is to be provided. Such training schedule shall be submitted not less than 21 calendar days prior to the time that the associated training is to be provided and shall be based on the current plan of operation.

1.11 RECORD KEEPING

- A. Maintain and submit following records generated during start-up and testing phase of Project:
 - 1. Daily logs of equipment testing identifying all tests conducted and outcome.
 - 2. Logs of time spent by manufacturer's representatives performing services on the job site.
 - 3. Equipment lubrication records.
 - 4. Electrical phase, voltage, and amperage measurements.
 - 5. Insulation resistance measurements.
 - 6. Data sheets of control loop testing including testing and calibration of instrumentation devices and setpoints.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 77 00 – CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes description and requirements of the required closeout procedures for the project:
 - 1. Providing and delivering informational submittals.
 - 2. Preparing, maintaining, providing and delivering Record Documents.
 - 3. Furnishing Releases from Agreements.
 - 4. Furnishing Evidence of Compliance with Requirements of Governing Authorities.
 - 5. Providing Warranties and Bonds.
 - 6. Providing Certificate of Final Completion.
- B. Related sections:
 - 1. 01 29 00 – Payment Procedures.
 - 2. 01 32 00 – Construction Progress Documentation.
 - 3. 01 72 20 – Field Engineering.
 - 4. 01 78 23 – Operation and Maintenance Data.
 - 5. 01 79 00 – Demonstration and Training.

1.2 SUBMITTALS

- A. Informational Submittals:
 - 1. Submit Prior to Application for Final Payment.
 - a. Record Documents: As required in General Conditions.
 - b. Approved Shop Drawings and Samples: As required in the General Conditions.
 - c. Operations and Maintenance Manuals: In accordance with Section 01 78 23, and as required in individual Specification sections.
 - d. Certificates of Testing and Inspection: As required in the General Conditions, these General Requirements sections, and the individual Specifications sections.
 - e. Training Sessions: In accordance with Section 01 79 00, and individual Specifications sections.
 - f. Certificate of Substantial Completion.
 - g. Special bonds, Special Guarantees, and Service Agreements.
 - 2. Form of Submittal:
 - a. Bind in commercial quality 8-1/2" by 11" three ring, side binders with hardback, cleanable, plastic covers.
 - 1). Label cover of each binder with typed or printed title Warranties and Bonds, with title of Project; name; address, and telephone number of Contractor and equipment Supplier, and name of responsible principal.
 - 2). Table of Contents: Neatly typed, in the sequence of the of the Project Manual, with each item identified with the number and title of the Specification section in which specified, and the name of the product or Work item.
 - 3). Separate each warranty or Bond with index tab sheets keyed to the Table of Contents. Provide full information, using separate typed sheets as necessary. List Subcontractor, Supplier, and Manufacturer, with name, address, and telephone number of responsible contact for service and warranty issues.
 - 3. Preparation of Submittal:
 - a. Obtain notarized warranties and Bonds, executed in duplicate by responsible Subcontractor, Supplier, and Manufacturer, within 10 days after completion of the applicable item or Work, except for items put into use with Owner's permission, leave date of beginning of time warranty until date of Substantial Completion is determined.
 - 4. Time of Submission: Submit within 10 days after the date of Date of Substantial Completion and prior to submission of Final Application of Payment.

- a. Spare parts and special tools as required by individual Specification sections.
- b. Consent of Surety to Final Payment: As required in General Conditions.
- c. Releases or Waivers of Liens and Claims: As required in General Conditions.
- d. Releases from Agreements.
- e. Final Application for Payment: Submit in accordance with procedures and requirements stated in Section 01 29 00.
- f. Extra Materials: As required by individual Specification sections.

1.3 RECORD DOCUMENTS

- A. Quality Assurance:
 1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.
 2. Accuracy of Records:
 3. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
 4. Purpose of Project record documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive Site measurement, investigation, and examination.
 5. Make entries within 24 hours after receipt of information that a change in the Work has occurred.
 6. Prior to submitting each request for progress payment, request Engineer's review and approval of current status of record documents. Failure to properly maintain, update, and submit record documents may result in a deferral by Engineer to recommend whole or any part of Contractor's Application for Payment, either partial or final.
 7. Maintain at Project site, available to OWNER and ENGINEER, 1 copy of the Contract Documents, shop drawings and other submittals, in good order.

1.4 RELEASES FROM AGREEMENTS

- A. Furnish Owner written releases from property owners or public agencies where side agreements or special easements have been made, or where Contractor's operations have not been kept within the Owner's construction right-of-way.
- B. In the Event Contractor is Unable to Secure Written Releases:
 1. Inform Owner of the reasons.
 2. Owner or its representatives will examine the Site, and Owner will direct Contractor to complete the Work that may be necessary to satisfy terms of the side agreement or special easement.
 3. Should Contractor refuse to perform this Work, Owner reserves right to have it done by separate contract and deduct cost of same from Contract Price, or require Contractor to furnish a satisfactory bond in a sum to cover legal Claims for damages.
 4. When Owner is satisfied that the Work has been completed in agreement with Contract Documents and terms of side agreement or special easement, right is reserved to waive requirement for written release if:
 5. Contractor's failure to obtain such statement is due to grantor's refusal to sign, and this refusal is not based upon any legitimate Claims that Contractor has failed to fulfill terms of side agreement or special easement, or
 6. Contractor is unable to contact or has had undue hardship in contacting grantor.

1.5 EVIDENCE OF COMPLIANCE WITH REQUIREMENTS OF GOVERNING AUTHORITIES

- A. Submit the Following:
 1. Certificate of Occupancy.
 2. Certificates of Inspection:
 - a. Mechanical.

- b. Electrical.

1.6 WARRANTIES AND BONDS

- A. Provide executed Warranty or Guaranty Form if required by Contract Documents.
- B. Provide specified additional warranties, guarantees, and bonds from manufacturers and suppliers.

1.7 CERTIFICATE OF FINAL COMPLETION

- A. When 7-day operational test has been successfully completed, ENGINEER will certify that new facilities are operationally complete. ENGINEER will submit a list of known items (punch list) still to be completed or corrected prior to contract completion.
- B. List of items to be completed or corrected will be amended as items are resolved by CONTRACTOR.
- C. When all items have been completed or corrected, submit written certification that the entire work is complete in accordance with the Contract Documents and request final inspection.
- D. Upon completion of final inspection, ENGINEER will either prepare a written acceptance of the entire work or advise CONTRACTOR of work not complete. If necessary, inspection procedures will be repeated.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 MAINTENANCE OF RECORD DOCUMENTS

- A. General:
 - 1. Promptly following commencement of Contract Times, secure from Engineer at no cost to Contractor, one complete set of Contract Documents. Drawings will be full size.
 - 2. Label or stamp each record document with title, "RECORD DOCUMENTS," in neat large printed letters.
 - 3. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.
- B. Preservation:
 - 1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
 - 2. Make documents and Samples available at all times for observation by Engineer.
- C. Making Entries on Drawings:
 - 1. Use an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.
 - a. Make annotations with erasable colored pencil conforming to the following color code:

Additions:	Red
Deletions:	Green
Comments	Blue

Dimensions:	Graphite
-------------	----------

2. Date entries.
3. Call attention to entry by "cloud" drawn around area or areas affected.
4. Legibly mark to record actual changes made during construction, including, but not limited to:
 5. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
 6. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work, and Reference to at least two measurements to permanent surface improvements.
 7. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
 8. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
 9. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, and Engineer's written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.
 10. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items that are described in previous subparagraph above.
 11. Clearly identify the item by accurate note such as "cast iron drain," "galv. water," and the like.
 12. Show, by symbol or note, vertical location of item ("under slab," "in ceiling plenum," "exposed," and the like).
 13. Make identification so descriptive that it may be related reliably to Specifications.
 14. Mark and record field changes and detailed information contained in submittals and change orders.
 15. Record actual depths, horizontal and vertical location of underground pipes, duct banks and other buried utilities. Reference dimensions to permanent surface features.
 16. Identify specific details of pipe connections, location of existing buried features located during excavation, and the final locations of piping, equipment, electrical conduits, manholes, and pull boxes.
 17. Identify location of spare conduits including beginning, ending and routing through pull boxes, and manholes. Record spare conductors, including number and size, within spare conduits, and filled conduits.
 18. Provide schedules, lists, layout drawings, and wiring diagrams.
- D. Maintain Documents Separate From Those Used for Construction:
 1. Label documents "RECORD DOCUMENTS."
- E. Keep Documents Current:
 1. Record required information at the time the material and equipment is installed and before permanently concealing.
- F. Deliver record documents with transmittal letter containing date, Project title, CONTRACTOR's name and address, list of documents, and signature of CONTRACTOR.
- G. During progress meetings, record documents will be reviewed to ascertain that changes have been recorded.
- H. Final Schedule Submittal in accordance with Section 01 32 00, CONSTRUCTION PROGRESS DOCUMENTATION.

3.2 FINAL CLEANING

- A. At completion of the Work or of a part thereof and immediately prior to Contractor's request for certificate of Substantial Completion; or if no certificate is issued, immediately prior to Contractor's notice of completion, clean entire Site or parts thereof, as applicable.
1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to Owner.
 2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.
 3. Repair, patch, and touch up marred surfaces to specified finish and match adjacent surfaces.
 4. Clean all windows.
 5. Clean and wax wood, vinyl, or painted floors.
 6. Broom clean exterior paved driveways and parking areas.
 7. Hose clean sidewalks, loading areas, and others contiguous with principal structures.
 8. Rake and clean all other surfaces.
 9. Remove snow and ice from access to buildings.
 10. Replace air-handling filters and clean ducts, blowers, and coils of ventilation units operated during construction.
 11. Leave water courses, gutters, and ditches open and clean.
 12. Perform final cleaning prior to inspections for Final Acceptance.
 13. Employ skilled workers who are experienced in cleaning operations.
 14. Use cleaning materials which are recommended by manufacturers of surfaces to be cleaned.
 15. Prevent scratching, discoloring, and otherwise damaging surfaces being cleaned.
 16. Clean roofs, gutters, downspouts, and drainage systems.
 17. Broom clean exterior paved surfaces and rake clean other surfaces of site work:
 - a. Police yards and grounds to keep clean.
 18. Remove dust, cobwebs, and traces of insects and dirt.
 19. Clean grease, mastic, adhesives, dust, dirt, stains, fingerprints, paint, blemishes, sealants, plaster, concrete, and other foreign materials from sight-exposed surfaces, and fixtures and equipment.
 20. Remove non-permanent protection and labels.
 21. Polish waxed woodwork and finish hardware.
 22. Wash tile.
 23. Wax and buff hard floors, as applicable.
 24. Wash and polish glass, inside and outside.
 25. Wash and shine mirrors.
 26. Polish glossy surfaces to clear shine.
 27. Vacuum carpeted and soft surfaces.
 28. Clean permanent filters and replace disposable filters when heating, ventilation, and air conditioning units were operated during construction.
 29. Clean ducts, blowers and coils when units were operated without filters during construction.
 30. Clean light fixtures and replace burned-out or dim lamps.
- B. Use only cleaning materials recommended by Manufacturer of surfaces to be cleaned.

3.3 WASTE DISPOSAL

- A. Arrange for and dispose of surplus materials, waste products, and debris off-site:
1. Prior to making disposal on private property, obtain written permission from OWNER of such property.
- B. Do not fill ditches, washes, or drainage ways which may create drainage problems.
- C. Do not create unsightly or unsanitary nuisances during disposal operations.

- D. Maintain disposal site in safe condition and good appearance.
- E. Complete leveling and cleanup prior to Final Acceptance of the Work.

3.4 TOUCH-UP AND REPAIR

- A. Touch-up or repair finished surfaces on structures, equipment, fixtures, and installations that have been damaged prior to inspection for Final Acceptance.
- B. Refinish or replace entire surfaces which cannot be touched-up or repaired satisfactorily.

3.5 FINAL CLEANING AND DISINFECTION OF SYSTEMS OF PLANT FACILITIES

- A. Clean channels, pipe, basins, reservoirs, and tanks before running of 7-day test, or before facility goes on stream when 7-day test is not required.
- B. Wash, wherever practicable, or broom sweep channels, pipe, basins, reservoirs, and tanks.
- C. Disinfect piping intended to carry potable water as follows or in accordance with American Water Works Association Standards.
- D. Provide ample sampling outlets in pipe for testing.
- E. Fill pipe with chlorine solution of sufficient strength to retain residual of not less than 10 parts per million at end of 24 hours.
- F. After disinfection, rinse entire potable water system with potable water sufficient to reduce chlorine residual to not more than 0.6 parts per million throughout system before system is put into service.

3.6 CLOSEOUT DOCUMENTS

- A. Submit following Closeout Submittals upon completion of the Work and at least 7 days prior to submitting Application for Final Payment:
 - 1. Evidence of Compliance with Requirements of Governing Authorities.
 - 2. Project Record Documents.
 - 3. Operation and Maintenance Manuals.
 - 4. Warranties and Bonds.
 - 5. Keys and Keying Schedule.
 - 6. Evidence of Payment and Release of Stop Payment Notices as outlined in Conditions of the Contract.
 - 7. Release of claims as outlined in Conditions of the Contract.
 - 8. Survey Record Documents as specified in Section 01 72 20, FIELD ENGINEERING.
 - 9. Certificate of Final Completion.

END OF SECTION

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. Summary includes: detailed information for the preparation, submission, and Engineer's review of Operations and Maintenance (O&M) Data, as required by individual Specification sections.
- B. Related sections:
 - 1. Section 01 77 00 – Closeout Procedures.

1.2 DEFINITIONS

- A. Preliminary Data: Initial and subsequent submissions for Engineer's review.
- B. Final Data: Engineer-accepted data, submitted as specified herein.
- C. Maintenance Operation: As used on Maintenance Summary Form is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment. Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.

1.3 SEQUENCING AND SCHEDULING

- A. Equipment and System Data:
 - 1. Preliminary Data:
 - a. Do not submit until Shop Drawing for equipment or system has been reviewed and approved by Engineer.
 - b. Submit prior to shipment date.
 - 2. Final Data:
 - a. Submit Instructional Manual Formatted data not less than 30 days prior to equipment or system field functional testing.
- B. Materials and Finishes Data:
 - 1. Preliminary Data: Submit at least 15 days prior to request for final inspection.
 - 2. Final Data: Submit within 10 days after final inspection.

1.4 DATA FORMAT

- A. Prepare preliminary data in the form of an instructional manual. Prepare final data in the form of an instructional manual and in electronic media format.
- B. Instructional Manual Format:
 - 1. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
 - 2. Size: 8-1/2" x 11" minimum.
 - 3. Cover: Identify manual with typed or printed title "OPERATION AND MAINTENANCE DATA" and list:
 - a. Project title.
 - b. Designate applicable system, equipment, material, or finish.
 - c. Identity of separate structure as applicable.
 - d. Identity of general subject matter covered in manual.
 - e. Identity of equipment number and Specification section.
 - 4. Title Page:

- a. Contractor name, address, and telephone number.
 - b. Subcontractor, Supplier, installer, or maintenance contractor's name, address, and telephone number, as appropriate.
 - 1). Identify area of responsibility of each.
 - 2). Provide name and telephone number of local source of supply for parts and replacement.
 - 5. Table of Contents:
 - a. Neatly typewritten and arranged in systematic order with consecutive page numbers.
 - b. Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.
 - 6. Paper: 20-pound minimum, white for typed pages.
 - 7. Text: Manufacturer's printed data, or neatly typewritten.
 - 8. Three-hole punched data for binding and composition; arrange printing so that punched holes do not obliterate data.
 - 9. Material shall be suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs.
- C. Electronic Media Format:
- 1. Portable Document Format (PDF):
 - a. After all preliminary data has been found to be acceptable to Engineer, submit Operation and Maintenance data in PDF format on CD.
 - b. Files to be exact duplicates of Engineer-accepted preliminary data. Arrange by specification number and name.
 - c. Files to be fully functional and viewable in most recent version of Adobe Acrobat.

1.5 SUBMITTALS

- A. Procedures of Submittal
- 1. Contractor shall:
 - a. Submit all submittals electronically using the **Info Exchange** project website to facilitate the transfer of submittals and related files.
 - b. Submit all required final hard copies and required electronic copies as specified herein.
- B. Informational:
- 1. Data Outline: Submit one electronic copy via the **Info Exchange** website of a detailed outline of proposed organization and contents of Final Data prior to preparation of Preliminary Data.
 - 2. Preliminary Data:
 - a. Submit one electronic copy for Engineer's review.
 - b. If data meets conditions of the Contract:
 - 1). One electronic copy will be returned to Contractor.
 - 2). One electronic copy will be forwarded to Resident Project Representative.
 - 3). One electronic copy will be retained in Engineer's file
 - c. If data does not meet conditions of the Contract:
 - 1). One electronic copy will be returned to Contractor with Engineer's comments (on separate document) for revision.
 - 2). Engineer's comments will be retained in Engineer's file.
 - 3). One electronic copy will be retained in Engineer's file.
 - 4). Re-submit one electronic copy revised in accordance with Engineer's comments.
 - 3. Final Data: Submit two hard copies and one electronic copy in each format specified herein.

1.6 DATA FOR EQUIPMENT AND SYSTEMS

A. Content for Each Unit (or Common Units) and System:

1. Product Data:
 - a. Include only those sheets that are pertinent to specific product.
 - b. Clearly annotate each sheet to:
 - 1). Identify specific product or part installed.
 - 2). Identify data applicable to installation.
 - 3). Delete references to inapplicable information.
 - c. Function, normal operating characteristics, and limiting conditions.
 - d. Performance curves, engineering data, nameplate data, and tests.
 - e. Complete nomenclature and commercial number of replaceable parts.
 - f. Original Manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.
 - g. Spare parts ordering instructions.
 - h. Where applicable, identify installed spares and other provisions for future work (e.g., reserved panel space, unused components, wiring, and terminals).
2. As-installed, color-coded piping diagrams.
3. Charts of valve tag numbers, with the location and function of each valve.
4. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:
 - a. Format:
 - 1). Provide reinforced, punched, binder tab; bind in with text.
 - 2). Reduced to 8-1/2" x 11", or 11" x 17" folded to 8-1/2" x 11".
 - 3). Where reduction is impractical, fold and place in 8-1/2" x 11" envelopes bound in text.
 - 4). Identify Specification section and product on Drawings and envelopes.
 - b. Relations of component parts of equipment and systems.
 - c. Control and flow diagrams.
 - d. Coordinate drawings with Project record documents to assure correct illustration of completed installation.
5. Instructions and Procedures: Within text, as required to supplement product data.
 - a. Format:
 - 1). Organize in consistent format under separate heading for each different procedure.
 - 2). Provide logical sequence of instructions for each procedure.
 - 3). Provide information sheet for Owner's personnel, including:
 - a). Proper procedures in event of failure.
 - b). Instances that might affect validity of guarantee or Bond.
 - b. Installation Instructions: Including alignment, adjusting, calibrating, and checking.
 - c. Operating Procedures:
 - 1). Startup, break-in, routine, and normal operating instructions.
 - 2). Test procedures and results of factory tests where required.
 - 3). Regulation, control, stopping, and emergency instructions.
 - 4). Description of operation sequence by control Manufacturer.
 - 5). Shutdown instructions for both short and extended duration.
 - 6). Summer and winter operating instructions, as applicable.
 - 7). Safety precautions.
 - 8). Special operating instructions.
 - d. Maintenance and Overhaul Procedures:
 - 1). Routine maintenance.
 - 2). Guide to troubleshooting.
 - 3). Disassembly, removal, repair, reinstallation, and re-assembly.
6. Guarantee, Bond, and Service Agreement: In accordance with Section 01 77 00, CLOSEOUT PROCEDURES.

- B. Content for Each Electric or Electronic Item or System:
1. Description of Unit and Component Parts:
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data, nameplate data, and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
 - d. Interconnection wiring diagrams, including control and lighting systems.
 2. Circuit Directories of Panelboards:
 - a. Electrical service.
 - b. Controls.
 - c. Communications.
 3. List of electrical relay settings, and control and alarm contact settings.
 4. Electrical interconnection wiring diagram, including control and lighting systems.
 5. As-installed control diagrams by control Manufacturer.
 6. Operating Procedures:
 - a. Routine and normal operating instructions.
 - b. Sequences required.
 - c. Safety precautions.
 - d. Special operating instructions.
 7. Maintenance Procedures:
 - a. Routine maintenance.
 - b. Guide to troubleshooting.
 - c. Adjustment and checking.
 - d. List of relay settings, control and alarm contact settings.
 8. Manufacturer's printed operating and maintenance instructions.
 9. List of original Manufacturer's spare parts, Manufacturer's current prices, and recommended quantities to be maintained in storage.
- C. Maintenance Summary:
1. Compile individual Maintenance Summary for each applicable equipment item, respective unit or system, and for components or sub-units.
 2. Format: Use only 8-1/2" x 11" size paper.
 3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommend type, grade, and temperature range of lubricants and frequency of lubrication.
 4. Recommended Spare Parts:
 - a. Data to be consistent with Manufacturer's Bill of Materials/Parts List furnished in O&M manuals.
 - b. "Unit" is the unit of measure for ordering the part.
 - c. "Quantity" is the number of units recommended.
 - d. "Unit Cost" is the current purchase price.

1.7 DATA FOR MATERIALS AND FINISHES

- A. Content for Architectural Products, Applied Materials, and Finishes:
1. Manufacturer's data, giving full information on products:
 - a. Catalog number, size, and composition.
 - b. Color and texture designations.
 - c. Information required for reordering special-manufactured products.
 2. Instructions for Care and Maintenance:
 - a. Manufacturer's recommendation for types of cleaning agents and methods.
 - b. Cautions against cleaning agents and methods that are detrimental to product.
 - c. Recommended schedule for cleaning and maintenance.
 3. Content for Moisture Protection and Weather Exposed Products:
 4. Manufacturer's data, giving full information on products:
 - a. Applicable standards.
 - b. Chemical composition.

- c. Details of installation.
- 5. Instructions for inspection, maintenance, and repair.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 79 00 – DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes description and requirements of the required demonstration and training for the project:
 - 1. Providing and delivering informational submittals.
 - 2. Submitting required qualifications of Manufacturer's Representative.
 - 3. Preparing, maintaining, providing and delivering Manufacturer's Certificate of Compliance and Manufacturer's Certificate of Proper Installation.
 - 4. Furnishing required Training.
 - 5. Furnishing required Equipment Testing, Unit Process and Facility Performance Demonstration.
- B. Related Sections
 - 1. Section 01 31 19 – Project Meetings.
 - 2. Section 01 32 00 – Construction Progress Documentation.
 - 3. Section 01 78 23 – Operation and Maintenance Data.

1.2 DEFINITIONS

- A. Person-Day: One person for 8 hours within regular Contractor working hours.
- B. Facility: Entire Project, or an agreed-upon portion including all unit processes.
- C. Functional Test: Test or tests in presence of Engineer and Owner to demonstrate that installed equipment meets Manufacturer's installation, calibration, and adjustment requirements and other requirements as specified.
- D. Performance Test: Test or tests performed after any required functional test in presence of Engineer and Owner to demonstrate and confirm individual equipment meets performance requirements specified in individual sections.
- E. Unit Process: As used in this Section, a unit process is a portion of the facility that performs a specific process function, such as, but not limited to:
 - 1. Vertical dry pit centrifugal pumps
- F. Facility Performance Demonstration:
 - 1. A demonstration, conducted by Contractor, with assistance of Owner, to demonstrate and document the performance of the entire operating facility, manually and automatically (if required), based on criteria developed in conjunction with Owner and as accepted by Engineer.
 - 2. Such demonstration is for the purposes of:
 - a. Verifying to Owner entire facility performs as a whole, and
 - b. Documenting performance characteristics of completed facility for Owner's records. Neither the demonstration nor the evaluation is intended in any way to make performance of a unit process or entire facility the responsibility of Contractor, unless such performance is otherwise specified.

1.3 SUBMITTALS

- A. Informational Submittals:

1. Training Schedule: Submit not less than 21 days prior to start of equipment installation and revise as necessary for acceptance.
2. Lesson Plan: Submit proposed lesson plan not less than 21 days prior to scheduled training and revise as necessary for acceptance.
3. Training Session Tapes: Furnish Owner with two complete sets of DVDs fully indexed and cataloged with printed label stating session and date taped.
4. Facility Startup and Performance Demonstration Plan.
5. Functional and performance test results.
6. Completed Unit Process Startup Form for each unit process.
7. Completed Facility Performance Demonstration/Certification Form.

1.4 QUALIFICATION OF MANUFACTURER'S REPRESENTATIVE

- A. Authorized representative of the Manufacturer, factory trained, and experienced in the technical applications, installation, operation, and maintenance of respective equipment, subsystem, or system, with full authority by the equipment Manufacturer to issue the certifications required of the Manufacturer. Additional qualifications may be specified elsewhere.
- B. Representative subject to acceptance by Owner and Engineer. No substitute representatives will be allowed unless prior written approval by such has been given.

1.5 FACILITY STARTUP AND PERFORMANCE DEMONSTRATION PLAN

- A. Develop a written plan, in conjunction with Owner's operations personnel; to include the following:
 1. Step-by-step instructions for startup of each unit process and the complete facility.
 2. Unit Process Startup Form (sample attached), to minimally include the following:
 - a. Description of the unit process, including equipment numbers/nomenclature of each item of equipment and all included devices.
 - b. Detailed procedure for startup of the unit process, including valves to be opened/closed, order of equipment startup, etc.
 - c. Startup requirements for each unit process, including water, power, chemicals, etc.
 - d. Space for evaluation comments.
 3. Facility Performance Demonstration/Certification Form (sample attached), to minimally include the following:
 - a. Description of unit processes included in the facility startup.
 - b. Sequence of unit process startup to achieve facility startup.
 - c. Description of computerized operations, if any, included in the facility.
 - d. Contractor certification facility is capable of performing its intended function(s), including fully automatic operation.
 - e. Signature spaces for Contractor and Engineer.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

- A. Furnish Manufacturers' services when required by an individual specification section, to meet the requirements of this Section.
- B. Where time is necessary in excess of that stated in the Specifications for Manufacturer's services, or when a minimum time is not specified, the time required to perform the specified services shall be considered incidental.

- C. Schedule Manufacturer's services to avoid conflict with other onsite testing or other Manufacturer's onsite services.
 - D. Determine, before scheduling services, that all conditions necessary to allow successful testing have been met.
 - E. Only those days of service approved by Engineer will be credited to fulfill the specified minimum services.
 - F. When specified in individual specification sections, Manufacturer's onsite services shall include:
 - 1. Assistance during product (system, subsystem, or component) installation to include observation, guidance, instruction of Contractor's assembly, erection, installation or application procedures.
 - 2. Inspection, checking, and adjustment as required for product (system, subsystem, or component) to function as warranted by Manufacturer and necessary to furnish Manufacturer's Certificate of Proper Installation.
 - 3. Providing, on a daily basis, copies of all Manufacturer's representatives' field notes and data to Engineer.
 - 4. Revisiting the Site as required to correct problems and until installation and operation are acceptable to Engineer.
 - 5. Resolution of assembly or installation problems attributable to or associated with, respective Manufacturer's products and systems.
 - 6. Assistance during functional and performance testing, and facility startup and evaluation.
 - 7. Training of Owner's personnel in the operation and maintenance of respective product as required.
 - 8. Additional requirements may be specified elsewhere.
 - G. Facility Startup Meetings: Schedule, in accordance with requirements of Section 01 31 19, PROJECT MEETINGS, to discuss test schedule, test methods, materials, chemicals and liquids required, facilities operations interface, and Owner involvement.
 - H. Contractor's Testing and Startup Representative:
 - 1. Designate and furnish one or more personnel to coordinate and expedite testing and facility startup.
 - 2. Representative(s) shall be present during startup meetings and shall be available at all times during testing and startup.
 - I. Provide temporary valves, gauges, piping, test equipment and other materials and equipment required for testing and startup.
 - J. Provide Subcontractor and equipment Manufacturer's with adequate staff to prevent delays. Schedule ongoing work so as not to interfere with or delay testing and startup.
 - K. Owner will:
 - 1. Provide water, power, chemicals, and other items as required for startup, unless otherwise indicated.
 - 2. Operate process units and facility with support of Contractor.
 - 3. Provide labor and materials as required for laboratory analyses.
- 3.2 MANUFACTURER'S CERTIFICATE OF COMPLIANCE
- A. When specified in individual Specification section, submit prior to shipment of product or material.

- B. Engineer may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted certification of compliance.
- C. Signed by product Manufacturer certifying that product or material specified conforms to or exceeds specified. Attach supporting reference data, affidavits, and certifications as appropriate.
- D. May reflect recent or previous test results on material or product, if acceptable to Engineer.

3.3 MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

- A. When so specified, a Manufacturer's Certificate of Proper Installation form, a copy of which is attached to this Section, shall be completed and signed by the equipment Manufacturer's representative.
- B. Such form shall certify that the signing party is a duly authorized representative of the Manufacturer, is empowered by the Manufacturer to inspect, approve, and operate their equipment and is authorized to make recommendations required to assure that the equipment is complete and operational.

3.4 TRAINING

- A. General:
 - 1. Furnish Manufacturer's representatives for detailed classroom and hands-on training to Owner's personnel on operation and maintenance of specified product (system, subsystem, component) and as may be required in applicable Specifications.
 - 2. Furnish trained, articulate personnel to coordinate and expedite training, to be present during training coordination meetings with Owner, and familiar with operation and maintenance manual information specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.
 - 3. Manufacturer's representative shall be familiar with facility operation and maintenance requirements as well as with specified equipment.
 - 4. Furnish complete training materials, to include operation and maintenance data, to be retained by each trainee.
- B. Training Schedule:
 - 1. List specified equipment and systems that require training services and show:
 - a. Respective Manufacturer.
 - b. Estimated dates for installation completion.
 - c. Estimated training dates.
 - 2. Allow for multiple sessions when several shifts are involved.
 - 3. Adjust schedule to ensure training of appropriate personnel as deemed necessary by Owner, and to allow full participation by Manufacturer's representatives. Adjust schedule for interruptions in operability of equipment.
 - 4. Coordinate with Section 01 32 00, CONSTRUCTION PROGRESS DOCUMENTATION.
- C. Lesson Plan: When Manufacturer or vendor training of Owner personnel is specified, prepare for each required course, containing the following minimum information:
 - 1. Title and objectives.
 - 2. Recommended types of attendees (e.g., managers, engineers, operators, maintenance).
 - 3. Course description and outline of course content.
 - 4. Format (e.g., lecture, self-study, demonstration, hands-on).
 - 5. Instruction materials and equipment requirements.
 - 6. Resumes of instructors providing the training.

- D. Pre-startup Training:
 - 1. Coordinate training sessions with Owner's operating personnel and Manufacturer's representatives, and with submission of operation and maintenance manuals in accordance with Section 01 78 23, OPERATIONS AND MAINTENANCE DATA.
 - 2. Complete at least 14 days prior to beginning of facility startup.
- E. Post-startup Training: If required in Specifications furnish and coordinate training of Owner's operating personnel by respective Manufacturer's representatives.
- F. Taping of Training Sessions:
 - 1. Furnish audio and color video taping of all instruction sessions, including Manufacturer's representatives, hands-on equipment instruction and classroom sessions.
 - 2. Video training DVDs shall be produced by a qualified, professional video specialist approved by Owner.
 - 3. Use DVD format, suitable for playback on standard equipment available commercially in the United States.

3.5 EQUIPMENT TESTING

- A. Preparation:
 - 1. Complete installation before testing.
 - 2. Furnish qualified Manufacturer's representatives, when required by individual Specification sections.
 - 3. Obtain and submit from equipment Manufacturer's representative Manufacturer's Certificate of Proper Installation Form when required by individual Specification sections.
 - 4. Equipment Test Report Form: Provide written test report for each item of equipment to be tested, to include the minimum information:
 - a. Owner/Project Name.
 - b. Equipment or item tested.
 - c. Date and time of test.
 - d. Type of test performed (Functional or Performance).
 - e. Test method.
 - f. Test conditions.
 - g. Test results.
 - h. Signature spaces for Contractor and Engineer as witness.
 - 5. Cleaning and Checking: Prior to beginning functional testing:
 - a. Calibrate testing equipment in accordance with Manufacturer's instructions.
 - b. Inspect and clean equipment, devices, connected piping, and structures to ensure they are free of foreign material.
 - c. Lubricate equipment in accordance with Manufacturer's instructions.
 - d. Turn rotating equipment by hand when possible to confirm that equipment is not bound.
 - e. Open and close valves by hand and operate other devices to check for binding, interference, or improper functioning.
 - f. Check power supply to electric-powered equipment for correct voltage.
 - g. Adjust clearances and torque.
 - h. Test piping for leaks.
 - 6. Ready-to-test determination will be by Engineer-based at least on the following:
 - a. Acceptable Operation and Maintenance Data.
 - b. Notification by Contractor of equipment readiness for testing.
 - c. Receipt of Manufacturer's Certificate of Proper Installation, if so specified.
 - d. Adequate completion of work adjacent to, or interfacing with, equipment to be tested.
 - e. Availability and acceptability of Manufacturer's representative, when specified, to assist in testing of respective equipment.
 - f. Satisfactory fulfillment of other specified Manufacturer's responsibilities.

- g. Equipment and electrical tagging complete.
- h. Delivery of all spare parts and special tools.

B. Functional Testing:

- 1. Conduct as specified in individual Specification sections.
- 2. Notify Owner and Engineer in writing at least 10 days prior to scheduled date of testing.
- 3. Prepare Equipment Test Report summarizing test method and results.
- 4. When in Engineer's opinion, equipment meets functional requirements specified such equipment will be accepted for purposes of advancing to performance testing phase, if so required by individual Specification sections. Such acceptance will be evidenced by Engineer/Owner's signature as witness on Equipment Test Report.

C. Performance Testing:

- 1. Conduct as specified in individual Specification sections.
- 2. Notify Engineer and Owner in writing at least 10 days prior to scheduled date of test.
- 3. Performance testing shall not commence until equipment has been accepted by Engineer as having satisfied functional test requirements specified.
- 4. Type of fluid, gas, or solid for testing shall be as specified.
- 5. Unless otherwise indicated, furnish labor, materials, and supplies for conducting the test and taking samples and performance measurements.
- 6. Prepare Equipment Test Report summarizing test method and results.
- 7. When, in Engineer's opinion, equipment meets performance requirements specified, such equipment will be accepted as to conforming to Contract requirements. Such acceptance will be evidenced by Engineer's signature on Equipment Test Report.

3.6 STARTUP OF UNIT PROCESSES

- A. Prior to unit process startup, equipment within unit process shall be accepted by Engineer as having met functional and performance testing requirements specified.
- B. Startup sequencing of unit processes shall be as chosen by Contractor to meet schedule requirements.
- C. Make adjustments, repairs, and corrections necessary to complete unit process startup.
- D. Startup shall be considered complete when, in opinion of Engineer, unit process as operated in manner intended for 5 continuous days without significant interruption. This period is in addition to functional or performance test periods specified elsewhere.
- E. Significant Interruption: May include any of the following events:
 - 1. Failure of Contractor to provide and maintain qualified onsite startup personnel as scheduled.
 - 2. Failure to meet specified functional operation for more than 2 consecutive hours.
 - 3. Failure of any critical equipment or unit process that is not satisfactorily corrected within 5 hours after failure.
 - 4. Failure of any non-critical equipment or unit process that is not satisfactorily corrected within 8 hours after failure.
 - 5. As determined by Engineer.
- F. A significant interruption will require startup then in progress to be stopped. After corrections are made; start up test period and start from beginning again.

3.7 FACILITY PERFORMANCE DEMONSTRATION

- A. When, in the opinion of Engineer, startup of all unit processes has been achieved, sequence each unit process to the point that facility is operational.
- B. Demonstrate proper operation of required interfaces within and between individual unit processes.
- C. After facility is operating, complete performance testing of equipment and systems not previously tested.
- D. Document, as defined in Facility Startup and Performance Demonstration Plan, the performance of the facility.
- E. Certify, on the Facility Performance Demonstration/Certification Form, that facility is capable of performing its intended function(s), including fully automatic operation.

3.8 SUPPLEMENTS

- A. Supplements listed below, following "End of Section", are a part of this Specification:
 - 1. Manufacturer's Certificate of Proper Installation Form.
 - 2. Unit Process Startup Form.
 - 3. Facility Performance Demonstration/Certification Form.

END OF SECTION

MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

OWNER: _____ EQUIP. SERIAL NO: _____
EQUIP. TAG NO: _____ EQUIP. SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above referenced equipment/system has been:

(Check Applicable)

<input type="checkbox"/>	Installed in accordance with Manufacturer's recommendations.
<input type="checkbox"/>	
<input type="checkbox"/>	Inspected, checked, and adjusted.
<input type="checkbox"/>	
<input type="checkbox"/>	Serviced with proper initial lubricants.
<input type="checkbox"/>	
<input type="checkbox"/>	Electrical and mechanical connections meet quality and safety standards.
<input type="checkbox"/>	
<input type="checkbox"/>	All applicable safety equipment has been properly installed.
<input type="checkbox"/>	
<input type="checkbox"/>	Functional tests.
<input type="checkbox"/>	
<input type="checkbox"/>	System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments:

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate its equipment, and (iii) authorized to make recommendations required to assure that the equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____.

Manufacturer: _____

By Manufacturer's Authorized Representative: _____
(Authorized Signature)

UNIT PROCESS STARTUP FORM

OWNER: _____ PROJECT: _____

Unit Process Description: (Include description and equipment number of all equipment and devices):

Startup Procedure: (Describe procedure for sequential startup and evaluation, including valves to be opened/closed, order of equipment startup, etc.):

Startup Requirements (Water, power, chemicals, etc.):

Evaluation Comments:

FACILITY PERFORMANCE DEMONSTRATION/CERTIFICATION FORM

OWNER: _____ PROJECT: _____

Unit Process Description: (List unit processes involved in facility startup):

Unit Processes Startup Sequence: (Describe sequence for startup, including computerized operations if any):

Contractor Certification that Facility is capable of performing its intended function(s), including fully automatic operation:

Contractor: _____ Date: _____, 20 ____

Engineer: _____ Date: _____, 20 ____

SECTION 01 80 01 – COMMISSIONING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Responsibilities of the OWNER, ENGINEER, and CONTRACTOR during the Commissioning Phase of the Project.
- B. Related sections:
 - 1. Section 01 75 60 – Testing, Training, and Facility Start-Up.

1.2 DEFINITIONS

- A. Commissioning: The sequential process in which a newly constructed facility, comprised of concrete basins interconnected with hydraulic conveyance structures and equipped with miscellaneous process oriented equipment, is put into successful operation.
- B. Automatic/SCADA Operational Mode: The definition of the automatic/SCADA operational mode centers around the designed remote control and monitoring capability of the control system.
- C. Facility Start-Up
- D. Manual Operational Mode: This operational mode represents the lowest level of control philosophy utilized in the plant instrumentation and control design. For all practical purposes, this means that an operational control decision requiring equipment or process monitoring and/or control will require an individual to physically go to the local control for the associated task in order to operate the facility. Normal prestart-up activities of exercising of the equipment is traditionally accomplished in this mode. In the manual operational mode, the focus will be on verifying that the equipment and processes function correctly, independent of the instrumentation system and control system.
- E. Successful Operation: The resultant operation of all the processes and related controls in a manner that is consistent with the design intent and treatment objectives.

1.3 SUBMITTALS

- A. Preventive and Unscheduled Maintenance Plan: Submit detailed plan prior to start of 7-day test for providing all preventive and unscheduled maintenance of all equipment and facilities in the plant throughout the entire commissioning phase of the project prior to start of 7-day test.
- B. OWNER's Personnel Training Schedule and Plan: Submit detailed plan and schedule for training OWNER's personnel in accordance with Section 01 75 60, Testing, Training and Facility Start-Up.

1.4 REQUIREMENTS

- A. Commissioning Process will commence after successful completion of 7-day test and issuance of Substantial Completion to CONTRACTOR.
- B. Commissioning Process will be 30 days in duration.
- C. During the course of the Commissioning Process, the ENGINEER and OWNER will evaluate design related issues and recommend design modifications which shall be implemented by the CONTRACTOR through the Change Order process.

1.5 RESPONSIBILITIES

- A. Responsibilities listed do not relieve the CONTRACTOR from all other responsibilities and duties associated with project closeout as defined in the OWNER's agreement with the CONTRACTOR and DIVISION 01 of the Specifications.
1. CONTRACTOR's Responsibilities During the Commissioning Process:
 - a. All Change Order work resulting from the evaluation of design-related issues by the ENGINEER and OWNER.
 2. All preventive and unscheduled maintenance of all equipment and facilities in the plant. This shall include, but not be limited to the following:
 - a. Providing all lubricants.
 - b. Lubrication of all equipment in accordance with manufacturer's recommendations.
 - c. Perform all manufacturer recommended preventive maintenance.
 - d. Exercise all equipment not in use during Commissioning phase.
 - e. Repair all failed equipment.
 - f. Periodic check of all equipment alignment, vibration, and noise levels in accordance with Specifications.
 - g. Provide all parts required for equipment repair.
 - h. Provide all tools and miscellaneous equipment required for equipment repair.
 - i. Administration/logging/documentation of all preventive maintenance and repair work.
 - j. Cleanup associated with equipment failure and repair.
 - k. Daily cleanup of buildings.
 - l. Landscaping maintenance.
 - m. Roadway cleanup and maintenance.
 - n. Replacement of all HVAC filters.
 3. Warranty related issues/items.
 4. OWNER's personnel training required after successful completion of the 7-day testing.
 5. Assist in transition to Automatic/SCADA operational mode.
 6. Other contractual requirements including, but not limited to, incomplete work list.
- B. OWNER's Responsibilities During the Commissioning Process:
1. Provide all chemicals required for plant operations, including scheduling and securing of chemical deliveries to the plant and respective storage tanks.
 2. Perform all laboratory analysis required for plant operations.
 3. Review training schedules and plans, and schedule personnel training.
 4. Assisting ENGINEER in the evaluation of design related issues and recommendations of modifications to be implemented by the CONTRACTOR through the change order process.
 5. Provide staff for Commissioning.
 6. Operation of facilities.
- C. ENGINEER's Responsibilities During Commissioning Process:
1. Provide OWNER with programming support during the Commissioning Process.
 2. Provide liaison and coordination between CONTRACTOR and OWNER's activities.
 3. Administer Change Order work performed by CONTRACTOR.
 4. Provide coordination of all other project closeout related issues/items.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 81 00 – PROJECT DESIGN CRITERIA

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Project design criteria such as temperature and site elevation.

1.2 PROJECT DESIGN CRITERIA

- A. All equipment and materials for the project are to be suitable for performance in the wastewater treatment plant environment and under following conditions:
 - 1. Design temperatures are:
 - a. Outdoor temperatures: 25 to 105 degrees Fahrenheit.
 - b. Indoor temperatures for the following buildings:
 - 1) Process areas: 55 to 85 degrees Fahrenheit.
 - 2) Electrical rooms: 60 to 85 degrees Fahrenheit.
 - 2. Design groundwater elevation: 605.00 Ft. El; this is the site's 100-year flood elevation.
 - 3. Frost line is assumed 36 inches below grade.
 - 4. Moisture conditions: Defined in individual equipment sections.
 - 5. Site elevation: Generally ranges from 612 to 615 feet above mean sea level.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 81 02 – SEISMIC DESIGN CRITERIA

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Seismic design criteria for the following:
 - 1. Anchorage of mechanical and electrical equipment.
 - 2. Seismic design and design of anchorage for small tanks fabricated off site and shipped to the Project site.
 - 3. Other structures or items as specified or indicated on the Drawings.
- B. Related sections:
 - 1. Section 01 41 00 – Regulatory Requirements.

1.2 REFERENCES

- A. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures

1.3 SYSTEM DESCRIPTION

- A. Design requirements:
 - 1. Design in accordance with the requirements of the building code as specified in Section 01 41 00:
 - a. Soil Site Class: D
 - b. Design spectral acceleration at short period, S_{DS} : 0.274g.
 - c. Design spectral acceleration at short period, S_{D1} : 0.123g.
 - d. Seismic Design Category: B
 - e. Importance Factor, I : 1.25
 - f. Component amplification factor, a_p : In accordance with ASCE 7-05, Tables 13.5.1 and 13.6-1.
 - g. Component response modification factor, R_p : In accordance with ASCE 7 05, Tables 13.5-1 and 13.6-1.
 - h. Component importance factor, I_p : 1.50.
 - 2. Do not use friction to resist sliding due to seismic forces.
 - 3. Do not use more than 60 percent of the weight of the mechanical and electrical equipment for designing anchors for resisting overturning due to seismic forces.
 - 4. Do not use more than 60 percent of the weight of the tank for resisting overturning due to seismic forces.
 - 5. Use anchor bolts, bolts, or welded studs for anchors for resisting seismic forces. Anchor bolts used to resist seismic forces shall have a standard hex bolt head embedded in the concrete. Do not use anchor bolts fabricated from rod stock with an L or J shape.
 - 6. Do not use chemical anchors, concrete anchors, flush shells, powder actuated fasteners, sleeve anchors, or other types of anchors unless indicated on the Drawings or accepted in writing by the ENGINEER.
 - 7. Seismic forces must be resisted by direct bearing on the fasteners used to resist seismic forces. Do not use connections that use friction to resist seismic forces.

1.4 SUBMITTALS

- A. Shop drawings and calculations: Complete shop drawings and seismic calculations.
- B. Calculations shall be signed and stamped by a civil or structural engineer licensed in the state where the Project is located.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

DIVISION 2
EXISTING CONDITIONS

SECTION 02 41 00 - DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Portions of buildings and other areas, equipment and materials selective demolition, and partial demolition work are as shown on Drawings and specified herein.
 - 2. Equipment and materials to be removed for construction and reinstalled for reuse or continued operation are as shown on the drawings and specified herein.

1.2 SUBMITTALS

- A. Shop Drawings: Plans showing all equipment and materials to be removed and reinstalled for reuse on continued operation including interim storage plans for each item.
- B. Quality Control Submittals:
 - 1. Schedule of demolition, as part of and consistent with the progress schedule specified in Section 01 32 00, CONSTRUCTION PROGRESS DOCUMENTATION.
 - 2. Methods of demolition and equipment proposed to demolish each structure.
 - 3. Copies of any authorizations and permits required to perform Work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Utilities:
 - 1. Notify Owner and appropriate utilities 72 hours prior to turning off affected services before starting demolition or alterations.
 - 2. Remove utility lines exposed by demolition excavation.
 - 3. Remove electric, sanitary, and storm drainage adjacent to buildings to be demolished.
 - 4. Excavate utility lines serving buildings to be demolished and provide a permanent leak-proof closure for water and gas lines.
 - 5. Plug sewer lines at locations shown or at limits of excavation if not shown with min. 2,000 psi compressive strength concrete plug to prevent groundwater infiltrating sewer systems. Length of plug shall be 5 feet minimum.
- B. Removal and Storage of Equipment for Reuse:
 - 1. Do not remove equipment and materials without approval of Engineer.
 - 2. Properly store and maintain equipment and materials in same condition as when removed.
 - 3. Engineer will determine condition of equipment and materials prior to removal.

3.2 DEMOLITION

- A. Drawings define minimum portion of equipment to be removed and structures to be modified. Unless otherwise shown, rough cuts or breaks may be made exceeding limits of demolition shown.
- B. Provide all demolition, removal, temporary storage, and reinstallation of existing equipment as required for implementation of the work.

- C. Core drill floor slabs, catch basins, and other concrete improvements to remain in place below ground, or break holes at structure's lowest point to allow water to freely migrate through.
- D. Remove piping from areas to be backfilled. Pipe, valves, and fittings adjacent to those to be removed may also be removed as salvage.
- E. Remove all materials associated with existing equipment that is to be removed or relocated.
- F. Cut off concealed or embedded conduit, boxes, or other materials a minimum of 3/4 inch below final finished surface.
- G. Cut off drilled piers a minimum of 6 inches below bottom of new foundations.
- H. Demolish existing concrete structure to 18" below grade.

3.3 DISPOSAL

- A. Dispose of debris and other non-salvaged materials offsite in licensed landfills.

3.4 BACKFILLING

- A. Demolished Areas: Backfill to existing ground level, elevations shown, or foundation level of new construction.
- B. Backfill Material and Compaction:
 - 1. For fill in structures, use sand conforming to AHTD Standard Specifications for Highway Construction, Section 802.02(b) Fine Aggregate, otherwise conform to Section 31 23 23.13, FILL AND BACKFILL. Top 6" of backfill to grade shall be select fill conforming to Section 31 23 23.13 FILL AND BACKFILL and shall be compacted to 90% standard proctor density.
 - 2. Do not use demolition debris as backfill material.

3.5 SALVAGE

- A. Equipment and materials not reused or reinstalled, including all metals and piping within the limits of demolition, unless otherwise specified, shall be delivered to the Owner for scrap.

END OF SECTION

DIVISION 3
CONCRETE

SECTION 03 01 00 - CONCRETE SURFACE REPAIR SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Resurfacing of concrete surfaces in preparation for finish materials.

1.2 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Association of State Highway and Transportation Officials (AASHTO):
 - a. T277, Standard Method of Test for Rapid Determination of the Chloride Permeability of Concrete.
 - 2. ASTM International (ASTM):
 - a. A 82, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - b. A 185, Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
 - c. C 78, Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading).
 - d. C 109, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars.
 - e. C 309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - f. C 348, Standard Test Method for Flexural Strength of Hydraulic Cement Mortars.
 - g. C 469, Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression.
 - h. C 496, Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.
 - i. C 596, Standard Test Method for Drying Shrinkage of Mortar Containing Portland Cement.
 - j. C 666, Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.
 - k. C 672, Standard Test Method for Scaling Resistance for Concrete Surfaces Exposed to Deicing Chemicals.
 - l. C 779, Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.
 - m. C 882, Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.
 - n. C 928, Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repair.
 - o. C 1012, Standard Test Method for Length Change of Hydraulic Cement Mortars Exposed to a Sulfate Solution.
 - p. C 1202, Standard Test Method for Electrical Induction of Concrete's Ability to Resist Chloride Ion Penetration.
 - q. E 699, Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee.

1.3 DEFINITIONS

- A. Low Pressure Spray Mortar: Mortar designated by "S" before the product number, applied by low pressure spraying, or in small areas by hand troweling.

- B. Surface Repair Areas: Areas that are deemed to be defective and not meeting the density or surface specified in Section 03 30 00, CAST-IN-PLACE CONCRETE, regardless of depth of the defective area.

1.4 SUBMITTAL

- A. Information Submittals:
 - 1. Mortar System:
 - a. Manufacturer's installation bulletin.
 - b. Manufacturer's recommended fabric size for mesh reinforcement.
 - 2. Written description of equipment proposed for hydro-demolition surface preparation.
 - 3. Certificates:
 - a. Certificate of Compliance that proposed product systems meet or exceed specified performance criteria when tested in accordance with Article FIELD QUALITY CONTROL.
 - b. Mortar system Manufacturer's Certificate of Proper Installation.
 - 4. Statements of Qualification:
 - a. Independent testing laboratory.
 - b. Mortar system Manufacturer's representative.
 - 5. Mortar system Manufacturer's proposed modified test procedures for ASTM C 109 and ASTM C 882 test methods.
 - 6. Independent testing laboratory test report.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Independent Testing Laboratory: Based on evaluation of laboratory submitted criteria in accordance with ASTM E 699.
 - 2. Mortar System Applicator: For low pressure spray mortar system in lieu of endorsement, complete mortar system manufacturer's demonstration in accordance with Article MANUFACTURER'S SERVICES.

PART 2 - PRODUCTS

2.1 LOW PRESSURE SPRAY MORTAR SYSTEM (FOR VERTICAL AND OVERHEAD REPAIRS)

- A. Mortar:
 - 1. One component, rheoplastic, cement based, fiber reinforced, shrinkage compensated, gray in color, with a minimum 30-minute working time.
 - 2. Cured materials mixed to a flow of 70%, at five drops shall conform to the following criteria:
 - a. Minimum Slant Shear Bond Strength: 3,000 psi in 28 days in accordance with "modified" ASTM C 882 test method.
 - b. Minimum Compressive Strength: 11,000 psi at 28 days in accordance with ASTM C 109.
 - c. Minimum Direct Shear Bond Strength: 650 psi in 28 days in accordance with Michigan DOT.
 - d. Minimum Tensile Bond Strength (MBT In-House Test): 300 psi. in 28 days.
 - e. Minimum Flexural Properties: 1,250 psi in 28 days in accordance with ASTM C 348.
 - f. Modulus of Elasticity: 4.1 to 4.5 by 106 psi in accordance with ASTM C 469.
 - g. Maximum Permeability: 1,000 coulombs in accordance with AASHTO T 277.
 - h. System shall not produce a vapor barrier.
- B. Sprayable, extremely low permeability, sulfate resistant, easy to use and requiring only the addition of water.

- C. Free of chlorides and other chemicals causing corrosion.
- D. Manufacturer and Product:
 - 1. Master Builders Technologies Co., Cleveland, OH; EMACO S88CA with Concreive liquid (LPL) bonding agent for hand applied areas.
 - 2. Sika Corp., Lyndhurst, NJ; SikaRepair 224.

2.2 POLYMER-MODIFIED REPAIR MORTAR (HORIZONTAL SURFACE REPAIR)

- A. Mortar: One component, polymer-modified, cementitious based, chloride resistant, flowable, gray in color, working time of 20 minutes minimum, surface renovation mortar conforming to the following properties:
 - 1. Bond strength in accordance with ASTM C 1042 Test Method at 7 days: Minimum 1,750 psi.
 - 2. Modules of Elasticity: ASTM C469, minimum 2.0 by 10⁶ psi.
 - 3. Compressive Strength:
 - a. ASTM C 109 at 1 day: minimum 2,500 psi.
 - b. ASTM C 109 at 28 days: minimum 7,500 psi.
 - 4. Flexural Properties, ASTM C 348 at 28 days: minimum 1,200 psi.
 - 5. Permeability, AASHTO T 277: 800 coulombs maximum.
 - 6. Splitting Tensile Strength: ASTM C 496 at 7 days, minimum 450 psi.
 - 7. Drying Shrinkage, ASTM C 596 at 28 days: -0.090%.
 - 8. Freeze Thaw Resistance, ASTM C 666, at 300 cycles: 95% RDF.
 - 9. Abrasion Resistance: ASTM C 799, 60 minutes, 0.0165".
- B. Manufacturers and Products:
 - 1. Master Builders Technologies Co., Cleveland, OH; EMACO R 310
 - 2. Or approved equal.

2.3 WATER

- A. Clean and free from oil, acid, alkali, organic matter, or other deleterious substances, meeting federal drinking water standards.

2.4 ACCESSORIES

- A. Finishing Aid Manufacturer and Product: Master Builders Inc., Cleveland, OH; CONFILM.
- B. Flexible Cementitious Rebar Coating Manufacturer and Product: Master Builders Inc., Cleveland, OH; EMACO P22.

PART 3 - EXECUTION

3.1 GENERAL

- A. Where required because of deficiencies, concrete surface repair system shall be low pressure spray mortar for structural repairs.

3.2 PREPARATION

- A. Remove unsound and deteriorated concrete from Work by high pressure water blasting machines capable of scoring concrete surfaces to minimum amplitude roughness of 3/16" or as shown. Remove to provide for maximum thickness specified for mortar.
- B. High pressure water blasting machines with 16,000 to 20,000 psi minimum.

- C. Collect and dispose of water from removal operations in manner and location acceptable to Owner.
- D. Do not use power-driven jackhammers and chipping hammers, unless water blasting is prohibited due to potential damage to installed equipment.
- E. Remove concrete minimum of 1" clearance around rebar for application and bonding of new mortar to entire periphery of exposed rebar if the following surface conditions exist:
 - 1. 50% or more of periphery around rebar is exposed during removal of concrete.
 - 2. 25% or more of periphery around rebar is exposed during removal of concrete and corrosion has eventuated to the extent that loss of section has occurred.
 - 3. Bond between existing concrete and reinforcement has deteriorated.
- F. Clean exposed reinforcing bars of rust and concrete, and coat with flexible cementitious rebar coating.
- G. Maintain surface areas free of slurry where concrete has been removed. Remove slurry from prepared areas before new mortar is applied.
- H. Clean surface areas to be filled with new mortar of laitance and contamination by high pressure water blasting not more than 24 hours before applying bonding agent, Saturated Surface Dry (SSD) existing concrete at time of application of mortar.

3.3 LOW PRESSURE SPRAY MORTAR APPLICATION

- A. Mix mortar in mortar-concrete mixer attached to pump-spray equipment for spray application. Mix with a slow speed drill and jiffler type paddle or small mortar type mixer for hand trowel application.
- B. Apply mortar by low pressure spraying with a machine such as Moynotype, MEYCO DEQUNA Model 20.
- C. Finish mortar with a hand float application to smooth even surface matching adjacent concrete. Provide finishing aid at full strength.
- D. Bonding Agent:
 - 1. Hand apply bonding agent within 20 minutes of troweling on mortar. Prevent bonding agent from drying by reapplying bonding agent to maintain surface tackiness of coat.
 - 2. Work mortar firmly and quickly into area and compact with firm trowel stroke. Finish smooth with finishing aid at full strength.

3.4 POLYMER-MODIFIED REPAIR MORTAR APPLICATION FOR REPAIR OF HORIZONTAL SURFACES

- A. Mix mortar in mortar-concrete mixer.
- B. Hand Troweling: Apply (scrub in) a bond coat slurry of the repair mortar to the SSD prepared substrate before application of the mortar. Do not apply more of the bond coat than can be covered with mortar before the bond coat dries. Do not re-temper this bond coat.
- C. Place mortar into prepared area from one side to the other.
- D. Work material firmly into the side and bottom of patch to assure a good bond. Level repair mortar and screed to elevation of existing concrete.

- E. Finish to same texture as existing concrete around patch.
- F. Use self-leveling mixture where appropriate to obtain uniform or plane surface.

3.5 CURING

- A. Water fog nozzle all of the mortar systems prior to curing in accordance with mortar system Manufacturer's instructions.
- B. Commence water curing after mortar system application and when curing will not cause erosion of mortar.
- C. Continuously cure mortar system for a period of 7 days.
- D. Do not membrane cure, unless method is part of mortar system Manufacturer's instructions and approval has been obtained.
- E. Cure intermediate layers of mortar in accordance with manufacturer's instructions.

3.6 FIELD QUALITY CONTROL

- A. Independent testing laboratory shall perform the following:
 - 1. Secure production samples of mixed materials during construction and test for compliance with the Specifications.
 - 2. Obtain actual core samples from the completed repair Work and test.
 - 3. Perform "modified" ASTM C 109 and ASTM C 882 test methods in accordance with manufacturer's approved modifications of testing procedures.
- B. Construction Testing:
 - 1. Production Samples:
 - a. Obtain mixed mortar material from shotcrete or spray equipment and produce samples, and cure samples prior to testing.
 - b. Provide minimum of three samples each test for each 1,000 square feet or portion thereof of mortar repair to be installed.
 - 2. Core Samples of In-Place Repair:
 - a. Obtain two core samples and test samples for each 2,000 square feet or portion thereof for actual repair Work:
 - b. Cores shall be either 2-1/2" or 3" in diameter and shall be cored through cured mortar repair and into base concrete to total depth equal to at least 2.5 times repair mortar thickness.
 - c. Sawcut the cores after removal to trim base concrete thickness to same thickness as mortar so that bond line is at center of repaired sample.
 - d. Samples shall be epoxy bonded to steel plates at each end using a bonding agent to prevent failure in bond to steel plates.
 - e. Sustain bond line without failure or movement with a minimum of 300 psi in direct tension. The tension test shall use eyebolts or threaded connectors tapped and threaded into base plate so that tension load is concentric with center of core sample.
- C. Repair and fill holes where core samples have been removed using same mortar used in repair.

3.7 MANUFACTURER'S SERVICES

- A. Provide mortar system manufacturer's representative at site for installation assistance, inspection and certification of proper installation, and training of mortar system applicators.

- B. Mortar System Manufacturer's Demonstration:
1. Schedule a time for Manufacturer's demonstration of repair system proposed for the Project. Prepare mortar, to specified consistency, for testing and placement. Initiate curing on portions of each type of surface to be repaired to include overhead and vertical applications.
 2. Prepare surface area in advance of demonstration and obtain manufacturer's acceptance of preparation for each type of application.
 3. Demonstrate:
 - a. Mixing and application equipment capabilities and procedures, including the flow of material from nozzle or sprayer.
 - b. Nozzle operator and person in charge of low pressure sprayer, capabilities and ability to follow prescribed application procedures and properly operate equipment and apply surface repair materials.
 4. Make compression test samples during demonstration and deliver to an independent testing laboratory for testing at 1, 7, and 28 days. Take a core of the demonstration placement and test for tensile bond at 1 day.

3.8 PROTECTION

- A. Protect adjacent surfaces, and equipment, from being damaged by overshooting of low pressure spray mortar.

3.9 CLEANING

- A. Remove overshot mortar and deposited rebound materials as Work proceeds. Remove from Work, waste materials, unsound material from concrete surfaces, material chipped from walls, water used in preparation of application and finishing.

END OF SECTION

SECTION 03 15 00 – CONCRETE ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Waterstops.
 - 2. Joint fillers.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM D570 - Standard Test Method for Water Absorption of Plastics.
 - 2. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
 - 3. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.
 - 4. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.
 - 5. ASTM D747 - Standard Test Method for Apparent Bending Modulus of Plastics by Means of a Cantilever Beam.
 - 6. ASTM D792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
 - 7. ASTM D2240 - Standard Test Method for Rubber Property – Durometer Hardness.
- B. American National Standards Institute (ANSI):
 - 1. ANSI A135.4 - Basic Hardboard.
- C. U. S. Army Corps of Engineers (USACE):
 - 1. CRD-C-572, Specification for Polyvinyl Chloride Waterstop.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Polyvinyl chloride waterstops: Complete physical characteristics.
 - 2. Preformed expansion joint material: Sufficient information on each type of material for review to determine conformance of material to requirements specified.
- B. Samples:
 - 1. Polyvinyl chloride waterstop.
- C. Laboratory test reports: Indicating that average properties of polyvinyl chloride waterstops material and finish conform to requirements specified in this Section.
- D. Quality control submittals:
 - 1. Certificates of Compliance:
 - a. Written certificates that polyvinyl chloride waterstops supplied on this Project meet or exceed physical property in accordance with USACE CRD-C-572 and the requirements of this Section.
 - 2. Manufacturer's instructions: For materials specified in this Section that are specified to be installed with such instructions.

1.4 QUALITY ASSURANCE

- A. Mock-ups:

1. Welding demonstration:
 - a. Demonstrate ability to weld acceptable joints in polyvinyl chloride waterstops before installing waterstop in forms.
- B. Field joints:
 1. Polyvinyl chloride waterstops field joints: Shall be free of misalignment, bubbles, inadequate bond, porosity, cracks, offsets, and other defects which would reduce the potential resistance of the material to water pressure at any point. Replace defective joints. Remove faulty material from the site and disposed of by the CONTRACTOR at its own expense.
- C. Inspections:
 1. Quality of welded joints will be subject to acceptance of the ENGINEER.
 2. Polyvinyl chloride waterstop: The following defects that represent a partial list that will be grounds for rejection:
 - a. Offsets at joints greater than 1/16 inch or 15 percent of the material thickness, at any point, whichever is less.
 - b. Exterior crack at joint, due to incomplete bond, which is deeper than 1/16 inch or 15 percent of the material thickness, at any point, whichever is less.
 - c. Any combination of offset or crack which will result in a net reduction in the cross section of the waterstop in excess of 1/16 inch or 15 percent of the material thickness, at any point, whichever is less.
 - d. Misalignment of the joint, which will result in misalignment of the waterstop in excess of 1/2 inch in 10 feet.
 - e. Porosity in the welded joint as evidenced by visual inspection.
 - f. Bubbles or inadequate bonding.

PART 2 - PRODUCTS

2.1 WATERSTOPS

- A. Waterstops - Polyvinyl chloride (PVC):
 1. Manufacturers: One of the following or equal:
 - a. Vinylex Corporation.
 - b. Greenstreak Plastic Products Company, Inc.
 2. Type: Ribbed waterstop:
 - a. Construction joints: 6-inch wide ribbed type. Vinylex R638, Greenstreak 679, or equal.
 - b. Construction joints for slab to wall intersections: 4-inch wide ribbed type. Vinylex R4316T, Greenstreak 781, or equal.
 - c. Expansion joint for wall penetrations for concrete encased electrical duct banks: 6-inch ribbed type with hollow center bulb. Vinylex RB638H, Greenstreak 732, or equal.
 - d. Expansion joints: 9-inch wide ribbed type with hollow center bulb or tear web. Vinylex RB938H, Greenstreak 735, or equal for expansion joints 1 inch and narrower, Vinylex TWB938, Greenstreak 739 or equal for expansion joints wider than 1 inch.
 3. Dumbbell type waterstop will not be allowed unless otherwise specified or indicated on the Drawings.
 4. Provide polyvinyl chloride waterstops complying with following requirements:
 - a. Manufactured from prime virgin polyvinyl chloride plastic compound containing the plasticizers, resins, stabilizers, and other materials necessary to meet the requirements of this Section.
 - b. No scrap or reclaimed material shall be used.
 5. Properties as indicated in the following table:

Physical Characteristics	Test Method	Required Results
Specific Gravity	ASTM D 792	Not less than 1.3.
Hardness	ASTM D 2240	70 to 90 Type A15 Shore durometer.
Tensile Strength	ASTM D 638	Not less than 2,000 pounds per square inch.
Ultimate Elongation	ASTM D 638	Not less than 300 percent
Alkali Extraction	CRD-C-572	7 day weight change between minus 0.1 percent and plus 0.25 percent. Hardness change within 5 points.
Low Temperature Brittle Point	ASTM D 746	No sign of cracking or chipping at - 35 degrees Fahrenheit minimum.
Water Absorption	ASTM D 570	Not more than 0.15 percent after 24 hours.
Accelerated Extraction Tensile	CRD-C-572	Not less than 1,600 pounds per square inch.
Stiffness in Flexure	ASTM D 747	Not less than 600 pounds per square inch.
Tear Resistance	ASTM D 624	Not less than 225 pounds per inch.
Thickness	—	3/8 inch
Center Bulb		
6 inch Waterstops	—	7/8 inch or 1-inch nominal outside diameter.
9 inch Waterstops	—	1-inch nominal outside diameter. For expansion joints 1 inch and narrower and 2 inches for expansion joints wider than 1 inch.
Allowable Tolerances		
Width	—	Plus or minus 3/16 inch.
Thickness	—	Plus or minus 1/32 inch.

2.2 JOINT FILLERS

- A. Hardboard: 1/8-inch minimum thickness, in accordance with ANSI A135.4 Class 2.
- B. Preformed expansion joint materials:
 - 1. General:
 - a. Use specific type in applications as indicated on the Drawings.
 - b. No scrap or recycled material shall be used.
 - 2. Bituminous fiber expansion joint material:
 - a. Manufacturers: One of The following or equal:
 - 1). Tamms Industries, a division of Euclid Chemical Company: Hornboard/fiber.
 - 2). Approved equal.
 - 3. Synthetic sponge rubber expansion joint material:
 - a. Manufacturers: One of the following or equal:
 - 1). Tamms Industries, a division of Euclid Chemical Company: Cementone.
 - 2). Approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Waterstops - General:

1. Waterstops shall be stored so as to permit free circulation of air around the waterstop material and to prevent direct exposure to sunlight.
2. Install waterstops in concrete joints where indicated on the Drawings.
3. Carry waterstops in walls into lower slabs and join to waterstops in slabs with appropriate types of fittings.
4. In water-bearing structures: Provide all joints with waterstops, whether indicated on the Drawings or not.
5. Provide waterstops that are continuous and in longest lengths practical.
6. Set waterstops accurately to position and line as indicated on the Drawings.
7. Hold and securely fix edges in position at intervals of not more than 24 inches so that they do not move during placing of concrete.
8. Position the waterstop so that symmetrical halves of the waterstop are equally divided between the concrete pours. The center axis of the waterstop shall be coincident with the centerline of the joint.
9. Do not drive nails, screws, or other fasteners through waterstops in vicinity of construction joints.
10. Use wires at not more than 24 inches on centers near outer edge of the waterstop to tie waterstops into position.
11. Special clips may be used in lieu of wires, at contractor's option.
12. Terminate waterstops 3 inches from top of finish surfaces of walls and slabs unless otherwise specified or indicated on the Drawings.
13. When any waterstop is installed in the concrete on one side of a joint, while the other half or portion of the waterstop remains exposed to the atmosphere for more than 2 days, suitable precautions shall be taken to shade and protect the exposed waterstop from direct rays of sunlight during the entire exposure and until the exposed portion is embedded in concrete.
14. When placing concrete at waterstops in slabs, lift the edge of the waterstop while placing concrete below the waterstop. Manually force the waterstop against and into the concrete. Then cover the waterstop with fresh concrete.

B. Polyvinyl chloride waterstops:

1. Install waterstops so that joints are watertight.
2. Weld joints such as unions, crosses, ells, and tees, with thermostatically controlled equipment recommended by waterstop manufacturer:
 - a. The material shall not be damaged by heat sealing.
 - b. Make joints by overlapping then simultaneously cut the ends of the sections to be spliced so they will form a smooth even joint. Heat the cut ends with the splicing tool until the plastic melts. Press the 2 ends together until the plastic cools.
 - c. The continuity of the waterstop ribs and tubular center axis shall be maintained.
 - d. The splices shall have a tensile strength of not less than 60 percent of the unspliced materials tensile strength.
3. Butt joints of the ends of 2 identical waterstop sections may be made while the material is in the forms.
4. Joints for crosses and tees shall be factory prefabricated by the manufacturer.

C. Joints:

1. Construct construction, and expansion joints as indicated on the Drawings.
2. Preformed expansion joint material: Fasten expansion joint strips to concrete, masonry, or forms with adhesive. No nailing will be permitted, nor shall expansion joint strips be placed without fastening.

D. Hardboard:

1. When indicated on the Drawings, face surface of joint filler with hardboard.
2. Other facing materials may be used provided they furnish equivalent protection and the material is acceptable to ENGINEER.
3. Hold boards in place by nails, waterproof adhesive, or other means acceptable to the ENGINEER.

END OF SECTION

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete, including concrete materials, concrete accessories, concrete mixture designs, placement procedures, and finishes, for the following:
 - 1. Footings.
 - 2. Foundation walls.
 - 3. Slabs-on-grade.
 - 4. Suspended slabs.
 - 5. Concrete toppings.
 - 6. Building frame members.
 - 7. Building walls.
 - 8. Hydraulic (liquid containing) structures.
- B. Related Sections:
 - 1. Section 03 01 00 - Concrete Surface Repair
 - 2. Section 03 15 00 - Concrete Accessories
 - 3. Section 03 60 00 - Grout

1.2 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 301 – Specifications for Structural Concrete
 - 2. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials
 - 3. ACI 305 - Hot Weather Concreting Standard
 - 4. ACI 306 - Cold Weather Concreting Standard
 - 5. ACI 318 - Building Code Requirements for Structural Concrete and Commentary
 - 6. ACI 350 - Code Requirements for Environmental Engineering Concrete Structures and Commentary
 - 7. ACI 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
 - 8. ACI 302.1R – Guide for Concrete Floor and Slab Construction
 - 9. ACI 308.1 – Standard Specification for Curing Concrete
 - 10. Manual of Concrete Practice
- B. ASTM International (ASTM):
 - 1. ASTM A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
 - 2. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
 - 3. ASTM C33 - Standard Specification for Concrete Aggregates
 - 4. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
 - 5. ASTM C40 - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
 - 6. ASTM C42 - Standard Test Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
 - 7. ASTM C88 - Standard Test Method of Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
 - 8. ASTM C94 - Standard Specification for Ready-Mixed Concrete
 - 9. ASTM C114 - Standard Test Methods for Chemical Analysis of Hydraulic Cement
 - 10. ASTM C117 - Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing

11. ASTM C123 - Standard Test Method for Lightweight Particles in Aggregate
12. ASTM C131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
13. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
14. ASTM C142 - Standard Test Method for Clay Lumps and Friable Particles in Aggregate
15. ASTM C143 - Standard Test Method for Slump of Hydraulic-Cement Concrete
16. ASTM C150 - Standard Specification for Portland Cement
17. ASTM C156 - Standard Test Method for Water Loss [from a Mortar Specimen] Through Liquid Membrane-Forming Curing Compounds for Concrete
18. ASTM C157 - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
19. ASTM C171 - Standard Specifications for Sheet Materials for Curing Concrete
20. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete
21. ASTM C173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
22. ASTM C192 – Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
23. ASTM C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
24. ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete
25. ASTM C295 – Standard Guide for Petrographic Examination of Aggregates for Concrete
26. ASTM C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
27. ASTM C494 – Standard Specification for Chemical Admixtures for Concrete
28. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
29. ASTM C881 – Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
30. ASTM C1064 – Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
31. ASTM C1059 – Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete
32. ASTM C1077 – Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
33. ASTM C1116 – Standard Specification for Fiber-Reinforced Concrete
34. ASTM C1315 – Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete
35. ASTM D448 – Standard Classification for Sizes of Aggregate for Road and Bridge Construction
36. ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
37. ASTM D2240 – Standard Test Method for Rubber Property – Durometer Hardness
38. ASTM E329 – Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
39. ASTM E1155 – Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers
40. ASTM E1643 – Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
41. ASTM E1745 – Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

- B. Exposed Concrete: Concrete surface that can be seen inside or outside of structures regardless whether concrete is above water, dry at all times, or can be seen when structure is drained.
- C. Hydraulic Structures: Liquid containing basins.
- D. Defective Areas: Surface defects that include honeycomb, rock pockets, indentations greater than 3/16", cracks 0.005" wide and larger as well as any crack that leaks for liquid containing basins and below grade habitable spaces; cracks 0.010" wide and larger in non-fluid holding structures, spalls, chips, air bubbles greater than 3/4" in diameter, pinholes, bug holes, embedded debris, lift lines, sand lines, bleed lines, leakage from form joints, fins and other projections, form pop-outs, texture irregularities, and stains and other color variations that cannot be removed by cleaning.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Concrete Mixture Designs: For each concrete mixture.
 - 1. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 2. Indicate amounts of mixing water to be withheld for later addition at Project site.
 - 3. Submit Shrinkage Test Results for design mixtures. See 3.14 FIELD QUALITY CONTROL, E. Shrinkage Tests - 3 for shrinkage test requirements and limitations. Any Mix Design submitted without a Shrinkage Test will not be reviewed and will be returned to the Contractor as "Rejected".
- C. Welding certificates.
- D. Qualification Data: For manufacturer, testing agency.
- E. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Curing compounds.
 - 4. Floor and slab treatments.
 - 5. Bonding agents.
 - 6. Adhesives.
 - 7. Vapor retarders.
 - 8. Semi-rigid joint filler.
 - 9. Joint-filler strips.
- F. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- G. Field quality-control test and inspection reports.
- H. Course Aggregate Gradation.
- I. Fine Aggregate Gradation.
- J. One copy of each 30 consecutive strength test results and mix design used from a record of past performance or one copy of the laboratory trial mix design and results and one copy of the mix design proposed for each mixture and use under this contract. If the 30 consecutive strength tests are used, the test shall have been made within the 12 month period prior to this submittal.

- K. Material Test Reports: for the following, from a testing agency acceptable to the ENGINEER, indicating compliance with requirements:
1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
- L. Ready-Mix concrete.
1. Provide delivery tickets for ready-mix concrete or weigh-masters certificate per ASTM C94 including weights of cement and each size aggregate and amount of water added at the plant and record of pours. Record the amount of water added on the job on the delivery ticket. Water added at the plant shall account for moisture in both coarse and fine aggregate. If water is added on the job the total water content shall not exceed the water content of the approved design mix.
 2. Keep record showing time and place of each pour (placement) of concrete, together with transit-mix delivery slips certifying the contents of the pour (placement).
 3. Furnish records to Engineer upon request.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm with a minimum of 5 years' experience in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
 2. The criteria hereinafter set out are solely for the purpose of establishing required mixture proportions and do not constitute a basis for confirming the adequacy of concrete strength.
 - a. Required Average Strength above Specified Compressive Strength: Proportions, including water-cement ratio, shall be established on the basis either of laboratory trial batches or of field experience with the materials to be employed. The proportions shall be selected to produce an average strength of 28 days exceeding the specified compressive strength by the amount indicated below, when both air content and slump are the maximums permitted by the Specifications.
 - b. Determination of the required average strength shall be in accordance with ACI 318 "Building Code Requirements for Reinforced Concrete," except that if suitable data from trial batches or field experience cannot be obtained, permission will not be granted to base concrete proportions on the water-cement ratio limits set out in the above referenced code.
 - 1). Past Plant Performance: Proportions may be established on the actual field performance of the ready-mix producer. Where the concrete production facility has a record, based on at least 30 consecutive strength tests taken within the prior 12 months representing similar materials and conditions to those expected, the strength used as the basis for selecting proportions shall exceed the required f'_c by at least:
 - a). 400 psi if the standard deviation is less than 300 psi;
 - b). 500 psi if the standard deviation is 300 to 400 psi;
 - c). 700 psi if the standard deviation is 400 to 500 psi;
 - d). 900 psi if the standard deviation is 500 to 600 psi;
 - e). 1,200 psi if the standard deviation is above 600 psi or unknown.
 - 2). Strength data for determining standard deviation shall be considered to comply with the foregoing stipulations if they represent either a group of at least 30 consecutive tests or the statistical average of two groups totaling 30 or more tests. The tests used to establish standard deviation shall represent concrete produced to meet a specified strength or strengths within 1,000 psi of that

specified for the proposed work. Changes in materials and proportions within the population of background tests shall not have been more closely restricted than they will be for the proposed work.

- 3). Strength data for determining standard deviation shall be considered to comply with the foregoing stipulations if they represent either a group of at least 30 consecutive tests or the statistical average of two groups totaling 30 or more tests. The tests used to establish standard deviation shall represent concrete produced to meet a specified strength or strengths within 1,000 psi of that specified for the proposed work. Changes in materials and proportions within the population of background tests shall not have been more closely restricted than they will be for the proposed work.
- 4). Laboratory Trial Batches: When the ready-mix producer does not have a record of past performance, the combination of materials and the proportions selected shall be determined from trial mixes having proportions and consistencies suitable for the work based on ACI 211.1-77.
 - a) When laboratory trial batches are used as the basis for selecting concrete proportions, strength tests shall be made in accordance with "Method of Test for Compressive Strength of Molded Concrete Cylinders" (ASTM C39) on specimens prepared in accordance with "Method of Making and Curing Test Specimens in the Laboratory" (ASTM C192). A curve shall be established showing the relationship between water-cement ratio (or cement content) and compressive strength. The curve shall be based on at least three points representing batches which produce strengths above and below that required. Each point shall represent the average of at least three specimens tested at 28 days or the earlier age designation.
 - b) The average strength required shall exceed the specified compressive strength by 1,200 psi.
 - c) The maximum permissible water-cement ratio (or minimum cement content) for the concrete to be used in the structure shall be that shown by the curve to produce the average strength indicated, but in no case shall the water-cement ratio exceed 0.42 by weight.

- C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E329 for testing indicated.
 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 1. ACI 301, "Specifications for Structural Concrete."
 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
 3. ACI 350 "Code Requirements for Environmental Engineering Concrete Structures."
 4. ACI 318 "Building Code Requirements for Reinforced Concrete."
- F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

- G. Sequence of concrete placing: Submit proposed sequence of placing concrete showing proposed beginning and ending of individual placements.
- H. Pre-installation Conference: Conduct conference at Project site.
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete subcontractor.
 - 2. Review special inspection and testing and inspecting agency procedure for field quality control, concrete finishes and finishing, cold and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints and joint-filler strips, semi-rigid joint fillers, forms and form removal limitations, shoring and re-shoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures and concrete protection.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements products that may be incorporated into the work include, but are not limited to products specified.
 - 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 FORM-FACING MATERIALS

- A. See Section 03 11 00 CONCRETE FORMWORK for additional requirements.
- B. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints. Furnish on exposed surfaces and interior surfaces.
- C. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit. Permitted to furnish on below grade exterior surfaces
- D. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- E. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.
- F. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- G. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

- H. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- I. Form-Release Agent: As specified in Section 03 11 00 CONCRETE FORMWORK.

2.3 REINFORCEMENT ACCESSORIES

- A. Expansion Joint Dowel Bars: ASTM A615/A615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
 - 1. All dowels shall be placed and securely anchored before placing concrete. All dowels shall be parallel with each other and perpendicular to the joint.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
 - 2. Secure all reinforcement in place using steel chairs, supports, "A" bars and any other ACI approved product. Supports shall be spaced adequately to support the steel firmly in place.
 - 3. Charis will not be accepted to hold reinforcing clearance on walls.
- C. General:
 - 1. Accessories shall be subject to Engineer's approval.
 - 2. Tie wire- 18 gauge steel wire. Ends of wire shall be bent towards the interior part of the wall.
 - 3. Support above forms with fabricated steel chairs. Number of chairs shall be adequate to prevent sag during steel and concrete placement.
 - 4. Wall layer spacers shall be 1/4" ROUND "Z" BAR.
 - 5. Horizontal layer spacers shall be stand.
 - 6. Mechanical Connectors:
 - a. Approved Manufactures: Dayton Superior, Erico, or approved equal.
 - b. The mechanical connection shall meet the code requirements of developing in tension and compression as required by the referenced codes. Install per the manufacture's approved procedures.

2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement (Non-hydraulic Above Grade Structures): ASTM C150, Type I or II, or combination of Type I with fly ash.
 - 2. Portland Cement (Hydraulic and/or Below Grade Structures): ASTM C150 type II or combination of Type I with fly ash.
 - 3. Fly Ash: ASTM C618, Class C or F fly ash shall not exceed 15 percent of the cementitious materials, unless written approval is given by the Engineer.
- B. Normal-Weight Aggregates: ASTM C33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
 - 1. Maximum Coarse-Aggregate Size: 1" nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
 - 3. Fine aggregate:

- a. Provide fine aggregate for concrete or mortar consisting of clean, natural sand or of sand prepared from crushed stone or crushed gravel.
- b. Do not provide aggregate having deleterious substances in excess of following percentages by weight of contaminating substances.
- c. In no case shall total exceed percent listed.

Item	Test Method	Percent
Removed by decantation (dirt, silt, etc.)	ASTM C117	3
Shale or Chert	ASTM C123	1
	ASTM C295*	1
Clay Lumps	ASTM C142	1
* Test Method C123 is used to identify particles in the sample lighter than 2.40 Specific Gravity. Test Method C295 is used to identify which of the lightweight particles are shale or chert. If the results of Test Method C123 are less than 1 percent, Test Method C295 is not required.		

- d. Except as otherwise specified, grade fine aggregate from coarse to fine in accordance with ASTM C33.
4. Coarse aggregate:
- a. Provide coarse aggregate consisting of gravel or crushed stone made up of clean, hard, durable particles free from calcareous coatings, organic matter, or other foreign substances.
 - b. Not exceeding 15 percent by weight, of thin or elongated pieces having length greater than 5 times average thickness.
 - c. Deleterious substances: Not in excess of following percentages by weight, and in no case having total of all deleterious substances exceeding 2 percent.
 - d. Coarse aggregate shall be washed prior to combining in concrete mix.

Item	Test Method	Percent
Shale or chert	ASTM C123	1.25
	ASTM C295**	1
Coal and lignite	ASTM C123	1/4
Clay lumps and friable particles	ASTM C142	1/4
Materials finer than Number 200 sieve	ASTM C117	1/2*
* Except when material finer than Number 200 sieve consists of crusher dust, maximum amount shall be 1 percent.		
** Test Method C 123 is used to identify particles in the sample lighter than 2.40 Specific Gravity. Test Method C 295 is used to identify which of the lightweight particles are shale, chert, coal, or lignite. If the results of Test Method C 123 are less than 1.25 percent (the minimum combined percentage of shale, chert, coal and lignite), Test Method C 295 is not required.		

5. Grading:
- a. Aggregate for building elements and hydraulic structures: In accordance with ASTM C33, Size Number 57, except as otherwise specified or authorized in writing by the ENGINEER.

C. Water: ASTM C94 and potable (not recycled water).

2.5 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 - 2. Retarding Admixture: ASTM C494/C494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type G.
 - a. Bayer Corporation.
 - b. ChemMasters.
 - c. Conspec Marketing & Manufacturing Co., Inc.; a Dayton Superior Company.
 - d. Davis Colors.
 - e. Elementis Pigments, Inc.

2.6 VAPOR RETARDERS

- A. Plastic Vapor Retarder: ASTM E1745, Class B. Include manufacturers' recommended adhesive or pressure-sensitive tape.
 - 1. Products:
 - a. Fortifiber Corporation: Moistop Ultra.
 - b. Revan Industries Inc.; Vapor Block 10.
 - c. Stego Industries, LLC; Stego Wrap, 15 mils.
- B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D448, Size 57, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

2.7 FLOOR AND SLAB TREATMENTS

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.
 - 1. Products:
 - a. Burke by Edoco; Titan Hard.
 - b. ChemMasters; Chemisil Plus.
 - c. ChemTec international; ChemTec One.
 - d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company
 - e. Curecrete Distribution Inc.; Ashford Formula.
 - f. Dayton Superior Corporation; Day-Chem sure Hard.
 - g. Euclid Chemical Company (The); Euco Diamond Hard.
 - h. Kaufman Products, Inc.; SureHard.
 - i. L&M Construction Chemicals, Inc.; Seal Hard.
 - j. Meadows, W. R., Inc.; Liqui-Hard.
 - k. Metalcrete Industries; Floorsaver.
 - l. Nox-Crete Products Group, Kinsman Corporation; Duranox.
 - m. Symons Corporation, a Dayton Superior Company; buff Hard.
 - n. US Mix Products Company; US Spec Industraseal.
 - o. Vexcon Chemicals, Inc.; Vexcon StarSeal PS.

2.8 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
1. Products:
 - a. Axim Concrete Technologies; Cimfilm.
 - b. Burke by Edoco; BurkeFilm.
 - c. ChemMasters; Spray-Film.
 - d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior company; Aquafilm.
 - e. Dayton Superior Corporation; Sure Film.
 - f. Euclid Chemical Company (The); Eucobar.
 - g. Kaufman Products, Inc.; Vapor Aid.
 - h. Lambert Corporation; Lambco Skin.
 - i. L&M Construction Chemicals, Inc.; E-Con.
 - j. MBT Protection and Repair, Div., of ChemRex; Confilm.
 - k. Meadows, W. R., Inc; Sealtight Evapre.
 - l. Metalcrete Industries; Waterhold.
 - m. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
 - n. Sika Corporation, Inc.; SikaFilm.
 - o. Symons Corporation, a Dayton Superior Company; Finishing Aid.
 - p. Unitex; Pro-Film.
 - q. US Mix Products Company; US Spec Monofilm ER.
 - r. Vexcon Chemicals, Inc.; Certi-Vex EnvioAssist.
- B. Absorptive Cover: AASHTO M182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C309, Type 1, Class B, dissipating.
1. Products:
 - a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
 - b. Burke by Edoco; Aqua Resin cure.
 - c. ChemMasters; Safe-Cure Clear.
 - d. Conspec Marketing & Manufacturing co., Inc., a Dayton Superior Company; W.B. Resin cure.
 - e. Dayton Superior Corporation; Day Chem Rez cure (J-11-W).
 - f. Euclid Chemical Company (The); Kurez DR VOX.
 - g. Kaufman Products, Inc.; Thinfilm 420.
 - h. Lambert Corporation; Aqua Kure-Clear.
 - i. L&M Construction Chemicals, Inc.; L&M Cure R.
 - j. Meadows, W. R., Inc.; 100 Clear.
 - k. Nox-Crete Products Group, Kinsman Corporation; Resom Cure E/
 - l. Sykkmons Corporation, a Dayton Superior Company; Resi-Chem Clear Cure.
 - m. Tamms Industries, Inc., Horncure WB 30.
 - n. Unitex; Hydro cure 309.
 - o. US Mix Products Company; US Spec Maxcure Resin Clear.
 - p. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.
- F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C1315, Type 1, Class A. Compatible with penetrating liquid floor treatment for surfaces specified to receive penetrating liquid floor treatment.

1. Products:
 - a. Burke by Edoco; Cureseal 1315 WB.
 - b. ChemMasters; Polyseal WB.
 - c. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Sealcure 1315 WB
 - d. Euclid Chemical Company (The); Super Diamond Clear VOX.
 - e. Kaufman Products, Inc.; Sure Cure 25 Emulsion.
 - f. Lambert Corporation; UV Safe Seal.
 - g. L&M Construction Chemicals, Inc.; Lumiseal WB Plus.
 - h. Meadows, W. R., Inc.; Vocomp-30.
 - i. Metalcrete Industries; Metcure 30.
 - j. Symons Corporation, a Dayton Superior Company; Cure 7 Seal 31 Percent E.
 - k. Tamms Industries, Inc.; LusterSeal WB 300.
 - l. Unitex; Hydro Seal 25.
 - m. US Mix Products Company; US Spec Radiance UV-25.
 - n. Vexcon Chemicals, Inc.; Vexcon Starseal 1315.

2.9 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber.
- B. Semi-rigid Joint Filler: Two-component, semi-rigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D2240.
- C. Bonding Agent: ASTM C1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 1. Types IV and V, load bearing for bonding hardened or freshly mixed concrete to hardened concrete.

2.10 REPAIR MATERIALS

- A. See Sections 03 01 00, CONCRETE SURFACE REPAIR SYSTEMS.

2.11 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage by weight of cementitious materials other than Portland cement in concrete as follows:
 1. Fly Ash: 15 percent of cementitious materials maximum, unless written approval is given by the Engineer.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement for non-hydraulic structures and 0.10 percent by weight of cement for hydraulic structures.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
 1. Use water-reducing or high-range water-reducing admixture in concrete, as required, for placement and workability.

2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

2.12 CONCRETE MIXTURES

- A. Proportion normal-weight concrete mixture as follows for all structural elements:
 1. Minimum Compressive Strength: 4,000 psi at 28 days.
 2. Maximum Water-Cementitious Materials Ratio: 0.42.
 3. Slump Limit: 8-inches Max for concrete with verified slump of 2 to 4-inches before adding high range water-reducing admixture or plasticizing admixture per ACI 301.
 4. Air content: 5 1/2%, $\pm 1.5\%$ at point of delivery.
- B. Proportion normal-weight concrete mixture as follows for all non-structural elements:
 1. Minimum Compressive Strength: 3,000 psi at 28 days.
 2. Maximum Water-Cementitious Materials Ratio: 0.45.
 3. Slump Limit: 8 inch for concrete with verified slump of 2" to 4": before adding high-range water-reducing admixture or plasticizing admixture per ACI 301.
 4. Air content: 5 1/2%, $\pm 1.5\%$ at point of delivery.

2.13 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C94/C94M and ASTM C1116, and furnish batch ticket information.
 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 PLACING CONCRETE

- A. Place no concrete without prior authorization of the Engineer.
- B. Do not place concrete until:
 1. Reinforcement is secure and properly fastened in its correct position and loose form ties at construction joints have been retightened.
 2. Dowels, bucks, sleeves, hangers, pipes, conduits, anchor bolts, and any other fixtures required to be embedded in concrete have been placed and adequately anchored.
 3. Forms have been cleaned and oiled as specified.
- C. Do not place concrete in which initial set has occurred, or that has been retempered.

- D. Do not place concrete during rainstorms or high velocity winds.
 - E. Protect concrete placed immediately before rain to prevent water from coming in contact with such concrete or winds causing excessive drying.
 - F. Keep sufficient protective covering on hand at all times for protection of concrete.
 - G. After acceptance, adhere to proposed sequence of placing concrete, except when specific changes are requested and accepted by the Engineer.
 - H. Notify the Engineer in writing of readiness, not just intention, to place concrete in any portion of the work:
 - 1. Provide this notification in such time in advance of operations, as the Engineer deems necessary to make final inspection of preparations at location of proposed concrete placing.
 - 2. Place forms, reinforcement, screeds, anchors, ties, and inserts in place before notification of readiness is given to the Engineer.
 - 3. Depositing concrete:
 - a. Deposit concrete at or near its final position to avoid segregation caused by rehandling or flowing.
 - b. Do not deposit concrete in large quantities in one place and work along forms with vibrator or by other methods.
 - c. Do not drop concrete freely into place from height greater than 5 feet.
 - d. Use tremies for placing concrete where drop is over 5 feet.
 - e. Commence placement of concrete on slopes, starting at bottom of slope.
 - I. Place concrete in approximately horizontal layers not to exceed 24 inches in depth and bring up evenly in all parts of forms.
 - J. Continue concrete placement without avoidable interruption, in continuous operation, until end of placement is reached.
 - K. After concrete placement begins, continue concrete placement without significant interruption. Plan and implement precautions to prevent any delay, between layers being placed, from exceeding 20 minutes.
 - L. If concrete is to be placed over previously placed concrete and more than 20 minutes has elapsed, spread layer of cement grout not less than 1/2 inch in thickness nor more than 1 inch in thickness over surface before placing additional concrete.
 - M. Placement of concrete for slabs, beams, or walkways:
 - 1. If cast monolithically with walls or columns, do not commence until concrete in walls or columns has been allowed to set and shrink.
 - 2. Allow set time of not less than 1 hour for shrinkage.
- 3.2 FORMWORK: See Section 03 11 00, CONCRETE FORMWORK.
- 3.3 VAPOR RETARDERS
- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches and seal with manufacturers' recommended tape.

3.4 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer/Owner
 - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 - 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
 - 6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one fourth of concrete thickness as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
 - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
 - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.5 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by the Engineer.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Maintain reinforcement in position on chairs during concrete placement.
 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 4. Slope surfaces uniformly to drains where required.
 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. All embedded items such as wall pipes, embed frames, steel guide rails, channels, etc. (not including conduit and reinforcing) shall be considered "massive embedments" and are required to be kept above 32 deg F during placement and for the first 48 hours after placement. Contractor shall take the necessary measures; including insulated blankets, heated blankets, and heaters; to insure items are kept above 32 deg F. All other methods shall be submitted to the Engineer for approval.
 3. Do not use frozen materials or materials containing ice or snow.
 4. Do not place concrete on frozen subgrade or on subgrade containing frozen materials. Top 12-inches of subgrade shall be thawed prior to concrete placement. Contractor is responsible for verifying that the temperature for the top 12-inches of subgrade is above 32 deg F.
 5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- G. Hot-Weather Placement: Comply with ACI 305 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is included in total amount of mixing water. Using liquid nitrogen to cool concrete is contractor's option, but liquid nitrogen should not replace water.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.
 3. All other methods shall be submitted to the Engineer for approval.

3.6 CONCRETE WALL FINISHES

- A. Type W-1 (Ordinary Wall Finish or Coating):
 - 1. Patch tie holes.
 - 2. Knock off projections.
 - 3. Patch defective areas.
- B. Type W-2 (Smooth Wall Finish):
 - 1. Patch tie holes.
 - 2. Grind off projections, fins, and rough spots.
 - 3. Patch defective areas and repair rough spots resulting from form release agent failure or other reasons to provide smooth uniform appearance.
- C. Type W-5 (Finish for Painting):
 - 1. Patch tie holes.
 - 2. Grind off projections, fins, and rough spots.
 - 3. Patch and repair defective areas as specified for Type W-2.
 - 4. Apply paint or coating system as specified in Section 09 90 00 Painting and Protective Coatings.

3.7 CONCRETE SLAB FINISHES

- A. General:
 - 1. Finish slab concrete per the requirements of ACI 302.1R
 - 2. Use manual screeds, vibrating screeds, or roller compacting screeds to place concrete level and smooth.
 - 3. Do not use "Jitterbugs" or other special tools designed for the purpose of forcing coarse aggregate away from the surface and allowing a layer of mortar, which will be weak and cause surface cracks or de-lamination, to accumulate.
 - 4. Do not dust surface with dry materials.
 - 5. Use evaporation retardant.
 - 6. Round off edges of slabs with a steel edging tool, except where a cove finish is shown. Steel edging tool radius shall be 1/4" for slabs subject to wheeled traffic.
- B. Type S-1 (Steel Troweled Finish):
 - 1. Finish by screeding and floating with straightedges to bring surfaces to required finish elevation, use evaporation retardant.
 - 2. While concrete is still green, but sufficiently hardened to bear a person's weight without deep imprint, wood float to true, even plane with no coarse aggregate visible.
 - 3. Use sufficient pressure on wood floats to bring moisture to surface.
 - 4. After surface moisture has disappeared, hand trowel concrete to produce smooth, impervious surface, free from trowel marks.
 - 5. Burnish surface with an additional troweling. Final troweling shall produce a ringing sound from trowel.
 - 6. Do not use dry cement or additional water during troweling, nor will excessive troweling be permitted.
 - 7. Power Finishing:
 - a. An approved power machine may be used in lieu of hand finishing in accordance with directions of machine manufacturer.
 - b. Do not use power machine when concrete has not attained the necessary set to allow finishing without introducing high and low spots in slab.
 - c. Do first steel troweling for slab S-1 finish by hand.
- C. Type S-2 (Wood Float Finish):
 - 1. Finish slabs to receive fill and mortar setting beds by screeding with straight edges to bring surface to required finish plane.

2. Wood float finish to compact and seal surface.
 3. Remove laitance and leave surface clean.
 4. Coordinate with other finish procedures.
- D. Type S-5 (Broomed Finish):
1. Finish as specified for Type S-1 floor finish, except omit final troweling and finish surface by drawing a fine-hair broom lightly across the surface.
 2. Broom in same direction and parallel to expansion joints, or, in the case of inclined slabs, perpendicular to scope, except for round roof slab, broom surface in radial direction.
- E. Type S-6 (Sidewalk Finish):
1. Slope walks down 1/4" per foot away from structures, unless otherwise shown.
 2. Strike off surface by means of strike board and float with wood or cork float to a true plane, then flat steel trowel before brooming.
 3. Broom surface at right angles to direction of traffic or as shown.
 4. Lay out sidewalk surfaces in blocks, as shown or as directed by Engineer, with a grooving tool.
- F. Type S-7: The top surfaces of basins in which raking mechanisms are to be installed
1. Slabs shall be finished by sweeping in cement grout with the mechanism. The cement grout to be used shall be composed of one part Portland cement and two parts sand.
 2. The sweeping-in process shall be performed under the supervision of a factory representative of the equipment manufacturer.
 3. The slab upon which the grout is to be applied shall receive a Type S-5 finish except that after leveling and floating, it shall be raked in such a manner as to provide a good bond for the grout. Raking shall develop a pattern with a depth of 1/4" every 2". Before grout is deposited on the slab, it shall be thoroughly cleaned, wet down with clean water and lightly dusted with neat cement immediately prior to placement of the grout.

3.8 SCHEDULE OF CONCRETE FINISHES

- A. Form Tolerances: As specified in Section 03 11 00, CONCRETE FORMWORK.

- B. Provide concrete finishes as scheduled:

Area	Type of Finish	Required Form Tolerances
EXTERIOR WALL SURFACES		
Above grade/exposed (above a point 12" below finish grade)	W-2	W-B
Backfilled (below a point 12" below final grade)	W-1	W-A
INTERIOR WALL SURFACES		
Hydraulic Structures including tanks, pump stations, flow channels, junction boxes, and basins	W-5	W-A
Buildings, pipe galleries, and other dry areas	W-5	W-B
EXTERIOR SLABS		
Exposed Roof slab or Slab-on-grade for non-hydraulic structures (includes slabs under open canopies)	S-5	
Roof slab or Top of Wall for Hydraulic Structures	S-1	
Other water holding tanks and basins	S-1	
Stairs and landings	S-5	
Sidewalks	S-6	

Other exterior slabs/pads	S-6	
Top surfaces of basins in which raking mechanisms are to be installed	S-7	
INTERIOR SLABS		
Non-Hydraulic areas such as pipe galleries and slabs-on-grade	S-1	
Hydraulic channels / Water Holding Structures	S-1	
Underside of elevated slabs	S-3	
Slabs to receive fill and mortar setting beds	S-2	

3.9 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

3.10 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305.1 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.

- c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
- 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
- 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.
- 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.11 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
 - 1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 - 2. Do not apply to concrete that is less than 28 days' old.
 - 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.
- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.12 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semi-rigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.13 REPAIRING CONCRETE

A. General:

1. Any areas deemed as having excessive defects or considered to have a negative effect on the structural performance of the structure shall be removed to the extents approved by the Engineer. The Engineer has the option of calling for the removal of the entire section if the damage is such that a repair will not be a suitable option. All work required to correct the defect will be the responsibility of the Contractor and will be paid for by the Contractor.
2. Inject cracks as defined in 1.3.D Defective Areas with crack repair epoxy as specified in Section 03 01 00, CONCRETE SURFACE REPAIR.
3. Repair concrete surfaces defects as defined in 1.3.D Defective Areas using one of the materials specified in Section 03 01 00, CONCRETE SURFACE REPAIR. Select system, submit for review, and obtain approval from Engineer prior to use.
4. Prior to starting the repair work, obtain quantities of color-matched repair material and manufacturer's detailed instructions for use to provide a structural repair with finish to match adjacent surface.
5. Develop repair techniques with material manufacturer.
6. Dress surface of repair that will remain exposed to view to match color and texture of adjacent surfaces. Repair of concrete shall provide a structurally sound surface finish, uniform in appearance or upgrade finish by other means until acceptable to Engineer.

B. Tie Holes:

1. Fill with nonshrink grout as specified in Section 03 60 00, GROUT.
2. Match color of adjacent concrete.
3. Compact grout using steel hammer and steel tool to drive grout to high density. Cure grout with water.

C. Alternate Form Ties-Through-Bolts:

1. Seal through-bolt hole by sandblasting or mechanically cleaning and roughening entire interior surface of hole, coating roughened surface with bonding agent and driving elastic vinyl plug and then dry packing entire hole on each side of plug with nonshrink grout, as specified in Section 03 60 00, GROUT. Use only enough water to dry pack grout. Dry pack while bonding agent is still tacky or remove bonding agent by mechanical means and reapply new bonding agent.
2. Compact grout using steel hammer and steel tool to drive grout to high density. Cure grout with water.

D. Exposed Metal Objects:

1. Metal objects not intended to be exposed in as-built condition of structure including wire, nails, and bolts, shall be removed by chipping back concrete to depth of 1 inch and then cutting or removing metal object.
2. Repair areas of chipped-out concrete per requirements of Section 03 01 00 CONCRETE SURFACE REPAIR SYSTEMS.

E. Blockouts at Pipes or Other Penetrations:

1. Meet details shown or submit proposed blockouts for review.
2. Use nonshrink, nonmetallic grout, Category I or II as specified in Section 03 60 00, GROUT.

3.14 FIELD QUALITY CONTROL

- #### A. Testing and Inspecting:
- Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports. Payment of the testing and inspection agency shall be by the Contractor from the contract allowance for independent testing in accordance with Section 01 29 00, PAYMENT PROCEDURES.

- B. Inspections:
1. Steel reinforcement placement.
 2. Headed bolts and studs.
 3. Verification of use of required design mixture.
 4. Concrete placement, including conveying and depositing.
 5. Curing procedures and maintenance of curing temperature.
 6. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd. plus one set for each additional 50 cu. yd. or fraction thereof.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C143/C143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 4. Concrete Temperature: ASTM C1064/C1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C31/C31M.
 - a. Cast and laboratory cure two sets of three standard cylinder specimens for each composite sample.
 - b. Cast and field cure two sets of three standard cylinder specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C39/C39M; test one set of three laboratory-cured specimens at 7 days and one set of three specimens at 28 days.
 - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days. The third cylinder will be retained for subsequent testing if required by the Engineer.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
 8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
 9. Test results shall be reported in writing to Engineer, Owner, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
 10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.

11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by the Engineer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Engineer.
 12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- D. Measure floor and slab flatness and levelness according to ASTM E 1155 48 hours after finishing. Specified overall values of flatness $F(f)=25$; and levelness $F(L)=20$; with minimum local values, $F(f)=17$ and $F(L)=15$.
1. $F(L)$ value only applies to elevated slabs after shoring has been removed.
- E. Shrinkage Tests:
1. Drying shrinkage tests shall be performed for the trial batch indicated in Paragraph CONCRETE MIXTURES FOR HYDRAULIC ELEMENTS for the first placement of each class of concrete for all structures noted in paragraph CONCRETE MIXTURES FOR HYDRAULIC ELEMENTS, and during construction to insure continued compliance with these Specifications. Number of field test to be determined by Engineer or Engineer's Field Representative.
 2. Drying shrinkage specimens shall be 4" by 4" by 11" prisms with an effective gauge length of 10"; fabricated, cured, dried, and measured in accordance with ASTM C157 modified as follows: specimens shall be removed from molds at an age of 23 ± 1 hours after trial batching, shall be placed immediately in water at $70 \text{ }^{\circ}\text{F} \pm 3 \text{ }^{\circ}\text{F}$ for at least 30 minutes, and shall be measured within 30 minutes thereafter to determine original length and then submerged in saturated lime water at $73 \text{ }^{\circ}\text{F} \pm 3 \text{ }^{\circ}\text{F}$. Measurement to determine expansion expressed as a percentage of original length shall be made at age 7 days. This length at age 7 days shall be the base length for drying shrinkage calculations ("0" days drying age). Specimens then shall be stored immediately in a humidity control room maintained at $73 \text{ }^{\circ}\text{F} \pm 3 \text{ }^{\circ}\text{F}$ and 50% $\pm 4\%$ relative humidity for the remainder of the test. Measurements to determine shrinkage expressed as percentage of base length shall be made and reported separately for 7, 14, 21, and 28 days of drying after 7 days of moist curing.
 3. The drying shrinkage deformation of each specimen shall be computed as the difference between the base length (at "0" days drying age) and the length after drying at each test age. The average drying shrinkage deformation of the specimens shall be computed to the nearest 0.0001" at each test age. If the drying shrinkage of any specimen departs from the average of that test age by more than 0.0004", the results obtained from that specimen shall be discarded. Results of the shrinkage test shall be reported in graphical form Length Change (in) vs. Age (days) and Length Change (%) vs. Age (days) to the nearest 0.001% of shrinkage. Compression test specimens shall be taken in each case from the same concrete used for preparing drying shrinkage specimens. These tests shall be considered a part of the normal compression tests for the project. Allowable shrinkage limitations shall be as indicated below.
 - a. Shrinkage Limitation: The maximum concrete shrinkage for specimens cast in the laboratory from the trial batch, as measured at 21-day drying age or at 28-day drying age shall be 0.036% or 0.042%, respectively. The Contractor shall only use a mix design for construction that has first met the trial batch shrinkage requirements.
 - b. The maximum concrete shrinkage for specimens cast in the field shall not exceed the trial batch maximum shrinkage requirement by more than 25%.
 - c. If the required shrinkage limitation is not met during construction, the Contractor shall take any or all of the following actions at no additional cost to the Owner, for securing the specified shrinkage requirements. These actions may include

changing the source of aggregates, cement and/or admixtures; reducing water content; washing of aggregate to reduce fines; increasing the number of construction joints; modifying the curing requirements; or other actions designed to minimize shrinkage or the effects of shrinkage

- F. Water Leakage Tests: In accordance with ACI 350.1.
1. Purpose: Determine integrity and water tightness of finished concrete surfaces. Contractor shall perform and pay for all costs associated with water leakage tests. Report all test results to the Engineer.
 2. All water-holding Structures:
 - a. Perform leakage tests after concrete structure is complete and capable of resisting the hydrostatic pressure of the water test. The concrete shall have achieved its full design strength.
 - b. Perform leakage test before backfill, brick facing, or other work that will cover concrete wall surfaces is begun.
 - c. Install all temporary bulkheads, cofferdams, and pipe blind flanges, and close all valves. Inspect each to see that it provides a complete seal.
 - d. Fill with water to test level shown, or maximum liquid level if no test level is given. Maintain this level for 72 hours prior to the start of the test to allow water absorption, structural deflection, and temperature to stabilize.
 - e. Measure evaporation and precipitation by floating a partially filled, transparent, calibrated, open top container.
 - f. Measure the water surface at two points 180° apart, when possible where attachments such as ladders exist, at 24-hour intervals. Using a sharp pointed hook gauge and fixed metal measure capable of reading to 1/100 of an inch. Continue the test for a period of time sufficient to produce at least 1/2" drop in the water surface based on the assumption that leakage would occur at the maximum allowable rate specified or for 72 hours whichever is the lesser time.
- G. Acceptance Criteria:
1. Volume loss shall not exceed 0.075% of contained liquid volume in a 24-hour period, correcting for evaporation, precipitation, and settlement.
 2. No damp spots or seepage visible on exterior surfaces. A damp spot is defined as sufficient moisture to be transferred to a dry hand upon touching.
- H. Repairs When Test Fails: Dewater the structure; fill leaking cracks with crack repair epoxy as specified in Section 03 01 00, CONCRETE SURFACE REPAIR. Patch areas of damp spots previously recorded, and repeat water leakage test in its entirety until the structure successfully passes the test.

END OF SECTION

SECTION 03 60 00 - GROUT

PART 1 - GENERAL

1.1 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. ASTM International (ASTM):
 - a. C 230, Standard Specification for Flow Table for Use in Tests of Hydraulic Cement.
 - b. C 1107, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
- B. Cement Grout (Non-shrink).
 - 1. Corps of Engineers (COE):
 - a. CRD-C 611, Flow of Grout for Prep laced Aggregate Concrete.
 - b. CRD-C 621, Specification for Non-shrink Grout.

1.2 SUBMITTALS

- A. Product data for each type of product indicated.
- B. Certified test results verifying compliance with compressive strength, shrinkage and expansion requirements and manufacturer's literature containing instructions and recommendations on the mixing, handling, placement and appropriate uses for each type of non-shrink and epoxy grout.
- C. Fine aggregate gradation.
- D. One copy of each 30 consecutive strength test results and mix design used from a record of past performance, or one copy of laboratory trial mix and design and results, and one copy of the mix design proposed for each cementitious mixture and use under this contract.
- E. Qualification for testing agency.
- F. Material test reports: For the following from a qualified testing agency, indicating compliance with requirements:
 - 1. Aggregates, Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
 - 2. Non-shrink grout.
 - 3. Epoxy grout.
- G. Material certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Non-shrink grout.
 - 3. Epoxy grout.
- H. Field quality-control tests and observation reports.
- I. Ready mix concrete (Cement Grout)
 - 1. Provide delivery tickets for ready-mix concrete (cement grout) or weigh master's certificate per ASTM C 94, include weights of cement and each size aggregate and amount of water added at the plant and a record of placements. Record the amount of water added at the job site on the delivery ticket. Water added at the plant shall account for the moisture in aggregate. If water is added at the job site, then the total water content shall not exceed the water content of the approved design mix.

2. Keep records showing time and place of each placement of concrete, joint mortar bed material or cement grout, together with transit delivery slips certifying the contents of the placement. Furnish records to Engineer.

J. Joint Mortar Bed: Provide material analysis and certification for each placement.

K. Shop Drawings:

1. Product data of grouts.
2. Curing method for grout.
3. Mix design of cement-sand grout mixture for pipe invert/structure fill.
4. Mix design of Joint Mortar Bed.

L. Information Submittals:

1. Manufacturer's written instructions for mixing of grout.
2. Manufacturer's Certificate of Compliance: Grout free from chlorides and other corrosion-causing chemicals.
3. Manufacturer's Certificate of Proper Installation.
4. Statements of Qualification: Non-shrink grout manufacturer's representative.
5. Test Reports: Test report for 24-hour evaluation of non-shrink grout.

1.3 QUALIFICATIONS

- A. Manufacturer's qualifications for cement grout and joint mortar bed: A firm experienced in manufacturing ready-mixed concrete products and a firm that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician – Grade I, Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician – Grade II.
- C. Source limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source and obtain admixtures through one source from a single manufacturer.

1.4 QUALIFICATIONS

- A. Non-shrink Grout Manufacturer's Representative: Authorized and trained representative of grout manufacturer, with minimum of 1 year experience that has resulted in successful installation of grouts similar to those for this Project.
- B. For grout suppliers not listed herein, provide completed 24-hour Evaluation of Non-shrink Grout Test Form, attached at the end of this section. Independent testing laboratory to certify that testing was conducted within last 18 months.

1.5 GUARANTEE

- A. Manufacturer's guarantee shall not contain disclaimer on the product data sheet, grout bag, or container limiting responsibility to only the purchase price of products and materials furnished.

- B. Manufacturer guarantees participation with Contractor in replacing or repairing grout found defective due to faulty materials, as determined by industry standard test methods.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand and source throughout project:
1. Portland Cement (Nonhydraulic Above Grade Structures): ASTM C 150, Type I or II or combination of Type I with fly ash.
 2. Portland Cement (Hydraulic and Below Grade Structures): ASTM C 150 Type II or combination of Type I with fly ash.
FLY ASH: ASTM C 618, CLASS F, FLY ASH SHALL NOT EXCEED 15 PERCENT.
- B. Fine aggregates: ASTM C 33, Class 4S or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials. Aggregates shall be free of materials with deleterious reactivity to alkali in cement. Aggregates for cement grout and/or mortar bed shall be provided from the same source as aggregate for the cast-in-place concrete.
- C. Water: ASTM C 94 and potable.

2.2 ADMIXTURES

- A. Comply with Section 03 30 00 Cast-In-Place Concrete.

2.3 NONSHRINK GROUT SCHEDULE

- A. Furnish non-shrink grout for applications in grout category in the following schedule:

Application	Temperature Range	Max. Placing Time	
	40 to 100 °F	20 min	Greater than 20 min
Filling tie hole	I	I	I
Machine bases 25 hp or less	II	II	II
Through-bolt openings	II	II	II
Patching Concrete Walls	II	II	II
Machine bases 26 hp and up	III	III	III
Base plates and/or soleplates with vibration, thermal movement, etc.	III	III	III
Other applications not listed	II	II	II

2.4 NONSHRINK GROUT

- A. Category I:
1. Nonmetallic and non gas-liberating.
 2. Prepackaged natural aggregate grout requiring only the addition of water.
 3. Test in accordance with ASTM C1107:
 - a. Flowable consistency 140%, five drops in 30 seconds, in accordance with ASTM C 230.
 - b. Flowable for 15 minutes.
 4. Grout shall not bleed at maximum allowed water.

5. Minimum strength of flowable grout, 3,000 psi at 3 days, 5,000 psi at 7 days, and 7,000 psi at 28 days.
6. Manufacturers and Products:
 - a. Chemrex, Inc., Shakopee, MN; Set Grout.
 - b. Euclid Chemical Co., Cleveland, OH; NS Grout.
 - c. Dayton Superior Corp., Miamisburg, OH; 1107 Advantage Grout.
 - d. US MIX Products, Denver, CO; US Spec Multi-Purpose Grout.
 - e. L & M Construction Chemicals, Inc., Omaha, NE; Duragrout.
 - f. Master Builders.

B. Category II:

1. Nonmetallic, non gas-liberating.
2. Prepackaged natural aggregate grout requiring only the addition of water.
3. Aggregate shall show no segregation or settlement at fluid consistency - at specified times or temperatures.
4. Test in accordance with COE CRD-C 621 and ASTM C 1107, Grade B:
 - a. Fluid consistency 20 to 30 seconds in accordance with COE CRD-C 611.
 - b. Temperatures of 40, 80, and 100 °F.
5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
6. Minimum strength of fluid grout, 3,500 psi at 1 day, 4,500 psi at 3 days, and 7,500 psi at 28 days.
7. Maintain fluid consistency when mixed in 1 to 9 yard loads in ready- mix truck.
8. Manufacturers and Products:
 - a. Chemrex, Inc., Shakopee, MN; Master Flow 928.
 - b. Five Star Products Inc., Fairfield, CT; Five Star 100.
 - c. Euclid Chemical Co., Cleveland, OH; Hi Flow Grout.
 - d. Dayton Superior Corp., Miamisburg, OH; Sure Grip High Performance Grout.
 - e. L & M Construction Chemicals, Inc., Omaha, NE; Crystex.
 - f. Master Builders.

C. Category III

1. Metallic and nongas-liberating flowable fluid.
2. Prepackaged aggregate grout requiring only the addition of water.
3. Aggregate shall show no segregation or settlement at fluid consistency at specified times or temperatures.
4. Test in accordance with CRD-C 621 and ASTM C 1107, Grade B:
 - a. Fluid consistency 20 to 30 seconds in accordance with CRD-C 611.
 - b. Temperatures of 40 and 100 °F.
5. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
6. Minimum strength of grout, 4,000 psi at 1 day, 5,000 psi at 3 days, and 9,000 psi at 28 days.
7. Maintain fluid consistency when mixed in 1 to 9 yard loads in ready-mix truck.
8. Manufacturers and Products: Chemrex, Inc., Shakopee, MN; EMBECO 885.

2.5 TOPPING GROUT AND CONCRETE/GROUT FILL

- A. Where fill is thicker than 3-inches, structural concrete 03 30 00, CAST-IN-PLACE CONCRETE, may be used when accepted by the Engineer.
- B. Grout for topping of slabs and concrete/grout fill for built-up surfaces of tank, channel and basin bottoms shall be composed of cement, fine aggregate, coarse aggregate, water and admixtures proportioned and be mixed as indicated. Bonding Agent shall be used to enhance adhesion to basin concrete. Materials and procedures indicated for normal concrete in Section 03 30 00, CAST-IN-PLACE CONCRETE, shall apply unless indicated otherwise.

- C. Topping grout and concrete/grout fill shall contain a minimum of 564 pounds of cement per cubic yard with a maximum water cement ratio of 0.45. Topping grout in clarifiers shall contain between 750 and 8900 pounds of cement per cubic yard with a maximum water cement ratio of 0.42.
- D. Aggregate shall be graded as follows:

U.S. STANDARD SIEVE SIZE	PERCENT BY WEIGHT PASSING
1/2 inch	100
3/8 inch	90-100
No. 4	20-55
No. 8	5-30
No. 16	0-10
No. 30	0

- E. Final mix design shall be as determined by trial mix design as indicated in Section 03 30 00, except that drying shrinkage tests are not required.
- F. Topping grout and concrete grout/fill shall contain air-entraining agent per Section 03 30 00.
- G. Strength: Minimum compressive strength of topping grout and concrete/grout fill at 28 days shall be 4000 psi.
- H. Topping grout used in clarifiers shall contain fiber reinforcing. Fiber shall be 100 percent virgin polypropylene fibrillated fibers specifically manufactured in a blended gradation for use as concrete secondary reinforcement. Fibers shall be added at a rate of 1.5 pounds per cubic yard of concrete. Fibers shall conform to ASTM C 1116 – Fiber Reinforced Concrete and Shotcrete. Type III.

2.6 CEMENT-GROUT (CEMENT-SAND GROUT) MIXTURE FOR PIPE INVERT/STRUCTURE FILL

- A. Prepare design mixture proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301. Submit proposed mixture design to Engineer for review. Comply with Section 03 30 00 Cast-In-Place Concrete and as follows.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based upon laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete and cement grout as follows:
 - 1. Fly Ash, 15 percent, Class F.
- C. Admixtures: All materials other than Portland cement, water and aggregates that are added to the concrete or cement grout, shall be subject to the approval of the Engineer. If so approved, use admixtures according to manufacturer's written instructions.
 - 1. Use water reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
- D. Minimum compressive strength: 2000 psi at 28 days.
- E. Minimum cementitious material of 846 pounds (9 bags) per cubic yard of cement grout.

- F. Air content: ASTM C 94, 5 percent, plus or minus 1.0 percent at point of delivery.
- G. Aggregate shall be sand, three parts sand to one part cementitious material by volume. The sand gradation shall be such that 100% shall pass the No. 16 sieve and not more than 30% shall be retained on a No. 30 sieve.
- H. Water – cementitious material ratio. The Contractor shall submit a proposed mix design to the Engineer for review. The amount of water shall be the minimum amount of water necessary to make a workable mixture.
- I. Slump: Maximum of 4 inches.

2.7 JOINT MORTAR BED

- A. Joint Mortar Bed: Mortar placed on horizontal construction joints shall be a mixture of cement, sand and water in the same proportions used in the approved 4000 psi cast-in-place concrete mix design and/but with the coarse aggregate omitted.

PART 3 - EXECUTION

3.1 NONSHRINK GROUT

- A. General: Mix, place, and cure non-shrink grout in accordance with grout Manufacturer's representative's training instructions.
- B. Form Tie or Through-Bolt Holes: Provide non-shrink grout, Category I and II, fill space with dry pack dense grout hammered in with steel tool and hammer. Through-bolt holes; coordinate dry pack dense grout application with vinyl plug as specified in Division 03, and bonding agent in Section 03 30 00, CAST-IN-PLACE CONCRETE.
- C. Grouting Machinery Foundations:
 - 1. Block out original concrete or finish off at distance shown below bottom of machinery base with grout. Prepare concrete surface by sandblasting, chipping, or by mechanical means to remove any soft material.
 - 2. Set machinery in position and wedge to elevation with steel wedges, or use cast-in leveling bolts.
 - 3. Form with watertight forms at least 2" higher than bottom of plate.
 - 4. Fill space between bottom of machinery base and original concrete in accordance with Manufacturer's representative's training instructions.

3.2 CEMENT GROUT

- A. Place cement grout topping over concrete slabs where indicated on the drawings. Place in accordance with the procedures of this section and the manufacturer's or suppliers of equipment recommendations. The finish surface of the grout topping shall be similar to a steel trowel finish and which will facilitate the proper operation of the mechanical equipment. The finish of the structural slab below the cement grout topping shall be a heavy broom finish.
- B. Where cement grout is to be placed without mechanical equipment, the fresh surface of the cement grout shall be a smooth trowel finish. Placement procedure of cement grout at areas with mechanical equipment includes:
 - 1. Notify Project Representative or Engineer a minimum of 48 hours in advance of placement.
 - 2. Make a trial cement grout batch of not less than 1/2 cubic yard to allow time for adjustment in mix design if required.
 - 3. Clean the exposed structural slab by sandblasting and washing clean.

4. Thoroughly broom a neat cement paste containing an epoxy binder into the concrete slab surface immediately ahead of placing the cement grout topping.
5. Where applicable, install level and true mechanical screed equipment over the floor slab to provide a minimum thickness of 2 inches +/- 1/4 inch. In areas where the distance between the mechanical screed and the structural slab is less than the above clearances, grind surface as directed by Engineer to provide such clearance. The mechanical screed shall operate at a speed acceptable to the cement grout topping placement procedures. Screeding procedures shall account for the effects of differential temperatures on the mechanical screed equipment.
6. Place cement grout topping in a continuous operation. If grouting operations are interrupted, clean the edge of the previously placed topping by water jetting and add a coat of cement paste to provide a bond to the fresh topping.
7. Temporarily equip the mechanical screed mechanism on at least two arms with a 2-inch by 10 inch continuous wood plate with light gauge metal angles and surface plates or channels. The bottom of the screed plates or steel plates shall be adjustable and set to elevations which allow the proper operation of equipment and as recommended by the equipment manufacturer or supplier.
8. Screed the topping immediately after consolidation with vibrators or tampers and provide a steel trowel finish.
9. Cure cement grout topping with water and cover with PVC sheeting to prevent damage from foot traffic for seven days. When/If the cement grout topping is found not to be acceptable, remove and replace. Cement grout topping not acceptable shall include, but is not limited to, poor bonding with the concrete slab, low strength, excessive cracking and unevenness in finish or elevation.

3.3 JOINT MORTAR BED

- A. Joint Mortar Bed: Immediately prior to placement of fresh concrete at horizontal joints, or as indicated, place joint mortar bed to cover horizontal joint and protect water stop as applicable. Spread uniformly and work into all irregularities of the surface. The water cement ratio of the joint mortar bed shall not exceed that of the concrete being placed and the consistency of the mortar shall be suitable for placing and working. The fresh concrete shall then be immediately placed in a time and manner so that the joint mortar bed and the fresh concrete mix to form a homogenous concrete meeting all requirements.

3.4 NON-SHRINK GROUT

- A. Non-Shrink grout:
 1. Used for repair of holes and defects and at locations indicated where epoxy grout is not indicated. Execution shall follow manufacturer's recommendations.
 2. Base plates and equipment where indicated. Execution shall follow manufacturer's recommendations.

3.5 EPOXY GROUT

- A. Epoxy Grout: Used to embed all anchor bolts and reinforcing steel set in grout, specific machinery base plates as indicated and at other locations where indicated. Execution shall follow manufacturer's recommendations.

3.6 FIELD QUALITY CONTROL

- A. Evaluation and Acceptance of Non-shrink Grout:
 1. Consistency: As specified in Article NON-SHRINK GROUT. Grout with consistencies outside range requirements shall be rejected.
 2. Segregation: As specified in Article NON-SHRINK GROUT. Grout when aggregate separates shall be rejected.

3.7 MANUFACTURER'S SERVICES

- A. General: Coordinate demonstrations, training sessions, and applicable site visits with grout manufacturer's representative.

3.8 SUPPLEMENTS

- A. The supplement listed below, following "END OF SECTION," is part of this Specification.
 - 1. 24-hour Evaluation of Non-shrink Grout Test Form and Grout Testing Procedures.

END OF SECTION

SUPPLEMENT 1

(Test Lab Name)

(Address)

(Phone No.)

24-HOUR EVALUATION OF NONSHRINK GROUT TEST FORM

OBJECTIVE: Define standard set of test procedures for an independent testing laboratory to perform and complete within a 24-hour period.

SCOPE: Utilize test procedures providing 24-hour results to duplicate field grouting demands. Intent of evaluation is to establish grout manufacturer's qualifications.

PRIOR TO TEST: Obtain five bags of each type of grout.

1. From intended grout supplier for Project.
2. Five bags of grout shall be of same lot number.

ANSWER THE FOLLOWING QUESTIONS FOR GROUT BEING TESTED FROM LITERATURE, DATA, AND PRINTING ON BAG:

- | | | | |
|----|---|----------|---------|
| A. | Product data and warranty information contained in company literature and data? | Yes_____ | No_____ |
| B. | Literature and bag information meet specified requirements? | Yes_____ | No_____ |
| C. | Manufacturer guarantees grout as specified in Article GUARANTEE? | Yes_____ | No_____ |
| D. | Guarantee extends beyond grout replacement value and allows participation with CONTRACTOR in replacing and repairing defective areas? | Yes_____ | No_____ |
| E. | Water demands and limits printed on bag? | Yes_____ | No_____ |
| F. | Mixing information printed on the bag? | Yes_____ | No_____ |
| G. | Temperature restrictions printed on bag? | Yes_____ | No_____ |

*Rejection of a grout will occur if one or more answers are noted NO.

GROUT TESTING PROCEDURES

A. Bagged Material:

1. List lot numbers. _____
2. List expiration date. _____
3. Weigh bags and record weight. _____

ENGINEER will disqualify grout if bag weights have misstated measure plus or minus 2 pounds by more than one out of five bags. (Accuracy of weights is required to regulate amount of water used in mixing since this will affect properties.)

B. Mixing and Consistency Determination:

1. Mix full bag of grout in 10 gallon pail.
2. Use electric drill with a paddle device to mix grout (jiffy or jiffler type paddle).
3. Use maximum water allowed per water requirements listed in bag instructions.
4. Mix grout to maximum time listed on bag instructions.
5. In accordance with COE CRD-C611 (flow cone) determine time of mixed grout through the flow cone. _____ seconds
6. Add water to attain 20 to 30 second flow in accordance with COE CRD-C611.
7. Record time of grout through cone at new water demand. _____ seconds
8. Record total water needed to attain 20 to 30 second flow. _____ pounds
9. Record percent of water. _____ percent

C. When fluid grout is specified and additional water is required beyond grout manufacturer's listed maximum water, COE CRD-C621 will be run at new water per grout ratio to determine whether grout passes using actual water requirements to be fluid. Use new water per grout ratio on remaining tests.

D. Bleed Test:

1. Fill two gallon cans half full of freshly mixed grout at ambient temperatures for each category and at required consistency for each.
2. Place one can of grout in tub of ice water and leave one can at ambient temperature.
3. Cover top of both cans with glass or plastic plate preventing evaporation.
4. Maintain 38 to 42 degrees F temperature with grout placed in ice and maintain ambient temperature for second container for 1 hour.
5. Visually check for bleeding of water at 15-minute intervals for 2 hours.
6. Perform final observation at 24 hours.
7. If grout bleeds a small amount at temperatures specified, grout will be rejected.

E. Extended Flow Time and Segregation Test (for Category II and III):

1. Divide the remaining grout into two 3 gallon cans. Place the cans into the 40 °F and 100 °F containers and leave for 20, 40, and 60 minutes. Every 20 minutes remove and check for segregation or settlement of aggregate. Use a gloved hand to reach to the bottom of the can, if more than 1/4-inch of aggregate has settled to the bottom or aggregate has segregated into clumps reject the grout.

2. Right after the settlement test mix the grout with the drill mixer for 10 seconds. Take a COE CRD-C611 flow cone test of grout and record flow time. Maintain this process for 1 hour at ambient temperatures of 40 and 100 degrees F.

- a. 20 min _____, sec. @ 40 degrees F.
- b. 40 min _____, sec. @ 40 degrees F.
- c. 60 min _____, sec. @ 40 degrees F.
- d. 20 min _____, sec. @ 100 degrees F.
- e. 40 min _____, sec. @ 100 degrees F.
- f. 60 min _____, sec. @ 100 degrees F.

All Category II and III grout that will not go through the flow cone with continuous flow after 60 minutes will be disqualified.

Qualified

Disqualified

F. 24-hour Strength Test:

- 1. Using grout left in mixing cans in accordance with COE CRD-C621 for mixing and consistency determination test and for extended time flow test, make minimum of nine cube samples.
- 2. Store cubes at 70 degrees F for 24 hours.
- 3. Record average compressive strength of nine cubes at 24 hours.

Grout will be disqualified if 24-hour compressive strengths are under 2,500 psi for grouts claiming fluid placement capabilities.

Grouts that have not been disqualified after these tests are qualified for use on the Project for the application indicated in Nonshrink Grout Schedule.

Signature of Independent Testing Laboratory

Date Test Conducted

DIVISION 9
FINISHES

SECTION 09 90 00 - PAINTING AND PROTECTIVE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Exposed, buried, and submerged metal, exposed PVC and CPVC, exposed FRP, and aluminum and dissimilar metals, to be protective painted, whether specifically mentioned or not, except as specified otherwise. Prime coat structural steel surfaces. Exterior concrete surfaces will not be protective painted unless specifically indicated. Interior concrete surfaces will be protective painted as specified herein.

1.2 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. ASTM International (ASTM):
 - a. D 16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
 - b. D 4541 - Standard Test Method for Pull-off Strength of Coatings Using Portable Adhesion Testers.
 - 2. NACE International (NACE):
 - a. SP0178 - Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service.
 - b. SP0188-06 - Discontinuity (Holiday) Testing of Protective Coatings.
 - 3. National Association of Pipe Fabricators (NAPF):
 - a. 500-03 - Surface Preparation Standard for Ductile Iron Pipe and Fittings Receiving Special External Coatings and/or Special Internal Linings.
 - 4. NSF International (NSF):
 - a. 61 - Drinking Water System Components - Health Effects.
 - 5. Society for Protective Coatings (SSPC):
 - a. QP1, Standard Procedure for Evaluating Qualifications of Painting Contractors.
 - b. QP2, Standard Procedure for Evaluating the Qualifications of Painting Contractors to Remove Hazardous Paint.
 - c. SP COM - Surface Preparation Commentary for Steel and Concrete Substrates.
 - d. SP-1 - Solvent Cleaning.
 - e. SP-2 - Hand Tool Cleaning.
 - f. SP-3 - Power Tool Cleaning.
 - g. SP-5 - White Metal Blast Cleaning.
 - h. SP-6 - Commercial Blast Cleaning.
 - i. SP-7 - Brush-Off Blast Cleaning.
 - j. SP 8, Pickling.
 - k. SP-10 - Near-White Blast Cleaning.
 - l. SP 11-T, Power Tool Cleaning to Bare Metal.
 - m. SP 13, Surface Preparation of Concrete.
 - n. Guide No. 3, PA, Guide to Safety in Painting Applications.
 - 6. U.S. Environment Protection Agency (EPA):
 - a. Method 24 - Surface Coatings.
 - 7. NACE International (NACE):
 - a. SP0178 - Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service.
 - b. SP0188-06 - Discontinuity (Holiday) Testing of Protective Coatings.
 - 8. National Association of Pipe Fabricators (NAPF):
 - a. 500-03 - Surface Preparation Standard for Ductile Iron Pipe and Fittings Receiving Special External Coatings and/or Special Internal Linings.
 - 9. NSF International (NSF):
 - a. 61 - Drinking Water System Components - Health Effects.

10. Society for Protective Coatings (SSPC):
 - a. QP1, Standard Procedure for Evaluating Qualifications of Painting Contractors.
 - b. QP2, Standard Procedure for Evaluating the Qualifications of Painting Contractors to Remove Hazardous Paint.
 - c. SP COM - Surface Preparation Commentary for Steel and Concrete Substrates.
 - d. SP-1 - Solvent Cleaning.
 - e. SP-2 - Hand Tool Cleaning.
 - f. SP-3 - Power Tool Cleaning.
 - g. SP-5 - White Metal Blast Cleaning.
 - h. SP-6 - Commercial Blast Cleaning.
 - i. SP-7 - Brush-Off Blast Cleaning.
 - j. SP 8, Pickling.
 - k. SP-10 - Near-White Blast Cleaning.
 - l. SP 11-T, Power Tool Cleaning to Bare Metal.
 - m. SP 13, Surface Preparation of Concrete.
 - n. Guide No. 3, PA, Guide to Safety in Painting Applications.
11. U.S. Environment Protection Agency (EPA):
 - a. Method 24 - Surface Coatings.

1.3 DEFINITIONS

- A. Terms used in this section:
 1. Submerged metal: Steel or iron surfaces below tops of channel or structure walls which will contain water even when above expected water level.
 2. Submerged concrete and masonry surfaces: Surfaces which are or will be:
 3. Underwater.
 4. In structures which normally contain water.
 5. Below tops of walls of water containing structures.
 6. Exposed surface: Any metal or concrete surface, indoors or outdoors that is exposed to view.
 7. Dry film thickness (DFT): Thickness of fully cured coating, measured in mils.
 8. Volatile organic compound (VOC): Content of air polluting hydrocarbons in uncured coating product measured in units of grams per liter or pounds per gallon, as determined by EPA Method 24.
 9. Ferrous: Cast iron, ductile iron, wrought iron, and all steel alloys except stainless steel.
 10. Where SSPC surface preparation standards are specified or implied for ductile iron pipe or fittings, the equivalent NAF surface preparation standard shall be substituted for the SSPC standard.
 11. Coverage: Total minimum dry film thickness in mils, or square feet per gallon.
 12. FRP: Fiberglass Reinforced Plastic.
 13. HCl: Hydrochloric Acid.
 14. MDFT: Minimum Dry Film Thickness.
 15. MDFTPC: Minimum Dry Film Thickness per Coat.
 16. Mil: Thousandth of an inch.
 17. Military Specification-Paint.
 18. PSDS: Paint System Data Sheet.
 19. SFGP: Square Feet per Gallon.
 20. SFGPC: Square Feet per Gallon per Coat.
 21. SP: Surface Preparation.

1.4 PERFORMANCE REQUIREMENTS

- A. Coating materials shall be especially adapted for use in wastewater treatment plants.
- B. Coating materials used in contact with potable water supply systems shall be certified to NSF 61.

1.5 SUBMITTALS

- A. General: Submit in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.
- B. Shop Drawings:
 - 1. Schedule of proposed coating materials.
 - 2. Schedule of surfaces to be coated with each coating material.
- C. Product Data: Include description of physical properties of coatings including solids content and ingredient analysis, VOC content, temperature resistance, typical exposures and limitations, and manufacturer's standard color chips:
 - 1. Data Sheets:
 - a. For each paint system, furnish a Paint System Data Sheet (PSDS), the Manufacturer's Technical Data Sheets, and paint colors available (where applicable) for each product used in the paint system. The PSDS form is appended to the end of this section.
 - b. Submit required information on a system-by-system basis.
 - c. Furnish copies of paint system submittals to the coating applicator.
 - d. Indiscriminate submittal of Manufacturer's literature only is not acceptable.
 - e. Regulatory requirements: Submit data concerning the following:
 - f. Volatile organic compound limitations.
 - g. Coatings containing lead compounds and PCBs.
 - h. Abrasives and abrasive blast cleaning techniques, and disposal.
 - i. NSF certification of coatings for use in potable water supply systems.
- D. Samples: Include 8-inch square drawdowns or brush-outs of topcoat finish when requested. Identify each sample as to finish, formula, color name and number and sheen name and gloss units.
- E. Certificates: Submit in accordance with requirements for Product Data.
- F. Manufacturer's Instructions: Include the following:
 - 1. Special requirements for transportation and storage.
 - 2. Mixing instructions.
 - 3. Shelf life.
 - 4. Pot life of material.
 - 5. Precautions for applications free of defects.
 - 6. Surface preparation.
 - 7. Method of application.
 - 8. Recommended number of coats.
 - 9. Recommended dry film thickness (DFT) of each coat.
 - 10. Recommended total dry film thickness (DFT).
 - 11. Drying time of each coat, including prime coat.
 - 12. Required prime coat.
 - 13. Compatible and non-compatible prime coats.
 - 14. Recommended thinners, when recommended.
 - 15. Limits of ambient conditions during and after application.
 - 16. Time allowed between coats (minimum and maximum).
 - 17. Required protection from sun, wind, and other conditions.
 - 18. Touch-up requirements and limitations.
 - 19. Minimum adhesion of each system submitted in accordance with ASTM D 4541.
- G. Manufacturer's Representative's Field Reports.
- H. Operations and Maintenance Data: Submit as specified in Section 01 77 00 CLOSEOUT PROCEDURES.

1. Reports on visits to project site to view and approve surface preparation of structures to be coated.
2. Reports on visits to project site to observe and approve coating application procedures.
3. Reports on visits to coating plants to observe and approve surface preparation and coating application on items that are "shop coated."

1.6 QUALITY ASSURANCE

- A. Quality Assurance Submittals:
 1. Quality Assurance plan.
 2. Qualifications of coating applicator including List of Similar Projects and List of References substantiating experience.
 3. Factory Applied Coatings: Manufacturer's certification stating factory applied coating system meets or exceeds requirements specified.
 4. If the Manufacturer of finish coating differs from that of shop primer, provide both Manufacturers' written confirmation that materials are compatible.
 5. Manufacturer's written instructions and special details for applying each type of paint.
 6. Manufacturers' Certification of Proper Installation.
- B. Certifications: All paints and coatings to be used on this project comply with current federal, state, and local VOC regulations
- C. Applicator qualifications:
 1. Minimum of 5 years' experience applying specified type or types of coatings under conditions similar to those of the Work:
 2. Provide qualifications of applicator and references listing 5 similar projects completed in the past 2 years.
 3. Manufacturer approved applicator when manufacturer has approved applicator program.
 4. Approved and licensed by polymorphic polyester resin manufacturer to apply polymorphic polyester resin coating system.
 5. Approved and licensed by elastomeric polyurethane (100 percent solids) manufacturer to apply 100 percent solids elastomeric polyurethane system.
 6. Applicator of off-site application of coal tar epoxy shall have successfully applied coal tar epoxy on similar surfaces in material, size, and complexity as on the Project.
- D. Regulatory requirements: Comply with governing agencies regulations by using coatings that do not exceed permissible volatile organic compound limits and do not contain lead:
 1. Do not use coal tar epoxy in contact with drinking water or exposed to ultraviolet radiation.
 2. Perform surface preparation and painting in accordance with recommendations of the following:
 3. Paint Manufacturer's instructions.
 4. SSPC-PA Guide No. 3, Guide to Safety in Paint Applications.
 5. Federal, state, and local agencies having jurisdiction.
- E. Samples:
 1. Reference Panel:
 - a. Prior to start of surface preparation, furnish a 4" by 4" steel panel for each grade of sandblast specified herein, prepared to specified requirements.
 - b. Provide panel representative of the steel used; prevent deterioration of surface quality.
 - c. Upon approval of Engineer, panel to be reference source for inspection.
 - d. Unless otherwise specified, before painting work is started, prepare minimum 8" by 10" samples with type of paint and application specified on similar substrate to which paint is to be applied.
 - e. Furnish additional samples as required until colors, finishes, and textures are approved.

- f. Approved samples to be the quality standard for final finishes.
 - g. Field samples:
 - h. Prepare and coat a minimum 100 square foot area between corners or limits such as control or construction joints of each system.
 - i. Approved field sample may be part of Work.
 - j. Obtain approval before painting other surfaces.
 - F. Pre-installation conference: Conduct as specified in Section 01 31 19 PROJECT MEETINGS.
 - G. Compatibility of coatings: Use products by same manufacturer for prime coats, intermediate coats, and finish coats on same surface, unless specified otherwise.
 - H. Services of coating manufacturer's representative: Arrange for coating manufacturer's representative to attend pre-installation conferences. Make periodic visits to the project site to provide consultation and inspection services during surface preparation and application of coatings, and to make visits to coating plants to observe and approve surface preparation procedures and coating application of items to be "shop primed and coated".
 - I. Contract Closeout Submittals: Special guarantee.
- 1.7 PRODUCT DELIVERY, STORAGE AND HANDLING
- A. Deliver, store, and handle products as specified in Section 01 60 00 PRODUCT REQUIREMENTS.
 - B. Remove unspecified and unapproved paints from Project site immediately.
 - C. Deliver new unopened containers with labels identifying the manufacturer's name, brand name, product type, batch number, date of manufacturer, expiration date or shelf life, color, and mixing and reducing instructions.
 - 1. Do not deliver materials aged more than 12 months from manufacturing date.
 - D. Store coatings in well-ventilated facility that provides protection from the sun, weather, and fire hazards. Maintain ambient storage temperature between 45 and 90 degrees Fahrenheit, unless otherwise recommended by the manufacturer.
 - E. Take precautions to prevent fire and spontaneous combustion.
 - F. Shipping:
 - 1. Where pre-coated items are to be shipped to the site, protect coating from damage. Batten coated items to prevent abrasion.
 - 2. Use nonmetallic or padded slings and straps in handling.
- 1.8 PROJECT CONDITIONS
- A. Surface moisture contents: Do not coat surfaces that exceed manufacturer specified moisture contents, or when not specified by the manufacturer, the following moisture contents:
 - 1. Plaster and gypsum wallboard: 12 percent.
 - 2. Masonry, concrete, and concrete block: 12 percent.
 - 3. Interior located wood: 15 percent.
 - 4. Concrete floors: 7 percent.
 - B. Do not apply coatings:
 - 1. Under dusty conditions or adverse environmental conditions, unless tenting, covers, or other such protection is provided for structures to be coated.

2. When light on surfaces measures less than 15 foot-candles.
 3. When ambient or surface temperature is less than 55 degrees Fahrenheit unless manufacturer allows a lower temperature.
 4. When relative humidity is higher than 85 percent.
 5. When surface temperature is less than 5 degrees Fahrenheit above dew point.
 6. When surface temperature exceeds the manufacturer's recommendation.
 7. When ambient temperature exceeds 90 degrees Fahrenheit, unless manufacturer allows a higher temperature.
 8. Apply clear finishes at minimum 65 degrees Fahrenheit.
- C. Provide fans, heating devices, dehumidifiers, or other means recommended by coating manufacturer to prevent formation of condensate or dew on surface of substrate, coating between coats and within curing time following application of last coat.
- D. Provide adequate continuous ventilation and sufficient heating facilities to maintain minimum 55 degrees Fahrenheit for 24 hours before, during and 48 hours after application of finishes.
- E. Dehumidification and heating for coating of digester interiors, wet wells, and high humidity enclosed spaces:
1. Provide dehumidification and heating of digester interior spaces in which surface preparation, coating application, or curing is in progress according to the following schedule:
 - a. October 1 to April 30: Provide continuous dehumidification and heating as required to maintain the tanks within environmental ranges as specified in this Section and as recommended by the coating material manufacturer. For the purposes of this Section, "continuous" is defined as 24 hours per day and 7 days per week.
 - b. May 1 to September 30: Provide temporary dehumidification and heating as may be required to maintain the tanks within the specified environmental ranges in the event of adverse weather or other temporary condition. At CONTRACTOR's option and at his sole expense, CONTRACTOR may suspend work until such time as acceptable environmental conditions are restored, in lieu of temporary dehumidification and heating. Repair or replace any coating or surface preparation damaged by suspension of work, at CONTRACTOR's sole expense.
 2. Equipment requirements:
 - a. Capacity: Provide dehumidification, heating, and air circulation equipment with minimum capacity to perform the following:
 - 1) Maintain the dew point of the air in the tanks at a temperature at least 5 degrees Fahrenheit less than the temperature of the coldest part of the structure where work is underway.
 - 2) Reduce dew point temperature of the air in the tanks by at least 10 degrees Fahrenheit in 20 minutes.
 - 3) Maintain air temperature in the tanks at 60 degrees minimum.
 - b. Systems:
 - 1) Internal combustion engine generators: May be used; CONTRACTOR shall obtain all required permits and provide air pollution and noise control devices on equipment as required by permitting agencies.
 - 2) Dehumidification: Provide desiccant or refrigeration drying. Desiccant types shall have a rotary desiccant wheel capable of continuous operation. No Liquid, granular, or loose lithium chloride drying systems will be allowed.
 - 3) Heating: Electric, indirect combustion, or steam coil methods may be used. Direct fired combustion heaters will not be allowed during abrasive blasting, coating application, or coating cure time.
 3. Design and submittals:
 - a. CONTRACTOR shall prepare dehumidification and heating plan for this project, including all equipment and operating procedures.

- b. Suppliers of services and equipment shall have not less than 3 years' experience in similar applications.
 - c. Supplier: The following or equal:
 - 1) Cargocaire Corporation (Munters) or equal.
 - d. Submit dehumidification and heating plan for ENGINEER's review.
- 4. Monitoring and performance:
 - a. Measure and record relative humidity and temperature of air, and structure temperature twice daily (beginning and end of work shifts) to verify that proper humidity and temperature levels are achieved inside the work area after the dehumidification equipment is installed and operational. Test results shall be made available to the ENGINEER upon request.
 - b. Interior space of the working area and tank(s) shall be sealed and a slight positive pressure maintained as recommended by the supplier of the dehumidification equipment.
 - c. The filtration system used to remove dust from the air shall be designed so that it does not interfere with the dehumidification equipment's ability to control the dew point and relative humidity inside the reservoir.
 - 1) The air from the tank, working area, or dust filtration equipment shall not be recirculated through the dehumidifier during coating application or when solvent vapors are present.

1.9 SEQUENCING AND SCHEDULING

- A. Sequence and Schedule: As specified in Section 01 14 00 WORK RESTRICTIONS.

1.10 SPECIAL GUARANTEE

- A. Furnish Manufacturer's extended guarantee or warranty, with OWNER named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction, or at the option of the OWNER, removal and replacement of work specified in this Specification section found *defective* during a period of 1 year after the date of Substantial Completion.
- B. Contractor and paint Manufacturer shall jointly and severally furnish guarantee.

1.11 MAINTENANCE

- A. Extra materials: Deliver as specified in Section 01 77 00. Include minimum 1 gallon of each type and color of coating applied:
 - 1. When manufacturer packages material in gallon cans, deliver unopened labeled cans as comes from factory.
 - 2. When manufacturer does not package material in gallon cans, deliver material in new gallon containers, properly sealed and identified with typed labels indicating brand, type, and color.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Special coatings: One of the following or equal:
 - 1. Carboline: Carboline, St. Louis, MO.
 - 2. Ceilcote: International Protective Coatings, Berea, OH.
 - 3. Dampney: The Dampney Company, Everett, MA.
 - 4. Devoe: International Protective Coatings, Louisville, KY.
 - 5. Dudick: Dudick, Inc., Streetsboro, OH.
 - 6. GET: Global Eco Technologies, Pittsburg, CA.

7. Henkel: Henkel North America, Madison Heights MI.
8. IET: Integrated Environmental Technologies, Santa Barbara, CA.
9. Induron Protective Coatings, Birmingham, AL.
10. PPG Amercoat: PPG Protective & Marine Coatings, Brea, CA.
11. Raven Lining Systems, Broken Arrow, OK.
12. Rustoluem : Rustoleum Corp., Somerset, NJ.
13. Sanchem: Sanchem, Chicago, IL.
14. Superior: Superior Environmental Products, Inc., Addison, TX.
15. S-W: Sherwin-Williams Co., Cleveland, OH.
16. Tnemec: Tnemec Co., Kansas City, MO.
17. Wasser: Wasser High Tech Coatings, Kent, WA.
18. ZRC: ZRC Worldwide Innovative Zinc Technologies, Marshfield, MA.

2.2 PREPARATION AND PRETREATMENT MATERIALS

- A. Metal pretreatment: As manufactured by one of the following or equal:
 1. Henkel: Galvaprep 5.
 2. International: AWLGrip Alumiprep 33.
- B. Surface cleaner and degreaser: As manufactured by one of the following or equal:
 1. Carboline Surface Cleaner No.3.
 2. Devoe: Devprep 88.
 3. S-W: Clean and Etch.

2.3 COATING MATERIALS

- A. Wax coating: As manufactured by the following or equal:
 1. Sanchem: No-Ox-Id A special.
- B. High solids epoxy (self-priming) not less than 72 percent solids by volume: As manufactured by one of the following or equal:
 1. Carboline: Carboguard 891.
 2. Devoe: Bar Rust 233H.
 3. Induron: PE-70
 4. PPG Amercoat: Amerlock 2.
 5. S-W: Macropoxy 646.
 6. Tnemec: HS Epoxy Series 104.
- C. Aliphatic or aliphatic-acrylic polyurethane: As manufactured by one of the following or equal:
 1. Carboline: Carbothane 134 VOC.
 2. Devoe: Devthane 379.
 3. PPG Amercoat: Amershield VOC.
 4. S-W: High Solids Polyurethane [CA].
 5. Tnemec: Endura-Shield II Series 1075 (U).
- D. Epoxy Novolac: Multi-component aggregate-filled epoxy system specifically designed for exposure to municipal wastewater. As manufactured by one of the following or equal:
 1. Sauereisen: Sewergard No. 210, 210S, or 210GL
 2. Carboline: Plasite 4550 S
 3. Devoe: Devmat 100
 4. Raven 410
- E. High temperature coating 150 to 350 degrees Fahrenheit: As manufactured by one of the following or equal:
 1. Carboline: Thermaline 4900.

2. Dampney: Thermalox 245 Silicone - Zinc Dust.
 3. PPG Amercoat: Amerlock 2/400 GFK.
- F. High temperature coating 400 to 1,000 degrees Fahrenheit (dry): As manufactured by one of the following or equal:
1. Carboline: Thermaline 4700.
 2. Dampney: Thermalox 230C Series Silicone.
 3. Devoe: HT-12, High Heat Silicone.
- G. High temperature coating up to 1,400 degrees Fahrenheit: As manufactured by the following or equal:
1. Dampney: Thermalox 240 Silicone Ceramix.
- H. Asphalt varnish: AWWA C 500.
- I. Coal tar: Where coal tar, coal tar epoxy, or coal tar mastic are specified or indicated on the Drawings, use coal tar epoxy substitute in their place. Coal tar shall not be allowed.
- J. Coal tar epoxy substitute: As manufactured by one of the following or equal:
1. [Devoe: Devtar 5A HS.
 2. S-W: Macropoxy 646 Black.]
- K. Vinyl ester: Glass mat reinforced, total system 125 mils DFT. As manufactured by one of the following or equal:
1. Carboline: Semstone 870.
 2. Ceilcote: 6640 Ceilcrete.
 3. Dudick: Protecto-Flex 800.
 4. Tnemec: Chembloc Series 239SC.
- L. Elastomeric polyurethane, 100 percent solids, ASTM D 16, Type V, (Urethane P): As manufactured by the following or equal:
1. GET: Endura-Flex EF-1988.
- M. Concrete floor coatings: As manufactured by one of the following or equal:
1. Carboline: Semstone 140SL.
 2. Devoe: Devran 124.
 3. Dudick: Polymer Alloy 1000.
 4. Tnemec: Tneme-Glaze Series 282.
- N. Waterborne acrylic emulsion: As manufactured by one of the following or equal:
1. S-W: DTM Acrylic B66W1.
 2. Tnemec: Tneme-Cryl Series 6.
- O. Galvanizing Zinc Compound: As manufactured by one of the following or equal:
1. ZRC: Cold Galvanizing Compound.
- 2.4 MIXES
- A. Mix in accordance with manufacturer's instructions.

PART 3 - EXECUTION

3.1 GENERAL PROTECTION

- A. Protect adjacent surfaces from coatings and damage. Repair damage resulting from inadequate or unsuitable protection:
- B. Protect adjacent surfaces not to be coated from spatter and droppings with drop cloths and other coverings:
 - 1. Mask off surfaces of items not to be coated or remove items from area.
- C. Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or droppings from fouling surfaces not being coated and in particular, surfaces within storage and preparation area.
- D. Place cotton waste, cloths, and material which may constitute fire hazard in closed metal containers and remove daily from site.
- E. Remove electrical plates, surface hardware, fittings, and fastenings, prior to application of coating operations. Carefully store, clean, and replace on completion of coating in each area. Do not use solvent or degreasers to clean hardware that may remove permanent lacquer finish.

3.2 GENERAL PREPARATION

- A. Prepare surfaces in accordance with coating manufacturer's instructions, unless more stringent requirements are specified in this Section.
- B. Protect following surfaces from abrasive blasting by masking, or other means:
 - 1. Threaded portions of valve and gate stems, grease fittings, and identification plates.
 - 2. Machined surfaces for sliding contact.
 - 3. Surfaces to be assembled against gaskets.
 - 4. Surfaces of shafting on which sprockets are to fit.
 - 5. Surfaces of shafting on which bearings are to fit.
 - 6. Machined surfaces of bronze trim, including those slide gates.
 - 7. Cadmium-plated items, except cadmium-plated, zinc-plated, or sherardized fasteners used in assembly of equipment requiring abrasive blasting.
 - 8. Galvanized items, unless scheduled to be coated.
- C. Protect installed equipment, mechanical drives, and adjacent coated equipment from abrasive blasting to prevent damage caused by entering sand or dust.
- D. Concrete:
 - 1. Allow new concrete to cure for minimum of 28 days before coating.
 - 2. Clean concrete surfaces of dust, mortar, fins, loose concrete particles, form release materials, oil, and grease. Fill voids so that surface is smooth. Etch or brush off-blast clean in accordance with SSPC SP-7 to provide surface profile equal to 40 to 60-grit sandpaper, or as recommended by coating manufacturer. All concrete surfaces shall be vacuumed clean prior to coating application.
- E. Ferrous metal surfaces:
 - 1. Remove grease and oil in accordance with SSPC SP-1.
 - 2. Remove rust, scale, and welding slag and spatter, and prepare surfaces in accordance with appropriate SSPC standard as specified.
 - 3. Abrasive blast surfaces prior to coating.

- a. When abrasive blasted surfaces rust or discolor before coating, abrasive blast surfaces again to remove rust and discoloration.
 - b. When metal surfaces are exposed because of coating damage, abrasive blast surfaces and feather in to a smooth transition before touching up.
 - c. Ferrous metal surfaces not to be submerged: Abrasive blast in accordance with SSPC SP-10, unless blasting may damage adjacent surfaces, prohibited or specified otherwise. Where not possible to abrasive blast, power tool clean surfaces in accordance with SSPC SP-3.
 - d. Ferrous metal surfaces to be submerged: Unless specified otherwise, abrasive blast in accordance with SSPC SP-5 to clean and provide roughened surface profile of not less than 2 mils and not more than 4 mils in depth when measured with Elcometer 123, or as recommended by the coating manufacturer.
- 4. All abrasive blast cleaned surfaces shall be blown down with clean dry air and or vacuumed.
- F. Ductile iron pipe and fittings to be lined or coated: Abrasive blast clean in accordance with NAPF 500-03.
- G. Sherardized, aluminum, copper, and bronze surfaces: Prepare in accordance with coating manufacturer's instructions.
- H. Galvanized surface:
 - 1. Degrease or solvent clean (SSPC SP-1) to remove oily residue.
 - 2. Power tool or hand tool clean or whip abrasive blast.
 - 3. Test surface for contaminants using copper sulfate solution.
 - 4. Apply metal pretreatment within 24 hours before coating galvanized surfaces that cannot be thoroughly abraded physically, such as bolts, nuts, or preformed channels.
- I. Shop primed metal:
 - 1. Certify that primers applied to metal surfaces in the shop are compatible with coatings to be applied over such primers in the field.
 - 2. Remove shop primer from metal to be submerged by abrasive blasting in accordance with SSPC SP-10, unless greater degree of surface preparation is required by coating manufacturer's representative.
 - 3. Correct abraded, scratched, or otherwise damaged areas of prime coat by sanding or abrasive blasting to bare metal in accordance with SSPC SP-2, SP 3, or SP-6, as directed by the ENGINEER.
 - 4. When entire shop priming fails or has weathered excessively (more than 25 percent of the item), or when recommended by coating manufacturer's representative, abrasive blast shop prime coat to remove entire coat and prepare surface in accordance with SSPC SP-10.
 - 5. When incorrect prime coat is applied, remove incorrect prime coat by abrasive blasting in accordance with SSPC SP-10.
 - 6. When prime coat not authorized by ENGINEER is applied, remove unauthorized prime coat by abrasive blasting in accordance with SSPC SP-10.
 - 7. Shop applied bituminous paint or asphalt varnish: Abrasive blast clean shop applied bituminous paint or asphalt varnish from surfaces scheduled to receive non-bituminous coatings.
- J. Cadmium-plated, zinc-plated, or sherardized fasteners:
 - 1. Abrasive blast in same manner as unprotected metal when used in assembly of equipment designated for abrasive blasting.
- K. Abrasive blast components to be attached to surfaces which cannot be abrasive blasted before components are attached.

- L. Grind sharp edges to approximately 1/16-inch radius before abrasive blast cleaning.
- M. Remove and grind smooth all excessive weld material and weld spatter before blast cleaning in accordance with NACE SP0178.
- N. PVC and FRP Surfaces:
 - 1. Prepare surfaces to be coated by light sanding (de-gloss) and wipe-down with clean cloths, or by solvent cleaning in strict accordance with coating manufacturer's instructions.
- O. Cleaning of previously coated surfaces:
 - 1. Utilize cleaning agent to remove soluble salts such as chlorides and sulfates from concrete and metal surfaces:
 - a. Cleaning agent: Biodegradable non-flammable and containing no volatile organic compounds.
 - b. Manufacturer: The following or equal:
 - 1) Chlor-Rid International, Inc.
 - 2. Steam clean and degrease surfaces to be coated to remove oils and grease, then, if necessary, proceed with abrasive blast cleaning.
 - 3. Cleaning of surfaces utilizing the decontamination cleaning agent may be accomplished in conjunction with abrasive blast cleaning, steam cleaning, high-pressure washing, or hand washing as approved by the coating manufacturer's representative and the ENGINEER.
 - 4. Test cleaned surfaces in accordance with the cleaning agent manufacturer's instructions to ensure all soluble salts have been removed. Additional cleaning shall be carried out as necessary.
 - 5. Final surface preparation prior to application of new coating system shall be made in strict accordance with coating manufacturer's printed instructions.

3.3 MECHANICAL AND ELECTRICAL EQUIPMENT PREPARATION

- A. Identify equipment, ducting, piping, and conduit as specified in Section 22 05 53 – MECHANICAL IDENTIFICATION and Section 26 05 53 – IDENTIFICATION FOR ELECTRICAL SYSTEMS.
- B. Remove grilles, covers, and access panels for mechanical and electrical system from location and coat separately.
- C. Prepare and finish coat-primed equipment with color selected by the ENGINEER.
- D. Prepare and prime and coat insulated and bare pipes, conduits, boxes, insulated and bare ducts, hangers, brackets, collars, and supports, except where items are covered with prefinished coating.
- E. Replace identification markings on mechanical or electrical equipment when coated over or spattered.
- F. Prepare and coat interior surfaces of air ducts, convactor and baseboard heating cabinets that are visible through grilles and louvers with 1 coat of flat black paint, to limit of sight line.
- G. Prepare and coat dampers exposed immediately behind louvers, grilles, convactor and baseboard cabinets to match face panels.
- H. Prepare and coat exposed conduit and electrical equipment occurring in finished areas with color and texture to match adjacent surfaces.
- I. Prepare and coat both sides and edges of plywood backboards for electrical equipment before installing backboards and mounting equipment on them.

- J. Color code equipment, piping, conduit, and exposed ductwork and apply color banding and identification, such as flow arrows, naming and numbering, in accordance with Contract Documents.

3.4 GENERAL APPLICATION REQUIREMENTS

- A. Apply coatings in accordance with manufacturer's instructions.
- B. Coat metal unless specified otherwise:
 - 1. Aboveground piping to be coated shall be empty of contents during application of coatings.
- C. Verify metal surface preparation immediately before applying coating in accordance with SSPC SP COM.
- D. Allow surfaces to dry, except where coating manufacturer requires surface wetting before coating.
- E. Wash coat and prime sherardized, aluminum, copper, and bronze surfaces, or prime with manufacturer's recommended special primer.
- F. Prime shop primed metal surfaces. Spot prime exposed metal of shop primed surfaces before applying primer over entire surface.
- G. Multiple coats:
 - 1. Apply minimum number of specified coats.
 - 2. Apply additional coats when necessary to achieve specified thicknesses.
 - 3. Apply coats to thicknesses specified, especially at edges and corners.
 - 4. When multiple coats of same material are specified, tint prime coat and intermediate coats with suitable pigment to distinguish each coat.
 - 5. Lightly sand and dust surfaces to receive high gloss finishes, unless instructed otherwise by coating manufacturer.
 - 6. Dust coatings between coats.
- H. Coat surfaces without drops, overspray, dry spray, runs, ridges, waves, holidays, laps, or brush marks.
- I. Remove spatter and droppings after completion of coating.
- J. Apply coating by brush, roller, trowel, or spray, unless particular method of application is required by coating manufacturer's instructions or these Specifications.
- K. Plural component application: Drums shall be premixed each day. All gauges shall be working order prior to the start of application. Ratio checks shall be completed prior to each application. A spray sample shall be sprayed on plastic sheeting to ensure set time is complete prior to each application. Hardness testing shall be performed after each application.
- L. Spray application:
 - 1. Stripe coat edges, welds, nuts, bolts, difficult to reach areas by brush before beginning spray application, as necessary, to ensure specified coating thickness along edges.
 - 2. When using spray application, apply coating to thickness not greater than that recommended in coating manufacturer's instructions for spray application.
 - 3. Use airless spray method, unless air spray method is required by coating manufacturer's instruction or these Specifications.
 - 4. Conduct spray coating under controlled conditions. Protect adjacent construction and property from coating mist, fumes, or overspray.

- M. Drying and recoating:
1. Provide fans, heating devices, or other means recommended by coating manufacturer to prevent formation of condensate or dew on surface of substrate, coating between coats and within curing time following application of last coat.
 2. For submerged service the CONTRACTOR shall provide a letter to the ENGINEER that the lining system is fully cured and ready to be placed into service .
 3. Limit drying time to that required by these Specifications or coating manufacturer's instructions.
 4. Do not allow excessive drying time or exposure which may impair bond between coats.
 5. Recoat epoxies within time limits recommended by coating manufacturer.
 6. When time limits are exceeded, abrasive blast clean and de-gloss clean prior to applying another coat.
 7. When limitation on time between abrasive blasting and coating cannot be met before attachment of components to surfaces which cannot be abrasive blasted, coat components before attachment.
 8. Ensure primer and intermediate coats of coating are unscarred and completely integral at time of application of each succeeding coat.
 9. Touch up suction spots between coats and apply additional coats where required to produce finished surface of solid, even color, free of defects.
 10. Leave no holidays.
 11. Sand and feather in to a smooth transition and recoat and recoat scratched, contaminated, or otherwise damaged coating surfaces so damages are invisible to naked eye.
- N. Concrete:
1. Apply first coat (primer) only when surface temperature of concrete is decreasing in order to eliminate effects of off-gassing on coating.

3.5 ALKALI RESISTANT BITUMASTIC

- A. Preparation:
1. Prepare surfaces in accordance with general preparation requirements.
- B. Application:
1. Apply in accordance with general application requirements and as follows:
 - a. Apply at least 2 coats, 8 to 14 mils dry film thickness each.

3.6 WAX COATING

- A. Preparation:
1. Prepare surfaces in accordance with general preparation requirements.
- B. Application:
1. Apply in accordance with general application requirements and as follows:
 - a. Apply at least 1/32-inch thick coat with 2-inch or shorter bristle brush.
 - b. Thoroughly rub coating into metal surface with canvas covered wood block or canvas glove.

3.7 HIGH SOLIDS EPOXY SYSTEM

- A. Preparation:
1. Prepare surfaces in accordance with general preparation requirements and as follows:
 - a. Abrasive blast ferrous metal surfaces to be submerged at jobsite in accordance with SSPC SP-5 prior to coating. When cleaned surfaces rust or discolor, abrasive blast surfaces in accordance with SSPC SP-10.

- b. Abrasive blast non-submerged ferrous metal surfaces at jobsite in accordance with SSPC SP-10, prior to coating. When cleaned surfaces rust or discolor, abrasive blast surfaces in accordance with SSPC SP 6.
- c. Abrasive blast clean ductile iron surfaces at jobsite in accordance with SSPC SP-7.

B. Application:

- 1. Apply coatings in accordance with general application requirements and as follows:
 - a. Apply minimum 2-coat system with minimum total dry film thickness (DFT) of 12 mils.
 - b. Recoat or apply succeeding epoxy coats within time limits recommended by manufacturer. Prepare surfaces for recoating in accordance with manufacturer's instructions.
 - c. Coat metal to be submerged before installation when necessary, to obtain acceptable finish, and to prevent damage to other surfaces.
 - d. Coat entire surface of support brackets, stem guides, pipe clips, fasteners, and other metal devices bolted to concrete.
 - e. Coat surface of items to be exposed and adjacent 1 inch to be concealed when embedded in concrete or masonry.

3.8 HIGH SOLIDS EPOXY AND POLYURETHANE COATING SYSTEM

A. Preparation:

- 1. Prepare surfaces in accordance with general preparation requirements and as follows:
 - a. Prepare concrete surfaces in accordance with general preparation requirements.
 - b. Touch up shop primed steel and miscellaneous iron.
 - c. Abrasive blast ferrous metal surfaces at jobsite prior to coating. Abrasive blast clean rust and discoloration from surfaces.
 - d. Degrease or solvent clean, whip abrasive blast, power tool, or hand tool clean galvanized metal surfaces.
 - e. Lightly sand (de-gloss) fiberglass and poly vinyl chloride (PVC) pipe to be coated and wipe clean with dry cloths, or solvent clean in accordance with coating manufacturer's instructions.
 - f. Abrasive blast clean ductile iron surfaces.

B. Application:

- 1. Apply coatings in accordance with general application requirements and as follows:
 - a. Apply 3 coat system consisting of:
 - 1) Primer: 4 to 5 mils dry film thickness high solids epoxy.
 - 2) Intermediate coat: 4 to 5 mils dry film thickness high solids epoxy.
 - 3) Topcoat: 2.5 to 3.5 mils dry film thickness aliphatic or aliphatic-acrylic polyurethane topcoat.
- 2. Recoat or apply succeeding epoxy coats within 30 days or within time limits recommended by manufacturer, whichever is shorter. Prepare surfaces for recoating in accordance with manufacturer's instructions.

3.9 EPOXY NOVOLAC SYSTEM

A. Preparation:

- 1. Prepare surfaces in accordance with general preparation requirements and as follows:
- 2. Prepare concrete to obtain clean, open pore with exposed aggregate in accordance with manufacturer's instructions.
- 3. Prepare ferrous metal surfaces in accordance with SSPC SP-5, with coating manufacturer's recommended anchor pattern.
- 4. Complete application of prime coat within 6 hours of abrasive blast cleaning. When cleaned surfaces rust or discolor, abrasive blast surfaces in accordance with SSPC SP-5.
- 5. When handling steel, wear gloves to prevent hand printing.

6. Adjust pH of concrete to within 7 to 11 before applying prime coat.

B. Application:

1. Apply coatings in accordance with general application requirements and in accordance with manufacturer's instructions.
2. Continue to monitor dew point. Dew point shall remain 5 degrees above ambient temperature for a minimum of 8 hours after application of coating.

3.10 HIGH TEMPERATURE COATING

A. Preparation:

1. Prepare surfaces in accordance with general preparation requirements and as follows:
 - a. Abrasive blast surface in accordance with SSPC SP-10.

B. Application:

1. Apply coatings in accordance with general application requirements and as follows:
 - a. Apply number of coats in accordance with manufacturer's instructions.

3.11 ASPHALT VARNISH

A. Preparation:

1. Prepare surfaces in accordance with general preparation requirements.

B. Application:

1. Apply coatings in accordance with general application requirements and as follows:
 - a. Apply minimum 2 coats.

3.12 COAL TAR EPOXY SUBSTITUTE

A. Preparation:

1. Prepare surfaces in accordance with general preparation requirements and in accordance with the coating manufacturer's printed instructions.

B. Application:

1. Apply 2 coats at 6 mils to 8 mils each, for a minimum total DFT of 12 mils.

3.13 VINYL ESTER

A. Preparation:

1. Prepare surfaces in accordance with coating manufacturer's recommendations and as directed and approved by coating manufacturer's representative.

B. Application:

1. Apply prime coat, as required by coating manufacturer, base coat, glass mat, and topcoat to total dry film thickness of 125 mils minimum:
 - a. Final topcoat on floors shall include non-skid surface, applied in accordance with manufacturer's instructions.
2. Perform high voltage holiday detection test in accordance with SP0188-06, over 100 percent of coated surface areas to ensure pinhole free finished coating system.
3. All work shall be accomplished in strict accordance with coating manufacturer's instructions and under direction of coating manufacturer's representative.

3.14 ELASTOMERIC POLYURETHANE (100 PERCENT SOLIDS)

A. Preparation:

1. Prepare surfaces in strict accordance with coating manufacturer's instructions and as directed and approved by coating manufacturer's representative.
 - B. Application:
 1. Apply epoxy primer at DFT of 1 to 2 mils, in strict accordance with manufacturer's instructions.
 2. Apply polyurethane coating at minimum total DFT as follows:
 - a. Steel: 60 mils DFT.
 - b. Ductile iron and ductile iron pipe coating and lining: 30 mils DFT.
 - c. Concrete: 120 mils DFT.
 - d. Or as recommended by the coating manufacturer and accepted by the ENGINEER.
 - C. For concrete application, provide saw cutting for coating terminations in strict accordance with manufacturer's instructions:
 - D. For application to damaged concrete, refer to Section 03_01_03.
 - E. Perform high voltage holiday detection test in accordance with SP0188-06, over 100 percent of coated surface areas to ensure pinhole free finished coating system.
- 3.15 CONCRETE FLOOR COATINGS
- A. Preparation:
 1. Prepare surfaces in accordance with general application requirements and in strict accordance with coating manufacturer's instructions.
 - B. Application:
 1. Apply primer if required by coating manufacturer.
 2. Apply 1 or more coats as recommended by coating manufacturer to receive a minimum total dry film thickness of 25 mils, color as selected by OWNER.
 - C. Final topcoat shall include non-skid surface, applied in strict accordance with coating manufacturer's instructions.
- 3.16 WATERBORNE ACRYLIC EMULSION
- A. Preparation:
 1. Remove all oil, grease, dirt, and other foreign material by Solvent Cleaning in accordance with SSPC SP-1.
 2. Lightly sand all surfaces and wipe thoroughly with clean cotton cloths before applying coating.
 - B. Application:
 1. Apply 2 or more coats to obtain a minimum dry film thickness (DFT) of 5.0 mils.
- 3.17 FIELD QUALITY CONTROL
- A. Each coat will be inspected. Strip and remove defective coats, prepare surfaces and recoat. When approved, apply next coat.
 - B. Control and check dry film thicknesses and integrity of coatings.
 - C. Measure dry film thickness with calibrated thickness gauge.

- D. Dry film thicknesses on ferrous-based substrates may be checked with Elcometer Type 1 Magnetic Pull-Off Gage or Positector 6000.
- E. Verify coat integrity with low-voltage sponge or high-voltage spark holiday detector, in accordance with SP0188 06. Allow ENGINEER to use detector for additional checking.
- F. Check wet film thickness before coal tar epoxy coating cures on concrete or non-ferrous metal substrates.
- G. Arrange for services of coating manufacturer's field representative to provide periodic field consultation and inspection services to ensure proper surface preparation of facilities and items to be coated, and to ensure proper application and curing:
 - 1. Notify ENGINEER 24 hours in advance of each visit by coating manufacturer's representative.
 - 2. Provide ENGINEER with a written report by coating manufacturer's representative within 48 hours following each visit.

3.18 PROTECTIVE COATINGS SYSTEMS

- A. System No. 1: Submerged Metal - General

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast, or Centrifugal Wheel Blast (SP 5)	Primer – High Solids Epoxy (Self Priming)	1 coat, 6 MDFT
	Top Coat – High Solids Epoxy	1 coat, 6 MDFT

- B. System No. 2: Submerged Metal - Domestic Sewage

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast (SP 10)	Primer – Per Manufacturer's Recommendations	1 coat, 5 MDFT
	Top Coat – Coal-Tar Epoxy Substitute	2 coats, 20 MDFTPC

- C. System No. 3: Exposed Metal - Highly Corrosive:

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast (SP 10)	Primer – Per Manufacturer's Recommendations	1 coat, 2.5 MDFT
	Intermediate Coat – High Solids Epoxy	1 coat, 4 MDFT
	Top Coat – Aliphatic Polyurethane	1 coat, 3 MDFT

- D. System No. 4: Exposed Metal – Mildly Corrosive:

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast (SP 10)	Primer – Per Manufacturer's Recommendations	1 coat, 2.5 MDFT
	Top Coat – Aliphatic Polyurethane	1 coat, 3 MDFT

E. System No. 5: Buried Metal - General:

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast or Centrifugal Wheel Blast (SP 10)	Standard Hot Coal-Tar Enamel -OR- Coal-Tar Epoxy -OR- Tape Coat System	AWWA C203 AWWA C210 AWWA C214
	For Acidic Soil, Brackish Water High Bacteria - Hot Coal-Tar, Double Felt	AWWA C203, App. A, Sec. A1.5
	For Highly Abrasive Soil, Brackish Water - Hot Coal-Tar, Fibrous Glass -OR- Tape Coat System	AWWA C203, App. A, Sec. A1.5 AWWA C214 with Double Outer Wrap

F. System No. 6 High Temperature (150° - 350°):

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast (SP 10)	Primer – Per Manufacturer's Recommendations	1 coat, 2 MDFT
	Top Coat – High Temperature Coating 150° - 350°	1 coat, 2 MDFT

G. System No. 7 High Temperature (400° - 1000°):

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast (SP 10)	Primer – Per Manufacturer's Recommendations	1 coat, 2 MDFT

	Top Coat – High Temperature Coating 400° - 1000°	1 coat, 2 MDFT 1 coat, 1.5 MDFT
--	--	------------------------------------

H. System No. 8 High Temperature (1000° - 1400°):

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast (SP 10)	Primer – Per Manufacturer's Recommendations	1 coat, 2 MDFT
	Top Coat – High Temperature Coating up to 1400°	1 coat, 1.5 MDFT

I. System No. 10 Galvanized Metal Conditioning:

Surface Prep.	Paint Material	Min. Coats, Cover
Solvent Clean (SP 1), followed by Hand Tool (SP 2), or Power Tool (SP 3),	Wash Primer or Coating Manufacturer's Recommendation.	1 coat, 0.4 MDFT
		Remaining coats as required by exposure

J. System No. 11 Galvanized Metal Conditioning:

Surface Prep.	Paint Material	Min. Coats, Cover
Solvent Clean (SP 1), followed by Hand Tool (SP 2), Power Tool (SP 3), or Brush-off Blast (SP 7)	Primer – Organic Zinc Rich	1 coat, 3 MDFT Additional coats as required by exposure.

K. System No. 12 Skid-Resistant Aluminum and FRP:

Surface Prep.	Paint Material	Min. Coats, Cover
Brush-off Blast (SP 7) or Plastic Surface Preparation	High Solids Epoxy (aggregated)	1 coat, 16 MDFT

L. System No. 13 Sliding Metal:

Surface Prep.	Paint Material	Min. Coats, Cover
Solvent Clean (SP 1), followed by Hand Tool (SP 2), Power Tool (SP 3), or Brush-off Blast (SP 7)	Wax Coating	1 coat, 31 MDFT

M. System No. 14 Exposed PVC:

Surface Prep.	Paint Material	Min. Coats, Cover
Plastic Surface Preparation	Primer – Per Manufacturer's Recommendations	1 coat, 2 MDFT
	Waterborne Acrylic Emulsion	1 coat, 3 MDFT

N. System No. 15 Aluminum and Dissimilar Metal Insulation:

Surface Prep.	Paint Material	Min. Coats, Cover
SP 1	Alkali Resistant Bitumastic or Coal-Tar Epoxy Substitute	1 coat, 18 MDFT

O. System No. 16 Existing Concrete/CMU Repair:

Surface Prep.	Paint Material	Min. Coats, Cover
SP 13	Filler – Per Manufacturer's Recommendations	1 coat, 10 MDFT
	Primer – Per Manufacturer's Recommendations	1 coat, 5 MDFT
	Top Coat – High Solids Epoxy	1 coat, 4 MDFT

P. System No. 17 New Concrete/CMU Exterior (as required by application schedule):

Surface Prep.	Paint Material	Min. Coats, Cover
SP 13	Filler – Per Manufacturer's Recommendations	1 coat, 10 MDFT
	Intermediate Coat – High Solids Epoxy	1 coat, 4 MDFT
	Top Coat – Aliphatic Polyurethane	1 coat, 3 MDFT

Q. System No. 18 Concrete/CMU – Interior or Immersion Mildly Corrosive:

Surface Prep.	Paint Material	Min. Coats, Cover
SP 13	Filler – Per Manufacturer's Recommendations	1 coat, 10 MDFT
	Intermediate Coat – High Solids Epoxy	1 coat, 6 MDFT
	Top Coat – Aliphatic Polyurethane	1 coat, 6 MDFT

R. System No. 19 Concrete/CMU – Immersion Highly Corrosive:

Surface Prep.	Paint Material	Min. Coats, Cover
SP 13	Per Manufacturer's Recommendations	As required by conditions
	Epoxy Novolac	2 coat, 40 MDFT Minimum or as called for on the Project Drawings.

3.19 SCHEDULE OF ITEMS NOT REQUIRING COATING

1. General: Unless specified otherwise, the following items do not require coating:
2. Items that have received final coat at factory and not listed to receive coating in field.
3. Aluminum, brass, bronze, copper, plastic (except PVC pipe), rubber, stainless steel, chrome, Everdur, or lead.
4. Buried or encased piping or conduit.
5. Exterior concrete.
6. Grease fittings.
7. Fiberglass ducting or tanks in concealed locations.
8. Steel to be encased in concrete or masonry.

3.20 SCHEDULE OF SURFACES TO BE COATED IN THE FIELD

- A. In general, apply coatings to steel, iron, galvanized surfaces, and wood surfaces unless specified or otherwise indicated on the Drawings. Coat concrete surfaces and anodized aluminum only when specified or indicated on the Drawings. Color coat all piping as specified in Section 40 23 39, PROCESS PIPING GENERAL.
- B. Following schedule is incomplete. Coat unlisted surfaces with same coating system as similar listed surfaces. Verify questionable surfaces.
- C. Metal:
 1. System 3 – Exposed Metal – Highly Corrosive
 - a. Above grade piping, wall pipes, and pipe sleeves.
 - b. Structural Steel.
 - c. Pumps and valves

END OF SECTION

SECTION 09 97 26.13 – INTERIOR COATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Interior coating systems for concrete sewer manholes and other concrete structures as indicated, specified, or as directed by the Engineer.
- B. Related sections:
 - 1. Section 33 39 13.13 – Pre-Cast Concrete Manholes

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM), latest edition.
 - 1. ASTM D 4263 – Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
 - 2. ASTM D 4414 – Standard Practice for Measurement of Wet Film Thickness of Organic Coating by Notched Gages
 - 3. ASTM D 4541 – Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
 - 4. ASTM D 4787 – Standard Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates
 - 5. ASTM D 790 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
 - 6. ASTM D 695 – Standard Test Method for Compressive Properties of Rigid Plastics
 - 7. ASTM D 638 – Standard Test Method for Tensile Properties of Plastics
 - 8. ASTM D4541 – Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
- B. Other Standards, latest edition.
 - 1. ICRI Guideline No. 03732 – Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays
 - 2. NACE No. 6 / SSPC SP-13 – Surface Preparation of Concrete

1.3 SUBMITTALS

- A. General: Submit listed submittals in accordance with conditions of the Contract and Section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer's product data for each coating, including generic description, complete technical data, surface preparation requirements, and application instructions.
- C. Color Samples: Submit manufacturer's color samples showing full range of standard colors.
- D. Manufacturer's Quality Assurance:
 - 1. Submit manufacturer's certification that coatings comply with specified requirements and are suitable for intended application.
 - 2. Submit a list of at least 5 completed projects of similar size and similar waste stream where coating has been applied. Include for each project:
 - a. Project name and location.
 - b. Name, address, and phone number of owner.
 - c. Name of applicator.

- d. Name of engineer.
- e. Approximate area of coatings applied.
- f. Date of completion.

E. Applicator's Quality Assurance:

1. The applicator must be trained and certified/approved by the coating system manufacturer.
2. Submit a list of at least 5 completed projects of size and complexity similar to this Work where applicator has spray applied 100% solids epoxies. Include for each project:
 - a. Project name and location.
 - b. Name, address, and phone number of owner.
 - c. Name of contractor.
 - d. Name of engineer.
 - e. Name of coating manufacturer and product applied.
 - f. Approximate area of coatings applied.
 - g. Date of completion.
3. Submit certification that each foreman to be utilized on this project has overseen the application of 50,000 square feet of 100% solids epoxy coatings in the last three years, 30,000 square feet of which shall have been applied in manholes. Certification for each foreman shall include the following information for each applicator company for which each foreman worked:
 - a. employees' name;
 - b. project names and descriptions;
 - c. name, address, and phone number of contact person for each applicator company worked for;
 - d. name, address, phone number of contact person for each project owner;
 - e. years experience and amount of coating applied.
4. Submit certification that the "nozzle men" to be utilized on this project each have a minimum of two years experience and have spray applied a minimum of 30,000 square feet of 100% solids epoxy coatings in the last two years, 20,000 square feet of which shall have been applied in manholes. Certification for each "spray man" to be utilized shall include the following information for each applicator company for which each "spray man" worked:
 - a. employees' name;
 - b. project names and descriptions;
 - c. name, address, and phone number of contact person for each applicator company worked for;
 - d. name, address, phone number of contact person for each project owner;
 - e. years experience and amount of coating applied.
5. Submit certification that at least two-thirds of the crew to be utilized on this project has a minimum of two years experience applying 100% solids epoxy coatings. Certification for each crew member to be utilized shall include the following information for each applicator company for which each employee worked:
 - a. employees' name;
 - b. project names and descriptions;
 - c. name, address, and phone number of contact person for each applicator company worked for;
 - d. name, address, phone number of contact person for each project owner;
 - e. primary role(s) and years experience in each role applying 100% solids epoxies.
6. Other, equivalent documentation will be considered for approval at Engineer's discretion.

F. Manufacturer's Field Report: Provide copy of report from manufacturer's representative confirming that the surfaces to which coating is to be applied are in a condition suitable to receive same.

G. Warranty:

1. Material Warranty: A written guarantee of 5 years submitted to the City for the specified project shall be provided by the Manufacturers of the Coatings and Repair Products, if different manufacturers.
2. Workmanship Warranty: A written guarantee of at least 2 years shall be provided by the Applicator against any shortcoming in Workmanship.

1.4 QUALITY ASSURANCE

- A. Pre-Installation Conference
 1. Pre-Installation Conference: Prior to beginning coating operations, a meeting will be held with Contractor, coating sub-contractor, Engineer, Owner's representative, and coating manufacturer's representative to verify and review the following:
 - a. Project requirements for coating as set out in Contract Documents.
 - b. Manufacturer's product data including application instructions.
 - c. Substrate conditions and procedures for substrate preparation and coating installation. Applicator shall be familiar with the overall condition of structures to be coated prior to the conference.
 2. Technical Consultation: The coating manufacturer's representative shall provide technical consultation on coating application.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying:
 1. Coating or material name.
 2. Manufacturer.
 3. Color name and number.
 4. Batch or lot number.
 5. Date of manufacture.
 6. Mixing instructions.
- B. Storage:
 1. Store materials in a clean dry area away from open flame, heat, and strong oxidants. Store materials within temperature range as recommended by manufacturer.
 2. Keep containers sealed until ready for use.
 3. Do not use materials beyond manufacturer's shelf life limits.
- C. Handling: Protect materials during handling and application to prevent damage or contamination. Handle materials according to their material safety data sheets.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Coating System:
 1. The coating system shall be a spray applied 100% solids epoxy coating which forms a monolithic coating covering all interior surfaces of the structures specified to be coated.
 2. The bonding strength of the finished coating shall exceed the point of concrete substrate failure according to ASTM D4541.
 3. The coating system shall be designed for hydrostatic loading and shall be continuously bonded to all brick, mortar, concrete, chemical sealant, grout, pipe, and other surfaces inside the manhole.
 4. When cured, the system shall form a continuous, tight fitting, hard, impermeable, pinhole-free coating that is suitable for sewer system service and chemically resistant to any

- chemicals, bacteria, or vapors normally found in domestic sewage and sewage from the Fayetteville Industrial Park.
5. The coating shall effectively seal the interior surfaces of the manhole and prevent any penetration or leakage of groundwater infiltration.
 6. Acceptable coating manufacturers shall be:
 - a. Raven
 - b. Warren
 - c. Approved Equal
 7. The epoxies shall meet the following minimum requirements:
 - a. Flexural strength according to ASTM D790: 6,000 psi
 - b. Compressive strength according to ASTM D695: 8,000 psi
 - c. Tensile strength according to ASTM D638: 4,000 psi
 - d. Tensile elongation according to ASTM D638: 4%
- B. Repair Materials and Primers:
1. Acceptable patching, filling, repairing, and priming systems shall be as recommended by the coating manufacturer and shall be certified to be compatible with and provide adequate bonding to both the substrate and coating system.
- C. Conductive Underlayment:
1. Acceptable conductive underlayments, as necessary to facilitate high-voltage holiday testing, shall be as recommended by the coating manufacturer and shall be certified by the coating manufacturer to be compatible with and provide adequate bonding to the substrate, any repair or primer materials, and coating system.
- D. Equipment:
1. All equipment for surface cleaning, surface preparation, and coating application shall be approved for use by the coating manufacturer.
 2. Spray equipment for application of the coating system shall be airless.
- E. Non-skid Materials:
1. Non-skid material shall be "8-12" dry sand as manufactured by APAC-Arkansas, Arkhola Division or approved equal.

PART 3 - EXECUTION

3.1 PROTECTION OF SURFACES NOT SCHEDULED TO BE COATED

- A. Protect surrounding areas and surfaces not scheduled to be coated from damage during surface preparation and application of coatings.
- B. Immediately remove coatings that fall on surrounding areas and surfaces not scheduled to be coated.

3.2 AREA PREPARATION

- A. All structures to be coated shall be readily accessible to applicator.
- B. Appropriate actions shall be taken to comply with local, state, and federal regulatory and other applicable agencies with regard to environment, health, and safety.
- C. Active flows shall be dammed, plugged, or diverted as required to ensure that the cleaning, preparation, and coating may be performed or applied to the entirety of the surfaces specified to be coated and shall remain dammed, plugged, or diverted until the coating manufacturer's recommended cure time for immersion service has been accomplished.

- D. Surface cleaning, surface preparation, and coating application shall not commence until the concrete substrate has properly cured for a minimum of 28 days.
- E. The temperature of the surface to be coated shall be maintained within the range recommended by the manufacturer. Prior to and during application, care should be taken to avoid exposure of structure to be coated to direct sunlight or other intense heat sources. Application of preparation or coating materials shall not be performed when the concrete surface temperature is rising or in direct sunlight to avoid blistering due to thermal expansion of trapped air or moisture in the substrate.
- F. Applicator shall inspect all surfaces specified to receive a coating prior to surface cleaning and preparation. Applicator shall notify Engineer of any noticeable disparity in the surfaces which may interfere with the proper preparation or application of the repair or coating materials.

3.3 SURFACE PREPARATION

- A. All contaminants including oil, grease, waxes, form release, curing compounds, efflorescence, sealers, salts, incompatible existing coatings, and other contaminants shall be removed.
- B. A water drop test shall be utilized to test the concrete surface for the presence of hydrophobic contaminants. A droplet of water is placed on the concrete surface and its wetting behavior is observed. If the water droplet flattens and "wets out" the concrete surface, it is likely that the concrete is not contaminated. If the water droplet beads up on the surface like rain on a freshly waxed car, it is likely that the concrete is contaminated.
- C. Suitable surface cleaning methods for removing oils, grease, and other chemicals from the substrate are low pressure detergent/degreaser water cleaning and low pressure hot water cleaning.
- D. Surface preparation shall achieve surfaces that are sound, clean, smooth, even, and free of laitance, fins, protrusions, chemical contaminants, dust, and standing water. Surface preparation shall also result in a concrete surface profile (CSP) as recommended by the coating manufacturer.
- E. Suitable surface preparation methods are abrasive blasting and water jetting. Surface preparation procedures shall be in accordance with ICRI Guideline No. 03732 and NACE No. 6 / SSPC SP-13.
- F. All surfaces shall be inspected during and after surface preparation and prior to application of the coating system. Any evidence of remaining contamination or laitance shall be removed by additional cleaning or surface preparation before proceeding with the application of the coating.
- G. Application of Repair Materials:
 - 1. Areas where structural steel has been exposed or removed shall be repaired as acceptable to the Engineer and surface shall be built out to full-thickness to match adjacent surfaces.
 - 2. All areas where the existing surface is more than 1/2" less than the thickness of the original surface will be built out to full-thickness to match adjacent surfaces.
 - 3. All structural cracks, voids, bug holes, and honeycombs shall be filled and floated with an approved repair material.
 - 4. All bituminous or elastomeric joint sealants or gaskets shall be coated with an approved material.
 - 5. Approved repair materials shall be trowel or spray applied using proper equipment to specified surfaces. Repair materials shall be applied and prepared to provide a surface

with a profile equivalent to the ICRI concrete surface profile (CSP) recommended by the coating manufacturer.

6. Repair materials shall be permitted to cure according to manufacturer recommendations. Curing compounds may not be used unless approved by the coating manufacturer for compatibility with the specified system.
7. Application of the repair materials, if not performed by the coating applicator, shall be observed by the applicator's representative to ensure proper finishing for suitability to receive the coating system.

3.4 APPLICATION OF COATING SYSTEM

- A. Prior to application of any coating, the conductivity of the concrete shall be tested for each structure to be coated. The test shall be performed in accordance with ASTM D4787. If the test indicates the concrete provides an insufficient ground, a conductive underlayment shall be applied prior to any coating.
- B. Prior to application of any coating, a moisture test shall be performed on the walls and repaired areas as recommended by the manufacturer.
- C. Application procedures shall conform to the recommendations of the coating manufacturer, including material handling, mixing, environmental controls during application, safety, equipment, pressure settings, and application techniques.
- D. For concrete surfaces that do not require rehabilitation, the coating shall be applied to average and minimum uniform dry film thicknesses as follows or as approved by Engineer:

Product	Average Thickness (mils)	Minimum Thickness (mils)
Raven - 405	100	80

- E. For concrete surfaces that require rehabilitation, the coating shall be applied to average and minimum uniform dry film thicknesses as follows or as approved by Engineer:

Product	Average Thickness (mils)	Minimum Thickness (mils)
Raven - 405	125	100

- F. Do not use mixed coatings exceeding manufacturer's recommended pot life.
- G. The spray applied coating, including any recommended basecoat or primer, shall be applied according to the manufacturer's recommended number of coat applications.
- H. The benches shall be coated to the same average and minimum thicknesses as required for the walls except the benches shall have non-skid materials included in the coating system. The benches shall be made non-skid in accordance with manufacturer recommended procedures and shall have a final texture similar to 10 grit sandpaper.
- I. The elapsed time between succeeding coats shall be as specified by manufacturer.
- J. Any solvents left in the equipment shall be completely removed before applying coating to the designated surfaces.
- K. No application shall be made to frozen surfaces or if freezing is expected to occur inside the structure within a time period detrimental to the uncured coating.

- L. Applied coatings shall be free of film characteristics or defects that would adversely affect performance or appearance of coating systems.

3.5 FIELD QUALITY CONTROL

- A. Contractor's Services:
 - 1. Verify coatings and other materials are as specified.
 - 2. Verify surface preparation and application are as specified.
 - 3. Verify wet film thickness of each coat using wet film gages and total dry film thickness of the coating system by dry film testing as described below.
 - 4. Coating Defects:
 - a. Check coatings for film characteristics or defects that would adversely affect performance or appearance of coating systems.
 - b. Check for holidays on interior surfaces using holiday detector as described in Paragraph 3.6.
 - 5. Report:
 - a. Submit written reports describing inspections made and actions taken to correct nonconforming work.
 - b. Report nonconforming work not corrected.
 - c. Submit copies of report to Engineer and Contractor.
- B. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for surface preparation and application of coating systems.

3.6 TESTING AND INSPECTION

- A. A wet film thickness gage, conforming to ASTM D4414, shall be used during coating application to ensure a uniform thickness during application.
- B. After the coating system has set hard to the touch it shall be inspected by the Engineer, verifying the following:
 - 1. The coating system's cured thickness. Measurement shall be obtained from a specimen retrieved by the applicator by physically cutting through the coating (by drilling or coring).
 - 2. No groundwater infiltration
 - 3. All pipe connections are open and clear
 - 4. No evident cracks, voids, pinholes, uncured spots, lifts, delamination, blisters, or other type of defects.
 - 5. No "runs" or "sags" not in conformance with the standard set by the mock-ups or that affect the performance of the coating system.
- C. Holiday Testing:
 - 1. Holiday testing shall be performed according to ASTM D 4787 and these specifications. After the elapsed time recommended by the coating manufacturer, the coating shall be inspected with high-voltage holiday detection equipment. An induced holiday shall be made onto the coated concrete surface and serve to determine the minimum/maximum voltage to be used to test the coating for holidays at that particular area. The spark tester shall be initially set at 100 volts per 1 mil (25 microns) of minimum specified (not average) film thickness applied but shall be increased if it is insufficient to detect the induced holiday. All detected holidays shall be marked. Holidays shall be repaired by abrading the coating system surface with grit paper or other hand tooling method, completely opening the holiday. After abrading and cleaning, additional coating material shall be hand applied to the repair area. All touch-up/repair procedures shall follow the recommendations of the coating system manufacturer. Repaired areas shall be allowed to cure, as recommended by the manufacturer, before being retested.
- D. Pull-off Testing:

1. Measurement of bond strength of the coating system to the substrate shall be made at a minimum of three locations on each coated structure and along different sections of the structure (i.e. corbel, wall, bench). Bond strength shall be measured in accordance with ASTM D4541, Method E and these specifications. A minimum of three 20mm dollies shall be fixed to the coated surface at locations selected by the Engineer. Test failures shall be documented as failure within the concrete, failure within the coating, or failure at the coating/concrete interface. The following criteria shall be used to evaluate the test results:
 - a. Failure of the dolly adhesive shall require retesting.
 - b. Failure at the coating/concrete interface with less than 20% of substrate adhered to the coating and less than 200 psi pull-off strength shall be deemed coating adhesion failure and the contractor shall remove all coating not meeting minimum requirements, re-perform surface preparation procedures, and recoat the failed surfaces, at no additional cost to the Owner.
 - c. Low pull-off strength values (<250 psi) may require additional testing/evaluation to determine potential adhesion defects at the sole discretion of the Owner.
 - d. The Owner shall further evaluate any areas detected to have inadequate adhesion. Further adhesion testing may be performed to determine the extent of potentially deficient bonded areas and repairs shall be made in accordance with the manufacturer's recommendations.
- E. A final visual inspection shall be made by the Engineer and applicator. Any deficiencies in the finished system shall be marked and repaired by the coating applicator according to the manufacturer's recommendations.

3.7 WARRANTY INSPECTIONS

- A. Inspection of the coated structures shall be performed after the first year of service. Owner will set date for inspections.
- B. Inspection shall be attended by Owner, Contractor, Engineer, and manufacturer's representative.
- C. Coating defects found shall be evaluated by a qualified inspector and the coating manufacturer to determine the cause of the failure and propose repair procedures. Contractor shall coordinate repair of deficiencies in coating systems in accordance with recommended repair procedures, at no additional cost to the Owner.

END OF SECTION

SECTION 09 97 26.23 - EXTERIOR COATINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Exterior Coating systems for concrete sewer manholes and concrete structures.

1.2 RELATED SECTIONS

- A. Section 33 39 13.13 – Pre-Cast Concrete Manholes

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM), latest edition.

ASTM D 4263 – Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.

ASTM D 4414 – Standard Practice for Measurement of Wet Film Thickness of Organic Coating by Notched Gages

- B. Other Standards, latest edition.

ICRI Guideline No. 03732 – Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays

NACE No. 6 / SSPC SP-13 – Surface Preparation of Concrete

1.4 SUBMITTALS

- A. General: Submit listed submittals in accordance with conditions of the Contract and Section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer's product data for each coating, including generic description, complete technical data, surface preparation, and application instructions.
- C. Manufacturer's Quality Assurance:
 - 1. Submit manufacturer's certification that coatings comply with specified requirements and are suitable for intended application.
- D. Applicator's Quality Assurance:
 - 1. Submit certification that the foreman to be utilized on this project has overseen the application of 30,000 square feet of similar coatings in the last three years.
- E. Manufacturer's Field Report: Provide copy of report from manufacturer's representative confirming that the surfaces to which coating is to be applied are in a condition suitable to receive same.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
 - 1. Specialize in manufacture of coatings with a minimum of 10 years successful experience.
 - 2. Able to demonstrate successful performance on comparable projects.
- B. Applicator's Qualifications:

1. Experienced in application of specified coatings for a minimum of 5 years on projects of similar size and complexity to this Work.
- C. Pre-Installation Conference: Prior to beginning exterior coating operations, a meeting will be held with Contractor, coating sub-contractor, Engineer, Owner's representative, and coating manufacturer's representative to verify and review the following:
 1. Project requirements for coating as set out in Contract Documents.
 2. Manufacturer's product data including application instructions.
 3. Substrate conditions and procedures for substrate preparation and coating installation. Applicator shall be familiar with the overall condition of structures to be coated prior to the conference.
- D. Technical Consultation: The coating manufacturer's representative shall provide technical consultation on coating application.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying:
 1. Coating or material name.
 2. Manufacturer.
 3. Color name and number.
 4. Batch or lot number.
 5. Date of manufacture.
 6. Mixing and thinning instructions.
- B. Storage:
 1. Store materials in a clean dry area away from open flame, heat, and strong oxidants. Store materials within temperature range as recommended by manufacturer.
 2. Keep containers sealed until ready for use.
 3. Do not use materials beyond manufacturer's shelf life limits.
- C. Handling: Protect materials during handling and application to prevent damage or contamination. Handle materials according to their material safety data sheets.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Coating System:
 1. The coating system shall be designed for hydrostatic loading and shall be continuously bonded to all brick, mortar, concrete, chemical sealant, grout, pipe, and other surfaces outside the manhole.
 2. When cured, the system shall form a continuous, tight fitting, hard, impermeable, pinhole free coating that effectively seals the exterior surfaces of the concrete structures and prevents any infiltration of groundwater through the coating.
 3. Acceptable exterior coating systems shall be:
 - a. Kop Coat – Bitumastic Black Solution
 - b. Tnemec – 46-465 H.B. Tnemecol
 - c. Approved Equal
- B. Repair Materials:
 1. Acceptable repair materials shall be as recommended by the coating manufacturer and shall provide adequate bonding to the substrate and coating system.

- C. Equipment:
 - 1. All equipment for surface cleaning, surface preparation, and coating application shall be approved for use by the coating manufacturer.

PART 3 - EXECUTION

3.1 PROTECTION OF SURFACES NOT SCHEDULED TO BE COATED

- A. Protect surrounding areas and surfaces not scheduled to be coated from damage during surface preparation and application of coatings.
- B. Immediately remove coatings that fall on surrounding areas and surfaces not scheduled to be coated.

3.2 AREA PREPARATION

- A. All structures to be coated shall be readily accessible to applicator.
- B. Appropriate actions shall be taken to comply with local, state, and federal regulatory and other applicable agencies with regard to environment, health, and safety.
- C. Surface cleaning, surface preparation, and coating application shall not commence until the concrete substrate has properly cured for a minimum of 28 days.
- D. The temperature of the surface to be coated shall be maintained within the range recommended by the manufacturer. Concrete surfaces that have been in direct sunlight must be shaded for 24 hours prior to application of coating materials. Prior to and during application, care should be taken to avoid exposure of structure to be coated to direct sunlight or other intense heat sources. Application of coating materials shall not be performed when the concrete surface temperature is rising or in direct sunlight to avoid blistering due to thermal expansion of trapped air or moisture in the substrate.
- E. Applicator shall inspect all surfaces specified to receive a coating prior to surface cleaning and preparation. Applicator shall notify Engineer of any noticeable disparity in the surfaces which may interfere with the proper preparation or application of the repair or coating materials.

3.3 SURFACE PREPARATION

- A. All contaminants including oil, grease, waxes, form release, curing compounds, efflorescence, sealers, salts, and other contaminants shall be removed.
- B. A water drop test shall be utilized to test the concrete surface for the presence of hydrophobic contaminants. A droplet of water is placed on the concrete surface and its wetting behavior is observed. If the water droplet flattens and "wets out" the concrete surface, it is likely that the concrete is not contaminated. If the water droplet beads up on the surface like rain on a freshly waxed car, it is likely that the concrete is contaminated.
- C. Suitable surface cleaning methods for removing oils, grease, and other chemicals from the substrate are low pressure detergent/degreaser water cleaning and low pressure hot water cleaning.
- D. Surface preparation shall achieve surfaces that are sound, clean, smooth, even, and free of laitance, fins, protrusions, chemical contaminants, dust, and standing water. Surface preparation shall also result in a surface with a neutral pH and a concrete surface profile (CSP) as recommended by the coating manufacturer.

- E. Suitable surface preparation methods are abrasive blasting and water jetting. Surface preparation procedures shall be in accordance with ICRI Guideline No. 03732 and NACE No. 6 / SSPC SP-13.
- F. All surfaces shall be inspected during and after surface preparation and prior to application of the coating system. Any evidence of remaining contamination or laitance shall be removed by additional cleaning or surface preparation before proceeding with the application of the coating.
- G. Application of Repair Materials:
 - 1. All structural cracks, voids, bugholes, and honeycombs shall be filled and floated with an approved repair material.
 - 2. Approved repair materials shall be trowel or spray applied using proper equipment to specified surfaces. Repair materials shall be applied and prepared to provide a surface with a profile equivalent to the ICRI concrete surface profile (CSP) recommended by the coating manufacturer.
 - 3. Repair materials shall be permitted to cure according to manufacturer recommendations. Curing compounds may not be used unless approved by the coating manufacturer for compatibility with the specified system.
 - 4. Application of the repair materials, if not performed by the coating applicator, shall be observed by the applicator's representative to ensure proper finishing for suitability to receive the coating system.

3.4 APPLICATION OF COATING SYSTEM

- A. Exterior coating system shall be applied to a total minimum dry film thickness of 30 mils.
- B. Application procedures shall conform to the recommendations of the coating manufacturer, including material handling, mixing, environmental controls during application, allowable moisture levels, safety, equipment, pressure settings, and application techniques.
- C. Do not use mixed coatings exceeding manufacturer's recommended pot life.
- D. The coating materials must be applied by a certified or approved installer of the coating system.
- E. The spray applied coating, including any recommended basecoat or primer, shall be applied to the manufacturer's recommended average and minimum dry film thicknesses and number of coat applications.
- F. The elapsed time between succeeding coats shall be as specified by manufacturer.
- G. No application shall be made to frozen surfaces or if freezing is expected to occur inside the structure within a time period detrimental to the uncured coating.
- H. Applied coatings shall be free of film characteristics or defects that would adversely affect performance or appearance of coating systems.

3.5 FIELD QUALITY CONTROL

- A. Contractor's Services:
 - 1. Verify coatings and other materials are as specified.
 - 2. Verify surface preparation and applications are as specified.
 - 3. Verify dry mil thickness of each coat and total dry mil thickness of each coating system are as specified using wet film and dry film gauges.
 - 4. Coating Defects:

- a. Check coatings for film characteristics or defects that would adversely affect performance or appearance of coating systems.
- 5. Report:
 - a. Submit written reports describing inspections made and actions taken to correct nonconforming work.
 - b. Report nonconforming work not corrected.
 - c. Submit copies of report to Engineer and Contractor.

- B. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for surface preparation and application of coating system.

3.6 TESTING AND INSPECTION

- A. A wet film thickness gage, conforming to ASTM D4414, shall be used during coating application to ensure a monolithic coating and uniform thickness during application.

END OF SECTION

DIVISION 22
PLUMBING

SECTION 22 05 29 - PROCESS SUPPORTS AND ANCHORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following hangers and supports for mechanical system piping and equipment:
 - 1. Steel pipe hangers and supports.
 - 2. Trapeze pipe hangers.
 - 3. Metal framing systems.
 - 4. Thermal-hanger shield inserts.
 - 5. Fastener systems.
 - 6. Pipe positioning systems.
 - 7. Equipment supports.
- B. Related Sections include the following:
 - 1. Section 40 23 39, PROCESS PIPING - GENERAL for pipe guides and anchors.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for the Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple pipes, capable of supporting combined weight of supported systems, system contents, and test water.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- C. Design seismic-restraint hangers and supports for piping and equipment.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel pipe hangers and supports.
 - 2. Thermal-hanger shield inserts.
 - 3. Pipe positioning systems.
- B. Shop Drawings:
 - 1. Show fabrication and installation details and include calculations for the following:
 - a. Trapeze pipe hangers. Include Product Data for components.
 - b. Metal framing systems. Include Product Data for components.
 - c. Equipment supports.

2. Drawings of piping support system, locating each support, brace, hanger, guide, component and anchor. Identify support, hanger, guide, and anchor type by catalog number and Shop Drawing detail number.
3. Revisions to support systems resulting from changes in related piping system layout or addition of flexible joints.

C. Welding certificates.

D. Contract Closeout Submittals: Maintenance information on piping support system.

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel and ASME Boiler and Pressure Vessel Code: Section IX.

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.3, "Structural Welding Code--Sheet Steel."
4. AWS D1.4, "Structural Welding Code--Reinforcing Steel."
5. ASME Boiler and Pressure Vessel Code: Section IX.

1.7 DESIGN REQUIREMENTS

A. General:

1. Contractor shall be responsible for the design, size, and location of process piping support systems in accordance with the requirements specified herein and in general conformance with the Drawings and the Design Details. The design shall be provided by a company specifically specializing in the design of support systems. The pipe support system design company shall demonstrate that they have at least five years of experience in pipe support design and have successfully completed at least three designs in the previous year. The Contractor shall provide Certification of Compliance with these requirements.
1. Seismic Load: Seismic Design Category B with seismic loads in accordance with the structural notes found on the Drawings.
2. Piping smaller than 30": Supports are shown only where specific types and locations are required; additional pipe supports may be required.
3. Piping 30" and larger: Support systems have been designed for piping shown.
4. Meet requirements of MSS SP 58, MSS SP 69, and MSS SP 89.

B. Pipe Support Systems:

1. Support Load: Dead loads imposed by weight of pipes filled with water, except air and gas pipes, plus insulation and capable of supporting combined weight of supported systems, system contents, and test water.
2. Safety Factor: Minimum of 5.
3. Maximum Support Spacing and Minimum Rod Size:
 - a. Steel or Ductile Iron Piping:

Pipe Size	Maximum Support/ Hanger Spacing	Minimum Rod Size Single Rod Hangers
1-inch & smaller	6 feet	1/4-inch
1-1/2-inch thru	8 feet	1/4-inch

Pipe Size	Maximum Support/ Hanger Spacing	Minimum Rod Size Single Rod Hangers
2-1/2-inch		
3-inch & 4-inch	10 feet	3/8-inch
6-inch	12 feet	3/8-inch
8-inch	12 feet	1/2-inch
10-inch & 12-inch	14 feet	5/8-inch
14-inch	16 feet	3/4-inch
16-inch & 18-inch	16 feet	7/8-inch
20-inch	18 feet	1-inch
24-inch	18 feet	1-1/4-inch
30-inch & larger	As shown on Drawings	As shown on Drawings

- b. Copper Piping:
Maximum Support Spacing: 2 feet less per size than listed for steel pipe, with 1" and smaller pipe supported every 5 feet.

Minimum Hanger Rod Sizing: Same as listed for steel pipe.

- c. Plastic and Fiberglass Piping:
Maximum support spacing: As recommended by manufacturer for flow temperature in pipe.

Minimum Hanger Rod Sizing: Same as listed for steel pipe.

- d. Stainless Steel Piping:

SST Pipe Size	Maximum Support/ Hanger Spacing	Minimum Rod Size Single Rod Hangers
1-inch thru 4-inch	8 feet	1/4-inch
6-inch	8 feet	3/8-inch
8-inch & 10-inch	10 feet	1/2-inch
12-inch	10 feet	1/2-inch
14-inch & 16-inch	12 feet	5/8-inch
18-inch &	14 feet	3/4-inch

SST Pipe Size	Maximum Support/ Hanger Spacing	Minimum Rod Size Single Rod Hangers
20-inch		
24-inch	14 feet	7/8-inch

- C. Framing Support System:
1. Beams: Size such that beam stress does not exceed 25,000 psi and maximum deflection does not exceed 1/240 of span.
 2. Column Members: Size in accordance with Manufacturer's recommended method.
 3. Support Loads: Calculate using weight of pipes filled with water.
 4. Maximum Spans:
 - a. Steel and Ductile Iron Pipe, 3" Diameter and Larger: 10-foot centers, unless otherwise shown.
 - b. Other Pipelines and Special Situations: May require supplementary hangers and supports.
 5. Electrical Conduit Support: Include in design of framing support system.
- D. Anchoring Devices: Design, size, and space support anchoring devices, including anchor bolts, inserts, and other devices used to anchor support, to withstand shear and pullout loads imposed by loading and spacing on each particular support.
- E. Vertical Sway Bracing: 10-foot maximum centers, or as shown.
- F. Existing Support Systems: Use existing supports systems to support new piping only if Contractor can show that they are adequate for additional load, or if they are strengthened to support the additional load.

PART 2 - PRODUCTS

2.1 GENERAL

- A. When specified items are not available, fabricate pipe supports of correct material and to general configuration indicated by catalogs.
- B. Special support and hanger details are shown for cases where standard catalog supports are inapplicable.
- C. Materials:
1. Wetted and Submerged: Stainless steel.
 2. Atmospheric Exposed: Galvanized or painted steel in accordance with Section 09 90 00, PAINTING AND PROTECTIVE COATINGS.
 3. Corrosive Areas: FRP

2.2 MANUFACTURERS

- A. The following requirements apply to product selection:
1. Available Manufacturers: Subject to compliance with requirements, Manufacturers offering products that may be incorporated into the Work include, but are not limited to, Manufacturers specified.

2.3 STEEL PIPE HANGERS AND SUPPORTS

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.
- B. Manufacturers:
 - 1. B-Line Systems, Inc.; a division of Cooper Industries.
 - 2. Empire Industries, Inc.
 - 3. ERICO/Michigan Hanger Co.
 - 4. Globe Pipe Hanger Products, Inc.
 - 5. Grinnell Corp.
 - 6. GS Metals Corp.
 - 7. National Pipe Hanger Corporation.
- C. Galvanized, Metallic Coatings: Pre-galvanized or hot dipped.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.
- E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.4 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

2.5 METAL FRAMING SYSTEMS

- A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.
- B. Manufacturers:
 - 1. B-Line Systems, Inc.; a division of Cooper Industries.
 - 2. Power-Strut Div.; Tyco International, Ltd.
 - 3. Thomas & Betts Corporation.
 - 4. Tolco Inc.
 - 5. Unistrut Corp.; Tyco International, Ltd.
- C. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.6 THERMAL-HANGER SHIELD INSERTS

- A. Description: 100-psig- minimum, compressive-strength insulation insert encased in sheet metal shield.
- B. Manufacturers:
 - 1. Carpenter & Paterson, Inc.
 - 2. ERICO/Michigan Hanger Co.
 - 3. PHS Industries, Inc.
 - 4. Pipe Shields, Inc.
 - 5. Rilco Manufacturing Company, Inc.
 - 6. Value Engineered Products, Inc.

- C. Insulation-Insert Material for Cold Piping: Water-repellent treated, ASTM C 533, Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass with vapor barrier.
- D. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass.
- E. Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- F. Clevis or Band Hangers: Insert and shield shall cover lower 180° of pipe.
- G. Insert Length: Extend 2" beyond sheet metal shield for piping operating below ambient air temperature.

2.7 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened Portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Manufacturers:
 - a. Hilti, Inc.
 - b. ITW Ramset/Red Head.
 - c. Masterset Fastening Systems, Inc.
 - d. MKT Fastening, LLC.
 - e. Powers Fasteners.
- B. Mechanical-Expansion Anchors: Insert-wedge-type stainless steel, for use in hardened Portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
 - 1. Manufacturers:
 - a. B-Line Systems, Inc.; a division of Cooper Industries.
 - b. Empire Industries, Inc.
 - c. Hilti, Inc.
 - d. ITW Ramset/Red Head.
 - e. MKT Fastening, LLC.
 - f. Powers Fasteners.

2.8 PIPE POSITIONING SYSTEMS

- A. Description: IAPMO PS 42, system of metal brackets, clips, and straps for positioning piping in pipe spaces for plumbing fixtures for commercial applications.
- B. Manufacturers:
 - 1. C & S Mfg. Corp.
 - 2. HOLDRITE Corp.; Hubbard Enterprises.
 - 3. Samco Stamping, Inc.

2.9 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

2.10 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install support systems in accordance with MSS SP 69, Pipe Hangers and Supports-Selection and Application and MSS SP 89, Pipe Hangers and Supports-Fabrication and Installation, unless shown otherwise.
- B. Support piping connections to equipment by pipe support and not by the equipment.
- C. Support large or heavy valves, fittings, and appurtenances independently of connected piping.
- D. Support no pipe from the pipe above it.
- E. Support pipe at changes in direction or in elevation, adjacent to flexible joints and couplings, and where shown.
- F. Do not install pipe supports and hangers in equipment access areas or bridge crane runs.
- G. Brace hanging pipes against horizontal movement by both longitudinal and lateral sway bracing.
- H. Install lateral supports for seismic loads at all changes in direction.
- I. Install pipe anchors where required to withstand expansion thrust loads and to direct and control thermal expansion.
- J. Repair mounting surfaces to original condition after attachments are made.

3.2 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use padded hangers for piping that is subject to scratching.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of non-insulated or insulated stationary pipes, NPS 1/2 to NPS 30.
 - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 °F pipes, NPS 4 to NPS 16, requiring up to 4" of insulation.

3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24, requiring clamp flexibility and up to 4" of insulation.
 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24, if little or no insulation is required.
 5. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
 6. Adjustable Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of non-insulated stationary pipes, NPS 3/4 to NPS 8.
 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of non-insulated stationary pipes, NPS 1/2 to NPS 8.
 8. Adjustable Band Hangers (MSS Type 9): For suspension of non-insulated stationary pipes, NPS 1/2 to NPS 8.
 9. Adjustable Swivel-Ring Band Hangers (MSS Type 10): For suspension of non-insulated stationary pipes, NPS 1/2 to NPS 2.
 10. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of non-insulated stationary pipes, NPS 3/8 to NPS 8.
 11. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of non-insulated stationary pipes, NPS 3/8 to NPS 3.
 12. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30.
 13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 14. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.
 15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
 16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36, if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.
 17. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from 2 rods if longitudinal movement caused by expansion and contraction might occur.
 18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20, from single rod if horizontal movement caused by expansion and contraction might occur.
 19. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42, if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
 20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24, if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
 21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30, if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6" for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 °F piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.

5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 °F piping installations.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- K. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4".
 3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
 4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
 5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25% to absorb expansion and contraction of piping system from hanger.
 6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25% to absorb expansion and contraction of piping system from base support.

7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25% to absorb expansion and contraction of piping system from trapeze support.
8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
 - a. Horizontal (MSS Type 54): Mounted horizontally.
 - b. Vertical (MSS Type 55): Mounted vertically.
 - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.
- L. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.
- M. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.
- N. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.
- O. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

3.3 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
 2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
- C. Fiberglass Pipe Hanger Installation: Comply with applicable portions of MSS SP-69 and MSS SP-89. Install hangers and attachments as required to properly support piping from building structure.
- D. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.
- E. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- F. Fastener System Installation:
 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4" thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool Manufacturer. Install fasteners according to powder-actuated tool Manufacturer's operating manual.
 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to Manufacturer's written instructions.

- G. Pipe Positioning System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture. Refer to Section 22 40 00, PLUMBING FIXTURES for plumbing fixtures.
- H. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- I. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- J. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- K. Install lateral bracing with pipe hangers and supports to prevent swaying.
- L. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- M. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- N. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.1 (for power piping) and ASME B31.9 (for building services piping) are not exceeded.
- O. Insulated Piping: Comply with the following:
 - 1. Attach clamps and spacers to piping.
 - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits according to ASME B31.1 for power piping and ASME B31.9 for building services piping.
 - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180°.
 - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
 - 4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12" long and 0.048" thick.
 - b. NPS 4: 12" long and 0.06" thick.
 - c. NPS 5 and NPS 6: 18" long and 0.06" thick.
 - d. NPS 8 to NPS 14: 24" long and 0.075" thick.
 - e. NPS 16 to NPS 24: 24" long and 0.105" thick.
 - 5. Pipes NPS 8 and Larger: Include wood inserts.
 - 6. Insert Material: Length at least as long as protective shield.
 - 7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.4 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make smooth bearing surface.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.5 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.6 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2".

3.7 PAINTING

- A. Paint exposed surfaces immediately after erecting hangers and supports as specified in Section 09 90 00, PROTECTIVE PAINTING AND COATINGS.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 22 05 53 - MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Extent of mechanical identification work required by this section is indicated on drawings and/or specified in other sections.
- B. Types of identification devices specified in this section include the following:
 - 1. Painted Identification Materials.
 - 2. Equipment Labels.
 - 3. Plastic Pipe Markers.
 - 4. Plastic Tape.
 - 5. Underground-Type Plastic Line Marker.
 - 6. Valve Tags.
 - 7. Valve Schedule Frames.
 - 8. Engraved Plastic-Laminate Signs.

1.2 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of identification devices of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Codes and Standards:
 - 1. ANSI Standards: Comply with ANSI A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

1.3 SUBMITTALS

- A. Product Data: Submit Manufacturer's technical product data and installation instructions for each identification material and device required.
- B. Schedules: Submit valve schedule for each piping system, typewritten and reproduced on 8-1/2" x 11" bond paper. Tabulate the valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification (if any). Mark valves which are intended for emergency shut-off and similar special uses, by special "flags", in margin of schedule. In addition to mounted copies, furnish extra copies for Maintenance Manuals as specified in Division 1.
- C. Maintenance Data: Include product data and schedules in maintenance manuals; in accordance with requirements of Division 01.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering mechanical identification materials which may be incorporated in the work include; but are not limited to, the following:
 - 1. Allen Systems, Inc.
 - 2. Brady (W.H.) Co.; Signmark Div.
 - 3. Industrial Safety Supply Co., Inc.
 - 4. Seton Name Plate Corp.

2.2 MECHANICAL IDENTIFICATION MATERIALS

- A. General: Provide Manufacturer's standard products of categories and types required for each application as referenced in other sections. Selection is Installer's option where more than a single type is specified for applications but provide single selection for each product category.

2.3 PAINTED IDENTIFICATION MATERIALS

- A. Stencils: Standard fiberboard stencils, prepared for required applications with letter sizes generally complying with recommendations of ANSI A13.1 for piping and similar applications, but not less than 1-1/4" high letters for ductwork and not less than 3/4" high letters for access door signs and similar operational instructions.
- B. Stencil Paint: Standard exterior type stenciling enamel; black, except as otherwise indicated; either brushing grade or pressurized spray-can form and grade.
- C. Identification Paint: Standard identification enamel of colors indicated or, if not otherwise indicated for piping systems, complying with ANSI A13.1 and/or Owner Selection for colors.
- D. See Section 09 90 00, PAINTING AND PROTECTIVE COATINGS.

2.4 EQUIPMENT LABELS

- A. Metal Labels for Equipment:
 - 1. Material and Thickness: Stainless steel, 0.025-inch (0.64-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
 - 2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
 - 3. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 - 4. Fasteners: Stainless-steel rivets or self-tapping screws
 - 5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

2.5 PLASTIC PIPE MARKERS

- A. Snap-On Type: Provide Manufacturer's standard pre-printed, semi-rigid snap-on, color-coded pipe markers, complying with ANSI A13.1.
- B. Pressure-Sensitive Type: Provide Manufacturer's standard pre-printed, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers, complying with ANSI A13.1.
- C. Insulation: Furnish 1" thick molded fiberglass insulation with jacket for each plastic pipe marker to be installed on un-insulated pipes subjected to fluid temperatures of 125 °F (52 °C) or greater. Cut length to extend 2" beyond each end of plastic pipe marker.
 - 1. Small Pipes: For external diameters less than 6" (including insulation if any), provide full-band pipe markers, extending 360° around pipe at each location, fastened by one of the following methods:
 - a. Snap-on application of pre-tensioned semi-rigid plastic pipe marker.
 - b. Adhesive lap joint in pipe marker overlap.
 - c. Laminated or bonded application of pipe marker to pipe (or insulation).
 - d. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 3/4" wide; full circle at both ends of pipe marker, tape lapped 1-1/2".

2. Large Pipes: For external diameters of 6" and larger (including insulation if any), provide either full-band or strip-type pipe markers, but not narrower than 3 times letter height (and of required length), fastened by one of the following methods:
 - a. Laminated or bonded application of pipe marker to pipe (or insulation).
 - b. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 1-1/2" wide; full circle at both ends of pipe marker, tape lapped 3".
 - c. Trapped-to-pipe (or insulation) application of semi-rigid type, with Manufacturer's standard stainless steel bands.
- D. Lettering: Manufacturer's standard pre-printed nomenclature which best describes piping system in each instance, as selected by Architect/Engineer in cases of variance with name as shown or specified.
 1. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

2.6 PLASTIC TAPE

- A. General: Provide Manufacturer's standard color-coded pressure-sensitive (self-adhesive) vinyl tape, not less than 3 mils thick.
- B. Width: Provide 1-1/2" wide tape markers on pipes with outside diameters (including insulation, if any) of less than 6", 2-1/2" wide tape for larger pipes.
- C. Color: Comply with ANSI A13.1, except where another color selection is indicated.

2.7 UNDERGROUND-TYPE PLASTIC LINE MARKERS

- A. General: Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape, intended for direct-burial service; not less than 6" wide x 4 mils thick. Provide tape with printing which most accurately indicates type of service of buried pipe.
- B. Provide multi-ply tape consisting of solid aluminum foil core between 2-layers of plastic tape.

2.8 VALVE TAGS

- A. Brass Valve Tags: Provide 19-gauge polished brass valve tags, with a stamp-engraved piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high, and with 5/32" hole for fastener.
 1. Provide 1-1/2" diameter tags, except as otherwise indicated.
 2. Provide size and shape as specified or scheduled for each piping system.
 3. Fill tag engraving with black enamel.
- B. Plastic Laminate Valve Tags: Provide Manufacturer's standard 3/32" thick engraved plastic laminate valve tags, with piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high, and with 5/32" hole for fastener.
 1. Provide 1-1/2" sq. black tags with white lettering, except as otherwise indicated.
 2. Provide size, shape and color combination as specified or scheduled for each piping system.
- C. Valve Tag Fasteners: Provide Manufacturer's standard solid brass chain (wire link or beaded type), or solid brass S-hooks of the sizes required for proper attachment of tags to valves, and manufactured specifically for that purpose.

- D. Access Panel Markers: Provide Manufacturer's standard 1/16" thick engraved plastic laminate access panel markers, with abbreviations and numbers corresponding to concealed valve. Include 1/8" center hole to allow attachment.

2.9 VALVE SCHEDULE FRAMES

- A. General: For each page of valve schedule, provide glazed display frame, with screws for removable mounting on masonry walls. Provide frames of finished hardwood or extruded aluminum, with SSB-grade sheet glass.

2.10 ENGRAVED PLASTIC-LAMINATE SIGNS

- A. General: Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in the sizes and thicknesses indicated, engraved with engraver's standard letter style of the sizes and wording indicated, black with white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.
- B. Thickness: 1/16" for units up to 20 sq. in. or 8" length; 1/8" for larger units.
- C. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.

2.11 LETTERING AND GRAPHICS

- A. General: Coordinate names, abbreviations and other designations used in mechanical identification work, with corresponding designations shown, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of mechanical systems and equipment.
- B. Multiple Systems: Where multiple systems of same generic name are shown and specified, provide identification which indicates individual system number as well as service (as examples; Boiler No. 3, Air Supply No. 1H, Standpipe F12).

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

- A. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

3.2 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.3 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.4 PIPING SYSTEM IDENTIFICATION

- A. General: Install pipe markers of one of the following types on each system indicated to receive identification, and include arrows to show normal direction of flow:
1. Stenciled markers, including color-coded background band or rectangle, and contrasting lettering of black or white. Extend color band or rectangle 2" beyond ends of lettering.
 2. Stenciled markers, with lettering color complying with ANSI A13.1.
 3. Plastic pipe markers, with application system as indicated under "Materials" in this section. Install on pipe insulation segment where required for hot non-insulated pipes.
 4. Stenciled markers, black or white for best contrast, wherever continuous color-coded painting of piping is provided.
 5. Locate pipe markers and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums) and exterior non-concealed locations.
 - a. Near each valve and control device.
 - b. Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.
 - c. Near locations where pipes pass through walls or floors/ceilings, or enter non-accessible enclosures.
 - d. At access doors, manholes and similar access points which permit view of concealed piping.
 - e. Near major equipment items and other points of origination and termination.
 - f. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.
 - g. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

3.5 UNDERGROUND PIPING IDENTIFICATION

- A. General: During back-filling/top-soiling of each exterior underground piping system, install continuous underground-type plastic line marker, located directly over buried line at 6" to 8" below finished grade. Where multiple small lines are buried in common trench and do not exceed overall width of 16", install single line marker. For tile fields and similar installations, mark only edge pipe lines of field.

3.6 VALVE IDENTIFICATION

- A. General: Provide valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibs, and shut-off valves at plumbing fixtures, HVAC terminal devices and similar rough-in connections of end-use fixtures and units. List each tagged valve in valve schedule for each piping system.
- B. Mount valve schedule frames and schedules in machine rooms where indicated or, if not otherwise indicated, where directed by Contracting Officer.
- C. Where more than one major machine room is shown for project, install mounted valve schedule in each major machine room, and repeat only main valves which are to be operated in conjunction with operations of more than single machine room.

3.7 ADJUSTING AND CLEANING

- A. Adjusting: Relocate any mechanical identification device which has become visually blocked by work of this division or other divisions.

- B. Cleaning: Clean face of identification devices, and glass frames of valve charts.

3.8 EXTRA STOCK

- A. Furnish minimum of 5% extra stock of each mechanical identification material required, including additional numbered valve tags (not less than 3) for each piping system, additional piping system identification markers, and additional plastic laminate engraving blanks of assorted sizes.
- B. Where stenciled markers are provided, clean and retain stencils after completion of stenciling and include used stencils in extra stock, along with required stock of stenciling paints and applicators.

END OF SECTION

DIVISION 26
ELECTRICAL

SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies the basic requirements for electrical installations and includes requirements common to more than one section of Division 26. It expands and supplements the requirements specified in the General and Supplementary Conditions.
- B. This project consists of construction of the new building structures, associated facilities, and all related electrical systems as defined in the plans and in these specifications.
- C. The work includes the installation, connection and testing of new electrical equipment, including electrical services, power distribution equipment, lighting equipment, underground electrical work, grounding systems, control systems, conduit and wiring, coordination of traffic flow, temporary power systems, special electrical systems and all appurtenances to construct and demonstrate proper operation of the completed electrical systems.
- D. The Contractor shall be responsible for the coordination of power, communication, and controls for the project.
- E. The electrical plans do not give exact locations, etc., and do not show all the offsets, control lines, pilot lines, and other installation details. Each contractor shall carefully lay out the work at the sites to conform to the job conditions, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and thereby to provide complete operating systems.
- F. The electrical plans show diagrammatically the locations of the various electrical outlets and apparatus and the general method of circuiting and controlling. Exact locations of these outlets and apparatus shall be determined by reference to the general plans and to all detail drawings, etc., by measurements at the buildings, and in cooperation with other crafts, and in all cases shall be subject to the approval of the Owner and Engineer. The Engineer reserves the right to make any reasonable change in location of any outlet or apparatus before installation, without additional cost to the Owner.
- G. These specifications and the accompanying drawings are intended to cover systems which will not interfere with the structure of the buildings, which will fit into the several available spaces, and which will ensure complete and satisfactory systems. Each bidder shall be responsible for the proper fitting of the material and apparatus into the buildings.
- H. Should the particular equipment which any bidder proposes to install require other space conditions than those indicated on the Drawings, the Bidder shall arrange for such space with the Engineer before submitting the bid. Should changes become necessary on account of failure to comply with this clause, the Contractor shall make such changes at the Contractor's expense.
- I. Where wire sizes, conduit and other items of construction are shown or required for a complete installation, but are not adequately identified as to size or material requirements, the materials furnished shall be in accordance with "Code" requirements as though shown in detail on the Drawings.
- J. All equipment shall be leveled and made plumb. Metal junction boxes, equipment enclosures and metal raceways mounted on water or earth-bearing walls shall be separated from walls not less than 1/4 inch by corrosion-resistant spacers. All electrical conduits and items of equipment shall be run or set parallel to walls, floors and other items of construction.

1.2 STANDARDS

- A. The Contractor shall perform work specified in Division 26 in accordance with standards listed below. Where these specifications are more stringent, the most stringent standard shall take precedence. In case of conflict, obtain a decision from the Engineer.
1. Applicable National Fire Protection Association (NFPA) codes, including but not limited to:
 - a. NFPA 70 – National Electrical Code.
 - b. NFPA 70E – Standard for Electrical Safety in the Workplace.
 - c. NFPA 72 - National Fire Alarm Code.
 - d. NFPA 101 – Life Safety Code.
 - e. NFPA 820 – Standard for Fire Protection in Wastewater Treatment and Collection Facilities.
 - f. Internet Website: <http://www.nfpa.org>
 2. Applicable Code of Federal Regulations (CFR) codes, including but not limited to:
 - a. 29 CFR 1910 – Occupational Safety and Health Standards (OSHA).
 - b. 29 CFR 1926 – Safety and Health Regulations for Construction.
 - c. Internet Website: <http://www.gpo.gov/fdsys>
 3. ANSI/IEEE C2 – National Electrical Safety Code.
 4. Applicable Federal, State and Local Fire codes.
 5. Applicable Federal, State and Local Energy Codes.
 6. Applicable Federal, State and Local Building Codes.
 7. Applicable City Electrical Code.
 8. Applicable City Ordinances pertaining to electrical work.
 9. Applicable Federal, State and Local – Environmental, Health and Safety Laws and Regulations.
- B. Contractor shall utilize the most current editions of standards, which are current at time of bid and as recognized by the Authority Having Jurisdiction for the respective standard.

1.3 SUBMITTALS

- A. Submittals shall comply with Section 01 33 00 SUBMITTAL PROCEDURES and the General and Supplementary Conditions.
- B. Submittals shall be furnished by the Contractor for the work involved in sufficient time so that no delay or changes will be caused. Fax copies are not acceptable.
- C. Submittals shall consist of manufacturing information, schematics, wiring diagrams, ladder logic diagrams, instrument loop diagrams, outline drawings, clearances and related information. Shop Drawings shall be so marked as to indicate the EXACT items offered.
- D. Submittals shall bear Contractor's certification that the item complies in all respects with the item originally specified. It is the Contractor's responsibility to procure the proper sizes, quantities, rearrangements, structural modifications or other modifications in order for the substituted item to comply with the established requirements.
- E. The Contractor shall combine each submittal set into one electronic file (pdf format). Group materials submitted by their Specification numbers, but do not submit the entire electrical within one submittal. Provide electronic bookmarks in the pdf to indicate the included equipment types and a title sheet to separate each section.
- F. The Contractor shall submit complete descriptions, illustrations, specification data, etc., of all materials, fittings, devices, fixtures, special systems, etc., as required by the individual sections of this Division.

- G. Submittal of shop drawings, product data and samples will be accepted only when submitted by the Contractor. Data submitted from subcontractors and material suppliers directly to the Engineer will not be processed.
- H. All submittals shall provide the following information:
 - 1. General Contractor.
 - 2. Sub-Contractor.
 - 3. Distributor and/or Supplier.
 - 4. Sales Agency.
 - 5. Submittals not supplying this information will be rejected.
- I. Shop Drawings: In addition to the above, submit shop drawings for major materials where called for and when requested by the Engineer.
 - 1. Lockout/Tagout Program.
 - 2. Switchboard, motor control centers, panelboards, surge arresters, and safety switches.
 - 3. Motor starters and contactors including custom wiring diagrams for all motors.
 - 4. Lighting fixtures and lamps including light pole foundation requirements.
 - 5. Wire, cable and conduit.
 - 6. Dry type transformers including weight and dimensions.
 - 7. Wiring devices and plates.
 - 8. Dimensioned layout of electrical room drawn to scale, with equipment location shown therein. Clearances shall be in accordance with NEC and local codes.
 - 9. Dimensioned layout of all below grade conduit installations.
 - 10. Grounding system and layout.
 - 11. Lightning protection system layout.
 - 12. Traffic control system layout and schematics.
 - 13. Seismic protection materials and methods for all electrical equipment.
 - 14. Mounting brackets, supports and assembly for walkway mounted equipment including instruments, lighting and control panels

1.4 QUALITY ASSURANCE

- A. Any electrical equipment provided under this Division shall be turned over to the Owner in operating condition. Instruction on further operation and maintenance shall be included in the operating and maintenance instructions.

1.5 PRODUCT LISTING

- A. Prepare listing of major electrical equipment and materials for the project.
- B. Provide all information requested.
- C. Submit this listing as a part of the submittal requirements.
- D. When two or more items of same material or equipment are required they shall be of the same manufacturer when available. Product manufacturer uniformity does not apply to raw materials, bulk materials, wire, conduit, fittings, sheet metal, steel bar stock, welding rods, solder, fasteners, motors for dissimilar equipment kits, and similar items used in Work, except as otherwise indicated.
- E. Provide products that are compatible within systems and other connected items.

1.6 NAMEPLATE DATA

- A. Provide permanent operational data nameplate on each item of power operated equipment, indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and similar essential data. Locate nameplates in an accessible location.

1.7 WORK SUPERVISION

- A. The Contractor shall designate in writing the qualified electrical supervisor who shall provide supervision to all electrical work on this project. The minimum qualifications for the electrical supervisor shall be a master electrician as defined by the statutes of the State of the work being performed. The supervisor or his appointed alternate possessing at least a master electrician license shall be on site whenever electrical work is being performed. The qualifications of the electrical supervisor shall be subject to approval of the Owner and the Engineer.
- B. All master and journeyman electricians shall be licensed in accordance with the statutes of the State of the work being performed. No unlicensed electrical workers shall perform work on this project. Apprentice electricians in a ratio of not more than one apprentice per journeyman electrician will be allowed if the apprentices are licensed and actively participating in an apprenticeship program recognized and approved by the statutes of the State of the work being performed.

1.8 TELEPHONE WORK

- A. The Contractor shall be responsible for coordinating all telephone work with the servicing utility, Owner and Engineer.

1.9 LOCKOUT / TAGOUT PROGRAM

- A. The Contractor shall provide a complete copy of and electrical energy source Lockout/Tagout Program to the Owner, with copy to the Engineer. The document shall clearly identify the on-site master electricians and their contact information, including office and mobile telephone numbers.
- B. The Lockout/Tagout Program shall comply with Part 1910 - Occupational Safety and Health Standards (OSHA) Subpart S – Electrical, and meet the requirements of 29 CFR 1910.147, The Control of Hazardous Energy (Lockout/Tagout), including requirements listed in 1910.331 through 1910.335.
- C. Implementation of the Lockout/Tagout Program and all other related safety requirements are the sole responsibility of the Contractor.

1.10 SAFETY PROGRAM

- A. The Contractor shall implement an electrical safety program that complies with NFPA 70E and 29 CFR 1926.
- B. Implementation of the Electrical Safety Program, determining and providing proper Personal Protective Equipment (PPE), training and enforcing personnel to wear the prescribed PPE, conducting work area safety inspections (including correcting deficiencies), and all other related safety requirements are the sole responsibility of the Contractor.

1.11 EQUIPMENT CONNECTIONS

- A. General: Provide connections for all equipment installed or modified by this contract, regardless of who furnished the equipment.
- B. Provide all disconnect switches required by Code whether or not shown on the plans.
- C. Contractor shall connect Owner-furnished equipment when specified.

1.12 GENERAL CONDITIONS

- A. The work under this heading is subject to the General and Supplementary Conditions, special conditions for mechanical and electrical work, and the Contractor or subcontractor will be responsible for and be governed by all requirements thereunder as though specifically repeated herein.

1.13 COORDINATION

- A. The Contractor shall coordinate arrangement, mounting and support of all electrical equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping and conduit installed at a required slope.
 - 4. So connecting raceways, cables and wireways will be clear of obstructions and of the working and access space of other equipment.
- B. The Contractor shall coordinate electrical equipment to be mounted on vendor supplied walkways with supplier.

1.14 SPECIAL NOTE

- A. The mechanical, structural and process plans and specifications, including the general conditions and all supplements issued thereto, information to bidders, and other pertinent documents issued by the Engineer, are a part of these specifications and the accompanying electrical plans, and shall be complied with in every respect. All the above is included herewith, and shall be examined by all bidders. Failure to comply shall not relieve the Contractor of responsibility or be used as a basis for additional compensation due to omission of mechanical, process and structural details from the electrical drawings.

1.15 CONTINUATION OF SERVICES

- A. The Contractor shall install any temporary lines and connections required to maintain electric services and safely remove and dispose of them when complete. The Contractor shall supply emergency power whenever any existing electrical service is without power. In general, the existing facility shall remain operational during construction.
- B. Planned outages shall be coordinated two weeks in advance with duration and time of start approved by the Owner. Changeover work which may be required after normal hours or weekends shall not constitute the basis for additional cost to the Owner. When an outage begins, the Contractor shall proceed directly to completion of the work without unscheduled interruptions or delays due to lack of manpower, equipment or tools.
- C. The Contractor shall refer to the sequence of construction and shall provide temporary connections as may be required to complete each phase of construction as may be required. The

Contractor shall submit proposed electrical service plans for each phase of construction to the Owner and Engineer for consideration.

1.16 LAYOUT

- A. The Contractor shall coordinate and establish all bench marks and control lines. The Contractor shall lay out all work. The lay out shall be reviewed by the Engineer and Owner prior to starting any work.

1.17 RELATED WORK SPECIFIED ELSEWHERE

- A. Mechanical Equipment: The Contractor shall rough-in for and make final electrical connections to all motor, panels, fixtures, and equipment furnished under other sections of the specifications, providing all material and equipment required for such final connections, except hereinbefore described. This includes, but is not limited to, control panels and other miscellaneous equipment.
- B. The Contractor shall refer to other sections of these specifications for all information relating to the requirements of all electrical connections to the equipment and shall furnish and install electrical items required for a complete installation, ready for operation.
- C. Roughing-in shall be accomplished from approved shop drawings.
- D. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
- E. Refer to equipment specifications in other Divisions for rough-in requirements.

1.18 LOCAL CONDITIONS

- A. Inspection of Sites: The bidder shall inspect the site, thoroughly acquaint himself with conditions to be met and work to be accomplished. Failure to comply with this shall not constitute grounds for any additional payments.

1.19 RECORD DOCUMENTS

- A. Refer to the General and Supplementary Conditions for requirements. The following paragraphs supplement the requirements of the General and Supplementary Conditions:
 - 1. Mark Drawings to indicate revisions to conduit size and location both exterior and interior; actual equipment locations, dimensioned for column lines; concealed equipment, dimensioned to column lines; distribution and branch electrical circuitry; fuse and circuit breaker size and arrangements; support and hanger details; Change Orders; concealed control system devices.
 - 2. The Contractor shall locate all underground and concealed work, identifying all equipment, conduit, circuit numbers, motors, feeders, breakers, switches, and starters. The Contractor will certify accuracy by endorsement. Record drawings shall be correct in every detail, such that the Owner can properly operate, maintain, and repair exposed and concealed work.
 - 3. The Contractor shall store the Record drawings on the site. Drawings shall not be rolled. Make corrections, additions, etc., with pencil, with date and authorization of change.
 - 4. Mark specifications to indicate approved substitutions; Change Orders; actual equipment and materials used.

1.20 OPERATION AND MAINTENANCE DATA

- A. Refer to Section 01 33 00 SUBMITTAL PROCEDURES and Section 01 78 23 OPERATION AND MAINTENANCE DATA for procedures and requirements for preparation and submittal of maintenance manuals.
- B. In addition to the information required by Sections 01 33 00 and 01 78 23, include the following information:
 - 1. Installation manual: Description of function, installation and calibration manuals, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.
 - 2. Operations manual: Manufacturer's printed operating instructions and procedures to include start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; summer and winter operating instructions; and all programming and equipment settings.
 - 3. Maintenance manual: Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
 - 4. Service manual: Servicing instructions and lubrication charts and schedules, including the names and telephone numbers of personnel to contact for both routine periodic and warranty service for equipment and materials provided under this Division.
 - 5. Final approved equipment shop drawings, clearly labeled.
 - 6. Final test reports, clearly labeled, including motor certification tests.
 - 7. Final certified calibration sheets for all equipment and instruments.
- C. After approval of the O&M Manuals, the Contractor shall provide three (3) complete electronic copies of all documentation in Adobe PDF file format using a storage media device of the Owner and Engineer's choosing along with 6 hard copies.

1.21 GUARANTEE

- A. The Contractor shall guarantee the work and materials for a period of one (1) year from the date of completion. If there are failures due to faulty material or workmanship, the Contractor shall correct the failure at no cost to the Owner.
- B. Refer to the General and Supplementary Conditions for procedures and submittal requirements for warranties. Refer to individual equipment specifications for warranty requirements.
 - 1. Compile and assemble the warranties specified in Division 26, into a separate set of vinyl covered, three ring binders, tabulated and indexed for easy reference.
- C. Provide complete warranty information for each item to include product or equipment to include date of beginning of warranty or bond; duration of warranty or bond; and names, addresses, and telephone numbers and procedures for filing a claim and obtaining warranty services.
- D. Upon completion of the installation, the Contractor shall adjust the systems to the satisfaction of the Engineer.
- E. This guarantee shall include the capacity and integrated performance of the component parts of the various systems in accordance with the intent of the specifications. The Contractor shall conduct complete tests required by the Engineer to demonstrate the ability of the various systems.

1.22 CLEANING

- A. Refer to Section 01 77 00 CLOSEOUT PROCEDURES for general requirements for final cleaning.

- B. Clean all light fixtures, lamps and lenses prior to final acceptance. Replace all inoperative lamps.
- C. The electrical system shall be thoroughly cleaned inside and outside, of all enclosures to remove all debris, dust, concrete splatter, plaster paint and lint.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. All materials and equipment used in carrying out these specifications shall be new and have UL listing, or listing by other recognized testing laboratory when such listings are available. Specifications and drawings indicate name, type, or catalog numbers of materials and equipment to be used as standards.

PART 3 - EXECUTION

3.1 SALVAGE

- A. All salvage and equipment removed by the work shall remain the property of the Owner unless directed otherwise by the Owner. Material removed from the project shall be stored on the project site where and as directed. Debris shall be removed from the job site and disposed of by the Contractor.

3.2 DEMOLITION AND DISPOSAL

- A. All conduit, wire, and other electrical appurtenances associated with equipment removed in this project, and no longer in use, shall be removed and stored or disposed of as directed by the Owner. The Contractor shall patch and apply finish to walls, floors, and other structures from which such items are removed to match surrounding colors, textures, or other visual characteristics.

3.3 DELIVERY, STORAGE, AND HANDLING

- A. Deliver equipment to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage, and handling.
- B. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage.
- C. Equipment and materials shall be stored in accordance with the manufacturer's recommendations and instructions.
- D. All equipment, including but not limited to equipment containing coils and/or electronics, shall be stored in a clean, dry, ventilated and heated building. The storage area shall be free from condensation or other injurious environmental conditions. Freedom from condensation shall be essential and shall be accomplished by the use of auxiliary heaters as required to raise the temperature to 5-degree C above the ambient temperature. The equipment shall be protected from excessive dust.
- E. In addition, certain electronic equipment that requires cooling based upon its specific storage temperature range shall be stored in an air-conditioned building.
- F. All motors shall be stored in a clean, dry, ventilated and heated building. The storage area shall be free from condensation or other injurious environmental conditions. Freedom from

condensation shall be essential and shall be accomplished by the use of auxiliary heaters as required to raise the temperature to 5 degree C above the ambient temperature. The motors shall be protected from excessive dust.

- G. Cables and wiring shall be kept in a dry location out of the sun.
- H. Outdoor storage, even when protected by a tarpaulin, is unacceptable.
- I. Equipment may be rejected if the storage criteria are not followed.

3.4 INSTALLATION

- A. Coordinate electrical equipment and materials installation with other building components.
- B. Verify all dimensions by field measurements.
- C. Arrange for chases, slots, and openings in other building components to allow for electrical installations.
- D. The Contractor shall keep ends of conduits, including those extending through roofs, equipment and fixtures covered or closed with caps or plugs to prevent foreign material from entering during construction.
- E. Coordinate the installation of required supporting devices and sleeves to be set in concrete and other structural components as they are constructed.
- F. Sequence, coordinate, and integrate installations of electrical materials and equipment for maintaining the required operation of the facility. Give particular attention to large equipment requiring positioning prior to closing-in the building.
- G. Coordinate the cutting and patching of building components to accommodate the installation of electrical equipment and materials.
- H. Where mounting heights are not detailed or dimensioned, install electrical services and overhead equipment to provide the maximum headroom possible.
- I. Install electrical equipment to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
- J. Coordinate the installation of electrical materials and equipment above ceilings with suspension system, mechanical equipment and systems, and structural components.
- K. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
- L. Coordinate installation of electrical equipment on vendor supplied walkways with supplier.

3.5 MATERIALS AND WORKMANSHIP

- A. All materials shall be new and shall be of the latest standard design of a manufacturer regularly engaged in the manufacture of that type of equipment. Materials shall be in good condition and shall be free from dents, scratches or other damage incurred in shipment or installation.

- B. All equipment shall comply with the National Electrical Code, Underwriters Laboratories or other appropriate agency.
- C. Installation shall be made in a neat and workmanlike manner, and all materials shall be installed in accordance with the recommendations of the various manufacturers. The installation shall be subject to the approval of the Owner and Engineer.
- D. Incidental materials required to complete the installation as intended by these Specifications shall be of the type and quality in keeping with specified equipment.

3.6 COORDINATION

- A. Carefully examine specification and drawings to be thoroughly familiar with items which require electrical connections and coordination. (Electrical drawings are diagrammatic and shall not be scaled for exact sizes.)
- B. Notify other tradesmen of any deviations or special conditions necessary for the installation of work. Interference between work of various contractors shall be resolved prior to installation. Work installed not in compliance with specifications and drawings and without properly checking and coordinating as specified above shall, if necessary, be removed and properly reinstalled without additional cost to the Owner. Engineer to be mediating authority in all disputes arising on project.
- C. Equipment shall be installed in accordance with manufacturer's recommendation. Where conflicts occur between contract documents and these recommendations, a ruling shall be requested of the Engineer for decision before proceeding with such work.

3.7 CUTTING AND PATCHING

- A. Repair or replace routine damage caused by cutting in performance of work under this Division.
- B. Correct unnecessary damage caused due to installation of electrical work, brought about through carelessness or lack of coordination.
- C. Holes cut through floor slabs to be sleeved or core drilled with drill designed for this purpose. All openings, sleeves, and holes in slabs to be properly sealed, fire proofed and water proofed.
- D. Repairs to be performed with materials which match existing materials and to be installed in accordance with appropriate sections of these specifications.
- E. All cutting and patching work shall be coordinated in advance with the Engineer and Owner prior to any work.

3.8 TRENCHING, EXCAVATION, BACKFILLING, AND REPAIRS

- A. Provide trenching, excavation, and backfilling necessary for performance of work under this Division.

3.9 FOUNDATIONS AND PADS

- A. Foundations and pads required for equipment shall be provided as indicated. Proper size and location of foundations, pads and anchor bolts shall be determined under this Division.
- B. Provide anchors and bases for electrical equipment to withstand lateral forces and accommodate displacements.

3.10 NOISE AND VIBRATION CONTROL

- A. The electrical system as installed shall be free of objectionable noise or vibration. The Contractor shall isolate motors, starters, transformers, equipment, ballasts, etc., as directed or required as to ensure acceptable noise level free from objectionable vibration in all systems.

3.11 TESTS

- A. On completion of work, installation shall be completely operational and entirely free from ground, short circuits, and open circuits. Perform a thorough operational test in presence of the Owner and Engineer. Furnish all labor, materials and instruments for above tests.
- B. Furnish the Engineer, as part of closing file, a copy of such tests including identification of each circuit and readings recorded. Test information to be furnished to the Engineer includes ampere readings of all panels and major circuit breakers, isolation resistance reading of motors and transformers.
- C. Prior to final observation and acceptance test, all electrical systems and equipment shall be in satisfactory operating condition. Including, but not limited to the following:
 - 1. Electrical power and distribution system.
 - 2. Lighting systems.
 - 3. Transformers.
 - 4. Electric motors for all equipment.
 - 5. Telecommunication system.
 - 6. Emergency power system.
 - 7. Special electrical control systems.
- D. After installation of the electrical system and before operating equipment, functional checking shall be conducted in accordance with the manufacturer's recommendations, with the contract drawings and as follows:
 - 1. Functional checking shall include inspection, testing and repair, replacement or adjustments as necessary to ensure compliance with the requirements of the specifications. Tests and inspections shall be recorded on appropriate yellow lined contract and shop drawings, standard test forms and checklists to indicate that wiring and controls are in place in accordance with requirements and to form the basis of record drawings.
 - 2. The functional test procedures shall be signed and dated by the Contractor and presented to the Owner's construction observation personnel prior to operating any equipment.
 - a. Visual Inspection – The electrical system shall be examined as outlined below:
 - 1). Parts of components missing
 - 2). Improper assembly
 - 3). Parts or components not functioning properly
 - 4). Finish not as specified
 - 5). Materials not as specified
 - 6). Connections not tight
 - 7). Mounting and supports loose or unsatisfactory
 - 8). Nameplates missing or inaccurate
 - b. Grounding System Tests
 - 1). Measure the resistance of the counterpoise grounding system by the rate-of-fall of potential method. Record all measurements on an approved standard test form made specifically for the purpose. The resistance of the grounding system to ground shall not exceed NFPA 70 requirements.
 - c. Continuity Tests
 - 1). Each wire and each wire in each cable rated 300 volts and below shall be tested for continuity. Record wire number and pass or fail on checklist for each wire.
 - d. Dielectric Tests

- 1). Each power conductor rated 600 volts and above shall be tested (meggered) for dielectric strength to ground.
- 2). Prior to testing, all components that could be damaged should be disconnected. After testing, the circuit shall still register a resistance value of not less than 1 megohm at 600 volts, dc. This test shall apply between all insulated circuits and external metal parts. Record equipment name, phase or wire number and all observed values for each wire.
- 3). Subsequent to wire and cable hook-ups, energize circuits and demonstrate proper functioning of all circuits. Record equipment or circuit number and pass or fail on function test checklist for each circuit.
- 4). The Contractor shall develop non-conforming material reports for each failure. Repair and report failures all failures to Owner and Engineer.
- 5). The Contractor shall replace defective parts, correct malfunctioning units, make all repairs and retest to demonstrate compliance. The Contractor shall document all actions taken on appropriate non-conforming material report.

3.12 INSPECTION FEES AND PERMITS

- A. Obtain and pay for all necessary permits and inspection fees required for electrical installation.

3.13 IDENTIFICATION OF EQUIPMENT

- A. Properly identify all electrical equipment, including but not limited to the following:
 1. Switchgear, switchboards, motor control centers, and control panels.
 2. Main distribution panel and individual devices within it.
 3. Panelboards and individual devices within it.
 4. Safety switches and disconnects.
 5. Contactors and lighting control center, including all branch circuits.
 6. Individually mounted circuit breakers.
 7. Relays.
 8. Transformers.
 9. Generators and automatic transfer switches.
 10. Any other type of enclosure that includes electrical equipment.

END OF SECTION

SECTION 26 05 14 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Receptacles with integral GFCI and associated device plates.
 - 2. Snap switches and wall-box dimmers.

1.2 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- D. RFI: Radio-frequency interference.
- E. TVSS: Transient voltage surge suppressor.

1.3 SUBMITTALS

- A. Product Data: for each type of product indicated.
- B. Shop Drawings: List of legends and description of materials and process used for pre-marking wall plates.
- C. Samples: One for each type of device and wall plate specified in each color specified.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as type are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.
- B. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers:
 - 1. Cooper wiring Devices; a division of Cooper Industries, Inc. (Cooper).
 - 2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).

3. Leviton Mfg. Company Inc. (Leviton).
4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

2.2 STRAIGHT BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20A: Comply with NEMA WD1, NEMA WD 6 configuration 5-20R, and UL 498.
 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the work include, but are not limited to the following:
 - a. Cooper; 5351 (single), 5352 (duplex).
 - b. Hubbell; HBL5351 (single), CR5352 (duplex).
 - c. Leviton; 5891 (single), 5352 (duplex).
 - d. Pass & Seymour; 5381 (single), 5352 (duplex).

2.3 GFCI RECEPTACLES

- A. General Description: Straight blade, feed-through type. Comply with NEMA WD1, NEMA WD6, UL498 and UL 943, Class A and include indicator light that is lighted when device is tripped.
- B. Duplex GFCI Convenience Receptacles, 125 V, 20A:
 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to the following:
 - a. Cooper; GF20.
 - b. Pass & Seymour; 2084.

2.4 SNAP SWITCHES

- A. Comply with NEMA WD 1 and UL 20.
- B. Switches, 120/277 V, 20 A:
 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the work include, but are not limited to the following:
 - a. Cooper; 2221 (single pole), 2222 (two pole), 2223 (three way), 2224 (four way).
 - b. Hubbell; CSI221 (single pole), CSI222 (two pole), CSI223 (three way), CSI224 (four way).
 - c. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 12224-2 (four way).
 - d. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole); 20AC3 (three way), 20AC4 (four way).
- C. Pilot Light Switches, 20A:
 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the work include, but are not limited to the following:
 - a. Cooper; 2221PL for 120 V and 277V.
 - b. Hubbell; HPL1221PL for 120 V and 277V.
 - c. Leviton; 1221-PLR for 120 V, 1221-7PLR for 277V.
 - d. Pass & Seymour; PS20AC1-PLR for 120 V.
 2. Description: Single pole, with neon-lighted handle, illuminated when switch is "OFF."

2.5 WALL PLATES

- A. Single and combination types to match corresponding wiring devices.
 1. Plate-Securing Screws: Stainless steel or unbreakable nylon in damp areas.
 2. Material: 0.035-inch-(1mm-) thick, satin-finished stainless steel.
 3. Provide in-use covers for all exterior installations and interior damp locations.

2.6 FINISHES

- A. Color:
 - 1. Wiring Devices: As selected by Owner, unless otherwise indicated or required by NFPA 70 or device listing.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.
- B. Coordination with Other Trades:
 - 1. Take steps to ensure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
 - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint and other material that may contaminate the raceway system, conductors and cables.
 - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 - 4. Install wiring devices after all wall preparation, including painting is complete.
- C. Conductors:
 - 1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
 - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 - 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
 - 4. Existing conductors:
 - a. Cut back and pigtail or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtailling existing conductors is permitted provided the outlet box is large enough.
- D. Device Installation:
 - 1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
 - 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
 - 3. Do not remove surface protection such as plastic film and smudge covers until the last possible moment.
 - 4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
 - 5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
 - 6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
 - 7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
 - 8. Tighten unused terminal screws on the device.
 - 9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.
- E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

3.2 IDENTIFICATION

- A. Comply with Division 26 Section "Identification for Electrical Systems."
1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
1. Test Instruments: Use instruments that comply with UL 1436.
 2. Test Instrument for Convenience Receptacles: digital wiring analyzer with digital readout or illuminated LED indicators of measurement.
- B. Tests for Convenience Receptacles:
1. Line voltage: Acceptable range is 105 to 132V.
 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
 3. Ground Impedance: Values of up to 2 ohms are acceptable.
 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 5. Using the test plug, verify that the device and its outlet box are securely mounted.
 6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- C. Test straight blade for the retention force of the grounding blade according to NFPA 99. Retention force shall be not less than 4 oz. (115g).

END OF SECTION

SECTION 26 05 15 - ELECTRIC MOTORS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section describes materials, installation and testing of induction motors and applies to motors which are generally provided as part of equipment specified in other sections. The Contractor shall provide motors, accessories and appurtenances complete and operable in accordance with the individual driven equipment specifications.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Complete motor data shall be submitted, including:
 - 1. Machine name and specification number of driven machine.
 - 2. Motor manufacturer.
 - 3. Motor type or model and dimensional drawing, including weight.
 - 4. Horsepower nominal.
 - 5. Guaranteed minimum full load efficiency. Also, nominal efficiencies at 1/2 and 3/4 load.
 - 6. Full load speed.
 - 7. Full load current at rated horsepower for application voltage.
 - 8. Service factor, minimum 1.15.
 - 9. Voltage, phase and frequency rating.
 - 10. Winding insulation class.
 - 11. Temperature rise class.
 - 12. Frame size.
 - 13. Enclosure.
 - 14. NEMA design.
 - 15. Thermal protection or over temperature protection.
 - 16. Wiring diagram for devices such as temperature switches, space heaters and motor leak detection as applicable.
 - 17. Bearing data, including recommendation of lubricants.
 - 18. Inverter duty motor for all motors connected to variable frequency drive controllers. Include minimum speed at which motors may be operated.
 - 19. Power factor at 1/2, 3/4 and full load.
 - 20. Complete nameplate data, rating and characteristics.
 - 21. Mounting arrangement, size and location of conduit entries, including lugs.
 - 22. Factory test results for each motor.

1.3 QUALITY ASSURANCE

- A. Provide routine (short commercial) test data complying with NEMA MG 1-12.51 and MG 1-23.46.
- B. Test thermally protected motors in accordance with NEMA MG 1 winding temperature and trip current tests.
- C. Comply with NEMA MG 1.
- D. Motors for applications in hazardous locations shall bear the UL label listing its use in accordance with the NEC.

1.4 COORDINATION

- A. Furnish reviewed shop drawings from motor controller manufacturer for coordination and sizing of the controller.
- B. Coordinate supplied motor connection box with conduits sizes indicated in the drawings.
- C. Coordinate motor leads and lugs with wire sizes indicated in the drawings.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

- A. Unless otherwise specified or specifically required by the manufacturer of the equipment to be driven, all motors shall be single speed, squirrel cage, a-c induction type motors. Electric motors shall be NEMA Design B constant speed squirrel cage induction motors having normal starting torque with low starting current except for motors controlled by variable speed operation and other special motors. In no case shall starting torque or breakdown torque be less than the value specified in ANSI/NEMA MG 1. In all cases, motors shall be suitable for the indicated starting method.
- B. Stator winding shall be copper.
- C. The maximum motor loading of each motor shall not exceed its nameplate horsepower rating (exclusive of service factor) under any operating condition.
- D. Motors shall be sized to start and accelerate the design loading and operate the full range of driven equipment without exceeding any of the specified design requirements. Motors that fail to meet these requirements shall be replaced at no additional cost to the Owner.
- E. All three phase motors shall be provided with Class F insulation, rated to operate at a maximum ambient temperature of 40 degrees C and at the altitudes where the motors will be installed and operated without exceeding Class B temperature rise limits stated in ANSI/NEMA MG1-12, 42. Single phase motors shall have Class F insulation with temperature rise not to exceed the insulation class. Motors to be operated with variable frequency drives shall be provided with insulation systems to withstand 1600 volt spikes, with dV/dt as defined in NEMA MG 1-31.
- F. All motors shall have a minimum service factor of 1.15.
- G. Motors for use in hazardous locations shall have enclosures suitable for the classification of the location. Such motors shall be UL listed and stamped.
- H. Motors larger than 50 HP located outdoors or in non-conditioned areas shall have 120-volt AC space heaters and temperature sensors.
- I. For motors controlled by variable frequency drives, the critical vibration speed of the motor/load combination shall either not fall within the operating range of the drive or such frequencies shall be blocked with the drive critical speed avoidance circuit. All motors connected to variable frequency drives shall be inverter duty rated.
- J. Unless otherwise specified, motors shall have no-load sound power levels not to exceed the values specified in NEMA MG 1-12.53.3.
- K. Premium Efficiency Motors:

1. Motors with a nameplate rating of 1 horsepower and larger shall be premium efficiency type motors as determined by the testing set forth in ANSI/IEEE 112 – Standard Test Procedure for Polyphase Induction Motors and Generators, Method B. Motors shall be stamped with the efficiency on the nameplate with the caption “NEMA Nominal Efficiency.”
2. Efficiency index, nominal efficiency and minimum efficiency shall be defined in accordance with ANSI/NEMA MG1-12.59 – Efficiency Levels of Energy Efficient Polyphase Squirrel-Cage Induction Motors. All three values are required to be indicated in the submittal.

2.2 MOTOR BEARINGS

- A. All motors greater than 2 horsepower shall have bearings designed for 17,500 hours (belted) or 100,000 hours (coupled) L-10 life.
- B. Motors less than 2 horsepower shall be provided with sealed, permanently lubricated ball bearings.
- C. Horizontal motors over 2 horsepower shall be shielded open-type bearing installed with labyrinth sealed end bells with pipe plugs. Bearings shall be regreasable and have provisions for purging old grease.
- D. Vertical motors over 2 horsepower shall be provided with relubricatable ball, spherical, roller or plate type trust bearings. Lubrication shall be per manufacturer's recommendation for smooth operation and long life of the bearing. Drains shall be provided to prevent over lubrication.

2.3 MOTOR THERMAL PROTECTION

- A. All single phase motors shall have integral thermal overload protection or shall be current limited.
- B. Winding thermostats shall be provided in accordance with NEMA MG-1. Thermostats shall be snap action, bi-metallic, temperature actuated type switches and shall be provided with a normally closed contact. Thermostats shall be precalibrated by the manufacturer and shall be series connected.

2.4 ACCESSORIES

- A. All vertical motors and horizontal motors 3 horsepower and larger shall have split-type conduit boxes with a gasketed moisture seal between the conduit box and motor frame. Motors less than 3 horsepower shall have the manufacturer's standard conduit boxes. Motors other than open drip-proof shall be gasketed.
- B. All motors weighing 250 pounds or greater shall have suitable lifting eyes for installation and removal.
- C. Motor grounding lugs shall be provided and shall be suitable for terminating ground wires.
- D. All motors shall be fitted with permanent stainless steel nameplates indelibly stamped or engraved with NEMA Standard motor data.
- E. Refer to equipment specifications for special requirements such as space heaters or motor winding thermal protection.

PART 3 - EXECUTION

3.1 STORAGE

- A. Protect motors from exposure to elements for which they are not designed. Install and energize temporary electrical service to motors with electrical heaters.
- B. Store motors in an air-conditioned, ventilated or protected environment similar to or better than the destination environment.

3.2 INSTALLATION

- A. Motor installation shall be performed in accordance with the motor manufacturer's written recommendations and the written requirements of the manufacturer of the driven equipment.
- B. Connections, switches, controls, disconnects and other items shall be provided in accordance with the plans and specifications for each motor.
- C. The Contractor shall coordinate conduit sizes indicated in the drawings with the supplied motor connection box. The Contractor shall be responsible for providing larger connection boxes as may be required.

3.3 FIELD TESTING

- A. Perform insulation resistance tests in accordance with NEMA MG-1. Test voltage shall be 1000 VAC plus twice the rated voltage of motor.
- B. Inspect the physical and mechanical conditions of each motor installation including any deviations from the nameplate, drawings, specifications and manufacturer's written guidelines. Verify expected rated voltage, phase and frequency for each motor installation. Confirm the presence of and correct application of lubrications for each motor along with proper securing and torque settings for bolted installations of each motor.
- C. Check for proper phase and ground connections for each motor are connected. For multi-voltage motors, verify that motors are connected properly for the supplied voltage.
- D. Verify that space heaters, where provided, are functional.
- E. Test the motor for proper rotation prior to connection to the driven equipment. Measure and record running current and evaluate the current relative to the load conditions and nameplate full-load amps.
- F. Simulate operating conditions for each motor to demonstrate proper operation of interlocks and control features.
- G. Record operating current in each phase for each motor ½ horsepower and larger. Motors exceeding motor nameplates values shall be repaired or replaced.
- H. For motors 50 horsepower and larger or when a discernible abnormal vibration is detectible, a vibration test shall be completed. Vibration shall not exceed 0.25 in./sec. For horizontal motors, the N-S and E-W vibrations shall be measured at the top and bottom of the front and rear bearing housing. For vertical motors, the N-S and E-W vibrations shall be measured at the upper and lower bearing housing.
- I. All testing shall be witnessed by the Engineer and Owner.

1. Motor and Motor Protection Tests for motors – In addition to other testing start and stop each motor a minimum of 3 times and perform a run test for vibration, heat, and to document motor protection. The Contractor shall document the settings of the motor overcurrent protection, overload relay and similar data on the provided form – MOTOR TEST REPORT.
2. The Contractor shall develop non-conforming material reports for each failure and repair or report failures.
3. The Contractor shall replace defective parts, correct malfunctioning units, make all repairs and retest to demonstrate compliance. The Contractor shall document action taken on appropriate non-conforming material report.

3.4 MOTOR TEST REPORT

- A. The following form is provided for the motor certification specified herein. Master blank forms are available on request.

END OF SECTION

PROJECT NAME

MOTOR TEST REPORT

Each electric motor shall be tested for proper operation. Follow manufacturer's testing recommendations and procedures.

1. Name and Horsepower of Motor Tested: _____
2. Overcurrent Protection: _____
3. Overload Protection: _____
4. Visual Inspection Checklist:
 - ☐ Momentarily Bump Motor Shaft for Proper Rotation
 - ☐ Motor Frame Bolts
 - ☐ Shaft Coupling
 - ☐ Lubricants
 - ☐ Other Comments:
5. Megger motor from wire in motor control center or control panel and record results:
 $\phi A-\phi B$ _____ $\phi B-\phi C$ _____ $\phi C-\phi A$ _____
 $\phi A-G$ _____ $\phi B-G$ _____ $\phi C-G$ _____
6. Record full load voltage and current:
 V_{ab} _____ V_{an} _____ I_a _____
 V_{bc} _____ V_{bn} _____ I_b _____
 V_{ca} _____ V_{cn} _____ I_c _____
7. Motor Nameplate FLA: _____
Running Amps: _____
P.F. _____
8. Comments:
Signature Required: _____
Company: _____
Date: _____

SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.
 - 3. Sleeves and sleeve seals for cables.
- B. Related Sections include the following:
 - 1. Division 26 Section.

1.2 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene monomer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Qualification Data: For testing agency.
- A. Field quality-control test reports.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association (NETA) or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
 - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

1.5 COORDINATION

- A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Alcan Products Corporation; Alcan Cable Division.
2. American Insulated Wire Corp.; a Leviton Company.
3. General Cable Corporation.
4. Senator Wire & Cable Company.
5. Southwire Company.

B. Copper Conductors: Comply with NEMA WC 70. No aluminum on project.

C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN, XHHW and RHH-RHW-USE.

2.2 CONNECTORS AND SPLICES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper, stranded.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type RHH-RHW-USE single conductors in raceway.

B. Exposed Feeders: Type RHH-RHW-USE, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type RHH-RHW-USE, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type RHH-RHW-USE single conductors in raceway.

E. Feeders in Cable Tray: Type RHH-RHW-USE, single conductors in raceway for larger than 4/0 AWG; Otherwise Type TC tray cable.

F. Exposed Branch Circuits, Including in Crawlspace: Type THHN-THWN, single conductors in raceway.

G. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.

- H. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW, single conductors in raceway.
- I. Variable Frequency Drive Branch Circuits: Shielded cable, size adjusted for published ampacity of cable.
- J. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- K. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- L. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."
- F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.
- D. Cable splicing, in general, will not be allowed. Where applicable, all wiring connections to be made using terminal block type connections. Wire nut use will be permitted only where allowed by the Owner and Engineer.

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
 - 1. Megger Test of individual conductors to ground after installation.
 - 2. Visual observation of conductor at accessible locations.
- B. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test the following for compliance with requirements.
 - a. All panel feeders.
 - b. All motor feeders.
 - c. All control wires for continuity.
 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- C. Test Reports: Prepare a written report to record the following:
1. Test procedures used.
 2. Test results that comply with requirements.
 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment.
 - 1. Underground distribution grounding.
 - 2. Common ground bonding with lightning protection system.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:
 - 1. Test wells.
 - 2. Ground rods.
 - 3. Ground rings.
 - 4. Grounding arrangements and connections for separately derived systems.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For grounding to include the following in emergency, operation and maintenance manuals.
 - 1. Instructions for periodic testing and inspection of grounding features at test wells ground rings grounding connections for separately derived systems based on ANSI/NETA MTS.
 - a. Test shall be to determine if ground resistance or impedance values remain within specified maximums and instructions shall recommend corrective action if they do not.
 - b. Include recommended testing intervals.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare copper Conductors:
 - 1. Solid Conductors: ASTM B3
 - 2. Stranded Conductors: ASTM B8.
 - 3. Tinned Conductors: ASTM B 33.
 - 4. Bonding Conductor: No. 4 AWG, stranded conductor or per NFPA 70.

2.2 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
 - 1. Pipe connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 4/0 AWG minimum.
 - 1. Bury at least 30 inches below grade.
- C. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
 - 4. Connections to Structural Steel: Bolted connectors.

3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with ANSI/IEEE C2 grounding requirements.
- B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, nonshrink grout.
- C. Grounding Connections to Manhole and Handhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields as recommended by manufacturer of splicing and termination kits.

- D. Pad-Mounted Equipment: Install four ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with utility transformers by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than No. 4/0 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inches from the foundation.

3.3 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.
 - 3. Receptacle circuits.
 - 4. Single-phase motor and appliance branch circuits.
 - 5. Three-phase motor and appliance branch circuits.
 - 6. Flexible raceway runs.
- C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- D. Water Heater, Heat-Tracing and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment and components.
- E. Metal Poles Supporting Outdoor Lighting fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.4 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact or damage.
- B. Common Ground Bonding with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor and install in conduit.
- C. Ground rods: Drive rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.
 - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
- D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 26 Section "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches deep, with cover.

1. Test Wells: Install at least one test well for each service, unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
- E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
 3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.
- F. Grounding and Bonding for Piping:
 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit from building's main service equipment, or grounding bus, to main metal water service entrance to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- G. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.
- H. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.
- I. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each steel column and indicated item, extending around the perimeter of building.
 1. Install tinned-copper conductor not less than No. 4/0 AWG for ground ring and for taps to building steel.
 2. Bury ground ring not less than 24 inches from building foundation at a depth not less than 30 inches below finished grade.
- J. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70, using a minimum of 20 feet of bare copper conductor not smaller than No. 4 AWG.
 1. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.
 2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to grounding electrode external to concrete.

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections and prepare test reports:
 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.

2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal at ground test wells. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
 3. Prepare dimensioned drawings locating each test well, ground rod and ground rod assembly and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- B. Report measured ground resistances that exceed the following values:
1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
 2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
 3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
 4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).
 5. Substations and Pad-Mounted Equipment: 5 ohms.
 6. Manhole and Handhole Grounds: 10 ohms.
- C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION

SECTION 26 05 33 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. Related Sections include the following:
 - 1. Division 26 Section 26 05 43, "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.

1.2 DEFINITIONS

- A. LFMC: Liquidtight flexible metal conduit.
- B. LFNC: Liquidtight flexible nonmetallic conduit.
- C. GRS: Galvanized Rigid Steel Conduit.
- D. RNC: Rigid nonmetallic conduit.
- E. EMT: Electrical Metallic Tubing.

1.3 SUBMITTALS

- A. Product Data: for surface raceways, wireways and fittings, hinged-cover enclosures and cabinets.
- B. Custom enclosures and cabinets.
- C. Source quality-control test reports.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Alflec Inc.
 - 3. Allied Tube & Conduit; a Tyco International Ltd. Co.
 - 4. Anamet Electrical, Inc.; Anaconda Metal Hose.
 - 5. Electri-Flex Co.
 - 6. Manhattan/CDT/Cole-Flex.
 - 7. Maverick Tube Corporation.
 - 8. O-Z Gedney; a unit of General Signal.

- 9. Wheatland Tube Company.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. PVC-Coated Steel Conduit: PVC-coated.
 - 1. Comply with NEMA RN 1.
 - 2. Coating Thickness: 0.040 inch, minimum.
 - 3. Comply with ETL Verified PVC-001.
- D. Joint Compound for Rigid Steel Conduit: Listed for use in cable connector assemblies and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 NONMETALLIC CONDUIT AND TUBING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Anamet Electrical, Inc.; Anaconda Metal Hose.
 - 3. Arnco Corporation
 - 4. CANTEX Inc.
 - 5. CertainTeed Corp.; Pipe & Plastics Group
 - 6. Condux International, Inc.
 - 7. ElecSYS, Inc.
 - 8. Electri-Flex co.
 - 9. Lamson & Sessions; Carlon Electrical Products.
 - 10. Manhattan/CDT/Cole-Flex.
 - 11. RACO; a Hubbell Company
 - 12. Thomas & Betts Corporation.
- B. RNC: NEMA TC2, Type EPC-40-PVC, unless otherwise indicated.
- C. Fittings for RNC: NEMA TC 3; match to conduit or tubing type and material.

2.3 BOXES, ENCLOSURES, AND CABINETS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
 - 2. EGS/Appleton Electric.
 - 3. Erickson Electrical Equipment Company
 - 4. Hoffman.
 - 5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division
 - 6. O-Z/Gedney; a unit of General Signal.
 - 7. RACO; a Hubbell company.
 - 8. Scott Fetzer Co.; Adalet Division.
 - 9. Spring City Electrical Manufacturing Company.
 - 10. Stahlin Non-Metallic Enclosures.
 - 11. Thomas & Betts Corporation.
 - 12. Walker Systems, Inc.; Wiremold Company (The)
 - 13. Woodhead, Daniel Company; Woodhead Industries, Inc. subsidiary.
- B. Sheet Metal Outlet and Device boxes: NEMA OS 1.
- C. Cast-Metal Outlet and Device boxes: NEMA FB 1, Type FD, with gasketed cover.

- D. Small Sheet Metal Pull and Junction boxes: NEMA OS 1.
- E. Cast-Metal Access, Pull and Junction boxes: NEMA FB 1.
- F. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch for conditioned spaces only, unless otherwise indicated.
- G. Hinged-Cover Enclosures: NEMA 250, Type 4 Stainless steel, with continuous-hinge cover with latches for outdoor, process buildings, above and below grade structures and damp locations, unless otherwise indicated.

2.4 SLEEVES FOR RACEWAYS

- A. Steel Pipe Sleeves: ASTM A 53/A, 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052-or 0.138-inch thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with Engineer.

2.5 SLEEVE SEALS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Advance Products & systems, Inc.
 - 2. Calpico, Inc.
 - 3. Metraflex Co.
 - 4. Pipeline Seal and Insulator, Inc.
- B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
 - 1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 - 2. Pressure Plates: Stainless steel. Include two for each sealing element.
 - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: apply raceway products as specified below, unless otherwise indicated:
 - 1. Exposed: PVC-Coated Rigid Steel
 - 2. Concealed: PVC-Coated Rigid Steel.
 - 3. Underground, Single Run: RNC, Schedule 40 in concrete encasement.
 - 4. Underground, Grouped: RNC, Schedule 40 in concrete encasement.
 - 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): PVC-Coated LFMC.
- B. Indoors:
 - 1. Exposed: PVC-Coated Rigid Steel or as noted in the Drawings.

2. Concealed: PVC-Coated Rigid Steel or as noted in the Drawings.
 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid or Motor-Driven Equipment): PVC-Coated LFMC.
 4. Damp or Wet Locations: PVC-coated Rigid Steel or as noted in the Drawings.
- C. Minimum Raceway Size: ¾-inch trade size; 1-inch trade size for below grade installation.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material.

3.2 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- F. Install no more than the equivalent of four 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- G. Raceways Embedded in Slabs:
1. Run conduit larger than 1 inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 3. Do not install conduits in such a manner as to compromise the structural integrity of walls, roofs, ceilings or floor. Where necessary, provide additional supporting members to support conduit runs. Below grade conduits 1 1/2" and larger shall be routed 24" below the concrete floor slabs.
 4. Comply with Chapter 6 of ACI 318.
 5. Change from nonmetallic conduit to Galvanized Rigid Steel or PVC-Coated Rigid Steel Conduit before rising above the floor.
- H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

- K. Install raceway sealing fittings at suitable, approved and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where otherwise required by NFPA 70.
- L. Expansion-Joint Fittings: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg. F, and that has straight-run length that exceeds 25 feet.
 - 1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
 - c. Indoor Spaces: connected with the Outdoors without Physical Separation: 125 deg F temperature change.
 - d. Attics: 135 deg F temperature change.
 - 2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.
 - 3. Install each expansion-joint fitting with position, mounting and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.
- M. Flexible conduit connections: Use maximum of 36 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement, and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- N. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block and install box flush with surface of wall.

3.3 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Coordinate sleeve selection and application Engineer.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed.
- G. Seal space outside of sleeves with grout for penetrations of concrete and masonry.
- H. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint.

- I. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with fire-stop materials.
- J. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.
- K. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- L. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between raceway and sleeve for installing mechanical sleeve seals.

3.4 SLEEVE-SEAL INSTALLATION

- A. Install to seal underground, exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.5 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

3.6 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 26 05 33.13 - PVC COATED CONDUIT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes PVC-coated raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. Related Sections include the following:
 - 1. Division 26 Section "Raceway and Boxes for Electrical Systems".

1.2 SUBMITTALS

- A. Product Data: for surface raceways, wireways and fittings, hinged-cover enclosures and cabinets.
- B. Custom enclosures and cabinets.
- C. Source quality-control test reports.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.
- C. All the conduit, fittings, and supporting products shall be provided by the same manufacturer to ensure that a five-year product warrantee is achieved.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include:
 - 1. Perma-Cote
 - 2. Plasti-Bond
 - 3. KorKap
 - 4. Calbond
 - 5. Ocal

2.2 MATERIALS

- A. PVC-coated, Galvanized Rigid Conduit (GRC), and fittings shall meet all the performance standards specified herein and such performance standards shall require verification by a nationally recognized testing agency including American Society for Testing and Materials (ASTM) and Underwriter Laboratories (UL).
- B. The PVC coated galvanized rigid conduit shall be UL Listed. The PVC coating shall have been investigated by UL as providing the primary corrosion protection for the rigid metal conduit.

Ferrous fittings for general service locations shall be UL Listed with PVC as the primary corrosion protection. Hazardous location fittings, prior to plastic coating shall be UL listed. All conduits and fittings must be new, unused material. Applicable UL standards shall include: UL 6 Standard for Safety, Rigid Metal Conduit, UL514B Standard for Safety, Fittings for Conduit and Outlet Boxes.

- C. The PVC coated galvanized rigid conduit shall be Electrical Testing Laboratory (ETL) Verified PVC-001 or Underwriter Laboratories (UL) 6 for safety.
- D. The conduit shall be hot dip galvanized inside and out with hot galvanized threads.
- E. A PVC sleeve extending one pipe diameter or two inches, whichever is less, shall be formed at every female fitting opening except unions. The inside sleeve diameter shall be matched to the outside diameter of the conduit.
- F. The PVC coating on the outside of conduit couplings shall have a series of longitudinal ribs 40 mils in thickness to protect the coating from tool damage during installation.
- G. Form 8 Condulets, 1/2" through 2" diameters, shall have a v-seal tongue-in-groove gasket to effectively seal against the elements. The design shall be equipped with a positive placement feature to ease and assure proper installation. Certified results confirming seal performance at 15 psig (positive) and 25 in. of mercury (vacuum) for 72 hours shall be available. Form 8 Condulets shall be supplied with plastic encapsulated stainless steel cover screws.
- H. A urethane coating shall be uniformly and consistently applied to the interior of all conduit and fittings. This internal coating shall be a nominal 2 mil thickness. Conduit or fittings having areas with thin or no coating shall be unacceptable.
- I. The PVC exterior and urethane interior coatings applied to the conduit shall afford sufficient flexibility to permit field bending without cracking or flaking at temperatures above 30°F (-1°C).
- J. All male threads on conduit, elbows and nipples shall be protected by application of a urethane coating.
- K. All female threads on fittings or conduit couplings shall be protected by application of a urethane coating.
- L. Independent certified test results shall be available to confirm coating adhesion under the following conditions:
 - 1. Conduit and conduit exposure to 150°F (65°C) and 95% relative humidity with a minimum mean time to failure of 30 days (ASTM D1151).
 - 2. The interior coating bond shall be confirmed using the Standard Method of Adhesion by Tape Test (ASTM D3359).
 - 3. No trace of the internal coating shall be visible on a white cloth following six wipes over the coating which has been wetted with acetone (ASTM D1308).
 - 4. The exterior coating bond shall be confirmed using the methods described in Section 3.8, NEMA RN1. After these tests the physical properties of the exterior coating shall exceed the minimum requirements specified in Table 3.1, NEMA RN1.
- M. Right angle beam clamps and U bolts shall be specially formed and sized to snugly fit the outside diameter of the coated conduit. All U bolts will be supplied with plastic encapsulated nuts that cover the exposed portions of the threads.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All clamping, cutting, threading, bending, and assembly instructions listed in the manufacturer's installation guide should be vigorously followed.
- B. Installation of the PVC Coated Conduit System shall be performed in accordance with the Manufacturer's Installation Manual. To assure correct installation, the installer shall be certified by Manufacturer to install coated conduit.
- C. Installer certification, before installation, is required.
- D. Clamps, bolts, angles, pipe straps, struts, rods, nuts and other supporting products for PVC-coated conduits shall be PVC-coated or stainless steel.
- E. The Contractor shall use equipment specifically designed for PVC-coated conduit when cutting, clamping, reaming, threading, bending, assembling or performing other installation procedures. PVC-coating shall be protected.
- F. Touch-up compound for PVC-coated conduit shall not be allowed for areas larger than one inch squared except for conduit rethreading. All conduits with damaged coatings larger than one inch squared shall be removed and replaced at no cost to owner.

END OF SECTION

SECTION 26 05 43 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Conduit, ducts, and duct accessories for concrete-encased duct banks.
 - 2. Handholes and boxes.

1.2 DEFINITIONS

- A. RNC: Rigid nonmetallic conduit.
- B. SCTE: Society of Cable Telecommunications Engineers.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Accessories for manholes, handholes, boxes.
- B. Shop Drawings for Precast or Factory-Fabricated Underground Utility Structures: Include plans, elevations, sections, details, attachments to other work, and accessories, including the following:
 - 1. Duct entry provisions, including locations and duct sizes.
 - 2. Reinforcement details/
 - 3. Step details.
 - 4. Grounding details.
 - 5. Dimensioned locations of cable rack inserts, pulling-in and lifting irons, and sumps.
 - 6. Joint details.
- C. Shop Drawings for Factory-Fabricated Handholes and Boxes Other Than Precast Concrete: Include dimensioned plans, sections and elevations, and fabrication and installation details, including the following:
 - 1. Duct entry provisions, including locations and duct sizes.
 - 2. Cover design.
 - 3. Grounding details.
 - 4. Dimensioned locations of cable rack inserts and pulling-in lifting irons.
- D. Duct-Bank Coordination Drawings: Show duct profiles and coordination with other utilities and underground structures.
 - 1. Include plans and sections, drawn to scale, and show bends and locations of expansion fittings.
- E. Product Certificates: for concrete and steel used in precast concrete handholes, as required by ASTM C858.
- F. Source quality-control test reports.
- G. Field quality-control test reports.

1.4 QUALITY ASSURANCE

- A. Comply with ANSI C2.

- B. Comply with NFPA 70.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver ducts to Project site with ends capped. Store nonmetallic ducts with supports to prevent bending, warping, and deforming.
- B. Store precast concrete and other factory-fabricated underground utility structures at Project site as recommended by manufacturer to prevent physical damage. Arrange so identification markings are visible.
- C. Lift and support precast concrete units only at designated lifting or supporting points.

1.6 COORDINATION

- A. Coordinate layout and installation of ducts, manholes, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field.
- B. Coordinate elevations of ducts and duct-bank entrances into manholes, handholes and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field.
- C. Coordinate elevations of ducts and duct-bank entrances into manholes, handholes, and boxes with final locations and profiles of ducts and duct banks as determined by coordination with other utilities, underground obstructions and surface features. Revise locations and elevations from those indicated a required to suit field conditions and to ensure that duct runs drain to manholes and handholes and as approved by Engineer.

PART 2 - PRODUCTS

2.1 CONDUIT

- A. Rigid Steel conduit: Galvanized. Comply with ANSI C80.1.
- B. PVC-Coated Steel Conduit: Comply with ANSI C80.
- C. RNC: NEMA TC2, type EPPC-40-PVC, UL 651, with matching fittings by same manufacturer as the conduit, complying with NEMA TC 3 and UL 514B.

2.2 PRECAST CONCRETE HANDHOLES AND BOXES

- A. Available Manufacturers: subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - 1. Oldcastle Precast Group.
- B. Comply with ASTM C 858 for design and manufacturing processes.
- C. Description: Factory-fabricated, reinforced-concrete, monolithically poured walls and bottom unless open-bottom enclosure are indicated. Frame and cover shall form top of enclosure and shall have load rating consistent with that of handhole or box.
 - 1. Frame and Cover: Weatherproof cast-iron frame, with cast-iron cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing bolts.
 - 2. Frame and Cover: Weatherproof steel frame, with steel cover with recessed cover hook eyes and tamper-resistant, captive cover-securing bolts.

3. Frame and Cover: Weatherproof steel frame, with hinged steel access door assembly with tamper-resistant, captive, cover-securing bolts.
4. Frame and cover: Weatherproof aluminum frame with hinged aluminum access door assembly with tamper-resistant, captive, cover-securing bolts.
 - a. Cover Hinges: concealed, with hold-open ratchet assembly.
 - b. Cover Handle: Recessed.
5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
6. Cover Legend: Molded lettering, "ELECTRIC."
7. Configuration: Units shall be designed for flush burial and have integral closed bottom, unless otherwise indicated.
8. Extensions and Slabs: Designed to mate with bottom of enclosure. Same material as enclosure.
 - a. Extension shall provide increased depth of 12 inches.
 - b. Slab: Same dimensions as bottom of enclosure, and arranged to provide closure.
9. Windows: Precast openings in walls, arranged to match dimensions and elevations of approaching ducts and duct banks plus an additional 12 inches vertically and horizontally to accommodate alignment variations.
 - a. Windows shall be located no less than 6 inches from interior surfaces of walls, floors, or frames and covers of handholes, but close enough to corners to facilitate racking of cables on walls.
 - b. Window opening shall have cast-in-place, welded wire fabric reinforcement for field cutting and bending to tie in to concrete envelopes of duct banks.
 - c. Window openings shall be framed with at least two additional No. 4 steel reinforcing bars in concrete around each opening.
10. Duct Entrances in Handhole Walls: Cast end-bell or duct-terminating fitting in wall for each entering duct.
 - a. Type and size shall match fittings to duct or conduit to be terminated.
 - b. Fittings shall align with elevations of approaching ducts and be located near interior corners of handholes to facilitate racking of cable.
11. Handholes 12 inches wide by 24 inches long and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.

2.3 HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

- A. Description: comply with SCTE 77.
 1. Color: Gray.
 2. Configuration: Units shall be designed for flush burial and have integral closed bottom, unless otherwise indicated.
 3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
 4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 5. Cover Legend: Molded lettering, "ELECTRIC" or as noted.
 6. Duct Entrance Provisions: Duct-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
 7. Handholes 12 inches wide by 24 inches long and larger shall have factory-installed inserts for cable racks and pulling-in irons.
- B. Polymer Concrete Handholes and Boxes with Polymer Concrete Cover: Molded of sand and aggregate, bound together with a polymer resin and reinforced with steel or fiberglass or a combination of the two.
 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to the following:
 - a. Amorcecast Products Company.
 - b. Quazite
 - c. Carson Industries LLC.

- d. CDR Systems Corporation.
- e. NewBasis.

2.4 UTILITY STRUCTURE ACCESSORIES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to the following:
 - 1. Bilco Company (The).
 - 2. Campbell Foundry Company.
 - 3. Carder Concrete Products
 - 4. Christy Concrete Products.
 - 5. East Jordan Iron Works, Inc.
 - 6. Elmhurst-Chicago Stone Co.
 - 7. McKinley Iron Works, Inc.
 - 8. Neenah Foundry Company.
 - 9. NewBasis.
 - 10. Oldcastle Precast Group.
 - 11. Osburn Associates, Inc.
 - 12. Pennsylvania Insert Corporation.
 - 13. Riverton Concrete Products; a division of Cretex companies, Inc.
 - 14. Strongwell Corporation; Lenoir City Division.
 - 15. Underground Devices, Inc.
 - 16. Utility Concrete Products, LLC.
 - 17. Utility Vault Co.
 - 18. Wausau Tile, Inc.
- B. Duct-Sealing Compound: Nonhardening, safe for contact with human skin, not deleterious to cable insulation and workable at temperatures as low as 35 degrees F. Capable of withstanding temperature of 300 degrees F without slump and adhering to clean surfaces of plastic ducts, metallic conduits, conduit coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and common metals.
- C. Cover Hooks: Heavy duty, designed for lifts 60 Lb and greater.

PART 3 - EXECUTION

3.1 UNDERGROUND DUCT APPLICATION

- A. Ducts for Electrical Feeders 600 V and Less: RNC, NEMA Type EPC-40-PVC, in red blended mix concrete-encased duct bank, unless otherwise indicated. Transition to above ground shall be PVC-coated steel conduit.

3.2 UNDERGROUND ENCLOSURE APPLICATION

- A. Handholes and boxes for 600 V and Less:
 - 1. Units in Roadways and Other Deliberate Traffic Paths: Precast concrete. AASHTO HB 17, H-20 structural load rating.
 - 2. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Precast concrete, AASHTO HB 17, H-20 structural load rating.

3.3 EARTHWORK

- A. Restore surface features at areas disturbed by excavation and reestablish original grades, unless otherwise indicated. Replace removed sod immediately after backfilling is completed.

- B. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary top soiling, fertilizing, timing, seeding, sodding, sprigging and mulching.
- C. Cut and patch existing pavement in the path of underground ducts and utility structures.

3.4 DUCT INSTALLATION

- A. Slope: Pitch ducts a minimum slope of 1:300 down toward manholes and handholes and away from buildings and equipment. Slope ducts from high point in runs between two manholes to drain in both directions.
- B. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 36 inches, both horizontally and vertically unless otherwise indicated. All below grade elbows and bends to be galvanized.
- C. Joints: Use solvent-cemented joints in ducts and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent ducts do not lie in same plane.
- D. Duct Entrances to Manholes and Concrete and Polymer Concrete Handholes: Use end bells, spaced approximately 10 inches o.c. for 5-inch ducts and vary proportionately for other duct sizes.
 - 1. Begin change from regular spacing to end-bell spacing 10- feet from the end bell without reducing duct line slope and without forming a trap in the line.
 - 2. Grout end bells into structure walls from both sides to provide watertight entrances.
- E. Building Wall or Floor Penetrations: Make a transition from underground duct to PVC coated steel conduit unless otherwise indicated, at least 10 feet outside the building wall without reducing duct line slope away from the building and without forming a trap in the line. Use fittings manufactured for duct-to-conduit transition. Extend concrete encasement beyond structural footings into the building directly below the electrical equipment.
- F. Sealing: Provide temporary closures at terminations of ducts that have cables pulled. Seal spare ducts at terminations. Use sealing compound and plugs to withstand at least 15-psig hydrostatic pressure.
- G. Pulling cord: Install 100-lbf-test nylon cord in ducts, including spares.

3.5 INSTALLATION OF CONCRETE MANHOLES, HANDHOLES AND BOXES

- A. Precast Concrete Handhole and Manhole Installation:
 - 1. Comply with ASTM C 891, unless otherwise indicated.
 - 2. Install units level and plumb and with orientation and depth coordinated with connecting ducts to minimize bends and deflections required for proper entrances.
 - 3. Unless otherwise indicated, support units on a level 12" bed of crushed stone or gravel graded from 1-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- B. Elevations:
 - 1. Install handholes with bottom below the frost line.
 - 2. Handhole covers: In paved areas and trafficways, set surface flush with finished grade. Set covers of other handholes 1 inch above finished grade.
 - 3. Where indicated, cast handhole cover frame integrally with handhole structure.

- C. Hardware: Install removable hardware, including pulling eyes, cable stanchions, and cable arms as required for installation and support of cables and conductors and as indicated.
- D. Field-Installed Bolting Anchors in Manholes and Concrete Handholes: Do not drill deeper than 3-7/8 inches for manholes and 2 inches for handholes, for anchor bolts installed in the field. Use a minimum of two anchors for each cable stanchion.

3.6 INSTALLATION OF HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting ducts to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of ducts and seal joint between box and extension as recommended by the manufacturer.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas and trafficways, set so cover surface will be flush with finished grade. Set covers of other handholes 1 inch above finished grade.
- D. Install handholes and boxes with bottom below the frost line.
- E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.
- F. Field-cut openings for ducts and conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.
- G. For enclosures installed in asphalt paving and subject to occasional, nondeliberate, heavy-vehicle loading form and pour a concrete ring encircling and in contact with, enclosure and with top surface screeded to top of box cover frame.
 - 1. Concrete: 3000 psi, 28-day strength, with a troweled finish.
 - 2. Dimensions: 12 inches wide by 12 inches deep.

3.7 GROUNDING

- A. Ground underground ducts and utility structures according to Division 26 Section "Grounding and Bonding for Electrical Systems."

3.8 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections and prepare test reports.
 - 1. Demonstrate capability and compliance with requirements on completion of installation of underground ducts and utility structures.
 - 2. Pull aluminum or wood test mandrel through duct to prove joint integrity and test for out-of-round duct. Provide mandrel equal to 80 percent fill of duct. If obstructions are indicated, remove obstructions and retest.
- B. Correct deficiencies and retest as specified above to demonstrate compliance.

3.9 CLEANING

- A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of ducts. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

END OF SECTION

SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Identification for conductors and communication and control cable.
 - 2. Warning labels and signs.
 - 3. Instruction signs.
 - 4. Equipment identification labels.
 - 5. Miscellaneous identification products.
- B. Related sections:
 - 1. DIVISION 26

1.2 SUBMITTALS

- A. Product Data: For each electrical identification product indicated.
- B. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

1.3 QUALITY ASSURANCE

- A. Comply with ANSI A13.1 and ANSI C2.
- B. Comply with NFPA 70.
- C. Comply with NFPA 70E
- D. Comply with 29 CFR 1910.145.

1.4 COORDINATION

- A. Coordinate identification names, abbreviations, colors and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.

PART 2 - PRODUCTS

2.1 CONDUCTOR AND COMMUNICATION – AND CONTROL-CABLE IDENTIFICATION MATERIALS.

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Marker Tapes: vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

2.2 WARNING LABEL AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145 and NFPA 70E.
- B. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door or other access to equipment unless otherwise indicated.
- C. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend and size required for application. ¼ inch grommets in corners for mounting. Nominal size, 10 by 14 inches.
- D. Sample warning label and sign shall include, but are not limited to the following legends:
 - 1. Multiple Power source Warning: "DANGER – ELECTRICAL SHOCK HAZARD – EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION – AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."
 - 3. WARNING – ARC FLASH AND SHOCK HAZARD –APPROPRIATE PPE REQUIRED.

2.3 INSTRUCTION SIGNS

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sized.
 - 1. Engraved legend with black letters on white face.
 - 2. Punched or drilled for mechanical fasteners.
 - 3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.4 EQUIPMENT IDENTIFICATION LABELS

- A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark gray background. Minimum letter height shall be 3/8 inch.
- B. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.5 MISCELLANEOUS IDENTIFICATION PRODUCTS.

- A. Cable ties: fungus-inert, self-extinguishing, 1-piece, self-locking, type 6/6 nylon cable ties.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength: 50 lb minimum.
 - 3. Temperature Range: Minus 40 to plus 185 degrees F.
 - 4. Color: Black, except where used for color-coding.
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Outlet Boxes for Receptacles: Identify branch circuit by panel name and circuit number.

- B. Power-Circuit Conductor Identification: of secondary conductors No. 1/0 AWG and larger in vaults, pull and junction boxes, manholes, and handholes use color-coding conductor tape. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.
- C. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use color-coding conductor tape. Identify each ungrounded conductor according to source and circuit number.
- D. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.
 - 1. Identify conductors, cables and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 - 2. Use system of marker type designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.
- E. Warning Labels for Indoor Cabinets, Boxes and Enclosures for Power and Lighting: comply with 29 CFR 1910.145 and apply metal-backed, butyrate warning signs. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover or other access.
 - 1. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to the following:
 - a. Power transfer switches
 - b. Controls with external control power connections.
 - 2. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.
- F. Instruction Signs:
 - 1. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
 - 2. Emergency Operating Instructions: Install instruction signs with white legend on a red background with minimum 3/8 inch high letters for emergency instructions at equipment used for power transfer.
- G. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
 - 1. Labeling Instructions:
 - a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch high letters on 1-1/2-inch high label; where 2 lines of text are required, use labels 2 inches high.
 - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
 - 2. Equipment to Be Labeled:
 - a. Panelboards, electrical cabinets and enclosures.
 - b. Access doors and panels for concealed electrical items.
 - c. Electrical switchgear and switchboards.
 - d. Transformers.
 - e. Motor-control centers.
 - f. Disconnect switches.

- g. Enclosed circuit breakers.
- h. Motor starters.
- i. Push-bottom stations.
- j. Power transfer equipment.
- k. Contactors.
- l. Remote-controlled switches and control devices.
- m. Power-generating units.
- n. Voice and data cable terminal equipment.
- o. Terminals, racks and patch panels for voice and data communications and for signal and control functions.

3.2 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach nonadhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.
- F. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded service, feeder and branch-circuit conductors.
 - 1. Color shall be factory applied or, for sized larger than No. 6 AWG if authorities having jurisdiction permit, field applied.
 - 2. Colors for 480/277-V Circuits:
 - a. Phase A: Brown
 - b. Phase B: Orange
 - c. Phase C: Yellow
 - 3. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

END OF SECTION

SECTION 26 67 05 - COMMUNICATION CABLE AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Requirements specified in Division 26 Sections apply to this Section.

1.2 DESCRIPTION OF WORK

- A. Section includes the following wiring system components:
 - 1. Communication cable.

1.3 SYSTEM DESCRIPTION

- A. Ethernet cabling.
- B. Instrumentation cable.

1.4 SUBMITTALS

- A. Procedures for submittals.
 - 1. Product Data: Provide for each material or equipment item specified.
 - 2. Shop Drawings:
 - a. Point-to-point wiring diagrams for cables installed under this Section.
 - b. Detailed plan views and elevations of telecommunications spaces showing termination equipment, and cable paths.
 - c. Minimum Scale for Details: 1/4 inch.
 - 3. Termination Schedule: Indicate the following.
 - a. Cable identification number.
 - b. Room location.
 - 4. Assurance/Control Submittals:
 - a. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
 - b. Qualification Documentation: Submit documentation of experience indicating compliance with specified qualification requirements.
- B. Procedures for closeout submittals. Deliver prior to Final Acceptance.
 - 1. Certification: Comprehensive test results for category 6, and fiber optic certification of cable plant per specifications of TIA/EIA 568A. Test results must be provided on 8.5 X 11 inch sheets of paper, and furnished in electronic PDF format.
 - 2. Project Record Documents: Accurately record the following:
 - a. Cable pulling schedules, in printed form and on CD-R data disks.
 - b. Labeling shall conform to the ANSI/TIA/EIA-606 guidelines.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer: Company specializing in manufacturing Products specified with minimum 5 years documented experience.
 - 2. Installer: Company specializing in the installation of category 6, and fiber optic structured wiring systems with minimum 5 years documented experience. Contractor shall have a minimum of one person on job site at all times with documented formal training in the installation of category 6, and fiber optic cabling systems if fiber optic cabling is required.

- B. Regulatory Requirements:
 - 1. Conform to requirements of NFPA 70.
 - 2. Products: Listed and classified by Underwriter's Laboratories Incorporated as suitable for the purpose specified and indicated.
- C. Pre-Installation Meetings:
 - 1. Convene a pre-installation meeting one week prior to commencing Work of this Section.
 - 2. Require attendance of parties directly affecting Work of this Section.
 - 3. Review conditions of operations, procedures and coordination with related work.
 - 4. Agenda:
 - a. Tour, inspect, and discuss conditions relating to communications cable.
 - b. Review exact location of each item within building construction, casework, and fixtures and their requirements.
 - c. Review required submittals, both completed and yet to be completed.
 - d. Review Drawings and Specifications.
 - e. Review and finalize construction schedule and verify availability of materials, personnel, equipment, and facilities needed to make progress and avoid delays.
 - f. Review cable routing and support.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Transport, handle, store, and protect products.
- B. Deliver in accordance with NEMA WC 26.

1.7 REFERENCES

- A. Telecommunication Industry Association (TIA), Electronic Industries Association (EIA):
 - 1. TIA/EIA-568-A - Commercial Building Telecommunications Cabling Standard
 - 2. TIA/EIA-569 - Commercial Building Standard for Telecommunications Pathways
 - 3. TIA/EIA-606 - Administration Standard for the Telecommunications Wiring Standard
 - 4. TIA/EIA-607 - Commercial Building Grounding and Bonding Requirements for Telecommunications
- B. National Electrical Manufacturer's Association (NEMA):
 - 1. NEMA WC 26 - Wire and Cable Packaging.
- C. National Fire Protection Association (NFPA):
 - 1. NFPA 70 - National Electrical Code.

PART 2 - PRODUCTS

2.1 PATCH CORDS

- A. Subject to compliance with project requirements, manufacturer's offering products which may be incorporated in the Work include the following:
 - 1. AMP Incorporated.
 - 2. Interlink Technologies.
 - 3. Lucent Technologies.
 - 4. NORDX/CDT, Incorporated.
 - 5. Siemon Company.
 - 6. Or Equal.
- B. Conductors: Straight through type 4 twisted pair - 24 AWG, stranded copper.
 - 1. Terminated with male 8-pin modular plugs.

2. Complies with individual characteristics established in TIA for category 6a cable performance specification.

2.2 INSTRUMENTATION CABLE

- A. Subject to compliance with project requirements, manufacturer's offering products which may be incorporated in the work include:
 1. Belden
 2. Approved equal.
- B. Conductors: For all 4-20mA signals, use 20 AWG stranded tinned copper, two pair minimum, wet location rated.
 1. Individually shielded with shield drain wire.
 2. Insulation to be polyethylene PE or PVC.
 3. Outer jacket to be polyvinyl chloride PVC.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Report in writing to the Engineer prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- C. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

3.2 INSTALLATION

- A. Cross electrical cables with communications cable at 90 degrees only.
- B. Run communication cables and power cables in separate conduits.
- C. Comply with cable manufacturers minimum bend radius requirements.
 1. Do not stretch, stress, tightly coil, bend or crimp cables.
 2. Replace cables that are severely stressed during installation at no additional cost to Owner.
- D. Furnish and install machine generated labels.
 1. Communications Cables:
 - a. Display cable identification number in black uppercase lettering on permanent adhesive white label stock covered with water resistant sealer.
 - b. Place labels on each end of cable, maximum 6 inches from cable termination.

3.3 CONSTRUCTION

- A. Interface with Other Work:
 1. Provide information to affected trades regarding requirements and responsibilities for preparation of Work of a particular trade for installation of Work installed under this Section.

3.4 FIELD QUALITY CONTROL

- A. Field testing and inspection.
- B. Inspect installation of cables and equipment during and at completion of installation.
- C. Perform end-to-end tests of each cable as follows:
 - 1. Pair/conductor for proper pinouts and continuity.
 - 2. Ground fault.
 - 3. Proper termination, shorts, and crossed pairs.
 - 4. Channel attenuation per ANSI/TIA/EIA-568-A, Annex E or later.
 - 5. Channel bi-directional worst case near end cross talk (NEXT) at frequencies up to 100 MHz, per ANSI/TIA/EIA-568-A, Annex E or later.
 - 6. Measured effective cable run length.

END OF SECTION

SECTION 26 90 00 – GENERAL INSTRUMENTATION AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. The work to be included under this section shall consist of furnishing all materials, labor, equipment, tools, supplies, and incidentals necessary for the installation and coordinate testing of all instrumentation, control, and SCADA systems.
- B. Related Sections:
 - 1. 26 90 10 - Process & Analytical Instruments

1.2 REFERENCES

- A. Definitions: Symbols, Definitions, and Abbreviations: All symbols, definitions, and engineering unit abbreviations utilized shall conform to IEEE 100-84, S50.1, and S51.1, where applicable.
 - 1. SCADA – Supervisory Control and Data Acquisition
 - 2. HMI – Human Machine Interface (Graphical Screens, Text Displays)
 - 3. OIT – Operator Interface Terminal
 - 4. PLC – Programmable Logic Controller
 - 5. I/O – Input/Output
 - 6. VFD – Variable Frequency Drive
 - 7. SSRVS – Solid State Reduced Voltage Starter (“Soft Starter”)
 - 8. RTU – Remote Telemetry Unit
 - 9. MTU – Master Telemetry Unit
 - 10. MCC – Motor Control Center
 - 11. Operating Program – Operating system, SCADA or other core software
 - 12. Integrated Operating Platform – System of installed, connected, and configured hardware, operating programs, and networking equipment.
 - 13. PLC and HMI Programming – Software configuration of operating programs to implement plant control strategies

1.3 PATENTS

- A. If the Manufacturer is required or desires to use any design, device, material, or process covered by letter, patent, or copyright, the Manufacturer shall provide for such use by suitable legal agreement with the patentee or owner, and the prices bid hereunder shall, without exception, indemnify and save the Owner and Engineer from any and all claims for infringement by reason of the use of any such patented design, device, material, or process, or any trademark or copyright used in connection with any equipment to be furnished hereunder.

1.4 SCOPE

- A. The scope of the instrumentation, control, and SCADA system for this project includes:
 - 1. Process Control: Furnishing, installing, and configuring existing Telemetry control panels and OITs to control the process equipment as detailed on the Drawings and in the Specifications. PLC panels in this project is listed below:
 - a. Existing Telemetry Control Panel

All instruments, PLC I/Os, terminal blocks, relays, and wires shall be furnished by the Contractor with the exception of items furnished as part of an equipment package. The Contractor shall be responsible for coordinating installation and commissioning of the required site control system. Coordination shall include equipment suppliers and subcontractors required to implement a complete and functional system as described herein.

2. With the exception of items furnished under this contract as part of an equipment package, PLC and HMI programming shall be by an application programmer selected and compensated by the Owner under separate contract.

1.5 SUBMITTALS

- A. Refer to Section 01 33 00 – Submittal Procedures.
- B. Product Data:
 1. Instrument Installation Details.
 2. Instrument Specification Sheets: See Specification 26 90 10 – Process and Analytical Instruments.
 3. Certified Calibration Sheets.
 4. Complete and detailed instruction manuals on each item furnished including but not limited to all devices and instruments. Information to be contained in the instruction manuals shall include but not be limited to drawings, dimensions, manufacturer's recommendations, ratings, performance charts, power requirements, schematics, maintenance requirements and procedures, calibration recommendations and procedures, repair instructions, complete and recommended spare parts lists and related information.
 5. Proposed tagging and attachment materials and methods.
- C. Shop Drawings shall be submitted for approval by the Engineer.
 1. The Contractor shall submit to the Engineer, for approval, Shop Drawings of the equipment to be installed to meet the Specifications. The Drawings shall be supported by notes or written directions as required to fully define the installation. The submission shall be made as soon as feasible after award of the Contract and, in any event, shall be submitted and approval obtained before installation of the equipment.
 2. The information required on the Shop Drawings shall include, but is not necessarily limited to, the following:
 - a. Full and complete specifications covering the equipment proposed to be furnished.
 - b. Detail Drawings showing plan, network connections and elevation dimensions of the equipment proposed to be furnished.
 - c. Guarantees of performance of the equipment proposed to be furnished.
 - d. Nearest location of factory maintenance and service facilities that will be available to service the equipment offered.
 - e. To scale plans, sections and elevations detailing entire installation. Include mounting hardware, brackets, assemblies and other devices as required for a complete installation.
 3. Control panels:
 - a. Panel and sub-panel layout
 - b. Point-to-Point Wiring Diagrams
 - c. Interconnection drawings
 - d. System hardware
- D. Third Party Certification documents shall be submitted for approval by the Engineer:
 1. Credentials of technicians doing the inspection and testing
 2. Written certification as detailed under Third Party Certification in this specification section
- E. Contract Closeout Submittals:
 1. Project Record Documents
 2. Operating and Maintenance Data
 3. Warranty
 4. Final as-built copies of documented PLC and OIT programs for vendor supplied equipment packages, on electronic media, suitable for future troubleshooting or modifications by others.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Protection: Delivery, storage, and handling shall be in accordance with Manufacturers' recommendation and the requirements of General Conditions and other sections herein.

1.7 PROJECT AND SITE CONDITIONS

- A. Environmental Requirements: Instrumentation and control elements may be installed outdoors exposed to sun, rain and excessive humidity and shall be capable of continuous operation without significant reduction of their operating life under the following ambient conditions:

Temperature	-25 °C to 80 °C
Pressure	650 mm Hg to 800 mm Hg
Relative Humidity	20% to 100% condensing
Vibration Frequency:	10 - 2000 Hz.
Vibration Position	1.5 mm peak-to-peak
Vibration Acceleration	10 G.

- B. Where the ratings of individual components cannot meet the requirements, provide suitable means of physical protection. Suitable physical protection shall consist of an assembly which meets the requirements listed, while limiting the ambient conditions at the non-conforming component to 90% of the component's rating (Example: A component rated for vibration at only 5 G. acceleration would be required to be combined with vibration isolation to limit the acceleration of the component to 4.5 G. when subjected to ambient acceleration of 10 G. from 10 - 2000 Hz.).
- C. Operating Environmental Conditions: All instruments and control devices provided shall be rated for continuous operation in their installed operating environment and shall be capable of continuous operation at the operating conditions without significant reduction of their operating life.
- D. All controlling devices shall be NEMA or IEC rated.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

- A. All meters, instruments, control units, and other components shall be the most recent field proven models marketed by their respective manufacturers at the time of the submittal of the shop drawings unless otherwise specified to match existing equipment.

- B. Analog measurements and control signals shall be electrical and shall vary in direct linear proportion to the variable being measured. All analog signals whether inputs or outputs shall be 4-20mA DC unless otherwise noted. The analog input signals shall maintain loop integrity with the installation of properly sized resistors across the input terminals.
- C. All of the elements, instruments, accessories, and assemblies shall be installed in accordance with the manufacturer's installation instructions, and as detailed on the Drawings. Shielded instrumentation cables shall be used for all analog signals from the instruments to the programmable logic controller panels. Separate conduits shall be used for instrument power, instrument signals, and fiber optic cables.
- D. All instruments installed outdoors shall include a stainless steel sunshade.
- E. All digital outputs shall be isolated from the field equipment through an interposing relay. The relays shall be mounted inside the cabinet housing the associated programmable logic controller as shown on Drawings.
- F. The Contractor shall make the necessary power connections and signal connections from the field devices (i.e. instruments, control valves, etc.) to the programmable logic controllers.
- G. The Contractor shall configure and verify proper operation of the Integrated Operating Platform, included but not limited to the following requirements:
 - 1. The computer workstations, SCADA servers, PLCs, OITs, ethernet switches, surge protection devices, uninterruptible power supplies, and other incidental equipment shall be configured and installed as shown on the Drawings and as specified herein.
 - 2. All networked devices shall be configured for proper communication via the topology and protocol shown on the Drawings or specified herein.
 - 3. Verify that all system devices power up, function and properly communicate prior to commencing any startup or testing procedures as described herein.

3.2 TESTING AND INSTALLATION REQUIREMENTS

- A. Testing and Installation Requirements: The Contractor shall be required to coordinate the following services during construction related to the testing and installation of the instrumentation and control system. The complete system testing shall include all PLCs, computer systems, SCADA software and hardware, network devices, remote telemetry devices, interconnecting cables, and other peripheral devices required for a complete and functional system. The testing of the system shall occur in three stages: a Control Panel Readiness Test, a Site Acceptance Test, and a Final Acceptance Test.
- B. Control Panel Readiness Test
 - 1. The Contractor shall conduct a Control Panel Readiness Test for each control panel at a facility located within fifty miles of the project construction site. The test shall include the Engineer and Contractor. The Owner may also attend this test. The Contractor shall coordinate with the Engineer and Owner to schedule this test a minimum of thirty (30) days in advance.
 - 2. The Contractor shall assemble all hardware components within the specified enclosures, including the instruments, PLCs, OITs, network components and other required items. This assembly shall be complete and considered suitable for field installation.
 - 3. For the Control Panel Readiness Test, the Contractor shall demonstrate that each control panel is suitable for field installation by powering up each item and testing for proper network connections. In addition, the Contractor shall test each PLC input and output for proper operation from each field connection point within each control panel. The Contractor shall be responsible for all measurement and testing components required to complete the Control Panel Readiness Test.

4. The Contractor shall be responsible for connecting test instruments to each PLC and OIT and verifying proper operation of each input and output. The Contractor shall provide test screens for the OITs and test programming for each PLC. All wire and terminal numbers will be checked for conformance with the submittal drawings during this Readiness Test.
 5. Each analog I/O point shall be checked for proper operation from each field connection point in the control enclosure and confirmation of each item shall be properly displayed on each associated OIT as applicable. The Contractor shall be prepared to simulate several inputs and outputs in order to fully confirm the proper operation of each analog I/O.
 6. After the Engineer (and Owner if in attendance) are satisfied that the system is fabricated as intended, the Contractor will then be authorized to ship the system to the project site for installation.
- C. Third Party Certification: Prior to the Site Acceptance Test, the Contractor shall furnish to the Engineer written certification from a third party that all system components, panels, communications, control wiring, device configurations, instrument calibrations, motor controllers, and variable frequency controllers and associated integration have been installed in conformance with the Contract Documents.
1. Said certification shall include energization and testing for correct hardware integration of all system components, including PLC remote I/O assemblies, and reliable communications between components with correct protocols.
 2. Analog input and output channels shall be verified at 0 percent, 25 percent, 50 percent, 75 percent, and 100% of span.
 3. Personnel performing the third party certification shall have International Society of Automation (ISA) Certified Control Systems Technicians (CCST) or equivalent credentials as approved by the Engineer or Owner.
 4. A written Third Party Certification that all aforementioned systems are installed and operational in conformance with the Contract Documents shall be submitted to the Engineer.
- D. Site Acceptance Test
1. Upon the Engineer's written approval of the Third Party Certification, the Site Acceptance Test may be scheduled and executed.
 2. Coordination with Engineer and Owner: The Contractor shall coordinate with the Engineer and Owner to schedule this test a minimum of thirty (30) days in advance.
 3. The Contractor shall conduct a Site Acceptance Test at the Owner's facility following system installation and prior to startup. The test shall include complete in-service testing of all system components, panels, communications, and OITs to ensure conformance with the Contract Documents. The Engineer and Owner may decide to witness these tests.
 4. The Contractor shall ensure that components having adjustable features are set carefully for the specific conditions and applications of this installation and that the components and systems are within the specified limits of accuracy. Defective elements which cannot achieve proper calibration or accuracy, either individually or within the system or subsystem, shall be replaced.
 5. Test Conditions: Where feasible, system testing and commissioning shall include the use of air or water to establish service conditions that simulate, to the greatest extent practical, normal final control element operating ranges and environmental conditions. Final control elements, control panels, and ancillary equipment shall be tested under startup and steady-state operating conditions to verify that proper and stable control is achieved.
 6. Failure to Complete Site Acceptance Test: If the Site Acceptance Test is not completed due to installation errors, the Contractor shall repeat the Third Party Certification process and resubmit certification to the Engineer at no additional cost to the Owner. After Engineer approval of the new Third Party Certification submittal, the Site Acceptance Test shall be repeated. The cycle of Third Party Certification and Site Acceptance

Testing shall be repeated at no cost to the Owner until all systems work correctly as determined by the Owner and Engineer.

E. Final Acceptance Test:

1. The Contractor shall conduct a 10-day Final Acceptance test of the completed installation. The test shall start after the Engineer has received marked record (as-built) drawings from the Contractor and when directed by the Owner/Engineer. The Contractor's personnel shall be readily available to address issues onsite during the acceptance test.
2. The system shall operate with 100% reliability during the test period. Failure shall be defined as the inability to control or indicate status of specified inputs or outputs or any specified function of the control systems as described herein caused by defective hardware or software furnished in this project. Failure of hardware or software shall require repair or remedy of the defect to the satisfaction of the Engineer within a two hour period. If the problem cannot be repaired in this time, the test shall be aborted and restarted after the problem is corrected and when directed by the Owner/Engineer. Restarting and satisfactory completion of the test shall be conducted at no additional cost to the Owner.
3. The Contractor shall complete the Operations and Maintenance Manuals including all updated documentation of programmable devices to the satisfaction of the Engineer.
4. The Contractor will be allowed two attempts at successfully completing the Final Acceptance Test. After that time, the Contractor will become responsible to reimburse the Owner for liquidated damages. Successful completion of the Final Acceptance Test will be required prior to Substantial Completion.

3.3 TRAINING, STARTUP ASSISTANCE, & WARRANTY

- A. Training: The Contractor shall provide training for the purpose of familiarizing Owner's personnel with the instrumentation and control system. All training shall be as scheduled by the Owner. The training shall be scheduled a minimum of thirty (30) days in advance of when it is to be given. Proposed training materials, including a detailed training agenda itemizing relative emphasis on various topics of each course, shall be submitted to the Owner and Engineer at least fourteen (14) days in advance of when the training is to begin. The course content shall include, but not be limited to, a description of system philosophy, all major hardware components utilized in the system and hardware maintenance practices.
- B. Startup Assistance
1. The Contractor shall be responsible for furnishing a qualified technical representative who shall supervise the installation of equipment and/or install equipment, and who shall test, adjust, field calibrate, and fully commission all flow metering equipment, instrumentation equipment, control equipment, and accessories specified herein and required as integral components of the complete systems. The commissioning will be deemed to be complete only after all systems are found to be performing satisfactorily following the final balancing of plant operation. The guarantee period, during which all defective materials shall be replaced and all faulty workmanship will be corrected at no cost to the Owner, shall begin with the date on which the commissioning is judged to be complete.
- C. Service:
1. Manufacturers shall provide as part of the equipment cost sufficient days of service by a factory-trained service engineer specifically trained on the type equipment herein specified to assist the Contractor during installation and start-up. The service time shall be sufficient to place the units in satisfactory service and instruct the Owner's personnel in proper operation and maintenance of the equipment.
 2. A minimum of three (3) days service Engineer time shall be provided.

D. Maintenance Instruction:

1. Operating and maintenance instructions, along with a separate parts list, shall be furnished in three (3) copies to the Owner. Operating instructions shall also incorporate a functional description of the system, including the system schematics which reflect "as-built" modifications. Maintenance requirements particular to the system shall be clearly defined, along with calibration and test procedures.

E. Warranty:

1. All equipment and workmanship furnished under this contract shall be guaranteed to be free of defects in materials and workmanship for a period of two (2) years from and after the date of final acceptance of the work by the Owner, and any such defects which appear within the stipulated guaranty period shall be repaired, replaced or made good without charge. This guarantee shall include the capacity and integrated performance of the component's parts.

END OF SECTION

SECTION 26 90 10 – PROCESS AND ANALYTICAL INSTRUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. The work to be included under this section of the Specifications shall consist of furnishing all materials, labor, equipment, tools, supplies, and incidentals for installation of all instrumentation equipment. The work shall include every item of construction necessary for a complete and acceptable installation as shown on the Drawings and as specified herein.
- B. Related Sections:
 - 1. 26 90 00 - General Instrumentation and Control

1.2 REFERENCES

- A. ISA S20 - Specification Forms for Process Measurement and Control Instruments, Primary Elements and Control Valves
- B. ISA S50.1 - Compatibility of Analog Signals for Electronic Industrial Process Instruments
- C. ISA S51.1 - Process Instrumentation Terminology
- D. ISA S51.1; Sec. 5 - Test Procedures
- E. Definitions: Symbols, Definitions, and Abbreviations: All symbols, definitions, and engineering unit abbreviations utilized shall conform to IEEE 100-84, S50.1, and S51.1, where applicable.
 - 1. SCADA – Supervisory Control and Data Acquisition
 - 2. HMI – Human Machine Interface
 - 3. VFD – Variable Frequency Drive
 - 4. PLC – Programmable Logic Controller
 - 5. SSRVS – Solid State Reduced Voltage Starter (“Soft Starter”)
 - 6. I/O – Input/Output
 - 7. OIT – Operator Interface Terminal
 - 8. RTU – Remote Telemetry Unit
 - 9. MTU – Master Telemetry Unit
 - 10. N.O. – Normally Open
 - 11. N.C. – Normally Closed

1.3 SCOPE

- A. This section of the Specifications covers the instrumentation equipment. The major items of instrumentation equipment to be furnished and installed shall include the following:
 - 1. Level Transmitters

1.4 SYSTEM REQUIREMENTS

- A. Design Requirements:
 - 1. Provide analog field instruments with transmitters which condition the signal to output a 4-20 mA signal linear to the measured variable.
 - 2. Similar instruments shall be by the same Manufacturer to the extent practical.
- B. Performance Requirements:
 - 1. Accuracy:

- a. Accuracy shall be as defined in ISA S51.1 and ISA S51.1, Sec. 5. Provide a complete and operating instrument installation with measurement accuracy determined by adding the accuracy of the element and the transmitter and any wiring to the field terminal enclosure of 0.75% of calibrated span or better, unless specified otherwise below, at any environmental condition specified.
- 2. Ranges:
 - a. The expected range of each instrument shall be as directed by the Owner and Engineer. Expected ranges shall correspond to actual field conditions.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- A. Furnish instruments specified in the instrument specification sheets at the end of this section. Instruments for services not listed shall be equal in quality, performance, and environmental and functional characteristics as instruments listed and shall be approved in writing by the Owner.

2.2 INSTRUMENT ACCESSORIES

- A. Instrument and Control Device Tags: Each field mounted field device shall be identified by its unique tag number as it appears on the original P&I diagrams and the Instrument Loop Diagram. The tag number shall be stamped on a 1" x 2" stainless steel tag permanently attached to the instrument by braided stainless steel wire which has been sealed by an approved method such that the wire must be cut or the seal broken to remove the tag. The tag number shall not be stamped on the nameplate of the instrument. This requirement shall be documented on the Instrumentation Specification Sheet.
- B. Sunshades: Furnish stainless steel sunshades for all outdoor instruments not shaded by adjacent or integral equipment.
- C. Process Tubing: Stainless Steel, ASTM A 269, TP316, seamless, annealed, 1/2" x 0.065" W.T. minimum.
- D. Pneumatic Supply Tubing: Stainless Steel, ASTM A 269, TP316, seamless, annealed, 1/2" x 0.065" W.T., 3/8" x 0.049" W.T. and 1/4" x 0.035" W.T. minimum.
- E. Fittings: 316 Stainless Steel ferrule type, SWAGELOCK or equal.
- F. Pipe Stand Type Supports for Instrumentation: Pipe stands shall be stainless steel using welded fabrications with 2" schedule 40 pipe, 2" square tube x 0.188" thick, 3/8 zinc/cadmium plated hardware, 1/2" expansion anchors, 12 gauge mounting channel and 1/4" thick stainless steel plate as a minimums. Supply u-bolts or cable mounts as necessary. Acceptable alternatives include engineered pipe stand systems such as O'Brien Saddlepak.
- G. Enclosures for outdoor locations: Furnish and install NEMA 4X enclosures. All outdoor enclosures with instrumentation accessible in enclosure door shall have a stainless steel sunshade.

2.3 CALIBRATION

- A. Order instruments factory calibrated to the range indicated with calibration sheets indicating certification of traceability to National Institute of Standards and Technology (NIST). Instruments shall be ranged as directed by Engineer.

2.4 FABRICATION

- A. Materials of Construction: Provide 316 Stainless Steel for wetted and other parts unless otherwise specified.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Installation
 - 1. Install sensing elements at the point of measurement and route sensing line or cable to the transmitter. Install the transmitters 4'-6" above grade or platform in an easily accessible location adjacent to the sensor location. Mount on pipe stanchion or steel support designed for the purpose individually or grouped with other transmitters. Furnish and install surge protector Phoenix Contact PipeTrab 2818122 or equal in each 4-20 mA current loop, adjacent to each respective instrument. Route signal cable in conduit from transmitter to terminal cabinet or control panel for termination to test terminals. Steel supports shall be in accordance with this Section, and all other sections and specification requirements. Process connections for instrumentation shall be in accordance with piping sections and all other specification requirements. Provide block valves at taps for pressure or sampling sensor lines. Provide plugged tees at taps suitable for rodding or blowing out taps. Make pipe taps with weld-o-let type fittings or equal. Install block valves suitable for the service and rated as the pipe at each tap, generally use NPT threaded ball valves. Use materials rated for the service and transition to tubing for sensor runs. Use 1/2" OD 316 SS tubing or as shown on the Drawing details.
- B. Flow Instruments: Mount magnetic flowmeters according to manufacturer's instructions with any reducers necessary. Install grounding rings and ground magnetic flowmeters according to manufacturer's instructions.
- C. Pressure Instruments: Make pressure taps in top of pipe for gas service and side of pipe for liquid or steam service.
- D. Pressure Gauges: Use 1/2" NPT pipe and ball or needle valve for pressure gauge taps. Mount gauges vertically; provide 90° fitting, seal, snubber or siphon tube as required. Where 90° fitting is required, install a tee-fitting with plug.
- E. Differential pressure and level transmitters: Use 1/2" tubing and ball or needle valves for pressure taps. Slope tubing runs 1" per foot to drain the sensing line to the pipe where the transmitter is higher than the tap and to drain the line to the transmitter where the transmitter is lower than the tap. At the transmitter connection provide a valve manifold that can block, bleed, vent, purge and provide calibration ports to the transmitter. For gas service transmitters, route 1/2" tubing straight up from the tap for a minimum of 12" to a high point in the line, then with a minimum slope of 1" per foot to the transmitter connection. Provide an automatic condensate drain at the transmitter.
- F. Temperature instruments: Generally mount thermocouple assemblies in the side of the pipe at a minimum angle of 15° up from horizontal and route thermocouple or RTD cable to the transmitter in conduit. Do not mount thermocouples absolutely horizontal or at angles below horizontal. Provide adequate clearance for removal of head assembly and extraction of sensor.
- G. pH elements: For pH elements mounted in sample lines, mount according to Manufacturer's instructions in an insertion assembly which permits removal of the element while the process line is pressurized. Mount with the element vertical and in a trap to keep electrodes hydrated. Arrange taps and sensor lines to keep flow velocity at sensor below 10 ft. / sec.

1. Mount all instrumentation according to manufacturer's instructions except as specified.
- H. Tubing and Fittings:
1. Install tubing and fittings in a neat, orderly and functional manner; level and plumb except as required, noted on approved drawings, or specified. Make offsets required for fittings or equipment level in the horizontal plane to prevent high or low spots.
- I. Conduit and fittings:
1. Install conduit as required. Provide a cast body tee fitting at the instrument connections at the low point of all conduit runs below the instrument with a drain fitting for condensate. Make connections from instrument to tee with liquid-tight flexible conduit and use sealing compound inside the conduit and shrink-fit tubing over the outside of the connection to prevent entry of water into the instrument. Heat trace and insulate all liquid filled lines and the sensing body of all instruments connected to liquid service in exterior locations.
- J. Calibration: Calibrate each and every instrument connected to the work of this contract in its range, whether furnished under this contract, owner-furnished or existing and fill out a signed and dated five point calibration sheet and install an initialed and dated calibration sticker. Notify the Owner in writing immediately of any instrument which will not calibrate. Instruments that do not calibrate will require the on-site services of a factory authorized representative at no cost to the Owner.

INSTRUMENT SPECIFICATION SHEETS:

INSTRUMENT SPECIFICATION SHEET

LEVEL TRANSMITTERS

Accuracy	±0.1% of full scale	
Operating Temperature	-4 °F to 204 °F	
Output	4-20mA	
Power Supply	120VAC	
Enclosure	IP68	
Features	Wastewater Approval	
Housing	316L SS coupling suitable for use in hazardous locations	
Suppliers	Siemens Echomax XPS 15 with Hydromanager 200HMI	
Instrument Tag	Application	Measurement Range
LT01	Wet Well No.1	0 – 50 ft
LT02	Wet Well No.2	0 – 50 ft

END OF SECTION

DIVISION 31
EARTHWORK

SECTION 31 11 00 - SITE PREPARATION

PART 1 - GENERAL

1.1 DEFINITIONS

- A. Interfering or Objectionable Material: Trash, rubbish, and junk; vegetation and other organic matter, whether alive, dead, or decaying; topsoil.
- B. Clearing: Removal of interfering or objectionable material lying on or protruding above ground surface.
- C. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots greater than 2 inches caliper to a depth of 12 inches below subgrade.
- D. Scalping: Removal of sod without removing more than upper 3 inches of topsoil.
- E. Stripping: Removal of topsoil remaining after applicable scalping is completed.
- F. Project Limits: Areas, as shown or specified, within which Work is to be performed.

1.2 SUBMITTALS

- A. Shop Drawings: Drawings clearly showing clearing, grubbing, and stripping limits.

1.3 QUALITY ASSURANCE

- A. Obtain Engineer's approval of staked clearing, grubbing, and stripping limits, prior to commencing clearing, grubbing, and stripping.

1.4 SCHEDULING AND SEQUENCING

- A. Prepare site only after adequate erosion and sediment controls are in place. Limit areas exposed uncontrolled to erosion during installation of temporary erosion and sediment controls to maximum of 5 acres.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

- A. Clear, grub, and strip areas actually needed for waste disposal, borrow, or site improvements within limits shown or specified.
- B. Do not injure or deface vegetation that is not designated for removal.

3.2 LIMITS

- A. As follows, but not to extend beyond Project limits.
 - 1. Excavation, including trenches, 5 feet beyond top of cut slopes or shored walls.
 - 2. Fill:
 - a. Clearing and Grubbing: 5 feet beyond toe of permanent fill.
 - b. Stripping and Scalping: 2 feet beyond toe of permanent fill.
 - 3. Structures: 15 feet outside of new structures.

4. Roadways: Clearing, grubbing, scalping, and stripping 15 feet from centerline.
5. Other Areas: As shown.

B. Remove rubbish, trash, and junk from entire area within Project limits.

3.3 CLEARING

- A. Clear areas within limits shown or specified.
- B. Fell trees so that they fall away from facilities and vegetation not designated for removal.
- C. Cut stumps not designated for grubbing to within 6 inches of ground surface.
- D. Cut off shrubs, brush, weeds, and grasses to within 2 inches of ground surface.

3.4 GRUBBING

- A. Grub areas within limits shown or specified.

3.5 SCALPING

- A. Do not remove sod until after clearing and grubbing is completed and resulting debris is removed.
- B. Scalp areas within limits shown or specified.

3.6 STRIPPING

- A. Do not remove topsoil until after scalping is completed.
- B. Strip areas within limits to minimum depths shown or specified. Do not remove subsoil with topsoil.
- C. Stockpile strippings, meeting requirements for topsoil, separately from other excavated material.

3.7 TOPSOIL

- A. Natural, friable, sandy loam, obtained from well-drained areas, free from objects larger than 1-1/2 inches maximum dimension, and free of subsoil, roots, grass, other foreign matter, hazardous or toxic substances, and deleterious material that may be harmful to plant growth or may hinder grading, planting, or maintenance.

3.8 DISPOSAL

- A. Clearing and Grubbing Debris:
 1. Dispose of debris
 2. Burning of debris will not be allowed.
 3. Woody debris may be chipped. Chips may be sold to CONTRACTOR'S benefit or used for landscaping as mulch or uniformly mixed with topsoil, provided that resulting mix will be fertile and not support combustion. Maximum dimensions of chipped material used shall be 1/4-inch by 2 inch. Dispose of chips that are unsaleable or unsuitable for landscaping or other uses with unchipped debris.
 4. Limit disposal of clearing and grubbing debris to locations that are approved by federal, state, and local authorities, and that will not be visible from Project.
- B. Scalpings: As specified for clearing and grubbing debris.

- C. Strippings:
1. Dispose of strippings that are unsuitable for topsoil or that exceed quantity required for topsoil
 2. Stockpile topsoil in sufficient quantity to meet Project needs. Dispose of excess strippings as specified for clearing and grubbing.

END OF SECTION

SECTION 31 22 13 - SUBGRADE PREPARATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Work and testing required for preparing subgrade.
- B. Related sections:
 - 1. Section 02 41 00 – Demolition.
 - 2. Section 31 11 00 – Site Preparation.
 - 3. Section 31 23 16 – Excavation.
 - 4. Section 31 23 23.13 – Fill and Backfill.

1.2 REFERENCE STANDARDS

- A. ASTM D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³)
- B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³)

1.3 DEFINITIONS

- A. Optimum Moisture Content: As defined in Section 31 23 23.13, FILL AND BACKFILL.
- B. Prepared Ground Surface: Ground surface after completion of clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and scarification and compaction of subgrade.
- C. Relative Compaction: As defined in Section 31 23 23.13, FILL AND BACKFILL.
- D. Relative Density: As defined in Section 31 23 23.13, FILL AND BACKFILL.
- E. Subgrade: Layer of existing soil after completion of clearing, grubbing, scalping of topsoil prior to placement of fill, roadway structure or base for floor slab.
- F. Standard Specifications: The latest edition, including supplements of the Texas Department of Transportation (ODOT) Standard Specifications for Highway Construction.

1.4 SEQUENCING AND SCHEDULING

- A. Complete applicable Work specified in Sections 02 41 00, DEMOLITION; 31 11 00, SITE PREPARATION; and 31 23 16, EXCAVATION, prior to preparation.

1.5 QUALITY ASSURANCE

- A. Notify Engineer when subgrade is ready for compaction or whenever compaction is resumed after a period of extended inactivity.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Prepare subgrade when unfrozen and free of ice and snow.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

- A. Keep subgrade free of water, debris, and foreign matter during compaction or proof-rolling.
- B. Bring subgrade to proper grade and cross-section and uniformly compact surface.
- C. Do not use sections of prepared ground surface as haul roads. Protect prepared from traffic.
- D. Maintain prepared ground surface in finished condition until next course is placed.

3.2 MOISTURE CONDITIONING

- A. Dry Subgrade: Add water, then mix to make moisture content uniform throughout.
- B. Wet Subgrade: Aerate material by blading, discing, harrowing, or other methods, to hasten drying process.

3.3 TESTING

- A. Test roll subgrade as specified in Standard Specifications to detect soft or loose subgrade or unsuitable material, as determined by Engineer.

3.4 CORRECTION

- A. Soft or Loose Subgrade:
 - 1. Adjust moisture content and recompact, or
 - 2. Over excavate as specified in Section 31 23 16, EXCAVATION, and replace with suitable material from the excavation, as specified in Section 31 23 23.13, FILL AND BACKFILL

END OF SECTION

SECTION 31 22 19 - GRADING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Removal and storage of topsoil.
 - 2. Rough grading the site for site structures, building pads, and drive and parking isles.
 - 3. Finish grading for planting.
- B. Related sections:
 - 1. Section 31 23 16 – Excavation.
 - 2. Section 31 23 16.13 – Trenching for Site Utilities.
 - 3. Section 31 23 23.13 – Fill and Backfill.

1.2 SUBMITTALS

- A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with State of Texas Highway Department standards.
 - 1. Maintain one copy on site.

1.4 PROJECT CONDITIONS

- A. Protect above – and below – grade utilities that remain.
- B. Protect plants, lawns, rock outcroppings, and other features to remain as a portion of final landscaping.
- C. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving and curbs from grading equipment and vehicular traffic.

PART 2 - PRODUCTS

2.1 MATERIALS.

- A. Topsoil: Shall be soil suitable for sustaining grass and vegetation and shall not have any particles larger than $\frac{3}{4}$ " in diameter and shall be free of any trash, debris, or deleterious material.
- B. Other Fill Materials: See Section 31 23 23.13, FILL AND BACKFILL.

PART 3 - EXECUTIONS

3.1 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum.

- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect utilities that remain from damage.
- D. Notify utility company to remove and relocate utilities.

3.3 ROUGH GRADING

- A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded without mixing with foreign materials.
- B. Do not remove topsoil when wet.
- C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
- D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.
- E. When excavating through roots, perform work by hand and cut roots with sharp axe.
- F. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

3.4 SOIL REMOVAL

- A. Stockpile excavated topsoil on site.
- B. Stockpile excavated subsoil on site.
- C. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.5 FINISH GRADING

- A. Before Finish Grading:
 - 1. Verify building and trench backfilling have been inspected.
 - 2. Verify subgrade has been contoured and compacted.
- B. Remove debris, roots, branches, stones, in excess of ½ inch in size. Remove soil contaminated with petroleum products.
- C. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.
- D. Place topsoil in areas where seeding are indicated.
- E. Place topsoil to the following compacted thicknesses:
 - 1. Areas to be Seeded with Grass: 6 inches.
 - 2. Areas to be Sodded: 4 inches.
 - 3. Shrub Beds: 18 inches.
 - 4. Flower Beds: 12 inches
 - 5. Planter Boxes: To within 3 inches of box rim.
- F. Place topsoil during dry weather.
- G. Remove roots, weeds, rocks, and foreign material while spreading.
- H. Near plants spread topsoil manually to prevent damage.

- I. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
- J. Lightly compact placed topsoil.

3.6 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.
- B. Top Surface of Finish Grade: Plus or minus ½ inch.

3.7 FIELD QUALITY CONTROL

- A. See Section 31 23 23.13, FILL AND BACKFILL for compaction density testing.

3.8 CLEANING AND PROTECTION

- A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.
- B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 31 23 16 - EXCAVATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Work and materials associated with excavation.
- B. Related sections:
 - 1. Section 01 50 00 – Temporary Facilities and Controls.
 - 2. Section 02 41 00 – Demolition.
 - 3. Section 31 11 00 – Site Preparation.
 - 4. Section 31 23 19 – Dewatering.
 - 5. Section 31 50 00 – Excavation Support Systems.

1.2 SUBMITTALS

- A. Shop Drawings:
 - 1. Excavation Plan, Detailing:
 - a. Methods and sequencing of excavation.
 - b. Proposed locations of stockpiled excavated material.
 - c. Proposed and spoil disposal sites.
 - d. Numbers, types, and sizes of equipment proposed to perform excavations.

1.3 QUALITY ASSURANCE

- A. Provide adequate survey control to avoid unauthorized overexcavation.

1.4 WEATHER LIMITATIONS

- A. Material excavated when frozen or when air temperature is less than 32 degrees F shall not be used as fill or backfill until material completely thaws.
- B. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.

1.5 SEQUENCING AND SCHEDULING

- A. Demolition: Complete applicable Work specified in Section 02 41 00, DEMOLITION, prior to excavating.
- B. Clearing, Grubbing, and Stripping: Complete applicable Work specified in Section 31 11 00, SITE PREPARATION, prior to excavating.
- C. Dewatering: Conform to applicable requirements of Section 31 23 19, DEWATERING, prior to initiating excavation.
- D. Excavation Support: Install and maintain, as specified in Section 31 50 00, EXCAVATION SUPPORT SYSTEMS, as necessary to support sides of excavations and prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed Work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

- A. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1-foot except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.
- B. Do not over excavate without written authorization of Engineer.
- C. Remove or protect obstructions as shown and as specified in Section 01 50 00, TEMPORARY FACILITIES AND CONTROLS.

3.2 UNCLASSIFIED EXCAVATION

- A. Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

3.3 TRENCH WIDTH

- A. Minimum Width of Trenches:
 - 1. Single Pipes, Conduits, Direct-Buried Cables, and Duct Banks:
 - a. Less than 4-inch Outside Diameter or Width: 18 inches.
 - b. Greater than 4-inch and up to 18-inch Outside Diameter or Width: 12 inches greater than outside diameter or width of pipe, conduit, direct-buried cable, or duct bank.
 - c. Greater than 18-inch Diameter or Width: 24-inches greater than outside diameter or width of pipe, conduit, direct-buried cable, or duct bank.
 - 2. Multiple Pipes, Conduits, Cables, or Duct Banks in Single Trench: 18 inches greater than aggregate width of pipes, conduits, cables, duct banks, plus space between.
 - 3. Increase trench widths by thicknesses of sheeting.
- B. Maximum Trench Width: Unlimited, unless otherwise shown or specified, or unless excess width will cause damage to existing facilities, adjacent property, or completed Work.

3.4 PIPE BEDDING GROOVES FOR NONPERFORATED DRAIN LINES

- A. Semicircular, trapezoidal, or 90-degree-V.
- B. Excavated or plowed into trench bottom. Forming groove by compaction will not be acceptable.

3.5 STOCKPILING EXCAVATED MATERIAL

- A. Stockpile excavated material that is suitable for use as fill or backfill until material is needed.
- B. Post signs indicating proposed use of material stockpiled. Post signs that are readable from all directions of approach to each stockpile. Signs should be clearly worded and readable by equipment operators from their normal seated position.
- C. Confine stockpiles to within easements, rights-of-way, and approved work areas. Do not obstruct roads or streets.

- D. Do not stockpile excavated material adjacent to trenches and other excavations unless excavation side slopes and excavation support systems are designed, constructed, and maintained for stockpile loads.
- E. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce excessive settlement.

3.6 DISPOSAL OF SPOIL

- A. Dispose of excavated materials, which are unsuitable or exceed quantity needed for fill or backfill,
- B. Dispose of debris resulting from removal of underground facilities as specified in Section 02 41 00, DEMOLITION, for demolition debris.
- C. Dispose of debris resulting from removal of organic matter, trash, refuse, and junk as specified in Section 31 11 00, SITE PREPARATION, for clearing and grubbing debris.

3.7 EXCAVATION SAFETY

- A. Conform to all applicable federal, state, and local regulations.

3.8 SUBGRADE PREPARATION

- A. The excavation for all structures and facilities shall be in dewatered, firm, undisturbed earth. If, in the Engineer's opinion, the has been disturbed, corrective measures may include:
 - 1. Scarification and recompaction to 95 percent relative compaction or,
 - 2. Overexcavation and replacement with compacted granular fill.
- B. If the source of disturbance is determined to be the result of the actions, or inactions of the Contractor, (for example, inadequate dewatering, disturbance by excavating or hauling equipment) the cost of additional subgrade preparation will be at the Contractor's expense.

END OF SECTION

SECTION 31 23 16.13 - TRENCHING FOR SITE UTILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Backfilling and compacting for utilities outside the building to utility main connections.

1.2 RELATED SECTIONS

- A. Section 31 22 19, GRADING.
- B. Section 31 23 16, EXCAVATION.
- C. Section 31 23 23.13, FILL AND BACKFILL.
- D. Section 31 23 23.16, TRENCH BACKFILL.

1.3 DEFINITIONS

- A. Subgrade Elevations: 4 inches below finish grade elevations indicated on drawings, unless otherwise indicated.
- B. Finish Grade Elevations: 4 inches above subgrade elevations indicated on drawings, unless otherwise indicated.

1.4 SUBMITTALS

- A. See Section 01 33 00, SUBMITTAL PROCEDURES, for submittal procedures.
- B. Compaction Density Test Reports.

1.5 PROJECT CONDITIONS

- A. Provide sufficient quantities of fill to meet project schedule and requirements. When necessary, store materials on site in advance of need.
- B. Verify that survey bench marks and intended elevations for the work are as indicated.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

- A. As specified in Section 31 23 23.16, TRENCH BACKFILL.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Locate, identify, and protect utilities that remain and protect from damage.
- C. Notify utility company to remove and relocate utilities.

- D. See Section 31 22 19, GRADING, for additional requirements.

3.2 TRENCHING

- A. Notify Owner's Representative of unexpected subsurface conditions and discontinue affected Work in areas until notified to resume work.
- B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Cut trenches wide enough to allow inspection of installed utilities.
- E. Hand trim excavations. Remove loose matter.
- F. Remove excavated material that is unsuitable for re-use from site.
- G. Remove excess excavated material from site.

3.3 PREPARATION FOR UTILITY PLACEMENT

- A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.4 BACKFILLING

- A. Backfill to contours and elevations indicated using unfrozen materials.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum lime for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Store grade away from building minimum 2 inches in 10 ft. unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- F. Correct areas that are over-excavated.
 - 1. Thrust bearing surfaces: Fill with concrete.
 - 2. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.
- G. Compaction Density Unless Otherwise Specified or Indicated.
 - 1. Under paving, slabs-on-grade, and similar construction: 97 percent of maximum dry density.
 - 2. All other locations: 95 percent of maximum dry density.
- H. Reshape and re-compact fills subjected to vehicular traffic.

3.5 BEDDING AND FILL AT SPECIFIC LOCATIONS

- A. Utility Piping, Conduits, and Duct Bank:
 - 1. Bedding: Use general fill.
 - 2. Cover with general fill.
 - 3. Fill up to subgrade elevation.
 - 4. Compact in maximum 8 inch lifts to 95 percent of maximum dry density.
- B. At Pipe Culverts:
 - 1. Bedding: use general fill.
 - 2. Cover with general fill.
 - 3. Fill up to subgrade elevation.
 - 4. Compact in maximum 8 inch lifts to 95 percent of maximum dry density.

3.6 TOLERANCES

- A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.7 FIELD QUALITY CONTROL

- A. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D6938, or ASTM D3017.
- B. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("Standard Proctor"), ASTM D1557 ("Modified Proctor"), or AASHTO T180.
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- D. Frequency of Tests; each lift.

3.8 CLEAN-UP

- A. Leave unused materials in a neat compact stockpile.
- B. Remove unused stockpiled material, leave area in a clean and neat condition. Grade stockpile areas to prevent standing surface water.
- C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 31 23 16.16 – TRENCHING FOR WATER AND SEWER LINES

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes excavation required for the construction of water and sewer pipes and appurtenances.
- B. Related sections:
 - 1. Section 31 23 23.16 – Trench Backfill
 - 2. Section 31 23 23.16 – Testing Sanitary Sewer Systems
 - 3. Section 33 39 13.13 – Pre-Cast Concrete Manholes
 - 4. Section 33 34 13 – Ductile Iron Force Main Pipe and Fittings
 - 5. Section 33 41 16 – Ductile Iron Gravity Sewer Pipe and Fittings
 - 6. Section 33 41 19 – Pipe Laying

1.2 GENERAL

- A. General Requirements: See Division 01, GENERAL REQUIREMENTS, which contains information and requirements that apply to the work specified herein and are mandatory for this project.
- B. Provide and install trench bracing and shoring that conforms to the requirements of 29 CFR Part 1926 Subpart P of the OSHA Standards. Bracing shall be so arranged as not to place any strain on portions of completed work until the construction has proceeded far enough to provide ample strength.
- C. Overexcavation, whether by Contractor's negligence or at direction of the Engineer, shall be repaired to required lines and grades.
- D. Trenches shall be dug to the alignment and depth required and shall not advance more than 100 feet ahead of the completed pipe, unless otherwise permitted by the Engineer.

1.3 UTILITIES

- A. Contractor shall call "TEXAS ONE CALL" two working days before starting excavation.
- B. The location and/or elevation of existing utilities as shown on these plans is based on records of the various utility companies and, where possible, measurements taken in the field. The information is not to be relied upon as being exact or complete. The Contractor must call each utility owner at least two working days before any excavation to request exact field location of utilities.
- C. Protect utilities encountered during excavation.
- D. Do not interrupt service in utilities encountered during excavation without approval of the utility owner.
- E. If utilities are damaged or utility service is interrupted by work under this section, the utility owner has the first right to repair. If public health or safety is at risk, Contractor shall take appropriate prudent action to repair damage and service interruption. Costs of utility protection and repair shall be at no additional cost to the Owner.

- F. If existing utilities are found to interfere with the permanent facility being constructed, notify the Engineer for instructions. Do not proceed with permanent relocation of utilities without written instructions from the Engineer.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

- A. Shall be as specified in Section 31 23 23.16, TRENCH BACKFILL

PART 3 - EXECUTION

3.1 GENERAL

- A. Notify property residents two working days prior to beginning excavation on property.
- B. Excavated materials not suitable for backfill or embankment shall not be incorporated into the project but shall be disposed of by Contractor.
- C. Excavate with caution so that structures and underground conduits can be protected.
- D. Excavate every type of material encountered to the lines and elevations necessary to complete the project.
- E. Reroute surface water before excavating and protect excavated trench from entrance of surface water.
- F. In general, the sheeting and bracing shall be removed as the trench or excavation is backfilled, and in such a manner as to avoid the caving in of the bank or disturbance of adjacent areas or structures. The voids left by the withdrawal of sheeting shall be backfilled the same as trench excavations.
- G. Provide "before and after" color photographs of lawns and gardens to Engineer.
- H. Comply with Section 33 41 19, PIPE LAYING.

3.2 TRENCH DEPTH

- A. Excavate to the elevation necessary to provide the depth of bedding material under the barrel of the pipe, noted on the plans or in these specifications, whichever is greater.
- B. All over-excavation up to 2 feet shall be backfilled with bedding material in 6-inch layers and tamped to a bearing capacity equal to the adjacent undisturbed earth. Over excavation greater than 2 feet will require excavation operation to stop until an engineered backfill is determined. Over excavation shall not proceed until approved by Engineer. Contractor shall bear all expense involved if he fails to obtain prior approval from the Engineer.

3.3 TRENCH WIDTH

- A. Excavate to the width shown in detail drawings. Specified width dimensions must be maintained from trench bottom to an elevation 12 inches above barrel of pipe. Over-width excavation will require excavation operation to stop until additional earth loads can be compared to strength of pipe. Costs of unauthorized deviation from the specified width will be borne by the Contractor.

3.4 TRENCH LENGTH

- A. Excavate to a maximum distance of 100 feet from the pipe jointing operation. Longer distances will be considered when conditions warrant.

3.5 EXCAVATION IN ROCK

- A. When rock is encountered, excavate to an elevation 6 inches below the pipe and to the trench width as shown in the details at no additional cost to Owner.

3.6 EXCAVATION IN UNSUITABLE SOIL

- A. Where, in the judgment of the Engineer, the planned bottom of trench is found to be unstable, excavation shall stop until an engineered subgrade stabilization method is determined.

3.7 EXCAVATION IN WET CONDITIONS

- A. Where the planned bottom of trench contains water or the trench bottom is soft from excess water, excavation depth shall increase a minimum of 6 inches or as directed by the Engineer.

3.8 EXCAVATION IN UNFORESEEN STRUCTURE

- A. Preserve unforeseen structures encountered in excavation.
- B. Advise the Engineer when unforeseen structure interferes with planned work. Engineer will determine if plan will change or if structure will be abandoned.

3.9 UNAUTHORIZED EXCAVATION

- A. Unauthorized excavation is removal of materials beyond specified elevations or dimensions without the Engineer or Owner's specific prior approval.

3.10 UNSUITABLE AND EXCESS EXCAVATED MATERIAL:

- A. Excavated material not suitable for backfill and excess excavated material shall be disposed of by Contractor in a manner approved by the Engineer and applicable governmental regulations.

3.11 EXCAVATION DEWATERING:

- A. Wellpointing or deep wells, where required to keep the excavation dry and the subgrade stable, shall be installed when the excavation extends to within two (2) feet of the water table, except as herein provided, and shall be in continuous operation until backfill is completed to this level.
- B. When construction equipment is to be operated in an area that has been excavated, and wellpointing or deep wells are required to keep the excavation dry and the subgrade stable, the wellpointing or deep wells shall be installed when the excavation extends to within five (5) feet of the water table.
- C. There shall be sufficient pumping equipment, in good working order, readily available at all times to remove any water that accumulates in excavations to the extent that a stable subgrade is obtained.
- D. Where the excavation crosses natural drainage channels, the work shall be conducted in such a manner that unnecessary damage or delays in the prosecution of the work will be prevented.

- E. Trench dewatering shall discharge to an approved location in conformance with the Stormwater Pollution Prevention Plan.
- F. Wellpoint dewatering for the sewer line construction will not be mandatory where a properly stabilized subgrade can be obtained by use of granular bedding. If granular bedding is utilized by the Contractor for stabilization of the trench bottom in lieu of wellpointing, such bedding material will not be measured for separate payment but will be considered subsidiary to the pipe installation.
- G. Where dewatering might be necessary to properly install the sewer line, such as at drainage channel crossings and tunnel or boring locations, the Contractor shall submit his proposal for this dewatering to the Owner for approval.
- H. Dewatering operations shall continue until pipe has been backfilled and a sufficient cover depth has been reached to prevent flotation of pipe.

END OF SECTION

SECTION 31 23 16.20 - ROCK EXCAVATION

PART 1 GENERAL

The following applies to all trenched construction including, but not limited to, water mains, sanitary sewer mains, gas mains, and other pipelines.

1.1 DESCRIPTION OF WORK

- A. Furnish all labor, material and equipment to excavate rock and dispose of rock as specified herein.
- B. REQUIREMENTS OF REGULATORY AGENCIES
 - 1. Observe all municipal ordinances and State and Federal laws relating to the transportation, storage, handling and use of explosives.
 - 2. Blasters shall be duly licensed and shall have their license on the work site at all time during blasting activities.

1.2 DEFINITION

- A. At sites of utility relocation projects, rock excavation is hereby defined as material that cannot be removed with the normal excavation equipment used on the project. It is further defined as material requiring drilling and/or blasting prior to its removal from the trench site. The following do not qualify for rock excavation: (1) soft or disintegrated rock that can be removed with a hand pick, power-operated excavator, or shovel; (2) loose, broken, or previously-blasted rock or broken stone in rock fills or elsewhere; and (3) rock which has fallen into the excavation from outside of the minimum limits of measurement allowed.

1.3 EXECUTION

- A. Excavate rock to the lines and grades indicated on the drawings. Dispose of excavated material not suitable for backfill in a location approved by the Owner.
- B. In rock, excavations shall be carried six inches (6") below the bottom of the pipe. Loose earth or gravel not larger than three fourths of an inch (3/4") in size shall be used for backfill, tamped thoroughly, and rounded to receive pipe as above.
- C. Excavate rock in structure excavations to 6" below the bottom of the foundation.

1.4 MEASUREMENT AND PAYMENT

- A. The contractor shall notify the owner when rock measurements can be performed. If backfill commences before measurement is made, the contractor will not be paid for that portion of the rock removed. Maximum measurement for rock excavation in pipe trenches shall be to six (6) inches below bottom of pipe with the width of trench at 2' 0" plus the interior diameter of pipe, regardless of the excess width excavated. Maximum measurement for precast and cast-in-place structures shall be structure width plus four (4) feet; structure length plus four (4) feet; and base of structure. Payment shall be the price bid per cubic yard and is to include aggregate fill to bring the ditch to plan grade.

END OF SECTION

SECTION 31 23 19 – DEWATERING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Work required to dewater excavations.
- B. Related sections:
 - 1. Section 01 50 00 – Temporary Facilities and Controls.

1.2 WATER CONTROL PLAN

- A. As a minimum, include:
 - 1. Descriptions of proposed groundwater and surface water control facilities including, but not limited to, equipment; methods; standby equipment and power supply, pollution control facilities, discharge locations to be utilized, and provisions for immediate temporary water supply as required by this section.
 - 2. Drawings showing locations, dimensions, and relationships of elements of dewatering system.
- B. If system is modified during installation or operation revise or amend and resubmit Water Control Plan.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

- A. Remove and control surface and subsurface water during periods when necessary to properly accomplish Work.

3.2 SURFACE WATER CONTROL

- A. See Section 01 50 00, TEMPORARY FACILITIES AND CONTROLS.
- B. Remove surface runoff controls when no longer needed.

3.3 DEWATERING SYSTEMS

- A. Provide, operate, and maintain dewatering systems of sufficient size and capacity to permit excavation and subsequent construction in dry and to lower and maintain groundwater level a minimum of 2 feet below the lowest point of excavation. Continuously maintain excavations free of water, regardless of source, and until backfilled to final grade.
- B. Design and Operate Dewatering Systems:
 - 1. To prevent loss of ground as water is removed.
 - 2. To avoid inducing settlement or damage to existing facilities, completed Work, or adjacent property.
 - 3. To relieve artesian pressures and resultant uplift of excavation bottom.
 - 4. Prevent softening, loosening or otherwise disturbing the excavation subgrade.
- C. Provide sufficient redundancy in each system to keep excavation free of water in event of component failure.

- D. Provide supplemental ditches and sumps only as necessary to collect water from local seeps.

3.4 DISPOSAL OF WATER

- A. Obtain discharge permit for water disposal from authorities having jurisdiction.
- B. Treat water collected by dewatering operations, as required by regulatory agencies, prior to discharge.
- C. Discharge water as required by discharge permit and in manner that will not cause erosion or flooding, or otherwise damage existing facilities, completed Work, or adjacent property.
- D. The discharge of ground water into treatment facilities will not be permitted unless specifically authorized by the Owner. Remove solids from treatment facilities and perform other maintenance of treatment facilities as necessary to maintain their efficiency. If Owner allows groundwater discharge into facilities.

3.5 PROTECTION OF PROPERTY

- A. Make assessment of potential for dewatering induced settlement. Provide and operate devices or systems, including but not limited to reinjection wells, infiltration trenches and cutoff walls, necessary to prevent damage to existing facilities, completed Work, and adjacent property.
- B. Securely support existing facilities, completed Work, and adjacent property vulnerable to settlement due to dewatering operations. Support shall include, but not be limited to, sheeting bracing, underpinning, or compaction grouting.

3.6 REMEDIATION OF GROUNDWATER AFTER DEPLETION

- A. If dewatering reduces quantity or quality of water produced by existing wells, temporarily supply water to affected well owners from other sources. Furnish water of a quality and quantity equal to or exceeding the quality and quantity available to the well owner prior to beginning Work or as satisfactory to each well owner.

END OF SECTION

SECTION 31 23 23.13 - FILL AND BACKFILL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Work and materials required for fill and backfill for all excavations other than trench type excavations.
- B. Related sections:
 - 1. Section 02 41 00 – Demolition.
 - 2. Section 03 30 00 – Cast-In-Place Concrete.
 - 3. Section 31 11 00 – Site Preparation.
 - 4. Section 31 22 13 – Subgrade Preparation.
 - 5. Section 31 23 16 – Excavation.
 - 6. Section 31 23 23.16 – Trench Backfill.
 - 7. Division 32

1.2 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Society for Testing and Materials (ASTM):
 - a. ASTM C117, Standard Test Method for Materials Finer Than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing.
 - b. ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - c. ASTM D75, Standard Practice for Sampling Aggregates.
 - d. ASTM D698, Standard Test Methods for Laboratory Characteristics of Soil Using Modified Effort (12,400 ft-lbf/ft³).
 - e. ASTM D1556, Standard Test Method for Density of Soil in Place by the Sand Cone Method.
 - f. ASTM D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³).
 - g. ASTM D6938, Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
 - h. ASTM D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 - i. ASTM D4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.

1.3 DEFINITIONS

- A. Relative Compaction:
 - 1. Ratio, in percent, of as-compacted field dry density to laboratory maximum dry density as determined in accordance with ASTM D698.
 - 2. Apply corrections for oversize material to either as-compacted field dry density or maximum dry density, as determined by Engineer.
- B. Optimum Moisture Content:
 - 1. Determined in accordance with ASTM D698 specified to maximum dry density for relative compaction.
 - 2. Determine field moisture content on basis of fraction passing 3/4-inch sieve.

- C. Relative Density: Calculated in accordance with ASTM D4254 based on maximum index density determined in accordance with ASTM D4253 and minimum index density determined in accordance with ASTM D4254.
 - D. Prepared Ground Surface: Ground surface after completion of required demolition, clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and preparation.
 - E. Completed Course: A course or layer that is ready for next layer or next phase of Work.
 - F. Lift: Loose (uncompacted) layer of material.
 - G. Geosynthetics: Geotextiles, geogrids, or geomembranes.
 - H. Well-Graded:
 - 1. A mixture of particle sizes with no specific concentration or lack thereof of one or more sizes.
 - 2. Does not define numerical value that must be placed on coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.
 - 3. Used to define material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.
 - I. Influence Area: Area within planes sloped downward and outward at 60-degree angle from horizontal measured from:
 - 1. 1-foot outside outermost edge at base of foundations or slabs.
 - 2. 1-foot outside outermost edge at surface of roadways or shoulder.
 - 3. 0.5-foot outside exterior at spring line of pipes or culverts.
 - J. Borrow Material: Material from required excavations or from designated borrow areas on or near site.
 - K. Selected Backfill Material/Earthfill: Materials available onsite that Engineer determines to be suitable for specific use.
 - L. Imported Material: Materials obtained from sources suitable for specified use.
 - M. Structural Fill: Fill materials as required under structures, pavements, and other facilities.
 - N. Embankment Material: Fill materials required to raise existing grade in areas other than under structures.
 - O. Standard Specification: The latest edition, including supplements of the [Texas Department of Transportation Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges.
- 1.4 SUBMITTALS
- A. Quality Control Submittals:
 - 1. Catalog and manufacturer's data sheets for compaction equipment.
 - 2. Certified test results from independent testing agency.
- 1.5 QUALITY ASSURANCE
- A. Notify Engineer when:
 - 1. Structure is ready for backfilling, and whenever backfilling operations are resumed after a period of inactivity.

2. Soft or loose subgrade materials are encountered wherever embankment or site fill is to be placed.
3. Fill material appears to be deviating from Specifications.

1.6 SEQUENCING AND SCHEDULING

- A. Complete applicable Work specified in Sections 02 41 00, DEMOLITION; 31 11 00, SITE PREPARATION; 31 23 16, EXCAVATION; and 31 22 13, SUBGRADE PREPARATION, prior to placing fill or backfill.
- B. Backfill against concrete structures only after concrete has attained compressive strength, specified in Section 03 30 00, CAST-IN-PLACE CONCRETE. Obtain acceptance of concrete work and attained strength prior to placing backfill.
- C. Backfill around water-holding structures only after completion of satisfactory leakage tests as specified in Section 03 30 00, CAST-IN-PLACE CONCRETE.
- D. Do not place granular base, subbase, or surfacing until after subgrade has been prepared as specified in Section 31 22 13, SUBGRADE PREPARATION.

PART 2 - PRODUCTS

2.1 SOURCE QUALITY CONTROL

- A. Gradation Tests: It will be the Contractor's responsibility to conduct testing as necessary to locate acceptable sources of imported material.

2.2 EARTHFILL

- A. Excavated material from required excavations, free from rocks larger than 3 inches, from roots and other organic matter, ashes, cinders, trash, debris, and other deleterious materials.

2.3 GRANULAR FILL

- A. Type A, Grade 3 or better crushed limestone base material meeting all the requirements of Item 247 of the Texas Department of Transportation Standard Specifications.

2.4 WATER FOR MOISTURE CONDITIONING

- A. Free of hazardous or toxic contaminants, or contaminants deleterious to proper compaction.

2.5 BASE COURSE ROCK

- A. As specified in Division 32.

2.6 FOUNDATION STABILIZATION ROCK

- A. Crushed rock or pit run rock.
- B. Uniformly graded from coarse to fine.
- C. Free from excessive dirt and other organic material.
- D. Maximum 2-1/2 inches particle size.

PART 3 - EXECUTION

3.1 GENERAL

- A. Keep placement surfaces free of water, debris, and foreign material during placement and compaction of fill and backfill materials.
- B. Place and spread fill and backfill materials in horizontal lifts of uniform thickness, in a manner that avoids segregation, and compact each lift to specified densities prior to placing succeeding lifts. Slope lifts only where necessary to conform to final grades or as necessary to keep placement surfaces drained of water.
- C. During filling and backfilling, keep level of fill and backfill around each structure and buried tank even.
- D. Do not place fill or backfill, if fill or backfill material is frozen, or if surface upon which fill or backfill is to be placed is frozen.
- E. If pipe, conduit, duct bank, or cable is to be laid within fill or backfill:
 - 1. Fill or backfill to an elevation 2 feet above top of item to be laid.
 - 2. Excavate trench for installation of item.
 - 3. Install bedding, if applicable, as specified in Section 31 23 23.16, TRENCH BACKFILL.
 - 4. Install item.
 - 5. Backfill envelope zone and remaining trench, as specified in Section 31 23 23.16, TRENCH BACKFILL, before resuming filling or backfilling specified in this section.
- F. Tolerances:
 - 1. Final Lines and Grades: Within a tolerance of 0.1-foot unless dimensions or grades are shown or specified otherwise.
 - 2. Grade to establish and maintain slopes and drainage as shown. Reverse slopes are not permitted.
- G. Settlement: Correct and repair any subsequent damage to structures, pavements, curbs, slabs, piping, and other facilities, caused by settlement of fill or backfill material.
- H. Fill and backfill materials shall be conditioned to a water content that is within 2 percentage points (plus or minus) of the optimum required for compaction as determined by ASTM D698.

3.2 BACKFILL UNDER AND AROUND STRUCTURES

- A. Under Facilities: Within influence area beneath structures, slabs, pavements, curbs, piping, conduits, duct banks, and other facilities, backfill with granular fill, unless otherwise shown. Place granular fill in lifts of 6-inch maximum thickness and compact each lift to minimum of 95 percent relative compaction as determined in accordance with ASTM D698, Method C.
- B. Subsurface Drainage: Backfill with granular drain material, where shown. Place granular drain material in lifts of 6-inch maximum thickness and compact each lift to minimum of 90 percent relative density.
- C. Other Areas: Backfill with earthfill to lines and grades shown, with proper allowance for topsoil thickness where shown. Place in lifts of 6-inch maximum thickness and compact each lift to minimum 95 percent relative compaction as determined in accordance with ASTM D698, Method C.

3.3 FILL

- A. Outside Influence Areas Beneath Structures, Tanks, Pavements, Curbs, Slabs, Piping, and Other Facilities: Unless otherwise shown, place earthfill as follows:
 - 1. Allow for 6-inch thickness of topsoil where required.
 - 2. Maximum 9-inch thick lifts.
 - 3. Place and compact fill across full width of embankment.
 - 4. Compact to minimum 95 percent relative compaction as determined in accordance with ASTM D698, Method C.
 - 5. Dress completed embankment with allowance for topsoil, crest surfacing, and slope protection, where applicable.

3.4 SITE TESTING

- A. Gradation:
 - 1. One sample from each 400 tons of finished product or more often as determined by Engineer, if variation in gradation is occurring, or if material appears to depart from Specifications.
 - 2. If test results indicate material does not meet Specification requirements, terminate material placement until corrective measures are taken.
 - 3. Remove material placed in Work that does not meet Specification requirements.
- B. In-Place Density Tests: In accordance with ASTM. During placement of materials, test as follows:
 - 1. One test per every other lift per 200 lineal feet of roadway or trench.
 - 2. A minimum of two tests on granular fill beneath structures.
 - 3. A minimum of two test per 300 cubic yards during backfilling of walls.
- C. Testing shall be the Contractor's responsibility and conducted by persons experienced in such work.

3.5 GRANULAR BASE, SUBBASE, AND SURFACING

- A. Place and Compact as specified in DIVISION 32.

3.6 REPLACING OVEREXCAVATED MATERIAL,

- A. Replace excavation carried below grade lines shown or established by Engineer as follows:
 - 1. Beneath Footings: Concrete of strength equal to that of respective footing.
 - 2. Beneath Fill or Backfill: Same material as specified for overlying fill or backfill.
 - 3. Beneath Slabs-On-Grade: Granular fill.
 - 4. Trenches:
 - a. Unauthorized Overexcavation: Either trench stabilization material or granular pipe base material, as specified in Section 31 23 23.16, TRENCH BACKFILL.
 - b. Authorized Overexcavation: Trench stabilization material, as specified in Section 31 23 23.16, TRENCH BACKFILL.
 - 5. Permanent Cut Slopes (Where Overlying Area is Not to Receive Fill or Backfill):
 - a. Flat to Moderate Steep Slopes (3: 1, Horizontal Run: Vertical Rise or Flatter): Earthfill.
 - b. Steep Slopes (Steeper than 3: 1):
 - 1) Correct overexcavation by transitioning between areas and designed slope adjoining areas, provided such cutting does not extend offsite or outside easements and right-of-ways, or adversely impacts existing facilities, adjacent property, or completed Work.

- 2) Backfilling overexcavated areas is prohibited unless, in opinion, backfill will remain stable, and overexcavated material is replaced as compacted earth fill.

END OF SECTION

SECTION 31 23 23.16 - TRENCH BACKFILL

PART 1 - GENERAL

1.1 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American National Standards Institute (ANSI): 253.1, Safety Color Code.
 2. American Public Works Association (APWA): Uniform Color Code for Temporary Marking of Underground Utility Locations.
 3. American Society for Testing and Materials (ASTM):
 - a. ASTM D448, Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
 - b. ASTM C94, Specification for Ready-Mixed Concrete.
 - c. ASTM C117, Standard Test Method for Materials Finer than 75 micrometer (No. 200) Sieve in Mineral Aggregates by Washing.
 - d. ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - e. ASTM C150, Standard Specification for Portland Cement.
 - f. ASTM C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
 - g. ASTM D422, Standard Test Method for Particle-Size Analysis of Soils.
 - h. ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil using Standard Effort (12,400 ft-lbf/cubic ft).
 - i. ASTM D1140, Standard Test Methods for Amount of Material in Soils Finer than the No. 200 (75 micrometer) Sieve.
 - j. ASTM D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil using Modified Effort (56,000 ft-lbf).
 - k. ASTM D3776, Standard Test Methods for Mass per Unit Area (Weight) of Fabric.
 - l. ASTM D3786, Standard Test Method for Bursting Strength of Textile Fabrics: Diaphragm Bursting Strength Tester Method.
 - m. ASTM D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 - n. ASTM D4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
 - o. ASTM D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - p. ASTM D4533, Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
 - q. ASTM D4832, Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.
 - r. ASTM D4991, Standard Test Method for Leakage Testing of Empty Rigid Containers by Vacuum Method.
 - s. ASTM D5034, Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test).

1.2 DEFINITIONS

- A. Base Rock: Granular material upon which manhole bases and other structures are placed.
- B. Bedding Material: Granular material upon which pipes, conduits, cables, or duct banks are placed.
- C. Imported Material: Material obtained by the Contractor from source(s) offsite.
- D. Lift: Loose (uncompacted) layer of material.

- E. Pipe Zone: Backfill zone that includes full trench width and extends from prepared trench bottom to an upper limit above top outside surface of pipe, conduit, cable or duct bank.
- F. Prepared Trench Bottom: Graded trench bottom after stabilization and installation of bedding material.
- G. Relative Compaction: The ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by ASTM D698. Corrections for oversize material may be applied to either the as-compacted field dry density or the maximum dry density, as determined by the Engineer.
- H. Relative Density: As defined by ASTM D4253 and ASTM D4254.
- I. Selected Backfill Material: Material available that the Engineer determines to be suitable for a specific use.
- J. Well-Graded: A mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes producing a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids. Well-Graded does not define any numerical value that must be placed on the coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.

1.3 SUBMITTALS

- A. Shop Drawings: Manufacturer's descriptive literature for marking tapes.
- B. Samples:
 - 1. Trench stabilization material.
 - 2. Bedding and pipe zone material.
 - 3. Granular drain.
 - 4. Granular backfill.
 - 5. Earth backfill.
 - 6. Sand(s).
 - 7. Geotextile.
- C. Quality Control Submittals: Catalog and manufacturer's data sheets for compaction equipment.
- D. Certified Gradation Analysis: Submit not less than 30 days prior to delivery for imported materials or anticipated use for excavated materials, except for trench stabilization material that will be submitted prior to material delivery to site.
- E. Controlled Low Strength Material: Certified mix design and test results. Include material types and weight per cubic yard for each component of mix.

PART 2 - PRODUCTS

2.1 MARKING TAPE

- A. Plastic:
 - 1. Inert polyethylene, impervious to known alkalis, acids, chemical reagents, and solvents likely to be encountered in soil.
 - 2. Thickness: Minimum 4 mils.
 - 3. Width: 12 inches.
 - 4. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.

5. Manufacturers and Products:
 - a. Reef Industries; Terra Tape.
 - b. Allen; Markline.
- B. Metallic:
 1. Solid aluminum foil, visible on unprinted side, encased in a protective high visibility, inert polyethylene plastic jacket.
 2. Thickness: Minimum 5 mils.
 3. Width: 12 inches.
 4. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
 5. Joining Clips: Tin or nickel-coated, furnished by tape manufacturer.
 6. Manufacturers and Products:
 - a. Reef Industries; Terra Tape Sentry Line.
 - b. Allen; Detectatape.
- C. Color: In accordance with APWA Uniform Color Code for Temporary Marking of Underground Facilities.

Color ^a	Facility
Red	Electric power lines, cables, conduit, and lightning cables
Orange	Communicating alarm or signal lines, cables, or conduit
Yellow	Gas, oil, steam, petroleum, or gaseous materials
Green	Sewers and drain lines
Blue	Water, irrigation, and slurry lines
^a As specified in ANSI Z53.1, Safety Color Code.	

2.2 TRENCH STABILIZATION MATERIAL

- A. Clean, hard, durable 3-inch minus crushed rock gravel, or pit run, free from clay balls, other organic materials, or debris.
- B. Uniformly graded from coarse to fine, less than 8 percent by weight passing the 1/4-inch sieve.

2.3 BEDDING MATERIAL AND PIPE ZONE MATERIAL

- A. Unfrozen, friable, and no clay balls, roots, or other organic material.
- B. Clean or gravelly sand with less than 5 percent passing No. 200 sieve, as determined in accordance with ASTM D1140, or gravel or crushed rock within maximum particle size and other requirements as follows unless otherwise specified.
 1. Duct Banks: 3/4-inch maximum particle size.
 2. PVC Irrigation System Piping, and Ductile Iron Pipe with Polyethylene Wrap: 3/8-inch maximum particle size.
 3. Pipe Under 18 Inches Diameter: 3/4-inch maximum particle size, except 1/4-inch for stainless steel pipe, copper pipe, tubing, and plastic pipe under 3 inches diameter.

4. Pipe Greater than 18 Inches Diameter: 1-1/2-inch maximum particle size for ductile iron pipe, concrete pipe, welded steel pipe, and pretensioned or prestressed concrete cylinder pipe. 3/4-inch maximum particle size for PVC, FRP, or HDPE Pipe.
5. Perforated Pipe: Granular drain material.
6. Conduit and Direct-Buried Cable:
 - a. Sand, clean or clean to silty, less than 12 percent passing the No. 200 sieve.
 - b. Individual Particles: Free of sharp edges.
 - c. Maximum Size Particle: Pass a No. 4 sieve.
 - d. If more than 5 percent passes No. 200 sieve, the fraction that passes No. 40 sieve shall be nonplastic as determined in accordance with ASTM D4318.

2.4 EARTH FILL

- A. As specified in Section 31 23 23.13, FILL AND BACKFILL.

2.5 CONTROLLED LOW STRENGTH FILL

- A. Select and proportion ingredients to obtain compressive strength between 50 and 150 psi at 28 days in accordance with ASTM D4832.
- B. Materials:
 1. Cement: ASTM C150, Type I or II.
 2. Aggregate: ASTM C33, Size 7.
 3. Fly Ash (if used): ASTM C618, Class C.
 4. Water: Clean, potable, containing less than 500 ppm of chlorides.

2.6 CONCRETE BACKFILL

- A. Provide as specified in Section 03 30 00, CAST-IN-PLACE CONCRETE.

2.7 TOPSOIL

- A. Topsoil removed and stockpiled from onsite excavation.

2.8 SOURCE QUALITY CONTROL

- A. Perform gradation analysis in accordance with ASTM C136 for:
 1. Earth backfill, including specified class(es).
 2. Trench stabilization material.
 3. Bedding and pipe zone material.
- B. Certify Laboratory Performance of Mix Designs:
 1. Controlled low strength fill.
 2. Concrete.

PART 3 - EXECUTION

3.1 TRENCH PREPARATION

- A. Water Control: Conform to Section 31 23 19, DEWATERING.
 1. Promptly remove and dispose of water entering trench as necessary to grade trench bottom and to compact backfill and install manholes, pipe, conduit, direct-buried cable, or duct bank. Do not place concrete, lay pipe, conduit, direct-buried cable, or duct bank in water.
 2. Remove water in a manner that minimizes soil erosion from trench sides and bottom.

3. Provide continuous water control until trench backfill is complete.

B. Remove foreign material and backfill contaminated with foreign material that falls into trench.

3.2 TRENCH BOTTOM

A. Firm Subgrade: Grade with hand tools, remove loose and disturbed material, and trim off high areas and ridges left by excavating bucket teeth. Allow space for bedding material if shown or specified.

B. Soft Subgrade: If it is encountered that it may require removal to prevent pipe settlement, notify Engineer. Engineer will determine the depth of overexcavation, if any, required.

3.3 TRENCH STABILIZATION MATERIAL INSTALLATION

A. Rebuild trench bottom with trench stabilization material.

B. Place material over full width of trench in 6-inch lifts to required grade, providing allowance for bedding thickness.

C. Compact each lift so as to provide a firm, unyielding support for the bedding material prior to placing succeeding lifts.

3.4 BEDDING

A. Furnish imported bedding material where, in the opinion of the Engineer, excavated material unsuitable for bedding or insufficient in quantity.

B. Place over the full width of the prepared trench bottom in two equal lifts when the required depth exceeds 8 inches.

C. Hand grade and compact each lift to provide a firm, unyielding surface.

D. Minimum Thickness:

1. Pipe, 15-inch and Smaller: 4 inches.
2. Pipe, 18-inch to 36 inch: 6 inches.
3. Pipe, 42-inch and Larger: 12 inches.
4. Conduit: 3 inches.
5. Direct-Buried Cable: 3 inches.
6. Duct Banks: 3 inches.

E. Check grade and correct irregularities in bedding material. Loosen top 1 to 2 inches of compacted bedding material with a rake or by other means to provide a cushion before laying each section of pipe, conduit, direct-buried cable, or duct bank.

F. Install to form continuous and uniform support except at bell holes, if applicable, or minor disturbances resulting from removal of lifting tackle.

G. Bell or Coupling Holes: Excavate in bedding at each joint to permit proper assembly and inspection of joint and to provide uniform bearing along barrel of pipe or conduit.

3.5 BACKFILL PIPE ZONE

A. Upper limit of pipe zone shall not be less than following:

1. Pipe: 12 inches above top of pipe, unless shown otherwise.

2. Conduit: 3 inches above top of conduit, unless shown otherwise.
 3. Direct-Buried Cable: 3 inches above top of cable, unless shown otherwise.
 4. Duct Bank: 3 inches above top of duct bank, unless shown otherwise.
- B. Restrain pipe, conduit, cables, and duct banks as necessary to prevent their movement during backfill operations.
- C. Place material simultaneously in lifts on both sides of pipe and, if applicable, between pipes, conduit, cables, and duct banks installed in same trench.
1. Pipes 10 Inches and Smaller Diameter: First lift less than or equal to pipe-diameter.
 2. Pipes Over 10 Inches Diameter: Maximum 6-inch lifts.
- D. Thoroughly tamp each lift, including area under haunches, with handheld tamping bars supplemented by "walking in" and slicing material under haunches with a shovel to ensure that voids are completely filled before placing each succeeding lift.
- E. After the full depth of the pipe zone material has been placed as specified, compact the material by a minimum of three passes with a vibratory plate compactor only over the area between the sides of the pipe and the trench walls.
- F. Do not use power-driven impact compactors to compact pipe zone material.

3.6 MARKING TAPE INSTALLATION

- A. Continuously install marking tape along centerline of all buried piping, at depth of 2 feet. Coordinate with piping installation drawings.
1. Metallic Marking Tape: Install with nonmetallic piping
 2. Plastic Marking Tape: Install with metallic piping.

3.7 BACKFILL ABOVE PIPE ZONE

- A. General:
1. Process excavated material to meet specified gradation requirements.
 2. Adjust moisture content as necessary to obtain specified compaction.
 3. Do not allow backfill to free fall into the trench or allow heavy, sharp pieces of material to be placed as backfill until after at least 2 feet of backfill has been provided over the top of pipe.
 4. Do not use power driven impact type compactors for compaction until at least 4 feet of backfill is placed over top of pipe.
 5. Backfill to grade with proper allowances for topsoil, crushed rock surfacing, and pavement thicknesses, wherever applicable.
 6. Backfill around structures with same class backfill as specified for adjacent trench unless otherwise shown or specified.
- B. Select Excavated Backfill:
1. Place in lifts not exceeding 9-inch thickness.
 2. Mechanically compact each lift to a minimum of 95 percent relative compaction prior to placing succeeding lifts.
- C. Excavated Backfill: Backfill trench above the pipe zone with granular backfill in lifts not exceeding 8 inches. Compact each lift to a minimum of 95 percent relative compaction prior to placing succeeding lifts.
- D. Concrete Backfill:
1. Place above bedding.

2. Minimum Concrete Thickness: 6 inches on top and sides of pipe.
3. Do not allow dirt or foreign material to become mixed with concrete during placement.
4. Allow sufficient time for concrete to reach initial set before additional backfill material is placed in trench.
5. Prevent flotation of pipe.
6. Begin and end concrete backfill within 4 inches of a pipe joint on each end.
7. Do not encase pipe joints except within the limits of the concrete backfill.

E. Controlled Low Strength Fill:

1. Discharge from truck mounted drum type mixer into trench.
2. Place in lifts as necessary to prevent uplift (flotation) of new and existing facilities.

3.8 REPLACEMENT OF TOPSOIL

- A. Replace topsoil in top 6 inches of backfilled trench.
- B. Maintain the finished grade of topsoil even with adjacent area and grade as necessary to restore drainage.

3.9 MAINTENANCE OF TRENCH BACKFILL

- A. After each section of trench is backfilled, maintain the surface of the backfilled trench even with the adjacent ground surface until final surface restoration is completed.
- B. Gravel Surfacing Rock: Add gravel surfacing rock where applicable and as necessary to keep the surface of the backfilled trench even with the adjacent ground surface, and grade and compact as necessary to keep the surface of backfilled trenches smooth, free from ruts and potholes, and suitable for normal traffic flow.
- C. Topsoil: Add topsoil where applicable and as necessary to maintain the surface of the backfilled trench level with the adjacent ground surface.
- D. Asphaltic Pavement: Replace settled areas or fill with asphalt as specified in Section 32 12 16, ASPHALT CONCRETE PAVEMENT.
- E. Other Areas: Add excavated material where applicable and keep the surface of the backfilled trench level with the adjacent ground surface.

3.10 SETTLEMENT OF BACKFILL

- A. Settlement of trench backfill, or of fill or facilities constructed over trench backfill, will be considered a result of defective compaction of trench backfill.

END OF SECTION

SECTION 31 23 23.19 – TRENCH BEDDING AND BACKFILL FOR WATER AND SEWER LINES

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes materials and work required for placing bedding and backfilling of water and sewer pipelines and appurtenances.
- B. Related sections:
 - 1. Section 31 23 16.16 – Trenching for Water and Sewer Lines
 - 2. Section 32 12 16 – Asphalt Concrete Pavement
 - 3. Section 33 39 13.13 – Pre-Cast Concrete Manholes
 - 4. Section 33 41 16 – Ductile Iron Gravity Sewer Pipe and Fittings
 - 5. Section 33 41 19 – Pipe Laying

1.2 GENERAL

- A. General Requirements: See Division 01, GENERAL REQUIREMENTS, which contains information and requirements that apply to the work specified herein and are mandatory for this project.

1.3 DEFINITIONS

- A. Base Rock: Granular material upon which manhole bases and other structures are placed.
- B. Bedding Material: Granular material which is used as fill material in the pipe zone of the trench.
- C. Backfill Material: Material used to fill pipe trench from the upper surface of the pipe zone to existing grade or bottom of proposed pavement section.
- D. Imported Material: Material obtained by the Contractor from source(s) offsite.
- E. Lift: Loose (uncompacted) layer of material.
- F. Pipe Zone: Backfill zone that includes full trench width and extends from prepared trench bottom to an upper limit above top outside surface of pipe or bedding material.
- G. Prepared Trench Bottom: Graded trench bottom after stabilization and installation of bedding material.
- H. Relative Compaction: The ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by ASTM D698, Corrections for oversize material may be applied to either the as-compacted field dry density or the maximum dry density, as determined by the Engineer.
- I. Relative Density: As defined by ASTM D4253 and ASTM D4254.
- J. Selected Backfill Material: Material available that the Engineer determines to be suitable for a specific use.
- K. Well-Graded: A mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes producing a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids. Well-Graded does not define any

numerical value that must be placed on the coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.

1.4 SUBMITTALS

- A. Quality Control Submittals
 - 1. Catalog and manufacturer's data sheets for compaction equipment.
 - 2. Certified test results from independent testing agency.
 - 3. Certified Gradation Analysis: Submit not less than 30 days prior to delivery for imported materials or anticipated use for excavated materials, except for trench stabilization material that will be submitted prior to material delivery to site.

1.5 QUALITY ASSURANCE

- A. Notify Engineer when:
 - 1. Soft or loose subgrade materials are encountered wherever pipe bedding is to be placed.
 - 2. Fill material appears to be deviating from Specifications.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Backfill materials shall be obtained from excavated materials or approved borrow sources.
- B. Backfill material shall be free of trash, debris, cinders, organic matter or other deleterious materials.
- C. All backfill materials shall be subject to the Engineer's approval.

2.2 TRENCH STABILIZATION MATERIAL

- A. Clean, hard, durable 3-inch minus crushed rock gravel, or pit run, free from clay balls, other organic materials, or debris.
- B. Uniformly graded from coarse to fine, less than 8 percent by weight passing the 1/4-inch sieve.

2.3 BEDDING MATERIAL AND PIPE ZONE MATERIAL

- A. Unfrozen, friable, and no clay balls, roots, or other organic material.
- B. Pipe bedding shall be in accordance with ASTM D2321, Class IA, manufactured aggregates, open-graded, clean, non-plastic. The gradation shall be as follows:

ASTM D2321, Class IA	
Sieve Size	Percent Passing
1 ½ in.	100
No. 4	≤10%
No. 200	<5%

- C. Alternative bedding materials may be considered at the discretion of the Engineer. Alternate bedding materials shall be crushed rock classified as GP as specified in ASTM D2487 with 15% sand or less, a maximum of 25% passing 3/8-inch sieve, and a maximum of 5% fines.

2.4 TRENCH BACKFILL - GENERAL

- A. Excavated material from required excavations, free from rocks larger than 3 inches, from roots and other organic matter, ashes, cinders, trash, debris, and other deleterious materials.

2.5 TRENCH BACKFILL – GRANULAR

- A. Granular backfill shall be placed under all existing or proposed driving surfaces and/or as specified on the Plans.
- B. Granular backfill shall be Type A, Grade 3 or better crushed limestone base material meeting all the requirements of Item 247 of the Texas Department of Transportation Standard Specifications.

2.6 TOPSOIL

- A. Topsoil removed and stockpiled from onsite excavation.
- B. Should the Contractor dispose of existing topsoil the Contractor shall acquire and place topsoil to a minimum 6-inch depth at no additional cost to the Owner.

PART 3 - EXECUTION

3.1 GENERAL

- A. All bedding material shall be placed in accordance with Section 31 23 16.16, TRENCHING FOR WATER AND SEWER LINES and Section 33 41 19, PIPE LAYING.
- B. Process excavated material to meet specified gradation requirements.
- C. Adjust moisture content as necessary to obtain specified compaction.
- D. Do not allow backfill to free fall into the trench or allow heavy, sharp pieces of material to be placed as backfill until after at least 2 feet of backfill has been provided over the top of pipe.
- E. Do not use power driven impact type compactors for compaction until at least 4 feet of backfill is placed over top of pipe.
- F. Backfill to grade with proper allowances for topsoil, crushed rock surfacing, and pavement thicknesses, wherever applicable.
- G. Backfill around structures with same class backfill as specified for adjacent trench unless otherwise shown or specified.

3.2 TRENCH BACKFILL-GENERAL

- A. Trench backfill shall be placed in in lift not exceeding 9-inch thickness.
- B. Each lift shall be mechanically compacted to a minimum of 95 percent relative compaction prior to placing succeeding lifts.

3.3 TRENCH BACKFILL-GRANULAR

- A. Granular backfill shall be used under all existing or prosed driving surfaces and at locations specified on the Plans.

- B. Granular backfill shall be placed in lifts not exceeding 8-inch thickness.
- C. Each lift shall be mechanically compacted to 95 percent relative compaction prior to placing succeeding lifts.

3.4 REPLACEMENT OF TOPSOIL

- A. Replace topsoil in top 6 inches of backfilled trench.
- B. Maintain the finished grade of topsoil even with adjacent area and grade as necessary to restore drainage.

3.5 MAINTENANCE OF TRENCH BACKFILL

- A. After each section of trench is backfilled, maintain the surface of the backfilled trench even with the adjacent ground surface until final surface restoration is completed.
- B. Gravel Surfacing Rock: Add gravel surfacing rock where applicable and as necessary to keep the surface of the backfilled trench even with the adjacent ground surface, and grade and compact as necessary to keep the surface of backfilled trenches smooth, free from ruts and potholes, and suitable for normal traffic flow.
- C. Topsoil: Add topsoil where applicable and as necessary to maintain the surface of the backfilled trench level with the adjacent ground surface.
- D. Asphaltic Pavement: Replace settled areas or fill with asphalt as specified in Section 32 12 16, ASPHALT CONCRETE PAVEMENT.
- E. Other Areas: Add excavated material where applicable and keep the surface of the backfilled trench level with the adjacent ground surface.

3.6 SETTLEMENT OF BACKFILL

- A. Settlement of trench backfill, or of fill or facilities constructed over trench backfill will be considered a result of defective compaction of trench backfill.

END OF SECTION

SECTION 31 50 00 - EXCAVATION SUPPORT SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Work required to install and remove excavation support systems.
- B. Related sections:
 - 1. Section 31 23 23.13 – Fill and Backfill

1.2 SUBMITTALS

- A. Shop Drawings:
 - 1. Excavation support plan.
 - 2. Movement monitoring plan.
- B. Quality Control Submittals: Movement measurement and data and reduced results indicating movement trends.

1.3 QUALITY ASSURANCE

- A. Provide surveys to monitor movements of critical facilities.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

- A. Design, provide, and maintain shoring, sheeting, and bracing as necessary and where shown to support the sides of excavations and to prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed Work.
- B. Minimum areas for shoring, sheeting and bracing are shown on the Drawings. It will be the Contractor's responsibility to determine if areas will require excavation slope retention to protect existing structures and facilities from damage resulting from the Contractor's excavation or excavation methods.
- C. The Contractor will also be responsible for providing shoring, sheeting and bracing of excavations as needed for worker safety and as may be required by federal, state, and local regulations.

3.2 EXCAVATION SUPPORT PLAN

- A. Prepare excavation support plan addressing following topics:
 - 1. Details of shoring, bracing, sloping, or other provisions for worker protection of existing structures or facilities.
 - 2. Design assumptions and calculations.
 - 3. Methods and sequencing of installing excavation support.
 - 4. Proposed locations of stockpiled excavated material.
 - 5. Minimum lateral distance from the crest of slopes for vehicles and stockpiled excavated materials.

3.3 MOVEMENT MONITORING PLAN

- A. Prepare movement monitoring plan addressing following topics:
 - 1. Survey control.
 - 2. Locations of monitoring points (at least one every 50 feet).
 - 3. Plots of data trends.
 - 4. Interval between surveys (not to exceed 5 working days).
- B. Movement monitoring shall be done on every existing structure that is adjacent to the Contractor's excavations.
- C. Results of movement monitoring will be delivered for the Engineer at least once a week.

3.4 REMOVAL OF EXCAVATION SUPPORT

- A. Do not begin to remove excavation support until it can be removed without damage to existing facilities, completed Work, or adjacent property.
- B. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and earth and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils and rock or damaging structures, pavements, facilities, and utilities. Maintain soil wall support as excavation is backfilled.
- C. Fill voids immediately with approved backfill compacted to density specified in Section 31 23 23.13, FILL AND BACKFILL.

END OF SECTION

DIVISION 32
EXTERIOR IMPROVEMENTS

SECTION 32 12 16 - ASPHALT CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Providing and placing Asphalt Concrete Hot Mix (ACHM).
- B. Related sections:
 - 1. Section 31 22 13 – Subgrade Preparation.

1.2 REFERENCE STANDARDS

- A. The following is a list of standards which may be referenced in this section:
 - 1. American Society for Testing and Materials (ASTM):
 - a. ASTM D2950 – Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods.
 - b. ASTM D2041 – Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures.
 - c. ASTM E699 – Standard Practice for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components.

1.3 DEFINITIONS

- A. Combined Aggregate: All mineral constituents of an asphalt concrete mix, including mineral filler and separately sized aggregates.
- B. Standard Specifications: The latest edition, including supplements of the Texas Department of Transportation Standard Specifications for Highway Construction.

1.4 SUBMITTALS

- A. Shop Drawings: Job-mix formula for pavements.
- B. Quality Control Submittals:
 - 1. Manufacturer's Certificate of Compliance for the following materials:
 - a. Aggregate: Gradation.
 - b. Asphalt for Binder: Type and grade.
 - c. Tack Coat: Type and grade of asphalt.
 - d. Mixes: Job-mix formula approved by the Materials Engineer for the State of Texas dated no earlier than January, 2018.
 - 2. Manufacturer's Certificate of Proper Installation.
 - 3. Statement of qualification for independent testing laboratory.
 - 4. Test Results:
 - a. For Each Trial Batch of the Mix Design:
 - Aggregate gradation.
 - Asphalt content.
 - Stability number.
 - Percent air voids.
 - Percent voids in mineral aggregate.
 - Density.

- Retained strength.
- b. Asphalt cement for binder.
- c. Field density.

1.5 QUALIFICATIONS

- A. Independent Testing Laboratory: In accordance with ASTM E699.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Temperature:
 - 1. Do not apply asphalt materials or place asphalt mixes when ground temperature is lower than 50 degrees F, air temperature is lower than 40 degrees F, or application surface is wet.
 - 2. Measure ground and air temperature in shaded areas away from heat sources or wet surfaces.

PART 2 - PRODUCTS

2.1 AGGREGATE

- A. As specified in Section 340.2 of Standard Specification for Dense Graded Hot Mix Asphalt; however, reclaimed material will not be acceptable.

2.2 MINERAL FILLER

- A. As specified in Section 340.2 of Standard Specifications.

2.3 TACK COAT

- A. Emulsified asphalt, CSS-1H, SS-1H or PG-58 minimum conforming to Section 340.2 of Standard Specifications.

2.4 BLOTTER MATERIAL

- A. As specified in Section 340 of Standard Specifications.

2.5 ASPHALT CONCRETE MIXTURE

- A. Surface Course: As specified in Section 300.2 of Standard Specifications.
- B. Base Course: As specified in Section 300.2 of Standard Specifications.

2.6 ASPHALT CEMENT

- A. Surface Course: As specified in Section 300.2 of Standard Specifications.
- B. Base Course: As specified in Section 300.2 of Standard Specifications.

2.7 SOURCE QUALITY CONTROL

- A. Tests: Furnish services of independent testing laboratory to conduct tests.
 - 1. Job-Mix Formula for Pavements:
 - a. Define gradation for each of the aggregate constituent used in mixture and establish exact proportion of each constituent to produce a gradation of aggregate within specified limits.
 - b. Bulk specific gravity for each aggregate constituent.
 - c. Measured maximum specific gravity of mix at optimum asphalt content determined in accordance with ASTM D2041.
 - d. Properties as stated in Standard Specifications, Section 340, for at least four different asphalt contents other than optimum, two below optimum, and two above optimum.
 - e. Percent of asphalt lost due to absorption by aggregate.
 - f. After each job-mix formula is established, the combined aggregate grading of respective mixture furnished to the Project shall meet tolerances specified in Section 340 of Standard Specifications.

PART 3 - EXECUTION

3.1 GENERAL

- A. Application Equipment: In accordance with Section 320 of Standard Specifications.
- B. Roadways: Construct to lines, grades, and cross-sections shown.
- C. Traffic Control: Minimize inconvenience to traffic, but keep vehicles off freshly treated or paved surfaces to avoid pickup and tracking of asphalt. Maintain at least one-way traffic at all times.
- D. Traffic Control: Contractor shall be solely responsible for traffic control and for meeting all federal, state, and local requirements for such.

3.2 CONTROL OF LINE AND GRADE

- A. Provide and maintain intermediate control of the underlying base to meet finish surface grades and minimum thickness.

3.3 SURFACE PREPARATION FOR ASPHALT OVER EXISTING GRAVEL ROAD

- A. Blade or otherwise work existing surface as necessary to achieve a smooth and thoroughly compacted surface.
- B. Surface Depressions: Fill with base course, and thoroughly compact.

3.4 TACK COAT

- A. Do not apply more tack coat than necessary for the day's paving operation.
- B. Application: Apply tack coat uniformly to clean dry surfaces. Avoid overlapping of applications. Touch up missed or lightly coated surfaces and remove excess tack coat.

- C. Application Rate: Minimum 0.05-gallon to maximum 0.15-gallon of asphalt (residual if diluted emulsified asphalt) per square yard of surface area. Apply at rate, within range specified, sufficient to assure good bonding, but not too heavy that surplus asphalt flushes into asphalt concrete being placed.

3.5 ASPHALT CONCRETE PAVEMENT PLACEMENT

- A. Lay asphalt concrete over prepared base in a single lift to a total compacted thickness as shown on Plans.
- B. Collect and dispose of segregated aggregate from raking process. Do not scatter material over finished surface.

3.6 CONNECTIONS WITH EXISTING FACILITIES

- A. Where asphalt concrete pavement connects to an existing roadway surface, bridge, railway crossing, or other facility, modify existing roadway profile to produce a smooth riding connection to existing facility.
- B. Modifying Existing Surfaces: Sawcut existing paved surfaces to provide meet lines and surfaces. Allow for sufficient depth of removal to reinstall a minimum thickness of 1-inch of asphalt concrete.
 - 1. Meet Lines: Lines straight and edges vertical.
 - 2. Edges of Meet Line Cuts: Paint with tack coat prior to placing pavement.
 - 3. Sealing Meet Line: After placement of pavement, by painting with liquid asphalt or emulsified asphalt, cover immediately with clean, dry sand.
- C. Paint edges of contact surfaces (curbs, manhole frames), before laying pavement, with tack coat or paving asphalt cement to provide watertight joints. Do not stain adjacent surfaces not intended to be coated.

3.7 JOINTS

- A. Offset edge of each layer a minimum of 6 inches so joints shall not be directly over those in underlying layer.
- B. Offset longitudinal joints in roadway pavements, so longitudinal joints in wearing layer coincide with pavement centerlines and lane divider lines.
- C. Form transverse joints by cutting back on previous day's run to expose full vertical depth of layer.

3.8 PATCHING

- A. Patch Thickness: 3 inches or thickness of adjacent asphalt concrete, whichever is greater.
- B. Preparation:
 - 1. Remove damaged, broken, or unsound asphalt concrete adjacent to patches. Trim to straight lines exposing smooth, sound, vertical edges.
 - 2. Prepare patch as specified in Section 31 22 13, SUBGRADE PREPARATION.
- C. Construction:
 - 1. Place asphalt concrete mix across full width of patch in layers of equal thickness.

2. Spread and grade asphalt concrete with hand tools or mechanical spreader, depending on size of area to be patched.
 3. Finished surface of patch shall be flush with adjacent surface and match grade, slope, and crown of adjacent surface.
- D. Compaction:
1. Roll patches with power rollers capable of providing compression of 200 to 300 pounds per linear inch. Use hand tampers where rolling is impractical.
 2. Begin rolling top course at edge of patches, lapping adjacent asphalt surface at least 1/2 the roller width. Progress toward center of patch overlapping each preceding track by at least 1/2 the width of roller. Make sufficient passes over entire area to remove roller marks and to produce desired finished surface.
- E. Surface Smoothness of Replaced Pavement: New pavement shall not deviate more than plus 1/4-inch or minus 0 inches when a straightedge is laid across patched area between edges of new pavement and surface of old surfacing.

3.9 COMPACTION

- A. Roll until roller marks are eliminated and a density of 92 percent of measured maximum density determined in accordance with ASTM D2041 and ASTM D2950 is obtained.

3.10 JOINT COMPACTION

- A. Place top or wearing layer as continuously as possible.
- B. Pass roller over unprotected end of freshly laid mixture only when laying of layer is discontinued long enough to permit mixture to become chilled.
- C. Cut back previously compacted mixture when Work is resumed to produce a slightly beveled edge for full thickness of layer.
- D. Cut away waste material and lay new mix against fresh cut.

3.11 TOLERANCES

- A. Conduct measurements for conformity with crown and grade immediately after initial compression. Correct variations immediately by removal or addition of materials and by continuous rolling.
- B. Tolerance Measurements:
1. Completed Surface of Top or Wearing Layer: Uniform texture, smooth, and uniform to crown and grade.
 2. Completed surface shall not vary more than 1/8-inch from lower edge of 10-foot straightedge placed on surface parallel to centerline.
 3. Transverse slope of completed surface shall not vary more than 1/4-inch in 10 feet from the rate of transverse slope shown.
 4. Finished grade shall not vary more than 0.02 feet.
- C. Correct deviations in excess of specified tolerances by addition of asphalt concrete mixture to low places or removal of material from high places.

- D. Wearing surface may be removed and replaced to achieve a satisfactory finish surface, if surface of completed pavement deviates by more than twice the specified tolerances.

3.12 FIELD QUALITY CONTROL

- A. General: Provide services of independent testing laboratory to conduct tests.

END OF SECTION

SECTION 32 91 19 - SODDING, SEEDING, FERTILIZING, AND MULCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Sodding.
 - 2. Fertilizer.
 - 3. Mulch.
 - 4. Seed.
 - 5. Preparation.
 - 6. Maintenance.
- B. Related Sections:
 - 1. Section 31 23 16 – Excavation
 - 2. Section 31 23 23.13 – Fill and Backfill
- C. Alternate Methods and Products:
 - 1. Alternate methods from those specified will be considered for use, provided that in the Engineer's opinion the end product will be equal to or exceed that which would result from the specified methods and products.

1.2 DEFINITIONS

- A. Weeds:
 - 1. Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wold Garlic, Perennial Sorrel, and Brome Grass.

1.3 REGULATORY REQUIREMENTS

- A. Comply with regulatory agencies for fertilizer and herbicide composition.

1.4 QUALITY ASSURANCE

- A. Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

1.5 MAINTENANCE DATA

- A. Submit maintenance data for continuing Owner maintenance.
- B. Include maintenance instruction, cutting method, maximum grass height, types, application frequency, and recommended coverage of fertilizer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.
- B. Deliver fertilizer in water proof bags showing weight, chemical analysis, and name of manufacturer.

PART 2 - PRODUCTS

2.1 AGRICULTURAL LIMESTONE

- A. Shall be agricultural limestone with not less than 90 percent passing the No. 4 sieve and containing not less than 40 percent calcium carbonate equivalent. Lime shall be applied at the rate recommended by soil test.

2.2 FERTILIZER

- A. Shall be a standard commercial product which when applied at the proper rate will supply the equivalent quantity of total nitrogen, available phosphoric acid and soluble potash specified. Fertilizer shall be delivered to the site in bags or other suitable containers, each fully labeled, conforming to applicable state fertilizer laws, and bearing the name, trade name or trademark, and warranty of the producer.
- B. Requirements per acre:
 - 1. Six hundred pounds of 17-17-17 grade fertilizer or equivalent.

2.3 MULCH

- A. Shall be vegetative mulch consisting of cereal straw from stalks of oats, rye, wheat or barley. Straw shall be free of prohibited weed seeds as stated in State Seed Law and shall be relatively free of all other noxious and undesirable seeds. Straw shall be clean and bright, relatively free of foreign material and be dry enough to be spread properly.

2.4 SEED

- A. Seed shall be a mixture with the specified minimum purity and germination requirements, as follows:

<u>Seed Type</u>	<u>% Mix (By Wt.)</u>	<u>Purity %</u>	<u>Germination %</u>
Kentucky K-31 Fescue	52	97	85
Creeping Red Fescue	18	85	80
Rye Grass	8	98	85
Rye Grain	22	-	-

Variation in the above mix to suit local conditions or time of year may be required.

- B. Seed shall be labeled in accordance with USDA regulations. Care shall be taken during transportation to avoid segregation of seed mixtures.
- C. Seed shall be sown at a rate of 217 pounds of seed mix per acre for drill seeding. Seed mixture shall be thoroughly mixed prior to application.

2.5 SODDING

- A. Sodding shall consist of furnishing, and placing sod at all locations shown on the Plans, where directed by the Engineer, and in conformity with these Specifications. Sod shall consist of a live, dense, well-rooted growth of permanent grasses, free of weeds and weedy grasses. All sod shall be cleanly cut in strips having a reasonably uniform thickness of not less than 1 inch, a reasonable uniform width of not less than 8 inches, and a length not less than 12 inches. Sod shall be Kentucky 31 Fescue, Bluegrass, or Bermuda grass. It shall be the obligation of the Contractor to secure a satisfactory growth of grass before final acceptance of the project.

PART 3 - EXECUTION

3.1 GENERAL

- A. The application of fertilizer, seed, and mulch shall follow each other in successive sequence as closely as possible. Seeding shall be accomplished in the first of the following two periods after completion of earthwork.
 - February 15 to May 1st
 - September 1st to October 1st
- B. Seeding outside the specified seeding periods may be permitted at the Engineer's option, provided the Contractor is willing to make appropriate modifications to his seeding operations, and will guarantee the crop.

3.2 INSPECTION

- A. Contractor must request that Engineer inspect site grading, clean-up and surface preparation to determine if site is ready for the seeding, fertilizing and mulching operations.
- B. Upon Engineer's approval operations may begin.

3.3 SURFACE PREPARATION

- A. Immediately in advance of fertilizing, the surface to be seeded shall be repaired, if necessary, to eliminate all damage from erosion or construction operations. The surface shall then be loosened and thoroughly pulverized by discing, harrowing and raking or other approved methods, to such an extent that it is free from sod, stones, clods, or roots. All growth of vegetation that will seriously interfere with planting operations shall be removed and disposed of as directed. The final surface shall be smooth and uniform, and left in such a condition as to prevent formation of low places and pockets.

3.4 FERTILIZING

- A. Fertilizer and lime shall be dressed evenly over the areas to be seeded using approved mechanical type spreading equipment.
- B. Fertilizer and lime after spreading shall be immediately incorporated into the soil to a depth of approximately 2 inches, by chisel, spike tooth harrow, or other approved methods.

3.5 SEEDING METHODS

- A. General methods:
 - 1. The Contractor shall employ a satisfactory method of sowing by use of either approved mechanical hand seeders or mechanical power-driven drills. When delays in operation carry the work beyond the specified planting seasons, or when conditions are such that by reason of drought, high winds, excessive moisture, or other factors, satisfactory results are not likely to be obtained, seeding shall stop. It will be resumed only where the desired results are probable or when approved alternate procedures have been adopted.
- B. Broadcast seeding:
 - 1. When broadcast seeding is utilized, the seed shall be uniformly broadcast by mechanical hand seeder, in two directions at right-angles to each other and at 1/2 of the specified rate per acre in each direction. After the seed is broadcast it shall be covered by an approved method to a depth of 1/3 inch to 3/4 inch. Broadcast seeding shall not be done in windy weather.

- C. Drill seeding:
 - 1. When drilling is utilized, it shall be done with approved equipment best suited to perform the work under prevailing conditions. The seed shall be uniformly drilled to a depth of one-third (1/3) inch to three-fourths (3/4) inch at the rate per acre specified. Drill seeding may be required in windy weather.
- D. Prior to start of seeding, the Contractor shall demonstrate that the application of seed is being made at the specified rate. A final check of the total quantity of seed used shall be made against the area seeded. If the check shows that the Contractor has not applied seed at the specified rate, he shall uniformly distribute seed at a rate calculated to meet the shortage.
- E. The Contractor shall maintain the seeded areas until all fertilizing, seeding and mulching is complete and the work accepted by the Engineer. Areas damaged from the Contractor's own operations shall be repaired at his expense. After acceptance of the work the Contractor will not be held responsible for erosion due to weather, or conditions not due to the Contractor's own operations or negligence. The Contractor is not required to guarantee a crop, if seeding is done during the specified seeding periods.

3.6 MULCHING

- A. Immediately after seeding, the Contractor shall apply vegetative mulch at a rate between 1-1/2 and 2-1/2 tons per acre to all seeded areas. Quantity of mulch shall be adjusted within the above limits, as directed by the Engineer, to the particular area or slope being mulched. Total application of mulch for the project shall average approximately 2 tons per acre. Mulch shall be applied by mechanical mulch spreaders equipped to eject by means of a constant air stream controlled quantities of the vegetative mulch.
- B. Mulch shall be embedded by a disc type roller having flat serrated discs spaced not more than 10 inches apart, with cleaning scrapers for each disc.
- C. Where indicated, or in areas of the project where soil conditions are not suitable for satisfactory crimping, asphalt emulsion shall be applied with the mulching operation. The normal rate of application shall be 100 gallons per ton of straw; however, this rate may be varied as directed by the Engineer to suit the particular area or slope conditions.
- D. All mulch shall be distributed evenly over the areas to be mulched within 24 hours after the seeding operation. Following the mulching operation, suitable precautions shall be taken to prohibit traffic over mulched areas. Displaced mulch shall be replaced immediately, including repair of the underlying seed bed, if damaged as well.

3.7 MAINTENANCE

- A. The Contractor shall maintain all seeded areas until the grass is properly established (not less than 90 days) until satisfactory development. Maintenance shall be continued until final acceptance of the work.
- B. Maintenance of seeded areas shall include protecting, watering, mowing, fertilizing, and such other work as may be necessary to establish a permanent lawn. The Contractor shall reseed those seeded areas in which a satisfactory growth is not obtained, and shall refill any areas which become eroded prior to final acceptance of the work.
- C. Paved areas shall be kept clean while maintenance operations are in progress.

3.8 REPLACEMENT

- A. The Contractor shall replace all trees, shrubs, and flowers damaged by construction activities in the areas designated on the construction plans. The replacement trees and shrubs shall be equal in size to the damaged or removed specimen.

END OF SECTION

DIVISION 33
UTILITIES

SECTION 33 31 23 – TESTING SANITARY SEWER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the Work necessary to test gravity sewer pipe, force main pipe, manholes and appurtenances.
- B. Related sections:
 - 1. Section 33 39 13.13 – Pre-Cast Concrete Manholes
 - 2. Section 33 34 13 – Ductile Iron Force Main Pipe and Fittings
 - 3. Section 33 41 16 – Ductile Iron Gravity Sewer Pipe and Fittings

1.2 GENERAL

- A. General Requirements: See Division 01, GENERAL REQUIREMENTS, which contains information and requirements that apply to the work specified herein and are mandatory for this project.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

- A. The contractor is responsible for supplying all equipment required to conduct testing and all testing shall be conducted by the Contractor.
- B. All testing shall be conducted in the presence of the Engineer.

3.2 GRAVITY SEWER TESTING

- A. The Contractor shall have the option of verifying water tightness by either air testing or water testing. The Engineer shall have the option to require testing by both methods to verify marginal results.
- B. Gravity Sewers – Air Testing:
 - 1. After gravity sanitary sewer and service pipe have been laid, all newly laid sewer main pipe shall be subject to an air pressure test to determine watertightness from air loss.
 - 2. Test Equipment:
 - a. All necessary equipment to perform the air test in accordance with this specification shall be provided by the Contractor. The test gauge shall have incremental divisions of 0.10 psi and have an accuracy of at least plus or minus 0.04 psi. In no case shall a test gauge be used which has incremental divisions of greater than 0.25 psi. The gauge shall be of sufficient size to determine accuracy.
 - 3. Procedure:
 - a. As each section of sewer is completed between manholes, each section shall be air tested. When practical, house connections in each section shall be completed. Air test shall be low-pressure air test based on the principal of air-pressure loss per time period. Contractor shall prepare a log of testing and submit this to the Engineer as each section is completed and tested. All tests shall be accomplished in the presence of the Engineer.

- b. The test section of the sewer line is plugged at each end. One of the plugs used at the manhole must be tapped and equipped for air inlet connection for filling the line from the air compressor.
- c. All service laterals, stubs and fittings into the sewer test section shall be properly capped or plugged, and carefully braced against the internal pressure to prevent air leakage by slippage and blowouts.
- d. Connect air hose to tapped plug selected for the air inlet. Then connect the other end of the air hose to the portable air control equipment which consists of valves and pressure gauge used.
 - 1) To control air entry rate to the sewer test section, and
 - 2) To monitor the air pressure in the pipe line.More specifically, the air control equipment includes a shutoff valve, pressure regulating valve, pressure reduction valve and a monitoring pressure gauge having a pressure range from 0-5 psi. The gauge shall have minimum divisions of 0.10 psi and an accuracy of 0.04 psi.
- e. Connect another air hose between the air compressor (or other source of compressed air) and the air control equipment. This completes the test equipment set-up. Test operations may commence.
- f. Supply air to the test section slowly, filling the pipe line until a constant pressure of 4.0 psig is maintained. The air pressure must be regulated to prevent the pressure inside the pipe from exceeding 5.0 psig.
- g. When constant pressure of 4.0 psig is reached, throttle the air supply to maintain the internal pressure between 3.5 to 4.0 psig for at least 5 minutes. This time permits the temperature of the entering air to equalize with the temperature of the pipe wall. If leakage is detected at any cap or plug, release the pressure in the line and tighten all leaky caps and plugs.

Then start the test operation again by supplying air. When it is necessary to bleed off the air to tighten or repair a faulty plug, a new five-minute interval must be allowed after the pipeline has been refilled.
- h. After the stabilization period, adjust the air pressure to 3.5 psig and shutoff or disconnect the air supply. Observe the gauge until the air pressure reaches 3.5 psig. At 3.5 psig commence timing with a stop watch which is allowed to run until the line pressure drops to 2.5 psig at which time the stop watch is stopped. The time required, as shown on the stop watch for a pressure loss of 1.0 psig, is used to compute the air loss.
- i. If the time in minutes and seconds for the air pressure to drop from 3.5 to 2.5 psig is greater than that shown in the table for the designated pipe size, the section undergoing test shall have passed and shall be presumed to be free of defects. The test may be discontinued at that time.
- j. If the time in minutes and seconds for the 1.0 psig drop is less than that shown on the table for the designated pipe size, the section of pipe shall not have passed the test; therefore, adequate repairs must be made and the line retested.
- k. Pipe sizes with their respective recommended minimum times, in minutes and seconds, for acceptance by the air test method are as shown below.

Minimum Time For A 1.0 psig Pressure Drop (Min:Secs)										
Distance Between Manholes	Nominal Diameter (inches)									
	8	10	12	15	18	21	24	30	36	42
100'	7:33	9:26	11:20	14:10	17:00	19:50	22:47	35:37	51:17	69:48
150'	7:33	9:26	11:20	14:10	17:00	26:11	34:11	53:25	76:55	104:42
200'	7:33	9:26	11:23	17:48	25:38	34:54	45:34	71:13	102:34	139:37
250'	7:33	9:53	14:14	22:15	32:03	43:38	56:58	89:02	128:12	174:30
300'	7:35	11:52	17:05	26:42	38:27	52:21	68:22	106:50	153:50	209:24
350'	8:51	13:51	19:56	31:09	44:52	61:08	79:46	124:38	179:29	244:19
400'	10:07	15:49	22:47	35:36	51:17	69:48	91:10	142:26	205:07	279:13
450'	11:23	17:48	25:38	40:04	57:41	78:32	102:33	160:15	230:46	314:07
500'	12:39	19:47	28:29	44:31	64:06	87:15	113:57	178:03	256:24	349:01

Times for distances not listed in the table can be obtained by calculating the straight-line ratio between distances given.

- l. For testing of long sections or sections of larger diameter pipes, or both, a timed-pressure drop of 0.5 psig may be used in lieu of a 1.0 psig timed-pressure drop as approved by the Owner or Engineer. If a 0.5 psig pressure drop is used, the appropriate required test time shall be exactly one-half the values shown in the table above.
- m. An air pressure correction is required when the prevailing ground water is above the sewer line being tested. Under this condition, the air test pressure must be increased 0.433 psi for each foot the ground water level is above the invert of the pipe.
- n. Height of ground water above sewer pipe shall be determined by a method approved by the Engineer.
- o. Any leaks in the system shall be repaired immediately upon discovery. Costs for repairing faulty work, including excavating and re-backfilling and for making tests, shall be paid for by the Contractor.
4. Safety Precautions:
 - a. The low pressure air test may be dangerous to personnel if, through lack of understanding or carelessness, a line is over pressurized or plugs are installed improperly. It is extremely important that the various plugs be installed to prevent the sudden expulsion of a poorly inflated plug. As an example of the hazard, a force of 250 pounds is exerted on an 8 inch plug by an internal pressure of 5 psi. Observe the following safety precautions.
 - 1) No one shall be allowed in the manholes during the test or when a plugged pipe is under pressure.
 - 2) Gauges, air piping manifolds, and valves shall be located at the top of the ground.
 - 3) Install and brace all plugs securely.
 - 4) Do not over pressurize the lines.
- C. Gravity Sewers – Water Testing:
 1. Water testing will be by either the infiltration method or by the exfiltration method if approved by the Engineer. Testing for water-tightness shall be made by the Contractor in the presence of the Engineer. The Contractor shall provide all equipment, plugs, bulkheads, fittings, water, etc. needed for the testing. The water used for testing shall be paid for by the Contractor.
 2. The Engineer shall have the right to direct that either the infiltration or the exfiltration water testing be performed based on groundwater conditions at the time.

3. The tests and measurements of the infiltration method shall be as approved by the Engineer. In all cases, the pipeline shall not leak under exterior ground water pressure in excess of 100 gallons per inch of nominal pipe diameter per mile of pipe per 24 hours. Leaks causing any sewer to fail such test shall be repaired until infiltration meets the allowable limit.
4. If, in the opinion of the Engineer, the ground water table at the time of testing is too low to produce dependable infiltration measurement results, the Contractor shall perform the exfiltration method test. The allowable limit shall be as given above including any manholes in the section(s) being tested. Water required for exfiltration test shall be obtained at the Contractor's expense.
5. Where the exfiltration test method is used, the following shall apply:
 - a. The downstream end of the pipe section being tested shall be plugged and the plug shall be braced and blocked securely. No one shall be allowed to enter a manhole where a plugged pipe is under pressure. Any other pipe entrances to the upstream manhole shall likewise be securely plugged.
 - b. Only water from a source approved by the Engineer shall be used to perform the test. Waste water shall not be used to perform exfiltration testing.
 - c. Water shall be added through the upstream manhole of the line section being tested to a depth of 2.0 feet above the inside top of the outgoing pipe (or 2.0' above the ground water level - see d. below). The water shall be maintained at this level for 24 hours prior to beginning the exfiltration test measurement.
 - d. There shall be a minimum of 2.0' positive head above the inside top of the pipe at the high end of the section being tested. This means, if the ground water in the trench is at (or above) the top of the pipe, then the manhole shall be filled to a point at least 2.0' above the ground water level.
 - e. The test shall be conducted for two hours. The leakage shall be determined by the calculated change in total volume of water used in the test.

3.3 PIPE DEFLECTION TESTING

- A. General
 1. All PVC, FRP, and Ductile Iron gravity sewer lines shall be mandrel tested in accordance with these specifications prior to acceptance.
- B. Allowable Deflection:
 1. The maximum allowable pipe deflection shall not exceed 5 percent of the inside diameter.
- C. Mandrel:
 1. The mandrel shall be hand-pulled by the Contractor through all PVC, FRP, and Ductile Iron gravity sewer lines no earlier than 30 days after the trench has been completely backfilled. Any sections of the sewer not passing the mandrel shall be uncovered and the Contractor shall rebed, reround, or replace the sewer to the satisfaction of the Engineer. Any repaired section shall be retested after a sufficient time has elapsed to ensure that trench settlement has stopped. This retest time shall be totally dependent upon method of repair. If the trench has been opened, the retest shall have the same requirements as the original installation. If the pipe has been rerounded, retest shall not occur sooner than seven days after rerounding.
 2. The mandrel (go/no-go) device shall be cylindrical in shape and constructed with either 9 or 16 evenly spaced arms or prongs. Mandrels with fewer arms will be rejected as not sufficiently accurate. The contact length of the mandrel's arms shall equal or exceed the nominal diameter of the sewer to be inspected. Critical mandrel dimensions shall carry a tolerance of plus or minus 0.01 inch. The mandrel and all necessary equipment for the mandrel test shall be provided by the Contractor.
 3. The Owner reserves the right to mandrel test any PVC, FRP, or Ductile Iron sewer pipe before acceptance, and also prior to expiration of the first year of operation. If a previously

accepted line fails a mandrel test performed during the first year of operation, the defects must be corrected at the Contractor's expense.

3.4 INSPECTION OF SERVICE LINES

- A. All building sewer lines shall be installed and tested in accordance with all state, regional, and local plumbing codes.
- B. All building sewer installations shall be inspected and approved by an authorized local governing agency inspector.
- C. Backfill may only be placed on the completed portions of a building sewer following inspection. No approval certificate shall be issued until all portions of a building sewer from the main connection to the building foundation have been inspected and approved by an authorized inspector. At the time of inspection, the pipe should be in place in the trench and "safed-up", but the top half of the pipe barrel exposed. No approval will be given for building sewers all or a portion of which are covered at the time of inspection.
- D. All building sewers are subject to testing to insure water tightness. All tests must be performed in the presence of the Engineer. Tests may be either by:
 - 1. Water Loss Test Procedure; or,
 - 2. Low Pressure Air Loss Procedure.
- E. If, in the opinion of the Engineer, the line in question is properly installed and free from open joints and breaks, building sewers constructed entirely of cast iron soil pipe may be connected to the sewer without testing.
- F. Water Loss Test Procedure
 - 1. Plug the section of line to be tested at the lower end and fill section with water so that at least four (4) feet of head is obtained.
 - 2. The maximum acceptable water loss while so filled is not more than 100 gallons per twenty-four hours per inch of pipe diameter per mile of pipe. This is approximately 3/16 gallon for a one hundred (100) foot long section of four (4) inch pipe tested thirty minutes.
- G. Low Pressure Air Loss Procedure
 - 1. Plug securely both ends of the line to be tested.
 - 2. Charge the line with air to a pressure of 4.5 psig.
 - 3. Allow at least five minutes for the temperature in the pipe to stabilize.
 - 4. Measure the time required for a one (1.0) psi drop in pressure.
 - 5. The minimum time for a one psi loss is $28.5 \times d$ seconds where d = the nominal diameter in inches of the pipe being tested.

3.5 MANHOLE TESTING

- A. Testing, Observations and Guarantee Period:
 - 1. The testing required shall be performed by the Contractor at all manholes and documented to the satisfaction of the Engineer.
 - 2. Testing shall not be performed on a specific manhole until all work has been completed for that specific manhole.
 - 3. Any manholes that are observed to be leaking by the Engineer shall be subject to additional repairs and retested by the Contractor at no additional cost to the Owner.
- B. Inflow Testing:
 - 1. All rehabilitated manholes and new manholes shall be dye tested. Manholes shall be dye water tested in the presence of the Engineer. The dye test shall consist of applying a

concentrated dye solution around the manhole frame. Dyed water shall be applied for at least ten (10) minutes.

2. Manholes observed to be actively leaking will have failed the test and will not be acceptable. Manholes failing the test will require additional rehabilitation by the Contractor at no additional compensation. The manhole shall then be retested as described above until a successful test is made.

C. Vacuum Testing:

1. All new and rehabilitated manholes shall be vacuum tested by the Contractor in the presence of the Engineer for sources of infiltration. Testing will be made during high groundwater conditions, wherever possible.
2. Manholes shall be tested after installation with all connections (existing and/or proposed) in place. Drop-connections and gas sealing connections shall be installed prior to testing. The lines entering the manhole shall be temporarily plugged with the plugs braced to prevent them from being drawn into the manhole. The plugs shall be installed in the lines beyond drop-connections, gas sealing connections, etc. The test head shall be placed inside the frame at the top of the manhole and inflated in accordance with the manufacturer's recommendations. Plate type test heads that rest on top of the frame are also acceptable. A vacuum of 10 inches of mercury shall be drawn, and the vacuum pump will be turned off. With the valve closed, the level of vacuum shall be read after the required test time. If the drop in the level is less than 1-inch of mercury (final vacuum greater than 9 inches of mercury), the manhole will have passed the vacuum test. After a successful test, the temporary plugs will be removed. The required test time is determined from the table below.

Minimum Time Required for a Vacuum Drop of 1" H _g (10"H _g - 9"H _g) (min:sec)				
Depth of Manhole (ft.)	Manhole Inside Diameter (inches)			
	48"	60"	72"	96"
8'	:20	:26	:32	:45
10'	:25	:33	:40	1:00
12'	:30	:39	:48	1:07
14'	:35	:46	:57	1:18
16'	:40	:52	1:05	1:29
18'	:45	:59	1:13	1:40
20'	:50	1:05	1:21	1:52
22'	:55	1:12	1:29	2:03
24'	:60	1:19	1:37	2:14
26'	1:05	1:25	1:45	2:25
28'	1:10	1:32	1:53	2:36
30'	1:15	1:38	1:01	2:47
Add for each Additional 2'	:05	:07	:08	:11

3. Manhole vacuum levels observed to drop greater than 1-inch of mercury (Final vacuum less than 9 inches of mercury) will have failed the test and will require additional rehabilitation. The Contractor shall make the necessary repairs at no additional compensation for only those work items completed by the Contractor. The manhole shall then be retested as described above until a successful test is made.

3.6 PRESSURE TEST FOR FORCE MAINS

- A. Perform hydrostatic leakage tests for force mains by filling the force main with water and increasing the pressure to a testing pressure of 150% of the working pressure with a minimum of 100 psi.
- B. The duration of the leakage test shall be two hours or as specified by the Engineer.
- C. The force main will not be accepted until the actual leakage is equal to or less than the allowable. In addition, all obvious leaks shall be repaired.
- D. The allowable leakage rate per hour for ductile iron, PVC, FRP or concrete pipe shall be calculated by the following formula:

$$L = \frac{ND \times P^{.5}}{7400}$$

L = Allowable Leakage (gallons per hour)

N = Number of Joints in Pipeline Tested

D = Nominal Diameter (inches)

P = Test Pressure (psi)

3.7 SYSTEM COORDINATION

- A. Maintain existing sewer flow through new connecting manholes until new sewer is approved by Engineer.
- B. Reshape manhole bottom to divert sewer flow into new sewer after new sewer is approved by Engineer.
- C. Locate sewer services before completing the first manhole downstream from the sewer service.

END OF SECTION

SECTION 33 34 13 - DUCTILE IRON FORCE MAIN PIPE AND FITTINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes the Work necessary to completely furnish and install Ductile Iron force main pipe and fittings.
- B. Related sections:
 - 1. Section 31 23 16.16 – Trenching for Water and Sewer Lines.
 - 2. Section 31 23 23.19 – Trench Bedding and Backfill for Water and Sewer Lines.
 - 3. Section 33 31 23 – Testing Sanitary Sewer Systems.
 - 4. Section 33 39 13.13 – Pre-Cast Concrete Manholes.
 - 5. Section 33 41 19 – Pipe Laying.

1.2 GENERAL

- A. Like items of ductile iron pipe provided hereinafter shall be the end products of one manufacturer to achieve standardization of appearance, operation, maintenance, and manufacturer's services.
- B. General Requirements: See Division 01, GENERAL REQUIREMENTS, which contains information and requirements that apply to the work specified herein and are mandatory for this project.
- C. All pipe shall be circular and shall be of the sizes shown on the Plans and/or listed in the Unit Price Schedule. All pipe shall be new. Used pipe is prohibited.
- D. At the discretion of the Engineer, all pipe line and materials are subject to inspection and approval at the plant of the manufacturer.
- E. All materials shall equal or exceed the standards specified herein.
- F. During the process of unloading, all pipe materials shall be inspected by the Contractor and any damaged pipe set aside.
- G. After pipe lines are laid, the Contractor shall test for defects and leakage as specified in Section 33 31 23, TESTING SANITARY SEWER SYSTEMS of these specifications.
- H. Inspection of pipe at the manufacturer's plant, at the point of delivery, on the job site, or in place shall not relieve the Contractor of his responsibility and the material may be subject to rejection until final acceptance of the completed project.

1.3 SUBMITTALS

- A. General: Administrative, shop drawings, samples, quality control, and contract closeout submittals shall conform to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES.
- B. In addition to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES, submit the following additional specific information:
 - 1. Quality Control Submittals:
 - a. Pipe size, class, and thickness.
 - b. Special shipping, storage and protection, and handling instructions.
 - c. Test procedures.

- d. Test results, reports, and certifications.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Ductile iron force main pipe shall be provided to conform to materials of construction as specified herein.
- B. All force mains shall be installed with tracer wire as specified in Section 33 41 19, PIPE LAYING.
- C. Weights and Marking:
 - 1. Weights of pipe and fittings shall conform strictly to the requirements of ANSI Specifications. The class designations for the various classes of pipe and fittings shall be cast onto fittings in raised numerals, and cast or stamped on the outside of each joint of pipe. Weights shall be plainly and conspicuously painted in white on the outside of each joint of pipe and each fitting after the exterior coating has hardened.
- D. Certification:
 - 1. The Contractor shall upon request furnish the Engineer with certified reports stating that inspection and specified tests have been made and that the results thereof comply with the applicable ANSI Specifications for each.

2.2 DUCTILE IRON FORCE MAIN PIPE

- A. All pipe and pipe fittings furnished for underground sewer piping shall have either push-on or mechanical type joints.
- B. Flanged DIP and DI fittings shall be used only as indicated on the Plans. Flanged pipe and pipe fittings shall conform to ANSI/AWWA C115/21.15, Class 250 psi. Flanged drilling shall conform to ANSI B16.1, Class 125 flange.
- C. All DIP, 4-inch through 36-inch, shall conform to the requirements of ANSI/AWWA C150/A21.50 (Thickness Design of Ductile-Iron Pipe) and ANSI/AWWA C151/A21.51 (Ductile Iron, Centrifugally-Cast for Water).
- D. Ductile iron pipe for force mains shall have a minimum Pressure Class of 350.
- E. Standard laying lengths shall be 20 feet \pm 1 inch, unless otherwise specified.

2.3 FITTINGS FOR DUCTILE IRON FORCE MAIN

- A. All fittings over 3-inches shall be ductile iron, mechanical joint fittings and shall conform to the requirements of AWWA C153. All fittings shall have a minimum pressure rating of 350 pounds per square inch and shall be lightweight (compact) fittings unless otherwise shown on the Plans.
- B. All fittings shall be furnished with gaskets. MJ fittings shall also be furnished with bolts, nuts, and iron glands. All plugs, caps, tees, and bends deflecting 22-1/2° or more shall be provided with reaction backing.
- C. All casting and mating surfaces shall be smooth and of a workmanlike quality, free from cracks, holes, scale, shrinkage, distortion, grooves, scratches, and other defects. Fittings and other castings may be rejected if found to be unacceptable by the Engineer in accordance with these Specifications.

- D. Joints shall be mechanical joint, shall conform to AWWA C111, and shall be furnished with Mega-lug type retainer glands and gaskets.
- E. Special fittings shall be in accordance with the pipe manufacturer's recommendations and as approved by the Engineer.
- F. All fittings and appurtenances placed on sanitary sewer lines shall meet with the requirements of the type of pipe used and shall be installed in accordance with the manufacturer's recommendations and as approved by the Engineer.
- G. Connections between different kinds of pipe shall be detailed on the Plans and provide self-cleansing sanitary flow and watertight joints and connections.
- H. All fittings shall be fusion-bonded epoxy coated inside and outside in accordance with ANSI/AWWA C116/A21.16.
- I. All valves and fittings (including in-line valves) shall have Megalug style retainer glands or approved equal. Valves, bends, reducers and other hardware near bends shall be positively bolted, all-threaded, or mechanically joined to each other. Bolted includes single and double flanged adapters (such as Foster Adapters or Swivel Adapters) which provide a solid bolted or mechanical joint type connection.

2.4 DUCTILE IRON PIPE JOINTS

- A. Joints shall be mechanical joints (MJ) or push-on type joints which conform to ANSI/AWWA C111/A21.11 (Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings), unless otherwise specified.
- B. Joints shall have the same pressure rating of the pipe or fittings of which they are a part.
- C. All pipe joints other than those specified herein shall be made in strict accordance with the manufacturer's recommendations and as approved.
- D. All joints shall be made watertight in accordance with the latest applicable AWWA and ASTM standards.

2.5 GASKETS FOR DUCTILE IRON JOINTS AND FITTINGS

- A. Gaskets shall be made of vulcanized styrene butadiene rubber (SBR).
- B. Gaskets shall be marked for nominal pipe size, manufacturer, and year of manufacture.
- C. Gaskets shall comply with the requirements of AWWA C111 (Rubber-Gasket joints for Ductile Iron Pressure Pipe and Fittings).

2.6 DUCTILE IRON JOINT AND FITTING LUBRICANT

- A. Lubricant shall be provided by the pipe manufacturer and applied as per the manufacturer's recommendations in accordance with ANSI/AWWA C111/A21.11 (Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings).
- B. Lubricant shall be non-toxic, not support the growth of bacteria and have no deteriorating effects on the gasket or pipe material.
- C. Lubricant containers shall be appropriately identified and labeled with the manufacturer's name.

- D. Each lubricant container shall have printed instructions for usage and joint assembly.

2.7 COATINGS

A. Interior Coatings

1. All ductile iron pipe for force mains shall receive the following interior lining treatment:
 - a. Epoxy Lining
 - 1) All DIP and DI fittings shall be lined with a high-build, multi-component amine-cured novalac epoxy lining, containing at least 20% ceramic quartz pigment, by volume.
 - 2) The lining system shall be Protecto 401 Ceramic Epoxy as manufactured by Vulcan Painters, Inc.
 - 3) The lining Applicator shall have a successful history of applying linings to the interior of DIP.
 - b. Condition of Ductile Iron Prior to Surface Preparation
 - 1) All DIP and DI fittings shall have a high-build protective lining on the interior. All DIP and DI fittings shall be delivered to the application facility without any lining on the interior surface. As removal of old linings may not be possible, the intent of this Specification is that the entire interior of DIP and DI fittings shall not have been lined with any substance prior to the application of the lining specified herein.
 - c. Surface Preparation
 - 1) Prior to abrasive blasting, the entire area to receive the protective compound shall be inspected for oil, grease, and other substances. Any areas where oil, grease, or another substance is detected and can be removed by solvent shall be solvent-cleaned using the guidelines outlined in SSPC-SP-1 (Solvent Cleaning).
 - 2) After the surface has been made free of grease, oil, and other substances, all areas to receive the protective compounds shall be abrasive blasted with sand or grit abrasive media.
 - 3) The entire surface to be lined shall be struck with the blast media so that all rust, loose oxides, and other sources of roughness shall be removed from the surface. If rust reappears before coating, the affected areas must be reblasted.
 - d. Lining
 - 1) Within eight (8) hours after surface preparation, the interior of the pipe shall receive approximately 40 mils dry film thickness of the protective lining.
 - 2) Lining shall not occur if the substrate or ambient temperature is below 40° F.
 - 3) The surface shall be dry and dustfree before lining.
 - 4) The linings shall not be used on the face of any flanged pipe or fitting, unless otherwise specified.
 - 5) All fittings shall be lined with approximately 40 mils of the protective lining. The 40 mils system shall not be applied in the gasket grooves.
 - e. Coating Gasket and End Spigots
 - 1) Due to the tolerances involved, the gasket area and exterior spigot end, up to six (6) inches back from the end of the spigot end, must be coated with 6 mils nominal, 10 mils maximum Protecto Joint Compound, or approved equal.
 - 2) This coating shall be applied by brush to ensure coverage. Care shall be taken so the coating is smooth, without excess buildup in the gasket groove or on the spigot end.
 - 3) All materials for the gasket groove and spigot end shall be applied after the application of the lining.
 - f. Number of Coats
 - 1) The number of coats of lining material applied shall be as recommended by the lining manufacturer. However, in no case shall this material be applied

above the dry thickness per coat recommended by the lining manufacturer in printed literature. The time between coats shall never exceed that time recommended by the lining material manufacturer. No material shall be used for lining which is not indefinitely recoatable without roughening of the surface.

- g. Touchup and Repair
 - 1) Protecto Joint Compound, or approved equal, shall be used for touchup or repair. Procedures for touchup and repair shall be in accordance with manufacturer's recommendations.
- h. Inspection and Certification
 - 1) Inspection
 - a) All DIP and DI fitting linings shall be checked for thickness using a magnetic film thickness gage. The thickness testing shall be as set forth in SSPC-PA-2 (Measurement of Dry Coating Thickness with Magnetic Gages).
 - b) The interior lining of all pipe and fittings shall be tested for pinholes with a nondestructive 2,500 volt test. Any defects shall be repaired prior to shipment.
 - c) Each pipe joint and fitting shall be marked with the date of application of the lining system and the numerical sequence of application on that date.
 - 2) Certification
 - a) The pipe or fitting manufacturer shall supply a certificate attesting that the Applicator met the requirements of these Specifications, the material used was as specified, and the material was applied as required.

B. Exterior Coatings

- 1. All ductile iron pipe shall have an exterior coating as set forth below.
 - a. Factory Primed Pipe
 - 1) Unless otherwise shown on the Plans, all exposed pipe and fittings within the limits of structure walls or exposed pipe and fittings located aboveground shall be delivered to the job site factory-blasted, cleaned, and primed with one (1) coat of Tnemec Series N140 Pota-Pox Plus, or approved equal compatible paint system.
 - b. Bituminous Coating
 - 1) All pipe and fittings indicated for buried service shall have a petroleum asphaltic coating approximately one (1) mil thick factory-applied to the outside of all pipe and fittings. The finished coating shall be continuous, smooth, neither brittle when exposed to the cold nor sticky when exposed to the sun, and shall be strongly adherent to the pipe or fitting. The bituminous coating shall not be applied to the first six (6) inches of the exterior of the spigot ends.

PART 3 - EXECUTION

3.1 GENERAL

- A. All pipe and fittings shall be installed in accordance with these specifications and the Plans.

3.2 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 60 00, PRODUCT REQUIREMENTS.
- B. Delivery of Materials: Products shall be delivered in original, unbroken packages, containers, or bundles bearing the name of the manufacturer.

- C. Storage: Products shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements.

3.3 FIELD QUALITY CONTROL

- A. Contractor shall visually inspect all pipe and fittings upon delivery and set aside and damaged or flawed materials and shall not install any damaged or flawed material.
- B. Contractor shall test for defects and leakage as specified in Section 33 31 23, TESTING SANITARY SEWER SYSTEMS.

3.4 INSTALLATION

- A. Installation shall be as specified in Section 33 41 19, PIPE LAYING.
- B. Pipe trenching shall be as specified in Section 31 23 16.16, TRENCHING FOR WATER AND SEWER LINES.
- C. Pipe bedding and backfill shall be as specified in Section 31 23 23.19, TRENCH BEDDING AND BACKFILL FOR WATER AND SEWER LINES.
- D. Pipe connections to concrete manholes and other concrete structures shall be as specified in Section 33 39 13.13, PRE-CAST CONCRETE MANHOLES.

END OF SECTION

SECTION 33 39 13.13 – PRECAST CONCRETE MANHOLES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Work for the construction of pre-cast manholes. The Contractor shall be responsible for the correct final elevations and slopes of manholes and the proper setting and elevations of manhole rings and covers.
- B. General Requirements:
 - 1. Manholes of different diameters are required on this project. See the Plans for manhole locations and sizes.
 - 2. The top surface of the barrel shall be constructed truly plumb and level, except where located within roadway limits where it shall match existing slopes and grades, and shall have a light broom finish. There shall be no exposed aggregate on the top edge of the barrel.
 - 3. Manholes where the top elevation is greater than 2-feet above adjacent ground shall use frames and covers conforming to Paragraph 2.5 of this specification. Manholes where the top elevation is less than 2-feet above adjacent ground shall use frames and covers conforming to either Paragraph 2.4 or 2.5 of this specification, at the Contractor's discretion.
- C. Related Sections:
 - 1. Section 01 11 00 – Summary of Work
 - 2. Section 03 30 00 – Cast-In-Place Concrete
 - 3. Section 03 60 00 - Grout
 - 4. Section 09 97 26.13 – Interior Coatings
 - 5. Section 09 97 26.23 – Exterior Coatings
 - 6. Section 31 23 16 – Excavation
 - 7. Section 31 22 19 - Grading
 - 8. Section 31 23 23.13 – Fill and Backfill
 - 9. Section 33 31 23 – Testing Sanitary Sewer Systems

1.2 QUALITY ASSURANCE:

- A. Manhole testing is specified in Section 33 31 23, TESTING SANITARY SEWER SYSTEMS.
- B. Concrete testing is specified in Section 03 30 00, CAST-IN-PLACE CONCRETE.

1.3 REFERENCE STANDARDS:

- A. American Society for Testing and Materials (ASTM) latest edition.
 - 1. ASTM A48, Standard Specification for Gray Iron Castings
 - 2. ASTM C361, Standard Specification for Reinforced Concrete Low-Head Pressure Pipe
 - 3. ASTM C443, Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
 - 4. ASTM C478, Standard Specification for Precast Reinforced Concrete Manhole Sections
 - 5. ASTM D1248, Standard Specification for Polyethylene Plastics Extrusion Materials For Wire and Cable

1.4 SUBMITTALS

- A. Section 01 33 00, SUBMITTAL PROCEDURES: Procedures for submittals.

- B. Certificates: Certify that products meet or exceed specified requirements.
- C. Submit design calculations supporting reinforcing, thicknesses, and dimensions proposed for use on this project.

PART 2 - PRODUCTS

2.1 PRE-CAST MANHOLES

- A. Pre-cast manholes shall conform to ASTM C478 – Standard Specifications for Pre-Cast Reinforced Concrete Manhole Sections
- B. The top section shall be an eccentric cone section conforming to ASTM C478.
- C. All manhole joints exposed to soil shall be sealed with an external joint wrap material, six (8) inch minimum width, material shall be Infi-Shield Seal Wrap as manufactured by Sealing Systems Inc. or approved equal. Manhole joints not exposed to soil shall be patched with concrete.
- D. Integral pre-cast floors shall be allowed, subject to the approval of Engineer. Cast-in-place floors shall be allowed.
- E. Inverts may be pre-cast or field formed into the base section of the manhole, but in either case, shall meet the proper sewer line gradient and alignment shown in the Plans.
- F. Precast concrete manhole sections shall not be delivered to the site until the sections are at least ten (10) days old. Two lift holes shall be cast into each cone or riser section for the purpose of handling and placing. The Contractor shall provide and install water plugs into lift holes after laying the sections.
- G. Cutouts in the bottom sections shall be appropriate for the pipe being laid.
 - 1. Bottom sections shall have clear identifying markings to assure their being used in the right locations.
 - 2. Suitable openings for the inlet and outlet pipe shall be cored into the base section (and into the riser sections for drop or "pass-through" manholes).
 - 3. These openings shall be true size, circular and located as needed to maintain the proper sewer gradient for each manhole.
- H. Manufactured pipe-to-manhole connectors shall be installed at each opening to assure a flexible watertight seal of the pipe to the manhole.
 - 1. The connector shall be specifically designed for the pipe material and size being utilized on the project.
 - 2. No adhesives or lubricants shall be employed in the installation of the connector into the manhole.
 - 3. All stainless steel parts of the connector shall be totally non-magnetic Series 304 Stainless except the worm screw for tightening the steel band which shall be Series 305 Stainless. The worm screw shall be torqued by a break-away type torque wrench set for 60 – 70 in/lbs.
 - 4. The connector shall be installed in the manhole so that it shall have a minimum cover of 3-inches of concrete at all points and in strict accordance with the manufacturer's recommendations.
- I. Each manhole shall be made up with as few risers as possible. The joints between risers shall be leak proofed with a mechanical water stop seal as approved by the Engineer and meeting the requirements of ASTM C443 and C361. There shall be a suitable spigot cast into the

tongue of each component to contain the seal. The seal shall consist of a supporting compression section and a thin sliding flap which has been pre-lubricated. When the sections are fitted together, the edge of the bell shall encounter the flap which then slides towards the compression section.

- J. No more than 8 inches of concentric rings shall be allowed to bring the manhole to finished grade.

2.2 INVERTS

- A. Inverts shall be formed as shown on the detail drawings to the grades specified. Manholes with inverts not conforming to these grades may be subject to removal and replacement at the Contractor's expense.
- B. Concrete for inverts shall be Class A as specified in Section 03 30 00, CAST-IN-PLACE CONCRETE.

2.3 STEPS

- A. Manhole steps are not required and will not be accepted.

2.4 NON-BOLTED FRAMES AND COVERS

- A. Frames:
 - 1. Frame material shall be cast iron or ductile iron conforming to ASTM A48, Class 35 or better. The frame shall exhibit a tensile strength of not less than 35,000 psi.
 - 2. Frames for standard manholes shall be Deeter 1266 for non-traffic areas and Deeter 1235-A for traffic areas, or approved equal(s), and shall have 4 - 3/4-inch diameter holes drilled in the bottom flange. The holes shall be centered in the flange and shall be equally spaced 90-degrees apart.
 - 3. Bearing surfaces between the ring and cover shall be machine finished or ground to assure nonrocking fit in any position, and interchangeability.
- B. Covers:
 - 1. The cover shall form a water resistant seal between the frame and manhole cover surface. The cover shall have concealed pick holes and a machined bearing surface on the bottom of the casting. The cover shall conform to ASTM A48, Class 35 or better, for Gray Iron. The cover shall have a tensile strength of 35,000 psi.
 - 2. A typical standard manhole cover design shall be Deeter 1266 for non-traffic areas and Deeter 1235-A for traffic areas, or approved equal(s).
 - 3. Covers shall set flush with the rim of the frame and shall have no larger than a 1/8-inch gap between the frame and cover.
 - 4. Bearing surfaces shall be machine finished.
 - 5. Lids shall have "SANITARY SEWER" cast on the surface.
- C. Watertight Manhole Inserts

This standard covers the furnishing and installation of watertight gasketed manhole inserts in the sanitary sewer collection system.

- 1. Materials (Stainless Steel)
 - a. Stainless steel inserts shall be installed at locations with outfall pipe diameters greater than 15-inches and as directed by the Engineer.
 - b. Stainless steel inserts shall be TETHERLOK stainless steel Rainstopper by Southwestern Packing and Seals, Inc., or approved equivalent.
 - c. Insert shall be constructed of 304 stainless steel

2.5 HINGED MANHOLE FRAMES AND COVERS

- A. Covers and frames shall conform to ASTM A48, Class 35 or better, for Gray Iron or equivalent ISO standard. Contractor shall provide verification of equivalency.
- B. Covers shall be hinged and incorporate a 90-degree blocking system to prevent accidental closure.
- C. Covers shall be one man operable using standard tools.
- D. Frames shall be circular with a 22-inch clear opening.
- E. The frame depth shall not exceed 4-inches, and the flange shall incorporate bedding slots, bolt holes and lifting eyes.
- F. Lids shall be lockable and lock/unlock hardware and tools shall be provided with each lid.
- G. Lids shall have "SANITARY SEWER" cast on the surface.

2.6 COATING

- A. The manhole shall be coated as specified in Section 09 97 26.13, INTERIOR COATINGS and Section 09 97 26.23, EXTERNAL COATINGS.

2.7 MANHOLE FRAME SEALS:

- A. The material for the seals between the frames and concrete shall be a bitumastic gasket material, meeting or exceeding ASTM C990. Bitumastic gasket material shall be Ram-Nek, EZ-STIK, or approved equal.

2.8 PIPE CONNECTIONS

- A. Manufactured pipe-to-manhole connectors shall be installed at each opening to assure a flexible watertight seal of the pipe to the manhole.
- B. The connector shall be capable of a 7-degree pipe deflection after installation without loss of sealing.
- C. The connector shall be manufactured expressly for embedment in the wall of concrete manholes and shall be specifically designed for the pipe material and size being utilized on the project.
- D. No adhesives or lubricants shall be employed in the installation of the connector into the manhole.
- E. All stainless steel parts of the connector shall be totally non-magnetic Series 304 Stainless except the worm screw for tightening the steel band which shall be Series 305 Stainless. The worm screw shall be torqued by a break-away type torque wrench set for 60 – 70 in/lbs.
- F. The connector shall be installed in the manhole so that it shall have a minimum cover of 3-inches of concrete at all points and in strict accordance with the manufacturer's recommendations.

2.9 STRUCTURAL GROUT

- A. Grout proposed for use to adjust manhole rings to critical grades, such as those located in streets or parking lots, shall conform to Section 03 60 00, GROUT.

PART 3 - EXECUTION

3.1 MANHOLE CONSTRUCTION

- A. Excavate to planned depth in accordance with Section 31 23 16, EXCAVATION.
- B. Place and compact 8-inches of Type A aggregate.
- C. Place concrete base.
- D. Place pre-cast manhole in accordance with manufacturer's recommendations, plumb, and to grade.
- E. Plug lifting holes on inside and outside. Grout lift holes on both sides.
- F. Manhole ring may be cast into top section or may be cast-in-place.
- G. Place concrete and form invert.
- H. Bolt manhole frame to manhole as shown in details.
- I. Install exterior manhole coating.
- J. Backfill in accordance with Section 31 23 23.13, FILL AND BACKFILL.
- K. Test manhole in accordance with Section 33 31 23.
- L. Install manhole coating in accordance with Section 09 97 26.13, INTERIOR COATINGS and Section 09 97 26.23, EXTERNAL COATINGS.
- M. Clean the manhole frame of all dirt and debris before placing the manhole insert on the rim. The manhole insert shall be fully seated around the manhole frame rim to retard water from seeping between the cover and the manhole frame rim.

END OF SECTION

SECTION 33 41 16 - DUCTILE IRON GRAVITY SEWER PIPE AND FITTINGS

PART 1 - GENERAL

1.1 WORK OF THIS SECTION

- A. This section includes the Work necessary to completely furnish and install Ductile Iron gravity sewer pipe and fittings.

1.2 RELATED SECTIONS

- A. 31 23 16.16 – Trenching for Water and Sewer Lines
- B. 31 23 23.16 - Trench Backfill
- C. 33 31 23 - Testing Sanitary Sewer Systems
- D. 33 39 13.13 – Pre-Cast Concrete Manholes
- E. 33 41 13 – Pipe Laying

1.3 GENERAL

- A. Like items of ductile iron pipe provided hereinafter shall be the end products of one manufacturer to achieve standardization of appearance, operation, maintenance, and manufacturer's services.
- B. General Requirements: See Division 1, GENERAL REQUIREMENTS, which contains information and requirements that apply to the work specified herein and are mandatory for this project.
- C. All pipe shall be circular and shall be of the sizes shown on the Plans and/or listed in the Unit Price Schedule. All pipe shall be new. Used pipe is prohibited.
- D. At the discretion of the Engineer, all pipe line and materials are subject to inspection and approval at the plant of the manufacturer.
- E. All materials shall equal or exceed the standards specified herein.
- F. During the process of unloading, all pipe materials shall be inspected by the Contractor and any damaged pipe set aside.
- G. After pipe lines are laid, the Contractor shall test for defects and leakage as specified in Section 33 31 23, TESTING SANITARY SEWER SYSTEMS of these specifications.
- H. Inspection of pipe at the manufacturer's plant, at the point of delivery, on the job site, or in place shall not relieve the Contractor of his responsibility and the material may be subject to rejection until final acceptance of the completed project.

1.4 SUBMITTALS

- A. General: Administrative, shop drawings, samples, quality control, and contract closeout submittals shall conform to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES.

- B. In addition to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES, submit the following additional specific information:
 - 1. Quality Control Submittals:
 - a. Pipe size, class, and thickness.
 - b. Special shipping, storage and protection, and handling instructions.
 - c. Test procedures.
 - d. Test results, reports, and certifications.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Ductile iron gravity sewer pipe shall be provided to conform to materials of construction as specified herein.

2.2 DUCTILE IRON GRAVITY SEWER PIPE

- A. All pipe and pipe fittings furnished for underground sewer piping shall have either push-on or mechanical type joints.
- B. Flanged DIP and DI fittings shall be used only as indicated on the Plans. Flanged pipe and pipe fittings shall conform to ANSI/AWWA C115/21.15, Class 250 psi. Flanged drilling shall conform to ANSI B16.1, Class 125 flange.
- C. All DIP, 8 inch through 36 inch, shall conform to the requirements of ANSI/AWWA C150/A21.50 (Thickness Design of Ductile-Iron Pipe) and ASTM A746 (Ductile Iron Gravity Sewer Pipe) or ANSI/AWWA C151/A21.51 (Ductile Iron, Centrifugally-Cast for Water).
- D. The minimum acceptable size of all gravity sewer mains shall be eight (8) inches.
- E. DIP and DI fittings shall be designed by the pipe manufacturer based on laying condition Type 5, with an additional four (4) inches initial backfill above the top of the pipe, as described in ANSI/AWWA C150/A21.50, and the depth of bury as shown on the Plans, plus a single AASHTO H20 truck load.
- F. Pipe shall be designed for a thickness class of no less than Special Class 50. The pipe manufacturer shall check for depth of bury and furnish pipe of a heavier class if needed, in accordance with ANSI/AWWA C150/A21.50.
- G. Standard laying lengths shall be 20 feet \pm 1 inch, unless otherwise specified.

2.3 FITTINGS FOR DUCTILE IRON GRAVITY SEWER

- A. All fittings over 3-inches shall be ductile iron, mechanical joint fittings and shall conform to the requirements of AWWA C153. All fittings shall have a minimum pressure rating of 350 pounds per square inch and shall be lightweight (compact) fittings unless otherwise shown on the Plans.
- B. All fittings shall be furnished with gaskets. MJ fittings shall also be furnished with bolts, nuts, and iron glands. All plugs, caps, tees, and bends deflecting 22-1/2° or more shall be provided with reaction backing.
- C. All casting and mating surfaces shall be smooth and of a workmanlike quality, free from cracks, holes, scale, shrinkage, distortion, grooves, scratches, and other defects. Fittings and other

castings may be rejected if found to be unacceptable by the Engineer in accordance with these Specifications.

- D. A wye shall be installed for each anticipated future connection of sewer service.
- E. Joints shall be mechanical joint, shall conform to AWWA C111, and shall be furnished with Mega-lug type retainer glands and gaskets.
- F. Special fittings shall be in accordance with the pipe manufacturer's recommendations and as approved by the Engineer.
- G. All fittings and appurtenances placed on sanitary sewer lines shall meet with the requirements of the type of pipe used and shall be installed in accordance with the manufacturer's recommendations and as approved by the Engineer.
- H. Connections between different kinds of pipe shall be detailed on the Plans and provide self-cleansing sanitary flow and watertight joints and connections.

2.4 DUCTILE IRON PIPE JOINTS

- A. Joints shall be mechanical joints (MJ) or push-on type joints which conform to ANSI/AWWA C111/A21.11 (Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings), unless otherwise specified.
- B. Joints shall have the same pressure rating of the pipe or fittings of which they are a part.
- C. All pipe joints other than those specified herein shall be made in strict accordance with the manufacturer's recommendations and as approved.
- D. All joints shall be made watertight in accordance with the latest applicable AWWA and ASTM standards.

2.5 GASKETS FOR DUCTILE IRON JOINTS AND FITTINGS

- A. Gaskets shall be made of vulcanized styrene butadiene rubber (SBR).
- B. Gaskets shall be marked for nominal pipe size, manufacturer, and year of manufacture.
- C. Gaskets shall comply with the requirements of AWWA C111 (Rubber-Gasket joints for Ductile Iron Pressure Pipe and Fittings).

2.6 DUCTILE IRON JOINT AND FITTING LUBRICANT

- A. Lubricant shall be provided by the pipe manufacturer and applied as per the manufacturer's recommendations in accordance with ANSI/AWWA C111/A21.11 (Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings).
- B. Lubricant shall be non-toxic, not support the growth of bacteria and have no deteriorating effects on the gasket or pipe material.
- C. Lubricant containers shall be appropriately identified and labeled with the manufacturer's name.
- D. Each lubricant container shall have printed instructions for usage and joint assembly.

2.7 COATINGS

A. Interior Coatings

1. All DIP, fittings, valves, service wyes, and other appurtenances for gravity sewer or force mains shall receive the following interior lining treatment:
 - a. Epoxy Lining
 - 1) All DIP and DI fittings shall be lined with a high-build, multi-component amine-cured novalac epoxy lining, containing at least 20% ceramic quartz pigment, by volume.
 - 2) The lining system shall be Protecto 401 Ceramic Epoxy as manufactured by Vulcan Painters, Inc.
 - 3) The lining Applicator shall have a successful history of applying linings to the interior of DIP.
 - b. Condition of Ductile Iron Prior to Surface Preparation
 - 1) All DIP and DI fittings shall have a high-build protective lining on the interior. All DIP and DI fittings shall be delivered to the application facility without any lining on the interior surface. As removal of old linings may not be possible, the intent of this Specification is that the entire interior of DIP and DI fittings shall not have been lined with any substance prior to the application of the lining specified herein.
 - c. Surface Preparation
 - 1) Prior to abrasive blasting, the entire area to receive the protective compound shall be inspected for oil, grease, and other substances. Any areas where oil, grease, or another substance is detected and can be removed by solvent shall be solvent-cleaned using the guidelines outlined in SSPC-SP-1 (Solvent Cleaning).
 - 2) After the surface has been made free of grease, oil, and other substances, all areas to receive the protective compounds shall be abrasive blasted with sand or grit abrasive media.
 - 3) The entire surface to be lined shall be struck with the blast media so that all rust, loose oxides, and other sources of roughness shall be removed from the surface. If rust reappears before coating, the affected areas must be reblasted.
 - d. Lining
 - 1) Within eight (8) hours after surface preparation, the interior of the pipe shall receive approximately 40 mils dry film thickness of the protective lining.
 - 2) Lining shall not occur if the substrate or ambient temperature is below 40° F.
 - 3) The surface shall be dry and dustfree before lining.
 - 4) The linings shall not be used on the face of any flanged pipe or fitting, unless otherwise specified.
 - 5) All fittings shall be lined with approximately 40 mils of the protective lining. The 40 mils system shall not be applied in the gasket grooves.
 - e. Coating Gasket and End Spigots
 - 1) Due to the tolerances involved, the gasket area and exterior spigot end, up to six (6) inches back from the end of the spigot end, must be coated with 6 mils nominal, 10 mils maximum Protecto Joint Compound, or approved equal.
 - 2) This coating shall be applied by brush to ensure coverage. Care shall be taken so the coating is smooth, without excess buildup in the gasket groove or on the spigot end.
 - 3) All materials for the gasket groove and spigot end shall be applied after the application of the lining.
 - f. Number of Coats

- 1) The number of coats of lining material applied shall be as recommended by the lining manufacturer. However, in no case shall this material be applied above the dry thickness per coat recommended by the lining manufacturer in printed literature. The time between coats shall never exceed that time recommended by the lining material manufacturer. No material shall be used for lining which is not indefinitely recoatable without roughening of the surface.
 - g. Touchup and Repair
 - 1) Protecto Joint Compound, or approved equal, shall be used for touchup or repair. Procedures for touchup and repair shall be in accordance with manufacturer's recommendations.
 - h. Inspection and Certification
 - 1) Inspection
 - a) All DIP and DI fitting linings shall be checked for thickness using a magnetic film thickness gage. The thickness testing shall be as set forth in SSPC-PA-2 (Measurement of Dry Coating Thickness With Magnetic Gages).
 - b) The interior lining of all pipe and fittings shall be tested for pinholes with a nondestructive 2,500 volt test. Any defects shall be repaired prior to shipment.
 - c) Each pipe joint and fitting shall be marked with the date of application of the lining system and the numerical sequence of application on that date.
 - 2) Certification
 - a) The pipe or fitting manufacturer shall supply a certificate attesting that the Applicator met the requirements of these Specifications, the material used was as specified, and the material was applied as required.
- B. Exterior Coatings
1. All DIP and DI fittings shall have an exterior coating as set forth below.
 - a. Factory Primed Pipe
 - 1) Unless otherwise shown on the Plans, all exposed pipe and fittings within the limits of structure walls or exposed pipe and fittings located aboveground shall be delivered to the job site factory-blasted, cleaned, and primed with one (1) coat of Tnemec Series N140 Pota-Pox Plus, or approved equal compatible paint system.
 - b. Bituminous Coating
 - 1) All pipe and fittings indicated for buried service shall have a petroleum asphaltic coating approximately one (1) mil thick factory-applied to the outside of all pipe and fittings. The finished coating shall be continuous, smooth, neither brittle when exposed to the cold nor sticky when exposed to the sun, and shall be strongly adherent to the pipe or fitting. The bituminous coating shall not be applied to the first six (6) inches of the exterior of the spigot ends.

PART 3 - EXECUTION

3.1 GENERAL

- A. All pipe and fittings shall be installed in accordance with these specifications and the Plans.

3.2 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 60 00, PRODUCT REQUIREMENTS.
- B. Delivery of Materials: Products shall be delivered in original, unbroken packages, containers, or bundles bearing the name of the manufacturer.
- C. Storage: Products shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements.

3.3 FIELD QUALITY CONTROL

- A. Contractor shall visually inspect all pipe and fittings upon delivery and set aside and damaged or flawed materials and shall not install any damaged or flawed material.
- B. Contractor shall test for defects and leakage as specified in Section 33 31 23, TESTING SANITARY SEWER SYSTEMS.

3.4 INSTALLATION

- A. Installation shall be as specified in Section 33 41 13, PIPE LAYING.
- B. Pipe trenching shall be as specified in Section 31 23 16.13, TRENCHING FOR WATER AND SEWER LINES.
- C. Pipe bedding and backfill shall be as specified in Section 31 23 23.19, TRENCH BEDDING AND BACKFILL FOR WATER AND SEWER LINES.
- D. Pipe connections to concrete manholes and other concrete structures shall be as specified in Section 33 39 13.13, PRE-CAST CONCRETE MANHOLES

END OF SECTION

SECTION 33 41 19 – PIPE LAYING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: the Work necessary to install gravity sewer, force main pipe, water pipe and appurtenances.
- B. Related sections:
 - 1. Section 01 60 00 – Product Requirements
 - 2. Section 31 23 23.19 – Trench Bedding and Backfill for Water and Sewer Lines
 - 3. Section 33 31 23 – Testing Sanitary Sewer Systems
 - 4. Section 33 39 13.13 – Pre-Cast Concrete Manholes
 - 5. Section 33 34 13 – Ductile Iron Force Main Pipe and Fittings
 - 6. Section 33 41 16 – Ductile Iron Gravity Sewer Pipe and Fittings

1.2 GENERAL

- A. General Requirements: See Division 01, GENERAL REQUIREMENTS, which contains information and requirements that apply to the work specified herein and are mandatory for this project.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All pipe materials shall be as specified on the Plans and conforming to these specifications.

2.2 WARNING TAPE

- A. Non-metallic sanitary sewer marking tape shall be warning tape as manufactured by Rhino Marking and Protection Systems, Harris Industries, Inc., or approved equal.
- B. Tape shall have a minimum thickness of 4 mils and manufactured with heavy metal-free polyethylene tape that is impervious to all known alkalis, acids, chemical reagents, and solvents found in soil. The minimum overall width of the tape shall not be less than 3-inches. Standard rolls shall be 1000' length.
- C. The tape for sewer lines shall be color coded Green and imprinted with the following message: Caution Buried Sewer Line Below.
- D. The tape for water lines shall be color coded Blue and imprinted with the following message: Caution Buried Water Line Below.

2.3 TRACER WIRE

- A. Tracer wire shall be 12-gauge, stranded coated copper for underground burial.
- B. Jacket color shall be GREEN and made of High Density Polyethylene (HDPE) or High Molecular Weight Polyethylene (HMWPE) designed for direct burial.
- C. Connectors shall be used for all splices or repairs. Connectors shall be moisture displacement style as manufactured by 3M DBR, or equal.

- D. A locate or conductivity test shall be performed prior to signing off on the project.

2.4 PIPE BEDDING AND BACKFILL

- A. Shall be in accordance with 31 23 23.19, TRENCH BEDDING AND BACKFILL FOR WATER AND SEWER LINES.

PART 3 - EXECUTION

3.1 GENERAL

- A. All pipe, fittings, bedding, backfill, and all other appurtenances shall be installed in accordance with these specifications and the Plans.

3.2 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 60 00, PRODUCT REQUIREMENTS.
- B. Delivery of Materials: Products shall be delivered in original, unbroken packages, containers, or bundles bearing the name of the manufacturer.
- C. Storage: Products shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements.
- D. Pipe and accessories shall be handled in such a manner that will ensure their condition after installation to be sound and undamaged. Equipment, tools and methods used in unloading, reloading, hauling and laying pipe and fittings shall be such that they are not damaged. Under no circumstances shall loading forks, or other equipment, be inserted into the barrel of the pipe or fitting.
- E. Pipe having pre-molded joint rings shall be handled in such a manner that no weight, including the weight of the pipe itself, will bear on or be supported by the spigot rings at any time. Care shall be taken to avoid dragging the spigot ring on the ground or allowing it to come in contact with gravel, crushed stone, rocks, or other hard objects. Joint rings which have been damaged in any way will not be accepted and shall not be incorporated in the work.

3.3 FIELD QUALITY CONTROL

- A. Provide skilled workmen to insure embedment of pipe.
- B. Contractor shall test for defects and leakage as specified in Section 33 31 23, TESTING SANITARY SEWER SYSTEMS.

3.4 TRACE WIRE

- A. Regardless of pipe material, a trace wire shall be laid on top of the pipe and shall be looped around the pipe at least once every 10-feet and connected to all valves and fittings. At valves, the trace wire shall be brought up into the valve box as indicated in the plans. A tracing test of trace wire will be required prior to final acceptance.

3.5 PIPE DETECTION TAPE

- A. Pipe detection tape shall be provided in all trenches for force main and water line construction. Installation shall be per manufacturer's recommendations and shall be as close as practical to

finished grade while maintaining a required minimum of 18 inches between the detection tape and the top of any pipe.

3.6 LAYING PIPE

- A. Proper means and equipment shall be used for lowering pipe into the trenches.
- B. The Contractor shall have full responsibility for any diversion of drainage and for dewatering trenches.
- C. Recesses for the pipe bells are mandatory and shall be hand excavated so that the entire pipe barrel is uniformly supported by the bedding material.
- D. Pipe shall be protected from lateral displacement by means of pipe embedment material installed as provided in this specification. Under no circumstances shall pipe be laid in water and no pipe shall be laid under unsuitable weather or trench conditions.
- E. When jointed in the trench, the pipe shall form a true and smooth line. Pipe shall not be trimmed except for closures, and pipe not making a good fit shall be removed.
- F. Unless otherwise approved by the Engineer, the laying of pipe shall begin at the lowest point, and the pipe shall be installed so that the spigot ends point in the direction of flow.
- G. Pipe which is a part of a gravity sewer line shall be aligned and constructed to grades as shown on the plans. Lines not conforming to these grades shall be subject to removal and replacement at the Contractor's expense. Force main pipe shall match the horizontal alignment and shall closely match the grades shown on the plans.
- H. Pipe lines or runs intended to be straight shall be laid straight.
- I. During installation, each pipe and fitting shall be inspected for defects. All defective, damaged, or unsound pipe and fittings shall be rejected and removed from the site of the work.
- J. Dependent on type of application, gravity or pressure, place thrust blocking at all pipe fittings, including bends and reducers, as shown on the Plans.
- K. Prior to joining the pipe, the plain ends of the pipe and the bells of the pipe shall be thoroughly cleaned using a soapy water and cloth, removing all foreign materials from the bells, especially the gasket seats. Any burrs or imperfections in that part of the plain end or bell which will be in contact with the gasket shall be removed.
- L. The clean gasket shall be inserted in the bell and a thin film of lubricant shall be applied to the inside surface of the gasket.
- M. The cleaned plain end shall initially be entered in the bell straight. The plain end shall be forced inside the gasket and bell until the limit mark is just visible. The pipe may then be deflected as allowed by the manufacturer.
- N. Lubricants shall be supplied by the pipe manufacturer in sufficient quantities. No substitutes shall be made.
- O. The Contractor shall furnish such jacks, or other devices as are necessary for forcing the pipe into the bell and gasket. Care shall be exercised to avoid damage to the pipe where the pushing device or machine part contacts the pipe. A wood block or suitable pad shall be placed between the pipe and that part of the pushing device which contacts the pipe.

- P. All plain ends that enter a push on bell shall be beveled at 30° for at least one eighth (1/8) inch. All cut pieces or ends of pipe of other classifications shall be so beveled.

3.7 PIPE BEDDING DUCTILE IRON PIPE

- A. Bedding material shall be as specified in Section 31 23 23.19, TRENCH BEDDING AND BACKFILL FOR WATER AND SEWER LINES.
- B. Place 6-inches, minimum, of bedding between excavated trench bottom or stabilized trench bottom and bottom of pipe or fitting. Provide depression in bedding for joints so that barrel of pipe or fitting rests on bedding. Place bedding in 6-inch maximum layers, compacted to 95% standard maximum density, to a minimum total depth of 3/4 (75%) of the outside diameter of the pipe as indicated on the drawings.
- C. Bedding is considered to be an integral part of the pipe installation. Therefore particular care shall be given to insure that bedding is in intimate contact with the pipe in all directions and that no portion of the bedding shall be compacted to less than the specified density, particularly the area below the springline of the pipe.
- D. For areas undercut, whether by Contractor's negligence or by direction of Engineer, provide and place crushed aggregate, compacted to 95% standard maximum density, to bottom elevation of pipe bedding.
- E. When used, the bottom of trench boxes will be above the level of pipe bedding before bedding is compacted. In no case will pipe bedding be compacted against the trench box or before the trench box is raised to allow compaction of bedding.

3.8 TRENCH BACKFILL

- A. Shall be as specified in Section 31 23 23.19, TRENCH BEDDING AND BACKFILL FOR WATER AND SEWER LINES.

3.9 ALIGNMENT AND GRADE

- A. All pipe shall be laid straight between changes in alignment, except as shown on the Plans, and at a uniform grade between changes in grade. All lines shall be laid so that each section between manholes will lamp.

3.10 JOINTING

- A. Boltless gasketed joints: All instructions and recommendations of the pipe manufacturer, relative to gasket installation and other jointing operations, shall be observed and followed by the Contractor. All joint surfaces shall be lubricated as recommended by the manufacturer immediately before the joint is completed.
- B. Mechanical joints: Mechanical joints shall be carefully assembled in accordance with the manufacturer's recommendations. If effective sealing is not obtained, the joint shall be disassembled, thoroughly cleaned and reassembled. Overtightening bolts to compensate for poor installation practice will not be permitted.

3.11 CUTTING PIPE

- A. Cutting of pipe shall be done in a neat manner, without damage to the pipe or to the lining therein. Pipe cuts shall be smooth, straight and at right angles to the pipe axis. All cutting of pipe shall be done with mechanical pipe cutters of an approved type except that in locations

where the use of mechanical cutters would be difficult or impracticable, existing pipe may be cut with diamond point chisels, saws, or other tools which will cut the pipe without damaging impact or shock.

3.12 CLEANING

- A. The interior of all pipe shall be cleaned of all foreign matter before being installed and shall be kept clean until the work has been accepted. All lumps, blisters and excess coating shall be removed from exterior spigot and interior bell surfaces. Such surfaces shall be wire brushed and wiped clean, dry, and free from oil and grease before placing the spigot in the bell. All joint contact surfaces shall be kept clean until the jointing is completed.
- B. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being installed. No debris, tools, clothing, or other materials shall be placed in the pipe.
- C. Whenever pipe laying is stopped, the open end of the line shall be sealed with a watertight plug.

3.13 WATER AND SEWER LINE CROSSINGS

- A. Water and sewer lines crossing one another shall have a minimum 24-inch vertical separation.
- B. In general water lines shall be above sewer lines, however if water line cannot be above sewer line because of cover limitations or other obstructions, the water line may be below the sewer line but either the water or sewer line shall be encased 10 feet either side of the crossing line in steel encasement.
- C. Water lines shall not pass through manholes.

3.14 PARALLEL WATER AND SEWER LINES

- A. Water and sewer line shall have a minimum 10 feet horizontal separation.
- B. Water and sewer lines shall not be installed within the same trench.

3.15 TESTING

- A. Acceptance testing for gravity lines and force mains shall conform to Section 33 31 23, TESTING SANITARY SEWER SYSTEMS.

3.16 CONNECTION OF NEW SEWER PIPELINES TO EXISTING SANITARY SEWERS

- A. Construct, clean, test, and obtain Engineer's approval for pipelines and manholes before connecting new pipeline to the existing sewer.
- B. If, in the opinion of the Engineer, conditions exist which require connection prior to final line acceptance, plug all lines entering the manhole connecting to the existing system until the new system is accepted. In addition, plug the line leaving the first manhole upstream. Never allow water being used to flush the new lines to enter the existing system.
- C. All new pipelines must connect to the existing system at a new or existing manhole. If a new manhole is built over an existing sewer line, do not break out the top of the existing pipe until the new line is accepted. Flexible pipe couplings, as manufactured by Fernco or equal, may be used to connect existing gravity sewer line to new gravity sewer lines as approved by the Engineer.

- D. If a new pipeline is to discharge into an existing manhole, divert the sewage flow around the existing manhole while the tie-in is under construction. Intercept the sewage flow at the existing manhole first upstream from the tie-in construction. Provide suitable pumping equipment and re-routing conduit to pump the sewage around the tie-in construction. Discharge into an appropriate manhole downstream from the construction.
- E. Connection to an existing manhole shall be made by core drilling. A concrete manhole adapter, A-LOK G3 boot system or equal, shall be installed on the sewer pipe, and the annular space grouted.
- F. Connect new pipelines to existing manholes in a neat, workmanlike manner, to ensure a watertight connection.

3.17 TRENCHING

- A. Pipe trenching shall be as specified in DIVISION 31.

3.18 CONNECTIONS TO MANHOLES

- A. Pipe connections to concrete manholes and other concrete structures shall be as specified in Section 33 39 13.13, PRE-CAST CONCRETE MANHOLES

END OF SECTION

DIVISION 40
PROCESS INTEGRATION

SECTION 40 05 00 – PIPING SYSTEMS TESTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Test requirements for piping systems.
- B. Related Sections:
 - 1. Section 01 41 00 – Regulatory Requirements.
 - 2. Section 01 50 00 – Temporary Facilities and Controls.
 - 3. Section 40 23 39 – Process Piping General.

1.2 REFERENCES

- A. National Fuel Gas Code (NFGC):
 - 1. ANSI Z 223.1 or NFPA 54.
- B. American Society of Mechanical Engineers (ASME):
 - 1. B31.8 – Gas Transmission and Distribution Piping Systems.
 - 2. B31.1 – Power Piping.
 - 3. B31.3 – Process Piping.

1.3 TESTING REQUIREMENTS

- A. General Requirements:
 - 1. Testing requirements are stipulated in Laws and Regulations; are included in the Piping Schedule in Section 40 23 39; are specified in the specifications covering the various types of piping; and are specified herein.
 - 2. Requirements in Laws and Regulations supersede other requirements of Contract Documents, except where requirements of Contract Documents are more stringent, including higher test pressures, longer test times, and lower leakage allowances.
 - 3. Test plumbing piping in accordance with Laws and Regulations, the plumbing code, as specified in Section 01 41 00, and UL requirements.
 - 4. Test Natural Gas or Digester Gas Piping:
 - a. For less than 125 pounds per square inch gauge working pressure, test in accordance with mechanical code, as specified in Section 01 41 00, or the National Fuel Gas Code, whichever is more stringent.
 - b. For 125 pounds per square inch gauge or greater working pressure, test per ASME B31.3 or ASME B31.8, whichever is more stringent.
 - 5. When testing with water, the specified test pressure is considered to be the pressure at the highest point of the piping section under test. Lower test pressure as necessary to prevent testing the lowest point above a safe test pressure.
- B. Furnish necessary personnel, materials, and equipment, including bulkheads, restraints, anchors, temporary connections, pumps, water, pressure gauges, and other means and facilities required to perform tests.
- C. Water for Testing, Cleaning, and Disinfecting:
 - 1. Water for testing, cleaning, and disinfecting will be provided as specified in Section 01 50 00.
- D. Pipes to be Tested: Test only those portions of pipes that have been installed as part of this Contract. Test new pipe sections prior to making final connections to existing piping. Furnish and

install test plugs, bulkheads, and restraints required to isolate new pipe sections. Do not use existing valves as test plug or bulkhead.

- E. Unsuccessful Tests:
 - 1. Where tests are not successful, correct defects or remove defective piping and appurtenances and install piping and appurtenances that comply with the specified requirements.
 - 2. Repeat testing until tests are successful.
- F. Test Completion: Drain and leave piping clean after successful testing.
- G. Test Water Disposal: Dispose of testing water at the RPCF Sludge Handling Facility in accordance with requirements of federal, state, county, and city regulations governing disposal of wastes in the location of the Project and disposal site.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 00.
- B. Schedule and Notification of Tests:
 - 1. Submit a list of scheduled piping tests by noon of the working day preceding the date of the scheduled tests.
 - 2. Notification of Readiness to Test: Immediately before testing, notify Engineer in writing of readiness, not just intention, to test piping. Have personnel, materials, and equipment specified in place before submitting notification of readiness.

1.5 SEQUENCE

- A. Clean piping before pressure or leak tests.
- B. Test gravity piping underground, including sanitary sewers, for visible leaks before backfilling and compacting.
- C. Underground pressure piping may be tested before or after backfilling when not indicated or specified otherwise.
- D. Backfill and compact trench or provide blocking that prevents pipe movement before testing underground piping with a maximum leakage allowance.
- E. Test underground piping before encasing piping in concrete or covering piping with slab, structure, or permanent improvement.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 TESTING, ALIGNMENT, GRADE, AND DEFLECTION

- A. Alignment and Grade:
 - 1. Visually inspect the interior of gravity piping with artificial light, reflected light, or laser beam.
 - 2. Consider inspection complete when no broken or collapsed piping, no open or poorly made joints, no grade changes that affect the piping capacity, or no other defects are observed.
- B. Deflection Test:
 - 1. Pull a mandrel through the clean piping section under test.

2. Perform the test not sooner than 30 days after installation and not later than 60 days after installation.
3. Use a 9-rod mandrel with a contact length of not less than the nominal diameter of the pipe within one percent plus or minus.
4. Consider test complete when the mandrel can be pulled through the piping with reasonable effort by 1 person, without the aid of mechanical equipment.

3.2 AIR TESTING METHOD FOR PRESSURE PIPING

- A. Air test piping, indicated with "AM" in the Piping Schedule, with air or another nonflammable or inert gas.
- B. Test gas, air, liquefied petroleum gas, liquid chlorine, and chlorine gas piping by the air test method:
 1. Test chlorine piping with dry air or nitrogen having a dew point of minus 40 degrees Fahrenheit or less. Supply temporary air dryers as necessary.
- C. Test at pressure as specified in Piping Schedule in Section 40 23 39:
 1. Provide temporary pressure relief valve for piping under test. Set at the lesser of 110 percent of the test pressure or 50 pounds per square inch gauge over the test pressure.
 2. Air method test pressures shall not exceed 110 percent of the piping maximum allowable working pressure calculated in accordance with the most stringent of ASME B31.1, ASME B31.3, ASME B31.8, or the pipe manufacturer's stated maximum working pressure.
 3. Gradually increase test pressure to an initial test pressure equal to the lesser of one-half the test pressure or 25 pounds per square inch gauge.
 4. Perform initial check of joints and fittings for leakage.
 5. Gradually increase test pressure in steps no larger than the initial pressure. Check for leakage at each step increase until test pressure reached.
 6. At each step in the pressure, examine and test piping being air tested for leaks with soap solution.
 7. Consider examination complete when piping section under test holds the test pressure for 15 minutes without losses.

3.3 TESTING GRAVITY FLOW PIPING

- A. Test Gravity Flow Piping indicated with "G" in the Piping Schedule, as follows:
 1. Unless specified otherwise, subject gravity flow piping to the following tests:
 - a. Alignment and grade.
 - b. For plastic piping test for deflection.
 - c. Visible leaks and pressure with maximum leakage allowance, except for storm drains and culverts.
 2. Inspect piping for visible leaks before backfilling. Provide temporary restraints when needed to prevent movement of piping. Pressure test piping with maximum leakage allowance after backfilling.
 3. With the lower end plugged, fill piping slowly with water while allowing air to escape from high points. Keep piping full under a slight head for the water at least 24 hours.
 - a. Examine piping for visible leaks. Consider examination complete when no visible leaks are observed.
 - b. Maintain piping with water or allow a new water absorption period of 24 hours for the performance of the pressure test with maximum leakage allowance.
 - c. After successful completion of the test for visible leaks and after the piping has been restrained and backfilled, subject piping to the test pressure for minimum of four hours while accurately measuring the volume of water added to maintain the test pressure.
 - 1). Consider the test complete when leakage is equal to or less than the following maximum leakage allowances:

- a). For Concrete Piping with Rubber Gasket Joints: 80 gallons per day per inch of diameter per mile of piping under test.
 - (1) Advise manufacturer of concrete piping with rubber gasket joints of more stringent than normal maximum leakage allowance.
 - (2) For Vitrified Clay and Other Piping: 500 gallons per day per inch of diameter per mile of piping under test.

3.4 TESTING HIGH-HEAD PRESSURE PIPING

- A. Test piping for which the specified test pressure in the Piping Schedule is 20 pounds per square inch gauge or greater, by the high head pressure test method, indicated "HH" in the Piping Schedule.
- B. General:
 - 1. Test connections, hydrants, valves, blowoffs, and closure pieces with the piping.
 - 2. Do not use installed valves for shutoff when the specified test pressure exceeds the valve's maximum allowable seat differential pressure. Provide blinds or other means to isolate test sections.
 - 3. Do not include valves, equipment or piping specialties in test sections if test pressure exceeds the valve, equipment or piping specialty safe test pressure allowed by the item's manufacturer.
 - 4. During the performance of the tests, test pressure shall not vary more than plus or minus 5 pounds per square inch gauge with respect to the specified test pressure.
 - 5. Select the limits of testing to sections of piping. Select sections that have the same piping material and test pressure.
 - 6. When test results indicate failure of selected sections, limit tests to piping:
 - a. Between valves.
 - b. Between a valve and the end of the piping.
 - c. Less than 500 feet long.
 - 7. Test piping for minimum 2 hours for visible leaks test and minimum 2 hours for the pressure test with maximum leakage allowance.
- C. Testing Procedures:
 - 1. Fill piping section under test slowly with water while venting air. Use potable water for all potable waterlines and where noted on the Piping Schedule.
 - 2. Before pressurizing for the test, retain water in piping under slight pressure for a water absorption period of minimum 24 hours.
 - 3. Raise pressure to the specified test pressure and inspect piping visually for leaks. Consider visible leakage testing complete when no visible leaks are observed.
- D. Pressure Test with Maximum Leakage Allowance:
 - 1. Leakage allowance is zero for piping systems using flanged, National Pipe Thread threaded and welded joints.
 - 2. Pressure test piping after completion of visible leaks test.
 - 3. For piping systems using joint designs other than flanged threaded or welded joints, accurately measure the makeup water necessary to maintain the pressure in the piping section under test during the pressure test period.
 - a. Consider the pressure test to be complete when makeup water added is less than the allowable leakage and no damage to piping and appurtenances has occurred.
 - b. Successful completion of the pressure test with maximum leakage allowance shall have been achieved when the observed leakage during the test period is equal or less than the allowable leakage and no damage to piping and appurtenances has occurred.
 - c. Successful completion of the pressure test with maximum leakage allowance shall have been achieved with the observed leakage during the test period is equal or

less than the allowable leakage and no damage to piping and appurtenances has occurred.

- d. When leakage is allowed, calculate the allowable leakage by the following formula:

$$L = \frac{S D \sqrt{P}}{148,000}$$

Where:

L = testing allowance (makeup water) (gph)

S = length of pipe tested (ft)

D = nominal diameter of the pipe (in.)

P = average test pressure during the hydrostatic test (psi [gauge])

3.5 TESTING LOW-HEAD PRESSURE PIPING

- A. Test piping for which the specified test pressure is less than 20 pounds per square inch gauge, by the low head pressure test method, indicated "LH" in the Piping Schedule.
- B. General:
1. Test pressures shall be as scheduled in Section 40 23 39.
 2. During the performance of the tests, test pressure shall not vary more than plus or minus 2 pounds per square inch gauge with respect to the specified test pressure.
 3. Test connections, blowoffs, vents, closure pieces, and joints into structures, including existing bell rings and other appurtenances, with the piping.
 4. Test piping for minimum 2 hours for visible leaks test and minimum 2 hours for the pressure test with maximum leakage allowance.
- C. Visible Leaks Test:
1. Subject piping under test to the specified pressure measured at the lowest end.
 2. Fill piping section under test slowly with water while venting air. Use potable water for all potable waterlines and where noted on the Piping Schedule.
 3. Before pressurizing for the tests, retain water in piping under slight pressure for the water absorption period of minimum 24 hours.
 4. Raise pressure to the specified test pressure and inspect piping visually for leaks. Consider testing complete when no visible leaks are observed.
- D. Pressure Test with Maximum Leakage Allowance:
1. Pressure test piping after completion of visible leaks test.
 2. Accurately measure the makeup water necessary to maintain the pressure in the piping section under test during the pressure test period.
 - a. Consider the pressure test to be complete when makeup water added is less than the allowable leakage of 80 gallons per inch of nominal diameter, per mile of piping section under test after 24 hours and no damage to piping and appurtenances has occurred.
 - b. Successful completion of the leakage test shall have been achieved when the observed leakage is equal or less than the allowable leakage and no damage to piping and appurtenances has occurred.
- E. Optional Joint Test:
1. When Joint Testing Is Allowed by Note in the Piping Schedule, the Procedure Shall Be as Follows:
 - a. Joint testing will be allowed only for low head pressure piping.
 2. Joint testing may be performed with water or air.
 3. Joint test piping after completion of backfill and compaction to the top of the trench.
 4. Joint Testing with Water:

- a. Measure test pressure at the invert of the pipe. Apply pressure of 4 feet plus the inside diameter of the pipe in water column within 0.20 feet in water column.
 - b. Maintain test pressure for one minute.
 - c. Base the allowable leakage per joint on 80 gallons per inch nominal diameter, per mile of piping, per 24 hours equally distributed to the actual number of joints per mile for the type of piping.
 - d. Consider the pressure test to be complete when makeup water added is less than the allowable leakage.
 - e. Successful completion of the joint test with water shall have been achieved when the observed leakage is equal or less than the allowable leakage.
5. Joint Testing with Air:
- a. Apply test pressure of 3 pounds per square inch gauge with a maximum variation of plus 0.20 and minus 0.00 pounds per square inch.
 - b. Maintain test pressure for 2 minutes.
 - c. Consider the pressure test to be complete when the test pressure does not drop below 2.7 pounds per square inch for the duration of the test.

END OF SECTION

SECTION 40 23 39 - PROCESS PIPING - GENERAL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Basic Process Piping Materials, Methods, and Appurtenances.
- B. Related sections:
 - 1. Section 01 60 00 – Product Requirements.
 - 2. Section 03 30 00 – Cast-In-Place Concrete.
 - 3. Section 09 90 00 – Painting and Protective Coatings.
 - 4. Section 22 05 29 – Process Supports and Anchors.
 - 5. Section 22 05 53 – Mechanical Identification.
 - 6. Section 31 23 23.16 – Trench Backfill.
 - 7. Section 40 24 00 – Process Piping Specialties.

1.2 REFERENCES

- A. The following is a list of standards which may be referenced in this Section and any supplemental Data Sheets:
 - 1. American Association of State Highway and Transportation Officials (AASHTO): Standard Specifications for Highway Bridges.
 - 2. American National Standards Institute (ANSI):
 - a. A21.52, Ductile Iron Pipe, Centrifugally Cast, for Gas.
 - b. B1.20.1, Pipe Threads, General Purpose (Inch).
 - c. B16.1, Cast Iron Pipe Flanges and Flanged Fittings.
 - d. B16.3, Malleable Iron Threaded Fittings.
 - e. B16.5, Pipe Flanges and Flanged Fittings.
 - f. B16.9, Factory-Made Wrought Steel Butt welding Fittings.
 - g. B16.11, Forged Fittings, Socket-Welding and Threaded.
 - h. B16.15, Cast Bronze Threaded Fittings, Classes 125 and 250.
 - i. B16.21, Nonmetallic Flat Gaskets for Pipe Flanges.
 - j. B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
 - k. B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings Class 150,300,400,600,900, 1500 and 2500.
 - l. B16.25, Butt Welding Ends.
 - m. B16.42, Ductile Iron Pipe Flanges and Flanged Fittings, Classes 150 and 300.
 - 3. American Petroleum Institute (API): 5L, Specification for Line Pipe.
 - 4. American Society of Mechanical Engineers (ASME):
 - a. Boiler and Pressure Vessel Code, Section VITI, Division 1, Pressure Vessels.
 - b. Boiler and Pressure Vessel Code, Section IX, Welding and Brazing Qualifications.
 - c. B31.1, Power Piping.
 - d. B31.3, Chemical Plant and Petroleum Refinery Piping.
 - e. B31.9, Building Services Piping.
 - f. B36.10M, Welded and Seamless Wrought Steel Pipe.
 - 5. American Society for Nondestructive Testing (ASNT): SNT-TC-1A, Recommended Practice for Nondestructive Testing Personnel Qualifications.
 - 6. American Society for Testing and Materials (ASTM):
 - a. A47, Standard Specification for Ferritic Malleable Iron Castings.
 - b. A53 Rev A, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - c. A105/A105M, Standard Specification for Forgings, Carbon Steel, for Piping Components.
 - d. A106, Standard Specification for Seamless Carbon Steel Pipe for High Temperature Service.

- e. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
- f. A135, Standard Specification for Electric-Resistance-Welded Steel Pipe.
- g. A139 Rev A, Standard Specification for Electric-Fusion (Arc) -Welded Steel Pipe (NPS 4 and Over).
- h. A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- i. A181/A181M Rev A, Standard Specification for Forgings, Carbon Steel, for General-Purpose Piping.
- j. A182/A182M Rev C, Standard Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
- k. A183, Standard Specification for Carbon Steel Track Bolts and Nuts.
- l. A193/A193M Rev A, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
- m. A194/A194M, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service.
- n. A197, Standard Specification for Cupola Malleable Iron.
- o. A216/A216M, Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High Temperature Service.
- p. A234/A234M, Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.
- q. A240, Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels.
- r. A276, Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
- s. A283/A283M Rev A, Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
- t. A285/A285M, Standard Specification for Pressure Vessel Plates, Carbon Steel, Low and Intermediate Tensile Strength.
- u. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
- v. A312/A312M, Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipes.
- w. A320/A320M, Standard Specification for Alloy Steel Bolting Materials for Low-Temperature Service.
- x. A395, Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
- y. A403/ A403M Rev A, Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings.
- z. A409/A409M, Standard Specification for Welded Large Diameter Austenitic Steel Pipe for Corrosive or High-Temperature Service.
- aa. A536, Standard Specification for Ductile Iron Castings.
- bb. A563, Standard Specification for Carbon and Alloy Steel Nuts.
- cc. 587, Standard Specification for Electric-Resistance-Welded Low-Carbon Steel Pipe for the Chemical Industry.
- dd. A774/A774M, Standard Specification for As-Welded Wrought Austenitic Stainless Steel Fittings for General Corrosive Service at Low and Moderate Temperatures.
- ee. A778 Rev A, Standard Specification for Welded, Un-annealed Austenitic Stainless Steel Tubular Products.
- ff. B32, Standard Specification for Solder Metal.
- gg. B43, Standard Specification for Seamless Red Brass Pipe, Standard Sizes.
- hh. B61, Standard Specification for Steam or Valve Bronzed Casting.
- ii. B62, Standard Specification for Composition Bronzed or Ounce Metal Castings.
- jj. B75, Standard Specification for Seamless Copper Tube.
- kk. B88 Rev A, Standard Specification for Seamless Copper Water Tube.
- ll. B98, Standard Specification for Copper-Silicone Alloy Rod, Bar, and Shapes.

- mm. 582, Standard Specification for Contact-Molded Reinforced Thermosetting Plastic (RTP) Laminates for Corrosion Resistant Equipment.
- nn. D412, Standard Testing Method for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
- oo. D413, Standard Testing Methods for Rubber Property-Adhesion to Flexible Substrate.
- pp. D1248, Standard Specification for Polyethylene Plastics Molding and Extrusion Materials.
- qq. D1784, Standard Specifications for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
- rr. D1785, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- ss. D2000, Standard Classification System for Rubber Products in Automotive Applications.
- tt. D2310, Standard Classification for Machine-Made "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.
- uu. D2464, Standard Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- vv. 2466, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
- ww. D2467, Standard Specification for Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
- xx. D2564, Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
- yy. D2665, Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe for Drain, Waste, and Vent Pipe and Fittings, Schedule 40.
- zz. D2996, Standard Specification for Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Pipe.
- aaa. D3222 Rev A, Standard Specification for Unmodified Poly (Vinylidene Fluoride) (PVDF) Molding Extrusion and Coating Materials.
- bbb. D3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
- ccc. D4101 Rev B, Standard Specification for Propylene Plastic Injection and Extrusion Materials.
- ddd. F437, Standard Specification for Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- eee. F439 Rev A, Standard Specification for Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- fff. F441, Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
- ggg. F491 Rev A, Standard Specification for Poly (Vinylidene Fluoride) (PVDF) Plastic-Lined, Ferrous Metal Pipes, and Fittings.
- hhh. F493 Rev A, Standard Specification for Solvent Cements for Chlorinated Poly Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
- iii. F714, Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) based on outside diameter.
- 7. American Welding Society (AWS):
 - a. A5.8, Specification for Filler Metals for Brazing and Braze Welding.
 - b. QC 1, Standard for AWS Certification of Welding Inspectors.
- 8. American Water Works Association (AWWA):
 - a. C104/A21.4, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
 - b. C110/A21.10, Ductile-Iron and Gray-Iron Fittings, 3" through 48"for Water and Other Liquids.
 - c. C111/A21.11, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - d. C115/A21.15, Flanged Ductile-Iron Pipe with Threaded Flanges.
 - e. C151/A21.51, Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.

- f. C153/A21.53, Ductile-Iron Compact Fittings 3" through 16", for Water and Other Liquids.
- g. C200, Steel Water Pipe – 6" and Larger.
- h. C205, Cement-Mortar Protective Lining and Coating for Steel Water Pipe-4" and Larger-Shop Applied.
- i. C207, Steel Pipe Flanges for Water Works Service, Sizes 4" through 144".
- j. C208, Dimensions for Fabricated Steel Water Pipe Fittings.
- k. C214, Fusion Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.
- l. C606, Grooved and Shouldered Type Joints.
- m. M11, Steel Pipe - A Guide for Design and Installation.
- 9. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS): SP 43, Wrought Stainless Steel Butt-Welding Fittings Including Reference to Other Corrosion Resistant Materials.
- 10. National Fire Protection Association (NFPA): 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances.

1.3 DEFINITIONS

- A. Submerged or Wetted:
 - 1. Zone below elevation of:
 - a. Top face of channel walls and cover slabs.
 - b. Top face of basin walkways.
 - c. Top face of clarifier walkways.
 - d. Top face of digester walls, including structure piping penetrations.
 - e. Liquid surface or within 2 feet above top of liquid surface.
 - f. Top of tank wall or under tank cover.

1.4 SUBMITTALS

- A. Shop Drawings:
 - 1. Shop Fabricated Piping:
 - a. Detailed pipe fabrication or spool drawings showing special fittings and bends, dimensions, coatings, and other pertinent information.
 - b. Layout drawing showing location of each pipe section and each special length; number or otherwise designate laying sequence on each piece.
 - 2. Pipe Wall Thickness: Identify wall thickness and rational method or standard applied to determine wall thickness for each size of each different service including exposed, submerged, buried, and concrete-encased installations for Contractor-designed piping.
 - 3. Hydraulic Thrust Restraint for Restrained Joints: Details including materials, sizes, assembly ratings, and pipe attachment methods.
 - 4. Thrust Blocks: Concrete quantity, bearing area on pipe, and fitting joint locations.
 - 5. Dissimilar Buried Pipe Joints: Joint types and assembly drawings.
 - 6. Gasket material, temperature rating, and pressure rating for each type of pipe and each type of service.
- B. Quality Control Submittals:
 - 1. Manufacturer's Certification of Compliance.
 - 2. Qualifications:
 - a. Weld Inspection and Testing Agency: Certification and qualifications.
 - b. Welding Inspector: Certification and qualifications.
 - c. Welders:
 - 1). List of qualified welders and welding operators.
 - 2). Current test records for qualified welder(s) and weld type(s) for factory and field welding.

3. Weld Procedures: Records in accordance with ASME Boiler and Pressure Vessel Code, Section IX for weld type(s) and base metal(s).
4. Nondestructive inspection and testing procedures.
5. Manufacturer's Certification of Compliance:
 - a. Pipe and fittings.
 - b. Factory applied resins and coatings.
6. Certified weld inspection and test reports.
7. Test logs.

1.5 QUALITY ASSURANCE

- A. Weld Inspection and Testing Laboratory Qualifications:
 1. Retain approved independent testing laboratory that will provide the services of an AWS certified welding inspector qualified in accordance with AWS QC1 with prior inspection experience of welds specified herein.
 2. Perform weld examinations with qualified testing personnel who will carry out radiography, ultrasonic, magnetic particle, and other nondestructive testing methods as specified herein.
 3. Welding Inspector:
 - a. Be present when shop or field welding is performed to certify that welding is in accordance with specified standards and requirements.
 - b. Duties include, but are not limited to, the following:
 - 1). Job material verification and storage.
 - 2). Qualification of welders.
 - 3). Certify conformance with approved welding procedure specifications.
 - 4). Maintain records and prepare reports in a timely manner.
 - 5). Notify Engineer within 1 hour of discovery of unsatisfactory weld performance and within 24 hours of weld test failure.
 - 6). Supervision of testing personnel.
- B. Welder and Welding Operator Performance:
 1. Qualify welders and welding operators by approved testing laboratory before performing any welding under this section.
 2. Perform welder qualification tests in accordance with Section IX, Article III of the ASME Boiler and Pressure Vessel Code.
 3. Qualification tests may be waived if evidence of prior qualification is deemed suitable by the Engineer.
 4. Qualify welders and operators in the performance of making groove welds in each different pipe material, including carbon steel pipe, in Positions 2G and 5G for each welding process to be used.
 5. Qualify welders and welding operators for stainless steel as stated herein on the type of stainless steel being welded with the welding process used.
- C. Certifications:
 1. Coal-Tar Epoxy Applicator: Certified by Piping Manufacturer to be qualified to apply coal-tar epoxy coating to submerged or embedded ductile iron or cast iron soil piping.
 2. Weld Testing Agency: Certified in accordance with current American Society for Nondestructive Testing (4153 Arlingate Plaza, Columbus, OH 43228) recommended practice SNT-TC-1A, NDT Level II.
- D. Quality Control Submittals:
 1. Manufacturer's Certification of Compliance.
 2. Laboratory Testing Equipment: Certified calibrations, Manufacturer's product data, and test procedures.
 3. Certified welding inspection and test results.
 4. Qualifications:

- a. Weld Inspection and Testing Agency: Certification and qualifications.
- b. Welding Inspector: Certification and qualifications.
- c. Welders:
 - 1). List of qualified welders and welding operators.
 - 2). Current test records for qualified welder(s) and weld type(s) for factory and field welding.
- 5. Weld Procedures: Records in accordance with ASME Boiler and Pressure Vessel Code, Section IX for weld type(s) and base metal(s).
- 6. Nondestructive inspection and testing procedures.
- 7. Manufacturer's Certification of Compliance:
 - a. Pipe and fittings.
 - b. Welding electrodes and filler materials.
 - c. Factory applied resins and coatings.
- 8. Certified weld inspection and test reports.
- 9. Pipe coating applicator certification.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with Section 01 60 00, PRODUCT REQUIREMENTS, and:
 - 1. Flanges: Securely attach metal, hardboard, or wood protectors over entire gasket surface.
 - 2. Threaded or Socket Welding Ends: Fit with metal, wood, or plastic plugs or caps.
 - 3. Linings and Coatings: Prevent excessive drying.
 - 4. Cold Weather Storage: Locate products to prevent coating from freezing to ground.
 - 5. Handling: Use heavy canvas or nylon slings to lift pipe and fittings.

PART 2 - PRODUCTS

2.1 PIPING

- A. As specified on Piping Data Sheet(s) and Piping Schedule located at the end of this section as Supplement.
- B. Diameters Shown:
 - 1. Standardized Products: Nominal size.
 - 2. Fabricated Steel Piping (Except Cement-Lined): Outside diameter, ASME 836.10M.
 - 3. Cement-Lined Steel Pipe: Lining inside diameter.

2.2 JOINTS

- A. Grooved End System:
 - 1. Rigid, except where joints are used to correct misalignment, to provide flexibility, or where shown, furnish flexible type.
 - 2. Flanges: When required, furnish with grooved type flange adapters of same manufacturer as grooved end couplings.
- B. Flanged Joints:
 - 1. Flanges for ductile iron pipe shall conform to AWWA C115 at pressure rating meeting requirements of the connecting piping.
 - 2. Flanges for steel pipe shall conform to ANSI/ASME B16.5 at pressure rating meeting requirements of the connecting piping.
 - 3. Higher pressure rated flanges as required, to mate with equipment when equipment flange is of higher pressure rating than required for piping.
- C. Threaded Joints: NPT taper pipe threads in accordance with ANSI B 1.20. 1.

- D. Thrust Tie-Rod Assemblies: NFPA 24; tie-rod attachments relying on clamp friction with pipe barrel to restrain thrust are unacceptable.
- E. Mechanical Joint Anchor Gland Follower:
 - 1. Ductile iron anchor type, wedge action, with break off tightening bolts.
 - 2. Manufacturer and Product: EBAA Iron Inc.; Megalug.
- F. Flexible Mechanical Compression Joint Coupling:
 - 1. Stainless steel, ASTM A276, Type 305 bands.
 - 2. Manufacturers:
 - a. Pipeline Products Corp.
 - b. Ferno Joint Sealer Co.
- G. Mechanical connections of the high density polyethylene pipe to auxiliary equipment such as valves, pumps, tanks, and other piping systems shall be through flanged connections consisting of the following:
 - 1. A polyethylene stub end thermally butt-fused to the end of the pipe.
 - 2. ASTM A240, Type 304 stainless steel backing flange, 125-pound, ANSI B16.1 Standard. Insulating flanges shall be used where shown.
 - 3. Bolts and nuts of sufficient length to show a minimum of three complete threads when the joint is made and tightened to the Manufacturer's standard. Re-torque the nuts after 4 hours.
 - 4. Gaskets as specified on Data Sheet.
 - 5. Connection to buried mechanical joint fittings and valves shall be by restrained mechanical joint follower glad designed for HDPE pipe. Provide stainless steel stiffener as required by pipe manufacturer.

2.3 COUPLINGS

- A. Steel Middle Rings and Followers:
 - 1. Fusion bonded, epoxy-lined, and coated in accordance with Section 09 90 00, PAINTING AND PROTECTIVE COATINGS.
- B. Flexible Couplings:
 - 1. Manufacturers and Products:
 - a. Steel Pipe:
 - 1). Dresser; Style 38.
 - 2). Smith-Blair; Style 411.
 - 3). Romac 501
 - b. Ductile Iron Pipe:
 - 1). Dresser; Style 38.
 - 2). Smith-Blair; Style 411.
 - 3). Romac 501
- C. Transition Couplings:
 - 1. Manufacturers and Products:
 - a. Dresser; Style 62.
 - b. Smith-Blair; Style 413.
 - c. Romac RC501
- D. Flanged Coupling Adapters:
 - 1. Manufacturers and Products:
 - a. Steel Pipe:
 - 1). Smith-Blair; Series 913.
 - 2). Dresser Industries, Inc.; Style 128-W.
 - 3). Romac FC400

- b. Ductile Iron Pipe:
 - 1). Smith-Blair; Series 912.
 - 2). Dresser Industries, Inc.; Style 128-W.
 - 3). Romac FCA501
 - E. Dismantling Joints:
 - 1. Manufacturers and Products:
 - a. Steel or Ductile Iron Pipe:
 - 1). Smith-Blair; Series 975.
 - 2). Dresser Industries, Inc.; Style 131.
 - 3). Romac DJ400.
- 2.4 HARDWARE
- A. All hardware on submerged piping or piping below the top elevation of tanks and directly exposed to water, wastewater and/or wastewater solids , including but not limited to bolts, nuts, washers, and threaded rod shall be stainless steel.
- 2.5 GASKET LUBRICANT
- A. Lubricant shall be supplied by pipe Manufacturer and no substitute or “or-equal” will be allowed.
- 2.6 DOUBLE WALL CONTAINMENT PIPING SYSTEM
- A. All system components shall be pre-engineered, factory fabricated, tested, and assembled such that field assembly is minimized to primarily that of straight joints.
- 2.7 THRUST RESTRAINT
- A. Buried piping shall be restrained joint piping unless specified otherwise or when connecting to existing pipe lines. When connecting to existing pipe lines concrete thrust blocking shall be used as specified in Section 03 30 00, CAST-IN-PLACE CONCRETE.
 - B. All above grade piping shall be adequately restrained and supported.
- 2.8 VENT AND DRAIN VALVES
- A. Pipeline 2-1/2” Diameter and Larger: Vent connections shall be 3/4-inch with V300 ball valve. Drain connection shall be 1-inch with V300 ball valve, unless shown otherwise.
 - B. Pipeline 2” Diameter and Smaller: Vent connections shall be 1/2-inch with V300 ball valve. Drain connection shall be 1-inch with V300 ball valve, unless shown otherwise.
 - C. Provide galvanized steel pipe plug in each ball valve.
- 2.9 FABRICATION
- A. Mark each pipe length on outside:
 - 1. Size or diameter and class.
 - 2. Manufacturer’s identification and pipe serial number.
 - 3. Location number on laying drawing.
 - 4. Date of manufacture.
 - B. Code markings according to approved Shop Drawings.

- C. Flanged pipe shall be fabricated in the shop, not in the field, and delivered to the site with flanges in place and properly faced. Threaded flanges shall be individually fitted and machine tightened on matching threaded pipe by the Manufacturer.

2.10 FINISHES

- A. Factory prepare, prime, and finish coat in accordance with Pipe Data Sheet(s), Piping Schedule, and Section 09 90 00, PAINTING AND PROTECTIVE COATINGS.
- B. Galvanizing:
 - 1. Hot-dip applied, meeting requirements of ASTM A153.
 - 2. Electroplated zinc or cadmium plating is unacceptable.
 - 3. Stainless steel components may be substituted where galvanizing is specified.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify size, material, joint types, elevation, horizontal location, and pipe service of existing pipelines to be connected to new pipelines or new equipment.
- B. Inspect size and location of structure penetrations to verify adequacy of wall pipes, sleeves, and other openings.
- C. Welding Electrodes: Verify proper grade and type, free of moisture and dampness, and coating is undamaged.

3.2 PREPARATION

- A. Notify Engineer at least 2 weeks prior to field fabrication of pipe or fittings.
- B. Inspect pipe and fittings before installation, clean ends thoroughly, and remove foreign matter and dirt from inside.
- C. Damaged Coatings and Linings: Repair using original coating and lining materials in accordance with Manufacturer's instructions, except for damaged glass-lined pipe or PVDF-lined pipe that is to be promptly removed from the site.

3.3 WELDING

- A. Perform in accordance with Section IX, ASME Boiler and Pressure Vessel Code and ASME B31.1 for Pressure Piping, as may be specified on Piping Data Sheets, and if recommended by piping or fitting Manufacturer.
- B. Weld Identification: Mark each weld with symbol identifying welder.
- C. Pipe End Preparation:
 - 1. Machine Shaping: Preferred.
 - 2. Oxygen or Arc Cutting: Smooth to touch, true, and slag removal by chipping or grinding.
 - 3. Beveled Ends for Butt Welding: ANSI B16.25.
- D. Surfaces:
 - 1. Clean and free of paint, oil, rust, scale, slag, or other material detrimental to welding.
 - 2. Clean stainless steel joints with stainless steel wire brushes or stainless steel wool prior to welding.

3. Thoroughly clean each layer of deposited weld metal, including final pass, prior to deposition of each additional layer of weld metal with a power-driven wire brush.
- E. Alignment and Spacing:
1. Align ends to be joined within existing commercial tolerances on diameters, wall thicknesses, and out-of-roundness.
 2. Root Opening of Joint: As stated in qualified welding procedure.
 3. Minimum Spacing of Circumferential Butt Welds: Minimum four times pipe wall thickness or 1", whichever is greater.
- F. Climatic Conditions:
1. Do not perform welding if there is impingement of any rain, snow, sleet or high wind on the weld area, or if the ambient temperature is below 32 °F.
 2. Stainless Steel and Alloy Piping: If the ambient is less than 32° F, local preheating to a temperature warm to the hand is required.
- G. Tack Welds: Performed by qualified welder using same procedure as for completed weld, made with electrode similar or equivalent to electrode to be used for first weld pass, and not defective. Remove those not meeting requirements prior to commencing welding procedures.
- H. Surface Defects: Chip or grind out those affecting soundness of weld.
- I. Weld Passes: As required in welding procedure.
- J. Weld Quality: Free of cracks, incomplete penetration, weld undercutting, excessive weld reinforcement, porosity slag inclusions, and other defects in excess of limits shown in applicable piping code.

3.4 INSTALLATION - GENERAL

- A. Join pipe and fittings in accordance with Manufacturer's instructions, unless otherwise shown or specified.
- B. Remove foreign objects prior to assembly and installation.
- C. Flanged Joints:
1. Install perpendicular to pipe centerline.
 2. Bolt Holes: Straddle vertical centerlines, aligned with connecting equipment flanges or as shown.
 3. Use torque-limiting wrenches to ensure uniform bearing and proper bolt tightness.
 4. Plastic Flanges: Install annular ring filler gasket at joints of raised-face flange.
 5. Raised-Face Flanges: Use flat-face flange when joining with flat-faced ductile or cast iron flange.
- D. Threaded and Coupled Joints:
1. Conform to ANSI B1.20.1.
 2. Produce sufficient thread length to ensure full engagement when screwed home in fittings.
 3. Countersink pipe ends, ream and clean chips and burrs after threading.
 4. Make connections with not more than three threads exposed.
 5. Lubricate male threads only with thread lubricant or tape as specified on Piping Data Sheets.
- E. Soldered Joints:
1. Use only solder specified for particular service.

2. Cut pipe ends square and remove fins and burrs.
 3. After thoroughly cleaning pipe and fitting of oil and grease using solvent and emery cloth, apply non-corrosive flux to the male end only.
 4. Wipe excess solder from exterior of joint before hardened.
 5. Before soldering, remove stems and washers from solder joint valves.
- F. Couplings:
1. General:
 - a. Install in accordance with Manufacturer's written instructions.
 - b. Before coupling, clean pipe holdback area of oil, scale, rust, and dirt.
 - c. Remove pipe coating if necessary to present smooth surface.
 2. Application:
 - a. Metallic Piping Systems: Flexible couplings, transition couplings, and flanged coupling adapters.
 - b. Nonmetallic Piping Systems: Teflon bellows connector.
 - c. Concrete Encased Couplings: Sleeve type coupling.
 - d. Corrosive Service Piping: Elastomer bellows connector.
 - e. Grit Slurry Piping: Elastomer bellows connector.
- G. Pipe Connections at Concrete Structures: As specified in article PIPING FLEXIBILITY PROVISIONS in Section 40 24 00, PROCESS PIPING SPECIALTIES.
- H. Penetrations:
1. Watertight Penetrations:
 - a. Provide wall pipes with thrust collars, as specified in Section 40 24 00, PROCESS PIPING SPECIALTIES.
 - b. Provide taps for stud bolts in flanges to be set flush with wall face.
 2. Non-watertight Penetrations:
 - a. Pipe sleeves with seep ring as specified in Section 40 24 00, PROCESS PIPING SPECIALTIES.
 - b. Pipe sleeves with modular mechanical seal may be provided where fabrication of seep ring on pipe sleeve is impractical.
 3. Existing Walls:
 - a. Rotary drilled holes with modular mechanical seal as specified in Section 40 24 00, PROCESS PIPING SPECIALTIES.
 4. Fire-Rated or Smoke-Rated Walls, Floor, or Ceilings: Insulated and encased pipe sleeves as specified in Section 40 24 00, PROCESS PIPING SPECIALTIES.
- I. PVC and CPVC Piping:
1. Provide Schedule 80 threaded nipple where necessary to connect to threaded valve or fitting.
 2. Use strap wrench for tightening threaded plastic joints. Do not over tighten fittings.
 3. Do not thread Schedule 40 pipe.
- J. Ductile Iron, Cement-Lined Ductile Iron, and Glass-Lined Ductile Iron Piping:
1. Cutting Pipe: Cut pipe with milling type cutter, rolling pipe cutter, or abrasive saw cutter. Do not flame cut.
 2. Dressing Cut Ends:
 - a. General: As required for the type of joint to be made.
 - b. Rubber Gasketed Joints: Remove sharp edges or projections.
 - c. Push-On Joints: Bevel, as recommended by pipe Manufacturer.
 - d. Flexible Couplings, Flanged Coupling Adapters, and Grooved End Pipe Couplings: As recommended by the coupling or adapter Manufacturer.

3.5 INSTALLATION-EXPOSED PIPING

- A. Piping Runs:
 - 1. Parallel to building or column lines and perpendicular to floor, unless shown otherwise.
 - 2. Piping upstream and downstream of flow measuring devices shall provide straight lengths as required for accurate flow measurement.
- B. Supports: As specified in Section 22 05 29, PROCESS SUPPORTS AND ANCHORS.
- C. Group piping wherever practical at common elevations; installing to conserve building space and not interfere with use of space and other work.
- D. Unions or Flanges: Provide at each piping connection to equipment or instrumentation on equipment side of each block valve to facilitate installation and removal.
- E. Install piping so that no load or movement in excess of that stipulated by equipment Manufacturer will be imposed upon equipment connection; install to allow for contraction and expansion without stressing pipe, joints, or connected equipment.
- F. Piping clearance, unless otherwise shown:
 - 1. Over Walkway and Stairs: Minimum of 7' 6", measured from walking surface or stair tread to lowest extremity of piping system including flanges, valve bodies or mechanisms, insulation, or hanger/support systems.
 - 2. Between Equipment or Equipment Piping and Adjacent Piping: Minimum 3' 0", measured from equipment extremity and extremity of piping system including flanges, valve bodies or mechanisms, insulation, or hanger/support systems.
 - 3. From Adjacent Work: Minimum 1" from nearest extremity of completed piping system including flanges, valve bodies or mechanisms, insulation, or hanger/support systems.
 - 4. Do not route piping in front of or to interfere with access ways, ladders, stairs, platforms, walkways, openings, doors, or windows.
 - 5. Head room in front of openings, doors, and windows shall not be less than the top of the opening.
 - 6. Do not install piping containing liquids or liquid vapors in transformer vaults or electrical equipment rooms.
 - 7. Do not route piping over, around, in front of, in back of, or below electrical equipment including controls, panels, switches, terminals, boxes, or other similar electrical work.

3.6 INSTALLATION-BURIED PIPE

- A. Joints:
 - 1. Dissimilar Buried Pipes:
 - a. Provide flexible mechanical compression joints for pressure pipe.
 - b. Provide concrete closure collar for gravity and low pressure (maximum 10 psi) piping or as shown.
 - 2. Concrete Encased or Embedded Pipe: Do not encase joints in concrete unless specifically shown.
- B. Placement:
 - 1. Keep trench dry until pipe laying and joining are completed.
 - 2. Pipe Base and Pipe Zone: As specified in Section 31 23 23.16, TRENCH BACKFILL.
 - 3. Exercise care when lowering pipe into trench to prevent twisting or damage to pipe.
 - 4. Measure for grade at pipe invert, not at top of pipe.
 - 5. Excavate trench bottom and sides of ample dimensions to permit visual inspection and testing of entire flange, valve, or connection.
 - 6. Prevent foreign material from entering pipe during placement.

7. Close and block open end of last pipe section laid when placement operations are not in progress and at close of day's work.
8. Lay pipe upgrade with bell ends pointing in the direction the pipe is laying.
9. Install closure sections and adapters for gravity piping at locations where pipe laying changes direction.
10. Deflect pipe at joints for pipelines laid on a curve using unsymmetrical closure of spigot into bell. If joint deflection of standard pipe lengths will not accommodate horizontal or vertical curves in alignment, provide:
 - a. Shorter pipe lengths.
 - b. Special mitered joints.
 - c. Standard or special fabricated bends.
11. After joint has been made, check pipe alignment and grade.
12. Place sufficient pipe zone material to secure pipe from movement before next joint is installed.
13. Prevent uplift and floating of pipe prior to backfilling.

C. PVC and CPVC Pipe Placement:

1. Lay pipe snaking from one side of trench to other.
2. Offset: As recommended by Manufacturer for maximum temperature variation between time of solvent welding and during operation.
3. Do not lay pipe when temperature is below 40 °F, or above 90 °F when exposed to direct sunlight.
4. Shield ends to be joined from direct sunlight prior to and during the laying operation.

D. Tolerances:

1. Deflection from Horizontal Line, Except PVC, CPVC, or HDPE: Maximum 2".
2. Deflection from Vertical Grade: Maximum 1/4".
3. Joint Deflection: Maximum of 75% of Manufacturer's recommendation.
4. Horizontal position of pipe centerline on alignment around curves maximum variation of 1.75' from position shown.
5. Pipe Cover: Minimum 5', unless otherwise shown.

3.7 THRUST RESTRAINT

A. Location:

1. Buried Piping: At pipeline tees, plugs, caps, bends, and other locations where unbalanced forces exist.
2. Exposed Piping: At all joints in pressure piping.

B. Thrust Ties:

1. Install as detailed.
2. Anchoring retainer glands or thrust ties with setscrews is unacceptable.

C. Mechanical Joint Valve Restraint in Proprietary Restrained Joint Piping: Install pipe joint Manufacturer's adapter gland follower and pipe end retainer, or thrust tie-rods and socket clamps.

D. Thrust Blocking:

1. Place between undisturbed ground and fitting to be anchored.
2. Quantity of Concrete: Sufficient to cover bearing area on pipe and provide required soil bearing area as shown.
3. Place blocking so that pipe and fitting joints will be accessible for repairs.
4. Place concrete in accordance with Section 03 30 00, CAST-IN-PLACE CONCRETE.

3.8 BRANCH CONNECTIONS

- A. Do not install branch connections smaller than 1/2-inch nominal pipe size, including instrument connections, unless shown otherwise.
- B. When line of lower pressure connects to a line of higher pressure, requirements of Piping Data Sheet for higher pressure rating prevails up to and including the first block valve in the line carrying the lower pressure, unless otherwise shown.
- C. Threaded Pipe Tap Connections:
 - 1. Ductile Iron Piping: Connect only with service saddle or at a tapping boss of a fitting, valve body, or equipment casting.
 - 2. Welded Steel or Alloy Piping: Connect only with welded thread-o-let or half-coupling as specified on Piping Data Sheet.
 - 3. Limitations: Threaded taps in pipe barrel are unacceptable.

3.9 VENTS AND DRAINS

- A. Vents and drains at high and low points in piping required for completed system may or may not be shown. Install the vents on high points, and drains on low points of pipelines, whether shown or not.

3.10 CLEANING

- A. Following assembly and testing, and prior to disinfection and final acceptance, flush pipelines (except as stated below) with water at 2.5 fps minimum flushing velocity until foreign matter is removed.
- B. Blow clean of loose debris plant process air, natural gas, and instrument air-lines with compressed air at 4,000 fpm; do not flush with water.
- C. If impractical to flush large diameter pipe at 2.5 fps or blow at 4,000 fpm velocity, clean in-place from inside by brushing and sweeping, then flush or blow line at lower velocity.
- D. Insert cone strainers in flushing connections to attached equipment and leave in-place until cleaning is complete.
- E. Remove accumulated debris through drains 2" and larger or by removing spools and valves from piping.

3.11 DISINFECTION

- A. Disinfect pipelines intended to carry potable water (W1).
- B. See Division 33.

3.12 FIELD FINISHING

- A. Notify Engineer at least 3 days prior to start of any surface preparation or coating application work.
- B. As specified in Section 09 90 00, PAINTING AND PROTECTIVE COATINGS.

3.13 PIPE IDENTIFICATION

- A. See Section 22 05 53, MECHANICAL IDENTIFICATION and 09 90 00 PAINTING AND PROTECTIVE COATINGS.

3.14 HEAT TRACING

- A. See Section 40 41 13, HEAT TRACING.

3.15 FIELD QUALITY CONTROL

- A. Pressure Leakage Testing: As specified. See Division 33.
- B. Minimum Duties of Welding Inspector:
 - 1. Job material verification and storage
 - 2. Qualifications of welders.
 - 3. Certify conformance with approved welding procedures.
 - 4. Maintenance of records and preparation of reports in a timely manner.
 - 5. Notification to Engineer of unsatisfactory weld performance within 24 hours of weld test failure.
- C. Required Weld Examinations:
 - 1. Perform Examinations in accordance with Piping Code ASME B31.1.
 - 2. Perform examinations for every pipe thickness and for each welding procedure, progressively, for all piping covered by this section.
 - 3. Examine at least one of each type and position of weld made by each welder or welder operator.
 - 4. For each weld found to be defective under the acceptable standards or limitations on imperfections contained in the applicable Piping Code, examine two additional welds made by the same welder that produced the defective weld. Such additional examinations are in addition to the minimum required above 3. Examine, progressively, two additional welds for each tracer examination found to be unsatisfactory.

3.16 SUPPLEMENTS

- A. The supplements listed below, following "END OF SECTION," are a part of this Specification.
 - 1. Piping Schedule.
 - 2. Data Sheets.

Number	Title
40 23 39.13	Ductile Iron Pipe and Fittings

END OF SECTION

PROCESS PIPING SCHEDULE										
Service	Flow Stream Identifier	Installation (Note 1)	Pipe Size (Note 2)	Material (Note 3)	Spec / Data Sheet No.	Max Operating Temp (°F)	Max Operating Pressure (psig)	Test Pressure (psig) & Method (Note 4)	Pipe Color (Note 5)	Remarks
Raw Sewage	RS	Exposed Buried Encased	>4" >4" >4"	CEDI CEDI CEDI	40 23 39.19	85	75	100, H	Green	1
PROCESS PIPING SCHEDULE										
<p>Notes:</p> <div> <div> 1 Exposed - Inside/Outside Exposed Submerged Buried - Directly into Soil Encased </div> <div> 2 > Greater Than < Less Than <= Less Than or Equal To >= Greater Than or Equal To </div> <div> 3 CLDI - Cement Lined Ductile Iron CEDI-Ceramic Epoxy Lined Ductile Lined CPVC - Chlorinated Polyvinyl Chloride CU - Copper DWCP - Double Wall Containment Pipe FRP - Fiberglass Reinforced Plastic Pipe GALV - Galvanized Pipe SST - Stainless Steel WS - Welded Steel </div> <div> 4 H - Hydrostatic Test P - Pneumatic Test G - Gravity Piping See Section 40 05 00 for Piping Systems Testing for requirements Pipe testing required as specified above. </div> <div> 5 See Section 09 90 00 for required painting. For buried piping, no color shall be required; coordinate for proper coatings, as necessary. Where no color is indicated, color to be selected by Owner For exposed piping not coated, provide colored banding and identification. General - Deviations from this schedule are indicated directly by note on Drawings where deviation is required </div> <div> 6 General - The piping material shall conform to the requirements for the service listed being drained or vented </div> </div>										
<p>Remarks:</p> <div> 1 See Section 40 23 39 for additional requirements. </div>										

SECTION 40 23 39.13 DUCTILE IRON PIPE AND FITTINGS	
Item	Description
Pipe	<p>Buried Liquid Service: Push-On, Mechanical, or Proprietary Restrained Joints: AWWA C110/A21.10-93, AWWA C115/A21.15-88, and AWWA C151/A21.51-91, pressure class conforming to Tables 51.1 and 51.3 for Type 4 trench, 250 psi minimum working pressure.</p> <p>Exposed Pipe: Grooved End or Flange Joints: AWWA C115/A21.15-88, and AWWA C151/A21.51-91, thickness Class 53 minimum conforming to Table 51.7, 250 psi minimum working pressure.</p>
Coating	<p>Buried Pipe: Exterior coating used under normal conditions shall be an asphaltic coating approximately 1 mil (25 µm) thick and per AWWA C151/A21.51-17.</p> <p>Exposed Pipe: Shall be as indicated in the schedule.</p>
Encasement	Polyethylene encasement shall be used on all underground ductile iron pipe, fittings, valves, and appurtenances. See Specification Section 40 42 13.16 – POLYETHYLENE ENCASEMENT FOR DUCTILE IRON AND CAST IRON PIPE.
Lining	<p>Lining shall be Cement-Mortar AWWA C104/A21.4-90 unless noted otherwise.</p> <p>Ceramic Epoxy Protecto 401 or equal shall be used where indicated in the pipe schedule.</p> <p>Glass Lining: VITCO Corp. SG-14 or equal shall be used where indicated in the schedule.</p> <p>Linings for fittings shall be as indicated below.</p>
Joints	<p>Push-On: 250 psi minimum working pressure, AWWA C110/A21.10-93 and C111/A21.11-90. American Cast Iron Pipe Co., Fastite Joints; U.S. Pipe and Foundry, Tyton Joint.</p> <p>Mechanical: 250 psi minimum working pressure, AWWA C111. American Cast Iron Pipe Co., Mechanical Joint; U.S. Pipe and Foundry, Mechanical Joint.</p> <p>Proprietary Restrained: 150 psi minimum working pressure. Clow Corp., Super-Lock; American Cast Iron Pipe Co., Flex-Ring or Lok-Ring; U.S. Pipe, TR Flex.</p> <p>Grooved End: Rigid type radius cut conforming to AWWA C606-87, 250 psi minimum working pressure. Victaulic; Gustin-Bacon.</p> <p>Flange: 125-pound flat face, 250-pound raised face, ductile iron, threaded conforming to AWWA C115/A21-15.88. Gray cast iron will not be allowed.</p>

**SECTION 40 23 39.13
DUCTILE IRON PIPE AND FITTINGS**

Item	Description
Fittings	<p>Push-On: AWWA C110/A21.10-93 and C111/A21.11-90, gray or ductile iron, 250 psi minimum working pressure. American Cast Iron Pipe Co., Fastite Joints; U.S. Pipe and Foundry, Tyton Joint.</p> <p>Mechanical Joint: For Buried Service. AWWA C110/A21.10-93, C111/A21.11-90, and C153/A21.53-88 gray or ductile iron, 250 psi minimum working pressure. Coating/lining shall be Fusion-Bonded Epoxy meeting AWWA C116. American Cast Iron Pipe Co., Mechanical Joint; U.S. Pipe and Foundry, Mechanical Joint.</p> <p>Proprietary Restrained Joint: AWWA C111/A21.11-90 and C153/A21.53-88, ductile iron, 250 psi minimum working pressure. Coating/lining shall be Fusion-Bonded Epoxy meeting AWWA C116. Clow Corp., Super-Lock Joint; American Cast Iron Pipe Co., Flex-Ring or Lok-Ring Joint; U.S. Pipe, TR Flex.</p> <p>Proprietary Restrained River Crossing: Clow Ball and Socket; U.S. Pipe Usiflex. Coating/lining shall be Fusion-Bonded Epoxy meeting AWWA C116.</p> <p>Grooved End: AWWA C606-87 and C110/A21.10-93, ductile iron, 250 psi minimum working pressure. Lining and coating shall match connecting pipe. Victaulic; Gustin-Bacon.</p> <p>Flange: AWWA C110/A21.10-93 and ANSI B16.1-89, ductile or gray cast iron, faced and drilled, 125-pound flat face or 250-pound raised face. Gray cast iron will not be allowed. Lining and coating shall match connecting pipe.</p>
Couplings	<p>Grooved End: 250 psi minimum working pressure, malleable iron per ASTM A47-90 or ductile iron per ASTM A536-84. Victaulic; Gustin-Bacon.</p> <p>Grooved End Adapter Flanges: 250-pound malleable iron per ASTM A47-90 or ductile iron per ASTM A536-84. Victaulic; Gustin-Bacon.</p>
Bolting	<p>Mechanical, Proprietary Restrained, and Grooved End Joints: 316 Stainless Steel Hardware.</p> <p>125-pound Flat-Faced Flange: Exposed piping - ASTM A307-94, Grade A carbon steel hex head bolts and ASTM A563-93, Grade A steel hex head nuts.</p> <p>250-pound Raised-Face Flange: Exposed piping - ASTM A307-94, Grade B carbon steel hex head bolts and ASTM A563-93, Grade A carbon steel heavy hex head nuts.</p> <p>All hardware on submerged piping or piping below the top elevation of tanks and directly exposed to water, wastewater and/or wastewater solids, including but not limited to bolts, nuts, washers, and threaded rod shall be stainless steel.</p>

**SECTION 40 23 39.13
DUCTILE IRON PIPE AND FITTINGS**

Item	Description
Gaskets	<p>Mechanical, and Proprietary Restrained Joints, Water and Sewage: Rubber conforming to ANSI/AWWA C111/A21.11-90 Locking gaskets produced in accordance with AWWA C111 are acceptable for use as a joint restraint mechanism for buried push-on type joints. Locking gaskets shall be rated for the same working pressure as the pipe. American Cast Iron Pipe Co., Fast-Grip Gasket; US Pipe, Field LOK Gaskets.</p> <p>Mechanical and Proprietary Restrained Joints, Air: Viton, Fluorel, or Manufacturer's standard for high temperature air service, rated to 300 degrees F minimum, conforming to ANSI/AWWA C111/A21.11-90</p> <p>Grooved End Joints: Halogenated butyl conforming to ASTM D2000-90 and AWWA C606-87. Gaskets for air service shall be pressure-responsive synthetic rubber, rated to 300 degrees F minimum, conforming to ASTM D2000.</p> <p>Flanged, Water and Sewage Services: 1/8-inch thick, unless otherwise specified, homogenous black rubber (EPDM), hardness 60 (Shore A), rated to 212 degrees F., conforming to ANSI B16.21 and ASTM D1330 Steam Grade.</p> <p>Flanged, Air Service: 1/8-inch thick, unless otherwise specified, Teflon, PTFE, or compressed inorganic fiber with nitrile binder, rated to 300 degrees F. minimum, conforming to ANSI B16.21 and ASTM D1330.</p> <p>Ring gaskets shall not be permitted.</p> <p>Blind flanges shall be gasketed covering the entire inside face with the gasket cemented to the blind flange.</p> <p>Gasket pressure rating equal to the pressure rating as the pipe or fitting.</p>
Joint Lubricant	Manufacturer's Standard.

END OF SECTION

SECTION 40 23 43 - PROCESS VALVES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Basic requirements for Process Valves.
- B. Related sections:
 - 1. Section 01 33 00 – Submittal Procedures.
 - 2. Section 01 60 00 – Product Requirements.
 - 3. Section 01 78 23 – Operation and Maintenance Data.
 - 4. Section 01 79 00 – Demonstration and Training.
 - 5. Section 09 90 00 – Painting and Protective Coatings.
 - 6. Section 22 05 53 – Mechanical Identification.
 - 7. Section 40 23 39 – Process Piping General.

1.2 GENERAL

- A. See Section 40 23 39, PROCESS PIPING GENERAL, which contains information and requirements that apply to the work specified herein and are mandatory for this project.
- B. Certain valves are specified in Division 44 to be furnished by equipment manufacturer as part of their equipment package and/or system. These valves are to be installed by the Contractor as specified herein. In addition to installation, the Contractor shall be responsible for test, inspection, and assisting the equipment suppliers in start-up services as required to place the valves into continuous, reliable operation.

1.3 SUBMITTALS

- A. Submittals shall be made as required in Section 01 33 00, SUBMITTALS. The following specific information shall be provided:
 - 1. Shop Drawings:
 - a. Product data sheets for make and model.
 - b. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
 - c. Refer to specific valve type for additional submittal requirements.
 - 2. Quality Control Submittals:
 - a. Tests and inspection data.
 - b. Manufacturer's Certificate of Proper Installation.
 - c. Manufacturer's printed installation instructions.
 - d. Special shipping, storage and protection, and handling instructions.
 - e. Suggested spare parts list to maintain the equipment in service for a period of 5 years. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
 - f. List special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.

1.4 OPERATION AND MAINTENANCE DATA

- A. O&M Manuals: Content, format, and schedule for providing as specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.
- B. Maintenance Summary Forms: As specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Valve to include operator, actuator, hand wheel, chain wheel, extension stem, floor stand, worm and gear operator, operating nut, chain, wrench, and accessories for a complete operation.
- B. Valve shall be suitable for intended service. Renewable parts not to be of a lower quality than specified.
- C. Valve shall be the same size as adjoining pipe.
- D. Valve ends to suit adjacent piping.
- E. Valve shall open by turning counterclockwise unless otherwise specified.
- F. Operator, actuator, and accessories shall be factory mounted.
- G. EFFECTIVE JANUARY 4, 2014 ANY VALVE, PIPE, FITTING, SOLDER, OR FLUX USED OR IN CONTACT WITH POTABLE WATER MUST COMPLY WITH THE REDUCTION OF LEAD IN DRINKING WATER ACT, AN AMENDMENT TO SECTION 1417 OF THE SAFE DRINKING WATER ACT (SDWA). VALVES SPECIFIED IN THIS SECTION MAY NOT MEET REQUIREMENTS OF THIS ACT, HOWEVER THIS DOES NOT RELIEVE THE CONTRACTOR FROM PROVIDING A VALVE TO MEET REQUIREMENTS OF THE (SDWA) AND THE SAME FUNCTIONAL REQUIREMENTS OF THIS SPECIFICATION.

2.2 SCHEDULE

- A. Requirements relative to this section for certain type of actuated or process valves are shown on the Valve Schedules attached as Supplements to the related Sections.

2.3 MATERIALS

- A. Brass and bronze valve components and accessories that have surfaces in contact with water shall be alloys containing less than 16% zinc and 2% aluminum.
- B. Approved alloys are of the following ASTM designations:
 - 1. B61, B62, B98 (Alloy UNS No.C65100, C65500, or C66100), B139 (Alloy UNS No.C51000), B584 (Alloy UNS No.C90300 or C94700), B164, B194, and B127.
 - 2. Stainless steel, AISI Type 316 may be substituted for bronze.

2.4 FACTORY FINISHING

- A. Epoxy Lining and Coating:
 - 1. In accordance with AWWA C550 unless otherwise specified. Coating shall be either two-part liquid material or heat-activated (fusion) material except only heat-activated material if specified as "fusion" or "fusion bonded" epoxy.
 - 2. Minimum 7-mil dry film thickness except where limited by valve operating tolerances.
- B. Exposed Valves Field Finish:
 - 1. Final paint coating shall be in accordance with Section 09 90 00, PAINTING AND PROTECTIVE COATINGS. System and color shall match adjacent piping system.
 - 2. Safety isolation valves and lockout valves with handles, hand wheels, or chain wheels "safety yellow."

2.5 VALVES

A. Gate Valves:

1. Type V140: Gate Valve, Less Than 3 Inches
 - a. General:
 - 1) Service: Aboveground, clean water and air.
 - 2) 150 psi Class
 - 3) Rising Stem type
 - 4) Threaded ends
 - 5) Conform to MSS-SP-80, Type 2
 - b. Materials:
 - 1) Body & bonnet: Bronze, ASTM B62 alloy C83600
 - 2) Disc: Bronze, ASTM B62 alloy C83600
 - 3) Stem: ASTM B505 alloy C83600 or ASTM B371 alloy C69400
 - c. Manufacturers and Products:
 - 1) Crane – Figure 431.
 - 2) Jenkins – Figure 2810J
 - 3) Nibco – T-131
2. Type V141: Buried Gate Valve, 3 Inches and Larger
 - a. Valve shall be resilient wedge type, of non-rising stem design and rated for 250 psig cold water working pressure.
 - b. Valve shall meet or exceed all requirements of the latest revision of AWWA C515.
 - c. Valve shall have mechanical joint ends, except tapping valves may be flanged by mechanical joint.
 - d. Stem shall be sealed by three O-Rings. O-Rings set in a cartridge shall not be allowed.
 - e. Each valve shall have maker's name, pressure rating, and year in which it was manufactured cast in the body. Country of origin to be clearly cast into body & cover castings.
 - f. Valves 14" and larger shall be equipped with geared actuators. Valves to be installed in the standard vertical position shall have spur gear actuators. Valve to be installed in the horizontal position shall have bevel gear actuators. Valves shall only be installed in the horizontal position if noted on the plans or if instructed by the Engineer.
 - g. Materials:
 - 1) All cast ferrous components shall be ductile iron, ASTM A536.
 - 2) The body, bonnet and O-ring plate shall be fusion-bonded epoxy coated, both interior and exterior on body and bonnet. Epoxy shall be applied in accordance with AWWA C550 and be NSF 61 Certified.
 - 3) Wedge shall be ductile iron fully encapsulated in EPDM rubber.
 - 4) Hardware shall be 304 stainless steel
 - 5) Stems shall be cast copper alloy with integral collars in full compliance with AWWA. All stems shall operate with copper alloy stem nuts independent of wedge and of stem
 - 6) Provide standard AWWA 2-inch operating nut, matching valve key, and valve box for operating stem.
 - h. Manufacturers and Products:
 - 1) M&H/Kennedy Valve Company.
 - 2) Mueller.
 - 3) American.
 - 4) Crispin-Ludlow Valve.
3. Type V142: Exposed Gate Valve, 3 Inches and Larger
 - a. Valve shall be resilient wedge type, of non-rising stem design and rated for 250 psig cold water working pressure.

- b. Valve shall meet or exceed all requirements of the latest revision of AWWA C515.
 - c. Valve shall have flanged ends.
 - d. Stem shall be sealed by three O-Rings. O-Rings set in a cartridge shall not be allowed.
 - e. Each valve shall have maker's name, pressure rating, and year in which it was manufactured cast in the body. Country of origin to be clearly cast into body & cover castings.
 - f. Valves 14" and larger shall be equipped with geared actuators. Valves to be installed in the standard vertical position shall have spur gear actuators. Valve to be installed in the horizontal position shall have bevel gear actuators. Valves shall only be installed in the horizontal position if noted on the plans or if instructed by the Engineer.
 - g. Materials:
 - 1) All cast ferrous components shall be ductile iron, ASTM A536.
 - 2) The body, bonnet and O-ring plate shall be fusion-bonded epoxy coated, both interior and exterior on body and bonnet. Epoxy shall be applied in accordance with AWWA C550 and be NSF 61 Certified.
 - 3) Wedge shall be ductile iron fully encapsulated in EPDM rubber.
 - 4) Hardware shall be 304 stainless steel
 - 5) Stems shall be cast copper alloy with integral collars in full compliance with AWWA. All stems shall operate with copper alloy stem nuts independent of wedge and of stem
 - 6) Provide handwheel, chainwheel, 2" nut, or actuator as noted on the drawings or specified in the valve schedule.
 - h. Manufacturers and Products:
 - 1) M&H/Kennedy Valve Company.
 - 2) Mueller.
 - 3) American.
 - 4) Crispin-Ludlow Valve.
4. Type V145: Knife Gate Valve, 2 Inches to 36 Inches
- a. Suitable for service under pressures equal to and less than 150 pounds per square inch.
 - b. Full round port, metal seated, raised face design.
 - c. Flanged wafer design, drilled and tapped to ANSI Class 125/150 standard.
 - d. Founded gate with beveled edge, finish-ground to 32 RMS, maximum, on both sides.
 - e. Body to incorporate guides and jams to assist in seating.
 - f. Materials:
 - 1) Body: Cast or ductile iron or cast steel, with Type 316 stainless steel lining or cast Type 316 stainless steel.
 - 2) Wetted Components (including gate): Type 316 stainless steel.
 - 3) Yoke Sleeve: Acid resisting bronze or aluminum bronze.
 - 4) Packing: PTFE.
 - g. Outside screw and yoke (OS&Y) with handwheel operator.
 - h. Manufacturers and Products:
 - 1) DeZurik.
 - 2) Fabri Valve.

B. Globe Valves:

- 1. Type V200: Globe Valve, 3 Inches and Smaller
 - a. General:
 - 1) Service: Aboveground, clean water.
 - 2) 150 psi Class
 - 3) Rising Stem type
 - 4) Union Bonnet
 - 5) Threaded ends

- 6) Conform to MSS-SP-80, Type 2
 - b. Materials:
 - 1) Body & bonnet: Bronze, ASTM B62 alloy C83600
 - 2) Disc: PTFE
 - 3) Stem: ASTM B505 alloy C83600 or ASTM B371 alloy C69400
 - c. Manufacturers and Products:
 - 1) Stockham; B-22T, threaded end.
 - 2) Crane. Co.; 7TF, threaded end.
 - 3) Nibco: T-235-Y
- 2. Type V201: Angle Pattern Valve, 2 Inches and Smaller
 - a. General:
 - 1) Service: Aboveground, clean water.
 - 2) 150 psi Class
 - 3) Rising Stem type
 - 4) Union Bonnet
 - 5) Threaded ends
 - 6) Conform to MSS-SP-80, Type 2
 - b. Materials:
 - 1) Body & bonnet: Bronze, ASTM B62 alloy C83600
 - 2) Disc: PTFE
 - 3) Stem: ASTM B505 alloy C83600 or ASTM B371 alloy C69400
 - c. Manufacturers and Products:
 - 1) Stockham; Figure B-222T.
 - 2) Crane Co.; Cat. No. 17TF.
 - 3) Nibco: T-335-Y
- 3. Type V235: Angle Type Hose Bibb Valve
 - a. 3/4-inch NPT female inlet, 3/4-inch male hose thread outlet, heavy rough brass body rated 125 psi, lockshield bonnet, removable handle, atmospheric vacuum breaker conforming to ASSE Standard 1011 and IAPMO code.
 - b. Manufacturers and Products:
 - 1) Acorn; 8126, surface pipe mount valve, bent nose without flange:
 - 2) Acorn; 8121, surface mount through wall valve, bent nose with flange.
 - 3) Acorn; 8131, pipe and pedestal mounted valve located above 6 inches, straightnose.
 - 4) Acorn; 8136, pedestal mounted valve located lower than 6 inches inverted nose.
- 4. Type V236: Angle Pattern Hose Valve, 1 Inch Through 3 Inches
 - a. All-bronze, screwed ends, inside screw, rising stem, 'I'F±. disc, outlet of cast brass NST by NPT, male by male, nipple adapter with hexagonal wrench feature, rated 300 WOG.
 - b. Manufacturers and Products:
 - 1) Stockham; Figure B-222T.
 - 2) Crane Co.; Cat. No. 17TF.
 - 3) James Jones Co.: J-300 Series, angle fire hydrant valve with NPT inlet and National Hose thread outlet.
 - 4) ITT Kennedy; Figure 936, angle fire hydrant valve with NPT inlet and National Hose thread outlet.

C. Ball Valves:

- 1. Type V300: Metal Body Ball Valve, Less than 6 Inches
 - a. General
 - 1) Type: Non-lubricated and capable of sealing in either flow direction.
 - 2) End Connections:

- a) Threaded or solder ends for sizes 3-inch and smaller.
 - b) Class 150 flanged for sizes larger than 3 inch. Flanges shall conform to ANSI/ASME B16.1 standards.
 - 3) Stem Packing: Manually adjustable while valve is under pressure.
 - 4) Shafts: Rigidly connected to the ball by a positive means. The connection shall be designed to transmit torque equivalent to at least 75 percent of the torsional strength of the shaft.
 - 5) Handles: Stainless steel latch lock handle with vinyl grip and stainless steel nut designed to open and close the valve under operating conditions.
 - 6) Temperature Limits: Suitable for operation between minus 20 and 350 degrees Fahrenheit.
 - b. Materials:
 - 1) Valves in Copper Lines: Bronze body
 - 2) Valves in Steel and Ductile Iron Piping: Ductile iron or cast steel bodies.
 - 3) Ball: Type 304 or 316 stainless steel.
 - 4) Seats: PTFE.
 - 5) Stem Seals: TFE or Viton
 - 6) Bearings: Self-lubricated, corrosion resistant material that will not contaminate potable water.
 - c. Manufacturers and Products:
 - 1) Apollo.
 - 2) Nibco.
 - 3) Milwaukee Valve.
2. Type V302: Metal Body Ball Valve, 6 Inches and Larger
 - a. General
 - 1) Type: Non-lubricated and capable of sealing in either flow direction.
 - 2) Conform to AWWA C 507.
 - 3) Stem Packing: Manually adjustable while valve is under pressure.
 - 4) ANSI B16.1, Class 125 flanged ends.
 - b. Materials
 - 1) Body: ASTM A48 cast iron and integrally cast bronze bushed trunnions.
 - 2) Ball: Type 304 or Type 316 stainless steel.
 - 3) Seats: TFE.
 - 4) Stem Seals: TFE or Viton.
 - c. Manually operated ball valves shall have self-locking worm gear type actuator with position indicator. Gearing shall be permanently lubricated. Provide adjustable screws to stop travel at both Open and Closed positions.
 - d. Manufacturers and Products:
 - 1) Henry Pratt.
 - 2) McANNA/MARPAC
3. Type V303 Instrumentation Ball Valves
 - a. Brass or stainless steel body ball valve, nylon handle.
 - b. Manufacturers and Products:
 - 1) Swagelok, 40G Series.
 - 2) Imperial Eastman; Series 200.
4. Type V330 PVC Body Ball Valve
 - a. General:
 - 1) Type: Non-lubricated and capable of sealing in either flow direction.
 - 2) End Connections: True union; solvent or heat welded to piping.
 - 3) Operator Handle: Lever.
 - 4) All ball valves on sodium hypochlorite lines and/or chlorine dioxide lines shall be venting type valves.
 - b. Materials

- 1) Body: Polyvinyl chloride (PVC).
- 2) Ball: Polyvinyl chloride (PVC).
- 3) Seats: Teflon (TFE).
- 4) O-rings: Viton (FPM).
- c. Manufacturers and Products:
 - 1) Asahi/America, Inc.
 - 2) Nibco.

D. Plug Valves:

- 1. Type V404: Eccentric Plug Valve, 1/2 Inch through 3 Inches
 - a. Non-lubricating type rated 175 psig CWP, drip-tight shutoff with pressure from either direction, cast iron body, or stainless steel body where indicated, with threaded NPT full size inlets. Connection shall be hexagonal for a wrench connection. Plug cast iron with round or rectangular port of no less than 80% of connecting pipe area and coated with Buna-N or Hycar, seats nickel, stem bearing self-lubricating stainless steel, stem seal multiple V -rings or V-cups of nitrile rubber, grit seals on stem.
 - b. Provide valves with wrench lever manual operator.
 - c. Manufacturers and Products:
 - 1) DeZurik.
 - 2) Henry Pratt.
 - 3) Val-Matic.
 - 4) Crispin Valve
- 2. Type V405: Eccentric Plug Valve, 4 Inches through 12 Inches
 - a. Non-lubricating type rated 175 psig CWP, drip-tight shutoff with pressure from either direction, cast iron body, or stainless steel body where indicated, with flanged ends or grooved ends in accordance with AWWA C606 for rigid joints, mechanical joint ends for buried valve. Plug cast iron with round or rectangular port of no less than 80% of connecting pipe area and coated with Buna-N or Hycar, seats nickel, stem bearing self-lubricating stainless steel, stem seal multiple V -rings or V-cups of nitrile rubber, grit seals on stem.
 - b. 4" valve with wrench lever manual operator and 6 through 12" valve with totally enclosed, geared, manual operator with hand wheel, 2" nut, or chain wheel.
 - c. Manufacturers and Products:
 - 1) DeZurik.
 - 2) Henry Pratt.
 - 3) Val-Matic.
 - 4) Crispin Valve.
- 3. Type V406: Eccentric Plug Valve, 14 Inches and Larger
 - a. Non-lubricating type rated 150 psig CWP, drip-tight shutoff with pressure from either direction, cast iron body with flanged ends or grooved ends in accordance with AWWA C606 for rigid joints, mechanical joint ends for buried valve. Plug cast iron with round or rectangular port of no less than 80% of connecting pipe area and coated with Buna-N or Hycar, seats nickel, stem bearing self-lubricating stainless steel, stem seal multiple V -rings or V-cups of nitrile rubber, grit seals on stem.
 - b. Provide with totally enclosed, geared, manual operator with hand wheel, 2" nut, or chain wheel.
 - c. Manufacturers and Products:
 - 1) DeZurik.
 - 2) Henry Pratt.
 - 3) Val-Matic.
 - 4) Crispin Valve.

E. Butterfly Valves:

1. General: Provide valves designed and manufactured in accordance with AWWA C504, Class 150B or Class 250B, AWWA C516, and the following requirements:
 - a. Valve class shall meet the requirements of the connecting line or as indicated in valve schedule or as indicated on the drawings.
 - b. Suitable for throttling operations and infrequent operation after periods of inactivity.
 - c. Elastomer seats bonded to body shall have adhesive integrity of bond between seat and body assured by testing with minimum 75-pound pull in accordance with ASTM D429, Method B. Seat may be retained by mechanical means on valves 24-inches and larger. No epoxy attachment method will be allowed.
 - d. Bubble-tight with rated pressure, or any pressure lower than rated, applied from either side with the valve mounted in any orientation.
 - e. No travel stops for the disc on interior of the body.
 - f. Shaft seal shall include V-type packing for self-adjusting and wear compensation.
 - g. Isolate metal-to-metal thrust bearing surfaces from flow stream.
 - h. Valves intended for air service shall meet ANSI B16.104 and ANSI B16.5.

2. Type V500: Butterfly Valve, 4 Inches and Larger
 - a. Valve Style: Flanged end, short body type.
 - b. Flanged end connections shall fully conform with ANSI B16.1 Class 125 or Class 250, or AWWA C207 Class D.
 - c. Materials:
 - 1) Body: Class 150B valve bodies shall be ASTM A126, Class B gray iron or ASTM A536 Grade 65-45-12 ductile iron. Class 250B valve bodies shall be ASTM A536 Grade 65-45-12 ductile iron.
 - 2) Disc: Valve disc shall be made from cast iron ASTM A-126 Class B or stainless steel ASTM A351 in sizes 20" and smaller. Sizes 24" and larger shall be built from ductile iron in conformance to ASTM A-536. Disc shall be furnished with Type 316 stainless steel seating edge to mate with the rubber seat on the body.
 - 3) Shafts: Shafts shall be Stainless Steel. ASTM A276 Type 304, or Type 316, or ASTM A564, grade 630.
 - 4) Seat: Valve seat shall be Buna-N rubber located on the valve body. In sizes 20" and smaller, valves shall have bonded seats that meet test procedures outlined in ASTM D-429 Method B. Sizes 24" and larger shall be retained in the valve body by mechanical means without use of metal retainers or other devices located in the flow stream.
 - 5) Bearings: Shall be sleeve type that is corrosion resistant and self-lubricating.
 - 6) Manual Actuators: Shall be fully grease packed and have stops in the open/close position. The actuator shall have a mechanical stop which will withstand an input torque of 450 ft. lbs. against the stop. The traveling nut shall engage alignment grooves in the housing. The actuators shall have a built in packing leak bypass to eliminate possible packing leakage into the actuator housing.
 - 7) Hardware: All seat retaining hardware shall be Type 316 stainless steel.
 - d. Manufacturers and Products:
 - 1) Henry Pratt /Mueller
 - 2) DeZurik - AWWA Butterfly Valves (BAW) 150B or 250B
 - 3) Crispin Valve
 - 4) Val-Matic – American BFV 150B or 250B

3. Type V504: Buried Butterfly Valve, 4 Inches and Larger
 - a. Valve Style: Mechanical joint end type
 - b. Mechanical joint end connections shall fully conform to ANSI/AWWA C111/A21.11.
 - c. Valve position indicator at valve box locations. Indicator to be hermetically sealed and show valve disc position, direction of rotation, and number of turns from FULLY OPENED to FULLY CLOSED.
 - d. Materials:

- 1) Body: Class 150B valve bodies shall be ASTM A126, Class B gray iron or ASTM A536 Grade 65-45-12 ductile iron. Class 250B valve bodies shall be ASTM A536 Grade 65-45-12 ductile iron.
 - 2) Disc: Valve disc shall also be made from cast iron ASTM A-126 Class B in sizes 20" and smaller. Sizes 24" and larger shall be built from ductile iron in conformance to ASTM A-536. Disc shall be furnished with Type 316 stainless steel seating edge to mate with the rubber seat on the body.
 - 3) Shafts: Shafts shall be Stainless Steel. ASTM A276 Type 304, or Type 316, or ASTM A564, grade 630.
 - 4) Seat: Valve seat shall be Buna-N rubber located on the valve body. In sizes 20" and smaller, valves shall have bonded seats that meet test procedures outlined in ASTM D-429 Method B. Sizes 24" and larger shall be retained in the valve body by mechanical means without use of metal retainers or other devices located in the flow stream. No epoxy attachment method will be allowed.
 - 5) Bearings: Shall be sleeve type that is corrosion resistant and self-lubricating.
 - 6) Manual Actuators: Shall be suitable for buried service. Shall be fully grease packed and have stops in the open/close position. The actuator shall have a mechanical stop which will withstand an input torque of 450 ft. lbs. against the stop. The traveling nut shall engage alignment grooves in the housing. The actuators shall have a built in packing leak bypass to eliminate possible packing leakage into the actuator housing.
 - 7) Hardware: All seat retaining hardware shall be Type 316 stainless steel.
 - e. Manufacturers and Products:
 - 1) Pratt / Mueller
 - 2) Henry Pratt - Class 150B - Groundhog
 - 3) Class 250B - HP-250II
 - 4) Mueller Co. - Class 150 B - Linesal III
 - 5) Class 250 B – Linesal XP
 - 6) DeZurik - AWWA Butterfly Valves (BAW) 150B or 250B
 - 7) Crispin Valve
 - 8) Val-Matic - American BFV 150B or 250B
4. Type V510: Lug Style Butterfly Valve, 2 Inches and Larger
 - a. Cast iron ASTM A126 body, ASTM A351-CF8M discs, Type 18-8 stainless steel or Type 416 stainless steel one-piece stem/shaft, self-lubricating sleeve-type Teflon or bronze bearing, EPDM replaceable resilient seat, self-adjusting multi-ring V-type packing, suitable for temperatures up to 250°F, bubble-tight at 150 psi differential pressure. Flanges and/or mounting design shall be for ANSI B16.1 125- or 150-pound flanges.
 - b. Manufacturers:
 - 1) Henry Pratt – Series 397
 - 2) DeZurik – BOS-CL
 - 3) Bray Valve
 5. Type V511: Wafer-Style Butterfly Valve, 2 Inches and Larger
 - a. Cast iron body, cast iron or ductile iron discs, Type 18-8 stainless steel one-piece stem, self-lubricating sleeve type bearing, EPDM replaceable resilient seat, self-adjusting packing, suitable for temperatures up to 250 degrees F, bubble-tight at 50 psi differential pressure, valve body to fit between ANSI B16.1 flanges.
 - b. Manufacturers:
 - 1) Henry Pratt.
 - 2) DeZurik
 - 3) Bray Valve
 6. Type V512: Plastic Body Butterfly Valve, 8 Inches and Smaller

- a. PVC or CPVC body, CPVC discs, 316 SS stem/shaft, Viton (FKM) seats and seals, suitable for pressures of up to 150 psi at 70°F. The liner seal shall be full seat design such that the disc and seat are the only wetted parts. Flanges and/or mounting design shall be for ANSI B16.5 or ANSI B16.10 bolt patterns
 - b. Manufacturers
 - 1) Asahi/America, Inc.
- F. Check and Flap Valve:
 - 1. Type V600: Check Valve, 2 Inches and Smaller
 - a. All-bronze, screwed ends and cap, swing type replaceable Buna-N disc, rated 125-pound SWP, 200-pound WOG.
 - b. Manufacturers:
 - 1) Stockham.
 - 2) Milwaukee Valve.
 - 2. Type V605: Resilient Seated Swing Check Valve, 3 Inches and Larger
 - a. Valve Connections: Flanged in accordance with ANSI B16.1, Class 125
 - b. The valve shall be in conformance with AWWA C508
 - c. The valves used in potable water service shall be certified to NSF/ANSI 61 Drinking Water System Components – Health Effects, and certified to be Lead-Free in accordance with NSF/ANSI 372.
 - d. The valve body shall be full flow equal to nominal pipe diameter at all points through the valve. The 4 in. (100mm) valve shall be capable of passing a 3 in. (75mm) solid. The seating surface shall be a minimum of 35 degree angle to minimize disc travel. A threaded port with pipe plug shall be provided on the bottom of the valve to allow for field installation of a backflow actuator or oil cushion device without special tools or removing the valve from the line.
 - e. The top access port shall be full size, allowing removal of the disc without removing the valve from the line. The access cover shall be domed in shape to provide flushing action over the disc for operating in lines containing high solids content. A threaded port with pipe plug shall be provided in the access cover to allow for field installation of a mechanical, disc position indicator.
 - f. The disc shall be of one-piece construction, precision molded with an integral O-ring type sealing surface and reinforced with alloy steel. The flex portion of the disc shall have no penetrations, contain nylon reinforcement and shall be warranted for twenty-five years. Non-Slam closing characteristics shall be provided through a short 35 degree disc stroke and a disc accelerator to provide a cracking pressure of 0.3 psig.
 - g. The disc accelerator shall be of one piece construction and provide rapid closure of the valve in high head applications. The disc accelerator shall be enclosed within the valve and shall be field adjustable and replaceable without removal of the valve from the line. The disc accelerator shall be securely held in place captured between the cover and disc. It shall be formed with a large radius to allow smooth movement over the disc surface
 - h. Materials:
 - 1) Body: The valve body and cover shall be constructed of ASTM A536 Grade 65-45-12 ductile iron or ASTM A126 class B gray iron for 30 in. (800mm) and larger. The exterior and interior of the valve shall be coated with an NSF/ANSI 61 approved fusion bonded epoxy coating.
 - 2) Disc: The disc shall be precision molded Buna-N (NBR), ASTM D2000-BG.
 - 3) Hardware: All retaining hardware shall be Type 316 stainless steel.
 - i. Manufacturers and Products:
 - 1) Val-Matic - Surgebuster
 - 2) Henry Pratt – RD-Series
 - 3) DeZurik/APCO – Series 100
 - 4) Crispin – RF/ASR

3. Type V608: Swing Check Valve, 2 Inches and Larger
 - a. AWWA C508, flanged end, cast iron body, bronze mounted valve, solid bronze hinges, stainless steel hinge shaft.
 - b. Valve 2" through 12" rated 175-pound and 14" through 36" rated 150-pound cold water, non-shock. Valve fitted with adjustable outside lever and weight or lever and spring as shown on the drawings. Increasing-pattern body valve may be used where increased outlet piping size is shown.
 - c. Manufacturers:
 - 1) Crispin Valve
 - 2) Val-Matic.
 - 3) DeZurik.
4. Type V609: Air Cushioned Swing Check Valve, 3 Inches and Larger
 - a. AWWA C508, flanged end, cast iron body, bronze mounted valve, solid bronze hinges, stainless steel hinge shaft.
 - b. Valve closure shall be cushioned by the action of a bronze piston in a bronze cushion cylinder. The cushion chamber assembly shall be non-pivoting and be mounted to the side of the valve body on machined pads without the need for brackets. The amount of cushioning shall be adjustable. Pivoting and/or commercial pneumatic cylinders are not acceptable.
 - c. A ductile iron disc arm shall be keyed to and suspended from the hinge shaft. A non-rotational, cast iron disc with replaceable Buna-N rubber disc seat ring shall be attached to the disc arm by means of a center pin and nut providing 360-degree oscillation. The disc seat ring shall be retained by a Type 316 stainless steel follower ring and stainless steel screws.
 - d. Manufacturers:
 - 1) GA Industries – GA Figure 250
 - 2) Or approved equal
5. Type V612: Double Disc Swing Check Valve, 2 Inches and Larger
 - a. Lug wafer style, spring loaded, cast or ductile iron body, aluminum-bronze or ductile iron doors, resilient seats, stainless steel hinge pin, stop pin spring.
 - b. Valve 2 inches through 12 inches rated 200-pound cold water and valve 14 inches through 54 inches rated 150-pound cold water.
 - c. Manufacturers:
 - 1) Crispin Valve.
 - 2) DeZurik.
6. Type V614: Stainless Steel Check Valve, 2 Inches and Smaller
 - a. Type 316 stainless steel body, disc, cap, and trim. Screwed ends and cap, swing-type disc; Class 150.
 - b. Manufacturers and Products.
 - 1) Stockham.
 - 2) Or equal.
7. Type V625: Slanting Disc Check Valve, 2 Inches and Larger
 - a. Two-piece cast iron construction, Body shall be ASTM A126, Grade B cast iron. Disc shall be bronze ASTM B584. Pivot pins and bushing shall be stainless steel. The valve shall be provided with a bottom mounted hydraulic buffer. The buffer shall contact and control the disc closure rate.
 - b. Manufacturer:
 - 1) DeZurik.
 - 2) Val-Matic.
 - 3) Crispin Valve.
8. Type V631: CPVC Ball Check Valve, 4 Inches and Smaller

- a. ASTM D1784 Cell Class 23477B chlorinated polyvinyl chloride body, single or dual union socket weld ends, rated 150 psi at 73 °F, 110 psi at 140 °F, Viton seat and seal.
 - b. Manufacturers:
 - 1) Asahi/America, Inc.
 - 2) Nibco.
 - 3) Spears.
9. Type V632: CPVC Foot Valve with Strainer, 4 Inches and Smaller
 - a. ASTM D1784 Cell Class 23477B chlorinated polyvinyl chloride body, single or dual union socket weld ends, rated 150 psi at 73 °F, 110 psi at 140 °F, CPVC screen, Viton seat and seal.
 - b. Manufacturers:
 - 1) Asahi/America, Inc.
 - 2) Nibco.
 - 3) Spears.
10. Type V635: Check Valve for Air Service, 2 Inches and Larger:
 - a. Check valves for low pressure process air service shall be carbon steel type with 150# flanged ends, rated 150 psig at 300 °F. Valve shall have stainless steel split disc mounted on Type 316 stainless steel center post, such that wafer type butterfly valve can be mounted directly downstream of check valve when discs of both valves are in the OPEN position.
 - b. Manufacturers:
 - 1) Techno Corporation, Style 5003
 - 2) Crane, Style H
11. Type V641: Double Check Valve Assembly, 2-1/2 Inches through 10 Inches
 - a. General:
 - 1) Regulatory Compliance: AWWA-C510-92, CSA B64.5, FCCHR of USC Section 10, ASSE 1048, IAPMO (UPC), SBCCI.
 - 2) Valve Body: Bronze
 - 3) End Connections: Flanged, ANSI B 16.1.
 - 4) Maximum Working Pressure: 175 PSI, (350 Hydrostatic Test Pressure).
 - 5) Temperature Range: 32 Degrees to 140 Degrees Fahrenheit.
 - b. Manufacturers:
 - 1) Febco.
 - 2) Watts.
 - 3) Hersey.
12. Type V642: Reduced Pressure Backflow Preventer, 3/4 Inches and Larger
 - a. General, (3/4 Inches through 2 Inches):
 - 1) Regulatory Compliance: AWWA-C510-92, CSA B64.5, FCCHR of USC Section 10, ASSE 1048, IAPMO (UPC), SBCCI.
 - 2) Valve Body: Bronze
 - 3) End Connection: Threaded, NPT ANSI/ASME B1.20.1
 - 4) Maximum Working Pressure: 175 PSI, (350 Hydrostatic Test Pressure).
 - 5) Temperature Range: 32 Degrees to 140 Degrees Fahrenheit.
 - 6) Shut-off Valves: Full port resilient seated, bronze ball valves with bronze ball valve test cocks.
 - 7) Size(s) and rating(s) as shown in the schedules following this Section.
 - 8) Manufacturers:
 - a) Febco.
 - b) Watts.
 - b. General, (2 Inches and Larger):

- 1) Regulatory Compliance: AWWA-C510-92, CSA B64.5, FCCHR of USC Section 10, ASSE 1048, IAPMO (UPC), SBCCI.
- 2) Valve Body: Ductile or Cast Iron, Class 125
- 3) End Connections: Flanged, ANSI B 16.1
- 4) Maximum Working Pressure: 175 PSI, (350 Hydrostatic Test Pressure).
- 5) Temperature Range: 32 Degrees to 140 Degrees Fahrenheit.
- 6) Shut-off Valves: Non-rising stem, resilient seated gate valves with bronze ball valve test cocks.
- 7) Accessories: Drain line with air gap.
- 8) Size(s) and rating(s) as shown in the schedules following this Section.
- 9) Manufacturers:
 - a) Febco.
 - b) Watts.

13. Type V650: Stainless Steel Flap Valve
 - a. General, (4 Inches and 6 Inches):
 - 1) Valve Body: 316 stainless steel
 - 2) End Connection: Flanged, 125# ANSI B 16.1
 - 3) Seat: buna-n seal
 - 4) Manufacturers:
 - a) Troy Valve.
 - b) Golden Harvest.

G. Self-Contained Automatic Valves:

1. Type V710: Pressure Regulating Valve, 2-1/2 Inches and Smaller
 - a. General:
 - 1) Maximum Inlet Pressure: 200 psig.
 - 2) Outlet Pressure Ranges: 20 to 80 psig.
 - 3) Maximum Allowable Outlet Pressure: 10% above spring setting, or 5 psig above setting, whichever is greater.
 - 4) Maximum Operating Differential: 5 psi.
 - 5) Maximum Operating Temperature: -20 Degrees to 150 Degrees Fahrenheit.
 - b. Construction Materials:
 - 1) Body: Bronze.
 - 2) Spring Case: Cast Iron.
 - 3) Valve Disk and Holder: Nitrile (NBR) and bronze.
 - 4) Diaphragm: Nitrile (NBR)
 - c. Manufacturers:
 - 1) Fisher.
 - 2) Mueller.
2. Type V711: High-Pressure Regulating Valve, 2 Inches and Smaller
 - a. General:
 - 1) Maximum Inlet Pressure: 300 psig.
 - 2) Outlet Pressure Ranges: 5 to 150 psig.
 - 3) Maximum Operating Temperature: 150 Degrees Fahrenheit.
 - b. Construction Materials:
 - 1) Body: Stainless Steel.
 - 2) Spring Case: Stainless Steel.
 - 3) Valve Disk and Holder: Nitrile (NBR) and bronze.
 - 4) Diaphragm: Nitrile (NBR)
 - c. Manufacturers:
 - 1) Fisher.
 - 2) Mueller.
3. Type V712: High-Pressure Regulating Valve, 3 Inches and Smaller

- a. General:
 - 1) Maximum Inlet Pressure: 150 psig.
 - 2) Outlet Pressure Ranges: 5 to 125 psig.
 - 3) Maximum Operating Temperature: 140 Degrees Fahrenheit.
 - b. Construction Materials:
 - 1) Body: Machined PVC
 - 2) Seals: Viton
 - c. Manufacturers:
 - 1) Plast-O-Matic Valves, Inc.
4. Type V713: Pressure Reducing Valve, 1 Inch through 4 Inches
- a. General:
 - 1) Maximum Inlet Pressure: 250 psig (Cast Iron), 300 psig (Steel).
 - 2) Droop: 10% of outlet pressure setting.
 - 3) Maximum Differential Pressure: 150 psig or body rating limit, whichever is lower.
 - 4) Body: Ductile Iron, Cast Steel, or Bronze.
 - 5) Disc Retainer and Diaphragm Washer: Cast Iron, Cast Steel, or Bronze.
 - 6) Stem, Nut and Spring: Stainless Steel
 - 7) Diaphragm: Nylon Reinforced Buna-N Rubber
 - b. Manufacturers:
 - 1) Cla-Val.
 - 2) Fisher.
 - 3) Ross Valve.
5. Type V730: Pressure Relief Valve, 2 Inches and Smaller
- a. Direct diaphragm, spring controlled, Type 316 stainless steel body, spring case, Type 316 stainless steel diaphragm, stainless steel valve stem.
 - b. Capable of opening when upstream-pressure reaches a maximum set point.
 - c. Manufacturers:
 - 1) Fisher.
 - 2) Or equal.
6. Type V731: Pressure Relief Valve, 1/4 Inch through 2 Inches
- a. General:
 - 1) Maximum Line Pressure: 150 psi
 - 2) Setting Range: 15-150 psi
 - b. Capable of opening when upstream-pressure reaches a maximum set point.
 - c. Construction Materials:
 - 1) Body: PVC, CPVC
 - 2) Spring Case: PVC
 - 3) Spring Keepers: PVC
 - 4) Diaphragm: PVC, PTFE
 - 5) Orifice Seal: EPDM, FKM
 - 6) Adjustment Screw: 316 SS
 - d. Manufacturers:
 - 1) Primary Fluid Systems, Inc.
 - 2) Or equal.
7. Type V732: Pressure Relief Valve, Pressure Sustaining Valve, 1 Inch and Larger
- a. Hydraulically operated, diaphragm, actuated, pilot controlled globe valve, cast iron body, ANSI B16.1 flanged ends, rated 175 psi, stainless steel trim, stainless steel stem, externally mounted strainers with cocks, to open when upstream pressure reaches a maximum set point.
 - b. Manufacturers:

- 1) Cla-Val.
- 2) Or equal.

8. Type V750: Well Service Air Valve, 1/2 Inch and Larger
 - a. Fully automatic float operated valve, suitable for vertical turbine pump discharge service, designed to exhaust air which is present in pump column on pump start-up and allow air to re-enter the column on pump shutdown or should a negative pressure occur.
 - b. Valves used in potable water service shall be NSF/ANSI 61 certified.
 - c. Valves 3" and smaller shall be equipped with a dual port throttling device to provide adjustable control of the exhaust rate and allow free air to flow into the valve through a separate inlet port. Valves 4" larger shall be equipped with a regulated exhaust device, which shall allow free airflow in and out of the valve, close upon rapid air exchange, and control the air exhaust rate to reduce pressure surges.
 - d. Valve interiors and exteriors shall be coated with an NSF/ANSI 61 certified fusion bonded epoxy in accordance with AWWA C550.
 - e. Connections:
 - 1) Inlet-Valve sizes 3 in. and smaller shall have full size NPT inlets and outlets equal to the nominal valve size. The body inlet connection shall be hexagonal for a wrench connection. Valve sizes 4 in. and larger shall have bolted flange inlets equal to the valve size. Flanges shall be in accordance with ANSI B16.1 for Class 125 or Class 250 iron flanges and ANSI B16.42 for Class 300 ductile iron flanges.
 - f. Outlets-Valve sizes 6 in. and smaller shall have NPT outlets; Valves 8 in. and larger shall have ANSI B16.1 Class 125 outlet flanges. The valve shall have two additional NPT connections for the addition of Air Release Valves, gauges, testing, and draining.
 - g. Materials: The Well Service Air Valve body, cover, and baffle shall be constructed of ASTM A126 Class B cast iron for Class 125 and Class 250 valves. Class 300 ductile iron valves shall be constructed of ASTM A536 Grade 65-45-12 cast ductile iron. The float, guide shafts, and bushings shall be constructed of Type 316 stainless steel. Non-metallic guides and bushings are not acceptable. Resilient seats shall be Buna-N.
 - h. Manufacturers:
 - 1) Val-Matic.
 - 2) DeZurik.
 - 3) Crispin Valve.
9. Type V752: Wastewater Combination Air Valves, 1 Inch and Larger
 - a. Valve shall be automatic float operated valve designed to exhaust large quantities of air during the filling of a piping system and close upon liquid entry. The valve shall open during draining or if a negative pressure occurs. The valve shall also release accumulated air from a piping system while the system is in operation and under pressure.
 - b. Valve shall perform functions of both air release and Air/Vacuum valves and be furnished as a single body.
 - c. Valve shall be suitable for use with domestic sewage.
 - d. Valve body and structure shall be constructed of cast iron or ductile iron. Float, guide shafts and bushings shall be stainless steel.
 - e. Manufacturers:
 - 1) Val-Matic.
 - 2) DeZurik.
 - 3) Crispin Valve.

10. Type V755: Clean Water Combination Air Valve, 1 Inch and Larger

- a. Valve shall be automatic float operated valve designed to exhaust large quantities of air during the filling of a piping system and close upon liquid entry. Valve shall open during draining or if negative pressures occur. Valve shall also release accumulated air from a piping system while system is in operation and under pressure.
 - b. Valve shall perform functions of both air release and Air/Vacuum valves and be furnished as a single body.
 - c. Valves used in potable water shall be NSF/ANSI certified.
 - d. Valve body and structure shall be constructed of cast iron or ductile iron. Float, guide shafts and bushings shall be stainless steel.
 - e. Manufacturers:
 - 1) Val-Matic.
 - 2) DeZurik.
 - 3) Crispin Valve.
- 11. Type V780: Safety Relief Valve for Air Service, 1-1/2 Inch through 3 Inches
 - a. Spring loaded, adjustable pressure relief valve for process air service, with stainless steel trim; seat material suitable for elevated temperatures above 300 °F, test pull ring or lever.
 - b. Manufacturers:
 - 1) Kunkle.
 - 2) Apollo Valve
- 12. Type V785: Safety Relief Valve for Air Service
 - a. Exposed spring, full nozzle with stainless steel trim, cast steel body, seat material suitable for elevated temperatures above 300 °F.
 - b. Manufacturers:
 - 1) Kunkle.
- H. Miscellaneous Valves:
 - 1. Type V901: Diaphragm Valve, 1/2 Inch and Larger
 - a. Diaphragm valves shall be weir type with solid CPVC body and bonnet. Provide with Type 316 stainless steel bushing bolts, and other integral metallic components (etc., sleeve and stem). All metallic components shall be isolated for contact with fluid and the surrounding atmosphere. Valves 1/2" through 2" shall have true union socket ends. Valves 2-1/2" and larger shall have ANSI flanged ends. Manual operator shall be indicating, rising stem type with hand wheel. Valve working pressure shall be 100 psig at 120 °F. Valve must also be suitable for testing at elevated pressure per respective flow stream as indicated in Piping Schedule. Diaphragm shall be PTFE or Viton.
 - b. Manufacturers:
 - 1). George Fisher.
 - 2). Asahi/America, Inc.
 - 2. Type V902: Pinch Valve
 - a. Iron body, fanged ends, TFE Teflon sleeves, upper and lower pinch bars, and hand wheel operator.
 - b. Manufacturer:
 - 1). Red Valve Co.
 - 3. Type V903: Anti-Siphon/Back Pressure Valves, 2 Inch and Smaller
 - a. Spring controlled diaphragm, CPVC body, with a safety vent, to close when upstream pressure reaches a minimum set point and serve as an anti-siphon device. Rated 150 psi. The safety vent shall be connected to a leak containment system which shall include clear polyethylene tubing connecting to a vented, CPVC spill chemical neutralization bucket appropriate for the chemical service.

- b. Construction Materials:
 - 1) Body: CPVC
 - 2) Diaphragm: PTFE
 - c. Manufacturers:
 - 1) Plast-O-Matic Valves, Inc.
 - 2) Or equal.
- 4. Type V910 Telescoping Valve, 4 Inches through 36 Inch
 - a. Valve configuration shall be as shown on the Drawings and detailed within the Supplements following End of Section.
 - b. Complete assembly consisting of rising stem, slip tube, seal flange, lifting bail, valve stand with indicator and motor, when required, and Type 316 stainless steel anchor bolts and mounting hardware.
 - c. Slip tube shall be Type 304 stainless steel, manufactured from seamless pipe or tube, with a minimum wall thickness of 1/8" and must be of sufficient length to facilitate valve travel and maintain an appropriate insert depth.
 - d. A stainless steel companion flange and neoprene slip seal gasket shall be provided. The gasket shall be a minimum 1/4-inch thick, mounted to allow sliding and shall be watertight throughout the travel of the slip tube.
 - e. Lift shall be handwheel type and stem shall be of the rising type, stainless steel, thrust bearings, automatic self-locking, and provide infinite valve positioning. A clear plastic Butyrate stem cover shall be provided with a mylar strip type position indicator, calibrated in 1/4-inch increments to illustrate valve position.
 - f. Manufacturers and Products:
 - 1) Troy Valve
 - 2) Waterman; TS-2.
 - 3) Golden-Harvest
 - 4) Amwell; Type RP.
- 5. Type V915: Mud Valve
 - a. Cast iron body tapered seat, bronze disc and seat ring, frame flanged, nonrising type stem, bronze extension stem, 2" square operating nut for floor box operation, and stem guides for maximum unsupported stem length of 5 feet.
 - b. Manufacturers and Products:
 - 1) Waterman; MV11.
 - 2) Clow; F-3075.
 - 3) Troy Valve; A25600RB
- 6. Type V916: Mud Valve
 - a. Type 316 stainless steel body tapered seat, disc and seat ring, frame flanged, nonrising type stem, stainless steel extension stem, 2" square operating nut for floor box operation, and stem guides for maximum unsupported stem length of 5 feet.
 - b. Manufacturers and Products:
 - 1) Waterman.
 - 2) Clow.
 - 3) Troy Valve
- 7. Type V940 Solenoid Valve, 2 Inches and Smaller
 - a. Two-way internal pilot operated diaphragm type, brass body, resilient seat suitable for air or water, solenoid coil molded epoxy, NEMA Class A, 120 volts ac, 60-Hz, unless otherwise indicated. Solenoid enclosure NEMA 250, Type 4 unless otherwise indicated. Size and normal position (OPEN or CLOSED when de-energized) as indicated.
 - b. Minimum operating pressure differential no less than 5 psig, maximum operating pressure differential no greater than 125 psig.
 - c. Manufacturers and Products:

- 1) ASCO
- 2) Skinner

8. Type V941 Plastic Body Solenoid Valve, 2 Inches and Smaller
 - a. Two-way internal pilot operated diaphragm type, PVC body, resilient seat suitable for air or water, solenoid coil molded epoxy, NEMA 4X, 120 volts ac, 60-Hz, unless otherwise indicated. Solenoid enclosure NEMA 250, Type 4 unless otherwise indicated. Size and normal position (OPEN or CLOSED when de-energized) as indicated.
 - b. Minimum operating pressure differential no less than 5 psig, maximum operating pressure differential no greater than 140 psig.
 - c. Manufacturers and Products:
 - 1) Plast-O-Matic Valves, Inc.
 - 2) Or Equal.

2.6 TAGGING REQUIREMENTS

- A. See Section 22 05 53, MECHANICAL IDENTIFICATION.
- B. The tags shall be attached to the valves by soldered split key rings so that ring and tag cannot be removed. The tag shall bear the 1/4" die-stamped equipment identification number as indicated in the Contract Documents.

2.7 ACCESSORIES

- A. T-Handled Operating Wrench:
 1. 2 each galvanized operating wrenches, 4 feet long.
 2. Manufacturers and Products:
 - a. Mueller; No. A-24610.
 - b. Clow No.; F-2520.
 3. 2 each galvanized operating keys for cross handled valves.
- B. Cast Iron Valve Box: Designed for traffic loads, sliding type, with minimum of 6" ID shaft.
 1. Box: Cast iron with minimum depth of 9".
 2. Lid: Cast iron, minimum depth 3", marked for the appropriate service.
 3. Extensions: Cast iron.

PART 3 - EXECUTION

3.1 SHIPPING, STORAGE, HANDLING, AND PROTECTION

- A. As specified in Section 01 60 00, PRODUCT REQUIREMENTS.

3.2 INSTALLATION

- A. Flange Ends:
 1. Flanged valve bolt holes shall straddle vertical centerline of pipe.
 2. Clean flanged faces, insert gasket and bolts, and tighten nuts progressively and uniformly.
- B. Screwed Ends:
 1. Clean threads by wire brushing or swabbing.
 2. Apply joint compound.
- C. Valve Orientation:

1. Install operating stem vertical when valve is installed in horizontal runs of pipe having centerline elevations 4' 6" or less above finished floor, unless otherwise shown.
 2. Install operating stem horizontal in horizontal runs of pipe having centerline elevations between 4' 6" and 6' 9" above finish floor, unless otherwise shown.
 3. Orient butterfly valve shaft so that unbalanced flows or eddies are equally divided to each half of the disc, i.e., shaft is in the plane of rotation of the eddy.
 4. If no plug valve seat position is shown, locate as follows:
 - a. Horizontal Flow: The flow shall produce an "unseating" pressure, and the plug shall open into the top half of valve.
 - b. Vertical Flow: Install seat in the highest portion of the valve.
- D. Install a line size ball valve and union upstream of each solenoid valve, in-line flow switch, or other in-line electrical device, excluding magnetic flow meters, for isolation during maintenance.
- E. Install safety isolation valves on compressed air.
- F. Locate valve to provide accessibility for control and maintenance. Install access doors in finished walls and plaster ceilings for valve access.
- G. Extension Stem for Operator: Where the depth of the valve is such that its centerline is more than 3 feet below grade. Furnish an operating extension stem with 2" operating nut to bring the operating nut to a point 6" below the surface of the ground and/or box cover.
- H. Torque Tube: Where operator for quarter-turn valve is located on floor stand. Furnish extension stem torque tube of a type properly sized for maximum torque capacity of the valve.
- I. Floor Box and Stem: Steel extension stem length shall locate operating nut in floor box.
- 3.3 TESTS AND INSPECTION
- A. Valve may be either tested while testing pipelines, or as a separate step.
 - B. Test that valves open and close smoothly with operating pressure on one side and atmospheric pressure on the other, in both directions for two-way valve and applications.
 - C. Inspect air and vacuum valves as pipe is being filled to verify venting and seating is fully functional.
 - D. Count and record number of turns to open and close valve; account for any discrepancies with Manufacturer's data.
 - E. Set, verify, and record set pressures for all relief and regulating valves.
 - F. Automatic valve to be tested in conjunction with control system testing.
 - G. Test hydrostatic relief valve seating; record leakage. Adjust and retest to maximum leakage of 0.1 gpm per foot of seat periphery.
- 3.4 MANUFACTURER'S SERVICES
- A. A Manufacturer's representative for the equipment specified herein shall be present at the jobsite for the minimum person-days listed for the services herein under, travel time excluded:
 1. 2 person-days for installation assistance, inspection, and certification of the installation. Provide certificate.
 2. 2 person-days for functional and performance testing.
 3. 2 person-days for pre-startup classroom or jobsite training of OWNER'S personnel.

- B. Training of OWNER'S personnel shall be at such times and at such locations as requested by OWNER.
- C. See Section 01 79 00, Demonstration and Training.

3.5 MANUFACTURER'S CERTIFICATE(S)

- A. Provide Manufacturer's certificate(s) in accordance with Section 01 79 00.

3.6 SUPPLEMENTS

- A. The supplements listed below, following "END OF SECTION," are a part of this Specification.
 - 1. Power Operated Valve Schedule.

END OF SECTION

SECTION 40 24 00 - PROCESS PIPING SPECIALTIES

PART 1 - GENERAL

1.1 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American National Standards Institute (ANSI):
 - a. B16.1, Cast Iron Pipe Flanges and Flanged Fittings.
 - b. B16.5, Pipe Flanges and Flanged Fittings.
 - 2. American Society for Testing and Materials (ASTM):
 - a. A153, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - b. A276, Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
 - 3. National Fire Protection Association (NFPA): 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances.

1.2 SUBMITTALS

- A. Shop Drawings: Manufacturer's data on materials, construction, end connections, ratings, overall lengths, and live lengths (as applicable).

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide required piping specialty items, whether shown or not shown on the Drawings, as required by applicable codes and standard industry practice.
- B. Rubber ring joints, mechanical joints, flexible couplings, and proprietary restrained ductile iron pipe joints are considered flexible joints; welded pipe joints are not.

2.2 CONNECTORS

- A. Teflon Bellows Connector:
 - 1. Type: Two convolutions unless otherwise shown, with metal reinforcing bands.
 - 2. Flanges: Ductile iron, drilled 150 psi ANSI B16.5 standard.
 - 3. Working Pressure Rating: 140 psi, minimum, at 120 ° F.
 - 4. Thrust Restraint: Limit bolts to restrain the force developed by the specified test pressure.
 - 5. Manufacturers and Products:
 - a. Garlock; Style 214.
 - b. Resistoflex; No. R6904.
- B. Elastomer Bellows Connector:
 - 1. Type: Fabricated spool, with single filled arch.
 - 2. Materials: Nitrile tube and neoprene cover.
 - 3. End Connections: Flanged, drilled 125-pound ANSI B16.1 standard, with full elastomer face and steel retaining rings.
 - 4. Working Pressure Rating: 140 psig, minimum, at 180° F for sizes 12" and smaller.
 - 5. Thrust Restraint: Control rods to limit travel of elongation and compression.
 - 6. Manufacturers and Products:
 - a. Goodall Rubber Co.; Specification E-1462.
 - b. Garlock; Style 204.
- C. Sleeve Type Coupling Manufacturers:

1. Dresser.
2. Rockwell.

D. Closure Collar Concrete: As specified in Section 03 30 00, CAST-IN-PLACE CONCRETE.

2.3 EXPANSION JOINTS

A. Elastomer Bellows:

1. Type: Reinforced, molded wide-arch.
2. End Connections: Flanged, drilled 125-pound ANSI B16.1 standard with split galvanized steel retaining rings.
3. Washers: Over the retaining rings to help provide a leak proof joint under test pressure.
4. Thrust Protection: Control rods to protect the bellows from overextension.
5. Bellows Arch Lining: Buna-N, nitrile, or butyl.
6. Rated Temperature: 250° F.
7. Rated Deflection and Pressure:
 - a. Lateral Deflection: 3/4" minimum.
 - b. Burst Pressure: Four times the working pressure.
 - c. Compression deflection and minimum working pressure as follows:

Size (inch)	Deflection (inch)	Pressure (psig)
2-1/2 to 12	1.06	150
14	1.65	130
16 to 20	1.65	110

8. Manufacturers and Products:
 - a. General Rubber Corp.; Style 1015 Maxijoint.
 - b. Mercer; Flexmore Style 450.
 - c. Goodall Rubber Co.; Specification E-711.

B. Teflon Bellows:

1. Type: Three convolutions, with metal reinforcing bands.
2. Flanges: Ductile iron, drilled 150 psi ANSI B 16.5 standard.
3. Working Pressure Rating: 100 psig, minimum, at 120° F.
4. Thrust Restraint: Limit bolts to restrain the force developed by the specified test pressure.
5. Manufacturers and Products:
 - a. Garlock; Style 215.
 - b. Resistoflex; No. R6905.

C. Copper Pipe Expansion Compensator:

1. Material: All bronze.
2. Working Pressure Rating: 125 psig, minimum.
3. Accessories: Anti-torque device to protect the bellows.
4. Manufacturers and Products:
 - a. Flexonics; Model HB.
 - b. Hyspan; Model 8509 or 8510.

D. Galvanized and Black Steel Pipe Expansion Compensator:

1. Material: Carbon steel with stainless steel bellows.
2. Working Pressure Rating: 150 psig, minimum.
3. Accessories: Anti-torque device to protect the bellows.
4. Manufacturers and Products:
 - a. Flexonics; Model H.
 - b. Hyspan; Model 8503.

- E. Flexible Metal Hose:
 - 1. Type: Close pitch, annular corrugated with single braided jacket.
 - 2. Material: Stainless steel, ASTM A276, Type 321.
 - 3. End Connections:
 - a. 3" and Larger: Shop fabricated flanged ends to match mating flanges.
 - b. 2-1/2" and Smaller: Screwed ends with one union end.
 - 4. Minimum Burst Pressure: 600 psig at 70° F for 12" and smaller.
 - 5. Length: Provide hose live-length equal to the lengths shown on the Drawings.
 - 6. Manufacturers and Products:
 - a. Flexonics; Series 401M.
 - b. Anaconda; BWC21-1.

2.4 FLEXIBLE PIPE CONNECTIONS TO EQUIPMENT

- A. Manufacturers and Products:
 - 1. Flexonics; Model TCS, with tie bolts.
 - 2. Keflex; Type 152-TR, with tie bolts.

2.5 SERVICE SADDLES

- A. Double-Strap Iron:
 - 1. Pressure Rating: Capable of withstanding 150 psi internal pressure without leakage or over stressing.
 - 2. Run Diameter: Compatible with the outside diameter of the pipe on which the saddle is installed.
 - 3. Taps: Iron pipe threads.
 - 4. Materials:
 - a. Body: Malleable or ductile iron.
 - b. Straps: Galvanized steel.
 - c. Hex Nuts and Washers: Steel.
 - d. Seal: Rubber.
 - 5. Manufacturers and Products:
 - a. Smith-Blair; Series 313 or 366.
 - b. Dresser; Style 91.
- B. Nylon-Coated Iron:
 - 1. Pressure Rating: Capable of withstanding 150 psi internal pressure without leakage or over stressing.
 - 2. Run Diameter: Compatible with the outside diameter of the pipe on which the saddle is installed.
 - 3. Materials:
 - a. Body: Nylon-coated iron.
 - b. Seal: Buna-N.
 - c. Clamps and Nuts: Stainless steel.
 - 4. Manufacturer and Product:
 - a. Smith-Blair; Style 315 or 317.

2.6 INSULATING FLANGES, COUPLINGS, AND UNIONS

- A. Materials:
 - 1. In accordance with the applicable piping material specified in the Pipe Data Sheets.
 - 2. Galvanically compatible with piping.
- B. Union Type:
 - 1. 2" and Smaller: Screwed or solder-joint.
 - 2. 2-1/2" and Larger: Flanged, complete with bolt insulators, dielectric gasket, bolts, and nuts.

- C. Working Pressure Rating: Suitable for specified system working pressure.
- D. Manufacturers and Products:
 - 1. Dielectric Flanges and Unions:
 - a. Epco Sales, Inc.
 - b. Capitol Insulation Unions.
 - 2. Insulating Couplings:
 - a. Dresser; STAB-39.
 - b. R. H. Baker; Series 216.

2.7 WALL PIPES

- A. Ductile Iron Wall Pipe:
 - 1. For penetrations through concrete walls, floors, slabs, or roofs that are to be watertight.
 - 2. Diameter and Ends: Same as connecting ductile iron pipe.
 - 3. Thickness: Equal to or greater than remainder of pipe in line.
 - 4. Fittings: In accordance with applicable Pipe Data Sheet.
 - 5. Thrust Collars:
 - a. Provide for all wall pipes.
 - b. Rated for thrust load developed at 250 psi.
 - c. Safety Factor: 2, minimum.
 - d. Material and Construction:
 - Ductile iron or cast iron, cast integral with wall pipe wherever possible.
 - Fabricate welded attachment of ductile iron thrust collar to pipe where casting impossible. Perform in pipe manufacturer's shop by qualified welders. Electric arc welds of ductile iron with NI-55 or FC-55 nickel-iron-carbon weld rod. Continuously weld on each side all around.
 - 6. Manufacturers: American Cat Iron Pipe Co.; U.S. Pipe and Foundry Co.
 - 7. Coating After Fabrication: Prepare and coat wall pipe in accordance with and as specified in Section 09 90 00, PAINTING AND PROTECTIVE COATINGS, System No. 2
- B. Steel or Stainless Steel Wall Pipe:
 - 1. Same material and thickness as connecting pipe, except 1/4-inch minimum thickness.
 - 2. Lining: Same as connecting pipe.
 - 3. Thrust Collar: Unless otherwise shown, 3 inches greater than outside diameter of wall pipe. Continuously fillet weld on each side all around.
 - 4. Coating After Fabrication: Prepare and coat wall pipe in accordance with and as specified in Section 09 90 00, PAINTING AND PROTECTIVE COATINGS, System No. 2
 - 5. Restraint: Provide lugs for use with thrust ties as specified.

2.8 PIPE SLEEVES

- A. Steel Pipe Sleeve:
 - 1. Material: 3/16" minimum thickness steel pipe.
 - 2. Seep Ring:
 - a. 3/16" minimum thickness center steel flange for water stoppage on sleeves in exterior or water-bearing walls.
 - b. Outside Diameter: 3" greater than pipe sleeve outside diameter.
 - c. Continuously fillet weld on each side all around.
 - 3. Factory Finish:
 - a. Galvanizing:
 - Hot-dip applied, meeting requirements of ASTM A153.
 - Electroplated zinc or cadmium plating is unacceptable.
 - b. Shop Lining and Coating: Factory prepare, prime, and finish coat in accordance with Section 09 90 00, PROTECTIVE PAINTING AND COATINGS, System No.2.

- B. Insulated and Encased Pipe Sleeve:
 - 1. Manufacturer: Pipe Shields, Inc.; Models WFB, WFB-CS and -CW Series, as applicable.
- C. Modular Mechanical Seal:
 - 1. Type: Interconnected synthetic rubber links shaped and sized to continuously fill annular space between pipe and wall sleeve opening.
 - 2. Fabrication: Assemble interconnected rubber links with ASTM A276, Type 316 stainless steel bolts, nuts, and pressure plates.
 - 3. Size: According to Manufacturer's instructions for the size of pipes shown to provide a watertight seal between pipe and wall sleeve opening, and to withstand a hydrostatic head of 40 feet of water.
 - 4. Manufacturer: Thunderline Link-Seal.

2.9 MISCELLANEOUS SPECIALTIES

- A. Strainers for Process Water Service, 2" and Smaller:
 - 1. Type: Bronze Body, Y-Pattern, 200 psi non-shock rated, with screwed gasketed bronze cap.
 - 2. Screen: Heavy gauge Type 304 stainless steel or Monel, 20-mesh
 - 3. Manufacturers:
 - a. Armstrong International, Inc.; Model F
 - b. Mueller Steam Specialty; Model 351M.
- B. Strainers for CPVC, Plastic Piping Systems, 4" and Smaller:
 - 1. Type: Y-pattern CPVC body, 150 psi non-shock rated, with screwed CPVC cap; and PTFE Teflon seals as recommended by manufacturer for service.
 - 2. End Connections: Screwed or solvent weld, 2" and smaller. Class 150 ANSI flanged, 1-1/2" and larger.
 - 3. Screen: Heavy-gauge CPVC, 1/32" mesh, minimum 2 to 1 screen area to pipe size ratio.
 - 4. Manufacturers and Products: Hayward; Series 85/80, or equal.
- C. Spray Nozzles:
 - 1. Scum Spray Nozzle Type 1:
 - a. Spray Pattern: Even
 - b. Spray Angle: 140° at 60 psi
 - c. Material: 316 Stainless Steel
 - d. Deflection Angle: 75°
 - e. Capacity: 8 gpm at 40 psi
 - f. Size: 1/2" NPT
 - g. Provide nozzle with adjustable ball fitting
 - h. Manufacturer and Produce: Spraying System Co., Nozzle Type K; or equal.
 - 2. Scum Spray Nozzle Type 2:
 - a. Spray Pattern: Solid narrow angle cone-shaped spray pattern with round impact area
 - b. Spray Angle: 15° at 40 psi
 - c. Material: 316 stainless steel
 - d. Capacity: 3 gpm at 40 psi
 - e. Size: 1/4" NPT
 - f. Provide nozzle with adjustable ball fitting
 - g. Manufacturer and Product: Spraying System Co., Nozzle Type G-15; or equal.
 - 3. Scum Spray Nozzle Type 3:
 - a. Spray Pattern: Deflected flat spray pattern at low pressure
 - b. Counterweight lever which when lifted, allows the solid stream flow to purge nozzle.
 - c. Material: Bronze with neoprene rubber deflector
 - d. Size: 1/4" NPT

- e. Manufacturer and Product: Spraying System Co., 22561 Foam Control Spray Nozzles; or equal.
- D. Quick Couplings:
 - 1. Provide female NPT by male quick-connect hose adaptors. All adapters and couplers shall satisfy dimensional requirements of MIL-C-27487E and shall be cast iron and sized shown on the Drawings.
 - 2. Manufacturers and Products: Swagelock; Series QH.
- E. Quick Disconnect Cam Operating Couplings for Chemical Service:
 - 1. Type: Twin cam arm actuated, male and female, locking, for chemical loading and transfer.
 - 2. Material: Glass-filled polypropylene and PVDF with Teflon gaskets and as recommended for the service by Manufacturer.
 - 3. End Connections: NPT threaded or flanged to match piping connections.
 - 4. Hose shanks for chemical installations.
 - 5. Plugs and Caps: Female dust cap for each male end, male dust plug for each female end.
 - 6. Pressure Rating: 125 psi, minimum at 70° F.
 - 7. Manufacturers:
 - a. OPW; Kamlock
 - b. Ryan Herco; 1300 Series
 - c. Goodall; Basic Eight
- F. Chemical Injection Quills:
 - 1. Retractable injection quill, service rated for 250 psi, including stainless steel check valve, ball valve, solution tube adaptor, packing nut, restraint system, and limit chains, and 300 Series O-ring gaskets.
 - 2. Manufacturer and Products: SAF-T-FLO; or equal.

PART 3 - EXECUTION

3.1 SHIPPING, STORAGE, HANDLING, AND PROTECTION

- A. As specified in Section 01 60 00, PRODUCT REQUIREMENT.
- B. Install process piping specialties in accordance with manufacturer's directions, as shown on the Drawings, and as specified herein.

3.2 PIPING FLEXIBILITY PROVISIONS

- A. General:
 - 1. Install thrust protection.
 - 2. Install flexible couplings to facilitate piping installation, in accordance with approved shop drawings.
- B. Flexible Joints at Concrete Backfill or Encasement: Install within 18" or one-half pipe diameter, whichever is less, from the termination of any concrete backfill or concrete encasement.
- C. Flexible Joints at Concrete Structures:
 - 1. Install 18" or less from the face of structures; joint may be flush with face.
 - 2. Install a second flexible joint, whether or not shown.
 - a. Pipe Diameter 18" and smaller: Within 18" of the first joint.
 - b. Pipe Diameter Larger than 18": Within one pipe diameter of the first joint.

3.3 PIPING TRANSITION

- A. Applications:
 - 1. Provide complete closure assembly where pipes meet other pipes or structures.
 - 2. Pressure Pipeline Closures: Plain end pieces with double flexible couplings, unless otherwise shown.
 - 3. Restrained Joint Pipe Closures: Install with thrust tie-rod assemblies as shown or in accordance with NFPA 24.
 - 4. Gravity Pipe Closures: As specified for pressure pipelines, or concrete closures.
 - 5. Concrete Closures: Use to make connections between dissimilar pipes where standard rubber gasketed joints or flexible couplings are impractical, as approved.
 - 6. Elastomer sleeves bonded to pipe ends are not acceptable.
- B. Installation:
 - 1. Flexible Transition Couplings: Install in accordance with coupling Manufacturer's instructions to connect dissimilar pipe and pipes with a small difference in outside diameter.
 - 2. Concrete Closures:
 - a. Locate away from structures so that there are at least two flexible joints between the closure and pipe entering the structure.
 - b. Clean pipe surface before closure collars are placed.
 - c. Wet non-metallic pipe thoroughly prior to pouring collars.
 - d. Prevent concrete from entering pipe.
 - e. Extend collar a minimum of 12" on each side of joint with minimum thickness of 6" around outside diameter of pipe.
 - f. Make entire collar in one placement.
 - g. After concrete has reached initial set, cure by covering with well moistened earth.

3.4 PIPING EXPANSION

- A. Piping Installation: Allow for thermal expansion due to differences between installation and operating temperatures.
- B. Expansion Joints:
 - 1. Grooved Joint and Flanged Piping Systems: Elastomer Bellows Expansion Joint.
 - 2. Nonmetallic Pipe: Teflon Bellows Expansion Joint.
 - 3. Screwed and Soldered Piping Systems: Copper or Galvanized and Black Steel Pipe Expansion Compensator, as applicable.
 - 4. Pipe Run Offset: Flexible Metal Hose.
- C. Anchors and Anchor Walls: Install as specified in Section 22 05 29, PROCESS SUPPORTS AND ANCHORS, to withstand expansion thrust loads and to direct and control thermal expansion.

3.5 SERVICE SADDLES AND THRUST TIES

- A. Service Saddles:
 - 1. Ferrous Metal Piping (except stainless steel): Double-strap iron.
 - 2. Plastic Piping: Nylon-coated iron.
- B. Thrust Ties:
 - 1. Install where shown and where required to restrain the force developed by the specified test pressure.
 - 2. Steel Pipe: Attach with fabricated lugs.
 - 3. Ductile Iron Pipe: Attach with socket clamps against a grooved joint coupling or flange.
 - 4. Flanged Coupling Adapters: For exposed installations, install Manufacturer's anchor studs through the coupling sleeve.

- C. Installation: Install in accordance with Manufacturer's written instructions.
 - 1. Before coupling, clean pipe holdback area of oil, scale, rust, and dirt.
 - 2. Remove pipe coating if necessary to present smooth surface.

3.6 FLEXIBLE PIPE CONNECTIONS TO EQUIPMENT

- A. Tie Bolts: Tighten snug prior to applying any pressure to the system.

3.7 INSULATING FLANGES, COUPLINGS, AND UNIONS

- A. Applications:
 - 1. Copper to ferrous metal piping connections.
 - 2. Cathodically protected piping penetration to buildings and watertight structures.
 - 3. Submerged to un-submerged metallic piping connections.
 - 4. Where required for electrically insulated connection.
- B. Installation of Insulating Kits: Drill oversize to accommodate insulating sleeves through the bolt holes, assuming standard bolt sizes.
- C. Pipe Installation:
 - 1. Insulating joints connecting immersed piping to non-immersed piping shall be installed above maximum water surface elevation.
 - 2. All submerged carbon steel, ductile iron, or galvanized piping in reinforced concrete basins shall be isolated from the concrete reinforcement steel.

3.8 WALL PIPES

- A. Applications:
 - 1. As specified in Section 40 23 39, PROCESS PIPING - GENERAL
 - 2. Watertight and Below Ground Penetrations:
 - a. Wall pipes with thrust collars.
 - b. Provide taps for stud bolts in flanges to be set flush with wall face.
 - c. Existing Walls: Rotary drilled holes.
 - 3. Wall Pipe Installation:
 - a. Isolate embedded metallic piping from concrete reinforcement.
 - b. Support wall pipes securely by formwork to prevent contact with reinforcing steel and tie-wires.

3.9 PIPE SLEEVES

- A. Application:
 - 1. As specified in Section 40 23 39, PROCESS PIPING - GENERAL.
 - 2. Above Grade in Non-submerged Areas: Hot-dip galvanized after fabrication.
 - 3. Below Grade or in Submerged or Damp Environments: Shop-lined and coated.
- B. Installation:
 - 1. Support non-insulating type securely in form work to prevent contact with reinforcing steel and tie-wires.
 - 2. Caulk joint with rubber sealant or seal with wall penetration seal.

3.10 MISCELLANEOUS SPECIALTIES

- A. Install in accordance with manufacturer's instructions.

END OF SECTION

DIVISION 44
POLLUTION CONTROL EQUIPMENT

SECTION 44 42 56.46 – VERTICAL CLOSE-COUPLED SOLIDS-HANDLING PUMP

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Vertical close-coupled solids-handling pumps and components to be supplied by the Contractor.
- B. Related Sections:
 - 1. The following Sections are related to the Work described in this Section. This list of Related Sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the CONTRACTOR to see that the completed Work complies accurately with the Contract Documents.
 - a. Section 26 05 00: Common Work Results for Electrical

1.2 QUALITY ASSURANCE

- A. Qualifications of manufacturer:
 - 1. The proposed manufacturer of equipment shall have been successfully engaged in the manufacture of similar equipment for at least 5 years prior to the start of this work and shall have a record of installations acceptable to the Engineer.
 - 2. Pump(s) are to be engineered and manufactured under the certification of ISO-9001:2000.
- B. Qualifications of installer:
 - 1. Use only skilled and experienced workmen who are thoroughly trained in the fabrication and installation of the selected equipment.
- C. Unit Responsibility: Pump(s), complete with motor, coupling, necessary guards and all other specified accessories and appurtenances shall be furnished by the pump manufacturer to insure compatibility and integrity of the individual components, and provide the specified warranty for all components.
- D. Codes and standards:
 - 1. Materials shall be suitable for service conditions. Iron castings shall be tough, close grained gray cast iron free from blowholes, flaws, or excessive shrinkage and shall conform to ASTM A48. Structural and miscellaneous fabricated steel used in items of equipment shall conform to the Standards of the American Institute of Steel Construction. All structural members shall be considered as subject to shock or vibratory loads.
 - 2. Electric motors shall be designed and applied in compliance with NEMA, ANSI, IEEE, and AFBMA standards and the NEC for the specific duty imposed by the driven equipment.

1.3 SUBMITTALS

- A. Shop Drawings:
 - 1. Within 30 days after award of Contract, and before any of the materials of this Section are delivered to the job site, submit complete Shop Drawings and catalog cuts to the Engineer in accordance with the provisions of Section 01 33 00, SUBMITTAL PROCEDURES of these Specifications, showing details of all equipment of this Section.
- B. Manufacturer's recommendations:
 - 1. Accompanying the Shop Drawings, submit two copies of the manufacturer's current recommended method of installation.

1.4 PRODUCT HANDLING

A. Protection:

1. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements and shall be kept thoroughly dry at all times. Pumps, motors, electrical equipment, and other equipment having antifriction or sleeve bearings shall be stored in weather tight warehouses which are maintained at a temperature at least 60 degrees F.
2. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. All painted surfaces which are damaged prior to acceptance of equipment shall be repainted to the satisfaction of the Engineer.
3. Electrical equipment, controls, and insulation shall be protected against moisture or water damage. All space heaters provided in the equipment shall be kept connected and operating at all times until equipment is placed in service.

B. Replacements:

1. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. The vertical close-coupled dry-pit solids-handling pump specified in this section shall be furnished by and be the product of one manufacturer.
- B. Where a Manufacturer's standard equipment name and/or model number is listed, the equipment system shall be provided as modified to conform to the performance, functions, features, and materials of construction as specified herein.
- C. Manufacturer of components and accessories specified herein shall be as follows:
 1. Fairbanks Nijhuis
 2. Or approved equal

2.2 PUMP CONSTRUCTION

- A. General: Major components shall be of gray cast iron, ASTM A-48, Class 30, with smooth surfaces devoid of blowholes or other casting irregularities.
- B. Type: vertical wet-pit centrifugal pump, driven by a vertical, submersible squirrel cage induction motor
- C. Volute/Casing
 1. The pump casing shall be ASTM 48, Class 30, cast-iron capable of hydrostatic test @150% of maximum discharge pressure and have a register fit to ensure alignments. The volute is to be of one piece circular constant flow, equalizing pressure design with smooth fluid passages large enough to pass any size solid that can pass through the impeller. Tapping openings provided for priming, venting, draining and suction and discharge gauge connections. Piping connection to be as shown per pump data sheet.
 2. The volute shall be side flanged tangential discharge and capable of rotation in 45 degree increments to accommodate piping orientation. Diffusion vanes are not permitted.
 3. The volute shall be furnished with large cleanout openings located at the impeller centerline, to allow access to the impeller. Volute priming, drain and 1/2" minimum gauge connections shall be provided. Flanges shall be 125 lbs. (250 lb. discharge flange on 6" C5446) flat faced flanges per ANSI drilling.

4. The casing shall be designed to permit the removal of the rotating assembly without disturbing the suction or discharge piping. The casing shall be hydrostatically tested to 1.5 times the design head or 1.25 times the shutoff head whichever is greater.
- D. Shaft Assembly
1. The pump shaft shall be constructed of high-strength 400 Series stainless steel with a minimum 100,000 PSI tensile strength and 75,000 PSI yield strength of sufficient diameter to carry the maximum loads imposed and to prevent vibration and fatigue.
 2. The shaft shall be accurately machined along its entire length and precision ground at bearing locations. Keyways shall be provided at both ends.
 3. A renewable straight shaft sleeve, positive adhesive sealed to prevent leakage between the shaft and the sleeve, shall protect the shaft through the sealing box area.
 4. The shaft sleeve shall be stainless steel with a Brinell hardness of 300 to 350.
 5. Radial inboard bearings shall be single-row grease lubricated ball bearings designed to carry the hydraulic radial loads encountered in the service conditions. Thrust outboard bearings shall be single-row designed to carry the pump hydraulic axial and dead load thrust. Bearing shall be designed for a nominal L10 life of 100,000 hours per AFBMA at best efficiency point.
- E. Rotation
1. The pump will have clockwise rotation when viewed from the driver end looking at the pump.
- F. Impeller
1. The impeller shall contain a stainless steel A743 GR CA-40 300 BHN wear ring.
 2. The impeller shall be of one-piece construction, single suction, two-vane, enclosed, radial flow design with well-rounded leading vanes and then tapered toward the trailing edge for a circular flow pattern. Impellers shall be dynamically balanced and secured to the shaft by means of a bolt, washer, and key. The arrangement shall be such that the impeller cannot be loosened from torque in either forward or reverse rotation.
 3. All impellers are to be statically balanced to insure smooth operation, also hydraulically balanced except in some small sizes where end thrust is but a minor factor.
 4. The clearance between the impeller outside diameter and cutwater shall be capable of passing a 3.5" sphere.
 5. The arrangement shall be such that the impeller cannot be loosened from torque in either forward or reverse rotation.
- G. Fronthead
1. The fronthead shall be made of close-grained cast iron conforming to ASTM A48 CL30. It shall be cast separately (integrally on B5441) to the volute and connected to the (suction elbow)(combination base elbow).
- H. Backhead
1. A separately cast close-grained cast iron backhead with large access openings and integral sealing box conforming to ASTM A48 Class 30 shall be provided.
 2. The sealing box shall be designed for use with conventional packing and mechanical seal without requiring re-machining.
 3. The sealing box shall be furnished with a 1/4" injection and vent tap for a clear water or grease connection to a water seal ring to prevent air from entering the pump through the sealing box.
 4. A 3/4" minimum sealing box drain tap shall be provided. Sealing box leakage will be collected by the packing box drain trough and piped directly to drain, eliminating any drippage to the floor.
 5. A minimum of 5 rings of graphite impregnated synthetic packing and a split PTFE Coating water seal ring shall be furnished. Glands shall be two-piece split interlocking made of bronze held in place by studs and nuts.

- I. Base and Elbow
 - 1. A rugged heavy duty fabricated steel base, with openings large enough to permit access to the suction elbow and cleanout, bolted directly to the volute shall be provided.
 - 2. The base shall be designed to support the assembled weight of the pump and driver. A cast iron 5" x 6" suction elbow, contoured handhole cleanout, and 125 lb flat-faced flange conforming to ANSI drilling shall be furnished.
 - 3. A heavy duty integrally cast one-piece base and elbow made of cast iron conforming to ASTM A48 Class 30 shall be provided. Base elbow is to be furnished with gauge connections to handhole cleanout located 180 degrees from the suction flange. Suction flange will be 6" 125 lb flat-faced flange conforming to ANSI drilling.
- J. Frame
 - 1. The bearing frame shall be close-grained cast iron conforming to ASTM A48 Class 30 and of heavy, rugged design for carrying the bearings and machined for accurate and permanent bearing alignment completely enclosing the shaft between the bearings.
 - 2. The bearing housing shall be of dust proof design incorporating lip type grease seals in contact with the shaft to prevent the entrance of contaminants.
 - 3. Jacking bolts for external impeller adjustment are required. Zerk-type grease fittings for bearing lubrication shall be supplied at the bearing housings.
- K. Hardware
 - 1. All machine bolts, nuts, and capscrews shall be of the hex head type and will not require the use of any special tools.
- L. Shop painting:
 - 1. See structural steel and miscellaneous metal for non-submerged metals.
- M. Vibration Limitations
 - 1. The limits of vibration as set forth in the standards of the Hydraulic Institute shall govern.
- N. Balance:
 - 1. All rotating parts shall be accurately machined and shall be in as rotational balance as is possible. Excessive vibration shall be cause for rejection of equipment. Resonance shall be avoided at operating speeds.
 - 2. Vibration displacement (peak to peak) as measured at any point on the machine shall not exceed requirements of the Hydraulic Institute at any operating speed.
 - 3. At any operating speed, the ratio of rotative speed to the critical speed of a unit or components shall be less than 0.8 or more than 1.3.
 - 4. Contractor shall provide the services of an independent testing company to check the balance of the installed pump at operating conditions and submit a report to the Engineer at no additional cost to the Owner. Tests shall include displacement, velocity, and critical speed of vibrations with certified test results. Testing services shall be Cullum-Brown Company, ABC (American Bearing Co.), Douglas Pump Co, or approved equal.

PART 3 - EXECUTION

3.1 TESTING

- A. The pump(s) shall be performance tested for flow, head, and efficiency, and hydrostatic tested and the manufacturer's plant prior to shipment, in accordance with Hydraulic Institute '1U' Test Standards. Certified copies of the test curves and hydrostatic test results shall be submitted to the engineer for approval.

3.2 SURFACE CONDITIONS

A. Inspection:

1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
2. Verify that all equipment may be properly installed in accordance with all pertinent codes and regulations, the original design, and the referenced standards.

B. Discrepancies:

1. In the event of discrepancies, immediately notify the Engineer.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.3 INSTALLATION

3.4 SHIPPING, STORAGE, HANDLING, AND PROTECTION

- #### A.
- As specified in Section 01 60 00, PRODUCT REQUIREMENTS.

3.5 INSTALLATION

- #### A.
- Work shall be as specified in Section 01 60 00, PRODUCT REQUIREMENTS.

3.6 PAINTING AND COATING

- #### A.
- Shop prime and field finish paint ferrous metal in accordance with and as specified in Section 09 90 00 PAINTING AND PROTECTIVE COATINGS Division 09, FINISHES, System No. 2 for all submerged metal surfaces and System No.4 for all non submerged metal surfaces.
- #### B.
- Exposed metal surfaces of motors, gear reducers, and drive assemblies shall be factory prepared and primed and field finish coated in accordance with Section 09 90 00 PAINTING AND PROTECTIVE COATINGS Division 09, FINISHES, System No. 4.

3.7 FACTORY TESTS

- #### A.
- Motor Tests and Test Reports: As specified in Division 26, ELECTRICAL.
- #### B.
- Balance of Vibration: The rotating parts of each pump and its driving unit shall be dynamically balanced before final assembly. The driving unit alone shall operate without vibration in excess of the limits stated in the latest revision of NEMA MG 1.

3.8 FIELD TESTS

- #### A.
- Functional Test: Prior to plant startup, all equipment described herein and in the Submersible Pump Data Sheets following shall be inspected for proper alignment, quiet operation, proper connection, and satisfactory performance by means of a functional test. Provide certification of test results. Tests and certification shall be as specified in Section 01 78 23 OPERATION AND MAINTENANCE DATA.
- #### B.
- Vibration Test: The complete assembly, consisting of the driving unit and pump, connected and in normal operation, shall not develop amplitudes of vibration exceeding limits recommended by the current edition of Hydraulic Institute Standards. If directed by Engineer, vibration tests shall be conducted at Contractor's sole expense to determine amplitude of vibration, and Contractor shall make any corrections necessary to meet these requirements. If corrections are made, a second vibration test shall be done following corrections.

3.9 MANUFACTURER'S SERVICES

- A. Provide representative for three (3) days on-site to verify correct installation, equipment testing, equipment certification, and personnel training.

3.10 MANUFACTURER'S CERTIFICATE(S)

- A. Provide Manufacturer's certificate(s). In accordance with Section 01 79 00, DEMONSTRATION AND TRAINING.

END OF SECTION

Section 44 42 56.46.1 – VERTICAL CLOSE-COUPLED SOLIDS-HANDLING PUMP(S)

PROJECT: Addison Kellway By-Pass
OWNER: Town of Addison
EQUIPMENT NAME(S): Lift Station Pump No. 3
EQUIPMENT TAG NUMBER(S): Pump No. 3
CONTROL PANEL(S): Pump Controller MCCA
TOTAL PUMPS REQUIRED: 1

MANUFACTURERS**MODEL**

Fairbanks Nijhuis 5" Discharge x 6" Suction Model 5443
Or approved equal

SERVICE CONDITIONS**PERFORMANCE REQUIREMENTS**

Liquid Pumped:	Wastewater	Capacity (US gpm): Primary (Secondary):	910 (1650)
Specific Gravity at 60 deg F:	62.36 lb/cf	Total Dynamic Head (ft) Primary (Secondary):	90 (60)
Largest dia. Solid pump shall be capable of passing:	3.5 in	Min Shutoff Head (ft):	116
Explosion Proof (Y/N)	Y	Max Shutoff Head (ft):	120
Pumping Temperature (°F)	65 °F	NPSH Required (ft) Primary (Secondary):	24 (26)
Max pump speed at rated capacity	1780 rpm	Efficiency (%) Primary (Secondary)	70 (74)

EQUIPMENT DESCRIPTION

Casing Material:	Cast Iron, ASTM A48 Class 30	Impeller Shaft Material:	400 Series Stainless Steel
Casing Wear Ring Material:	Stainless Steel 410	Suction Flange:	6 inch
Impeller Type:	Single suction, enclosed two vane	Discharge Flange:	5 inch
Impeller Material:	Cast Iron, ASTM A48 Class 30		
Impeller Wear Ring (Y/N):	Y	Packing (Y/N):	Y
Impeller Wear Ring Material:	Stainless Steel A743 GR CA-40	Double Mechanical Seal (Y/N):	N

MOTOR DATA

Type: Vertical Solid Shaft, Premium Efficiency
Manufacturer: For multiple units of the same type of equipment, furnish motors and accessories of a single manufacturer.
Hazardous Location: ☒ Furnish motors for hazardous (classified) locations that conform to UL 674 and have an applied UL listing marking

Motor Horsepower:	50	Mounting Type:	<input type="checkbox"/> Horizontal	<input checked="" type="checkbox"/> Vertical
Voltage:	460	Enclosure Type:	WPI	
Phase:	3	Material:	Cast Iron, A48 Class 35B	
Frequency:	60 Hz	Load Class:		
Synchronous Speed:	1800 rpm	<input type="checkbox"/> Multispeed, Two speed:	_____ rpm	
Service Factor:	<input type="checkbox"/> 1.0 <input checked="" type="checkbox"/> 1.15			

☒ Adjustable Speed Drive: See Division 26, ELECTRIC. Provide Inverter Duty Rated Motors.
Windings: ☐ One ☐ Two ☒ Thermal protection embedded in windings.
Motor nameplate horsepower shall not be exceeded at any operational point.
Provide ☒ Space Heater ☒ Oversize main terminal (conduit) box for motors ☒ Moisture detection switches.

SPECIAL FEATURES / NOTES

See Division 26 for general instrumentation and control requirements.

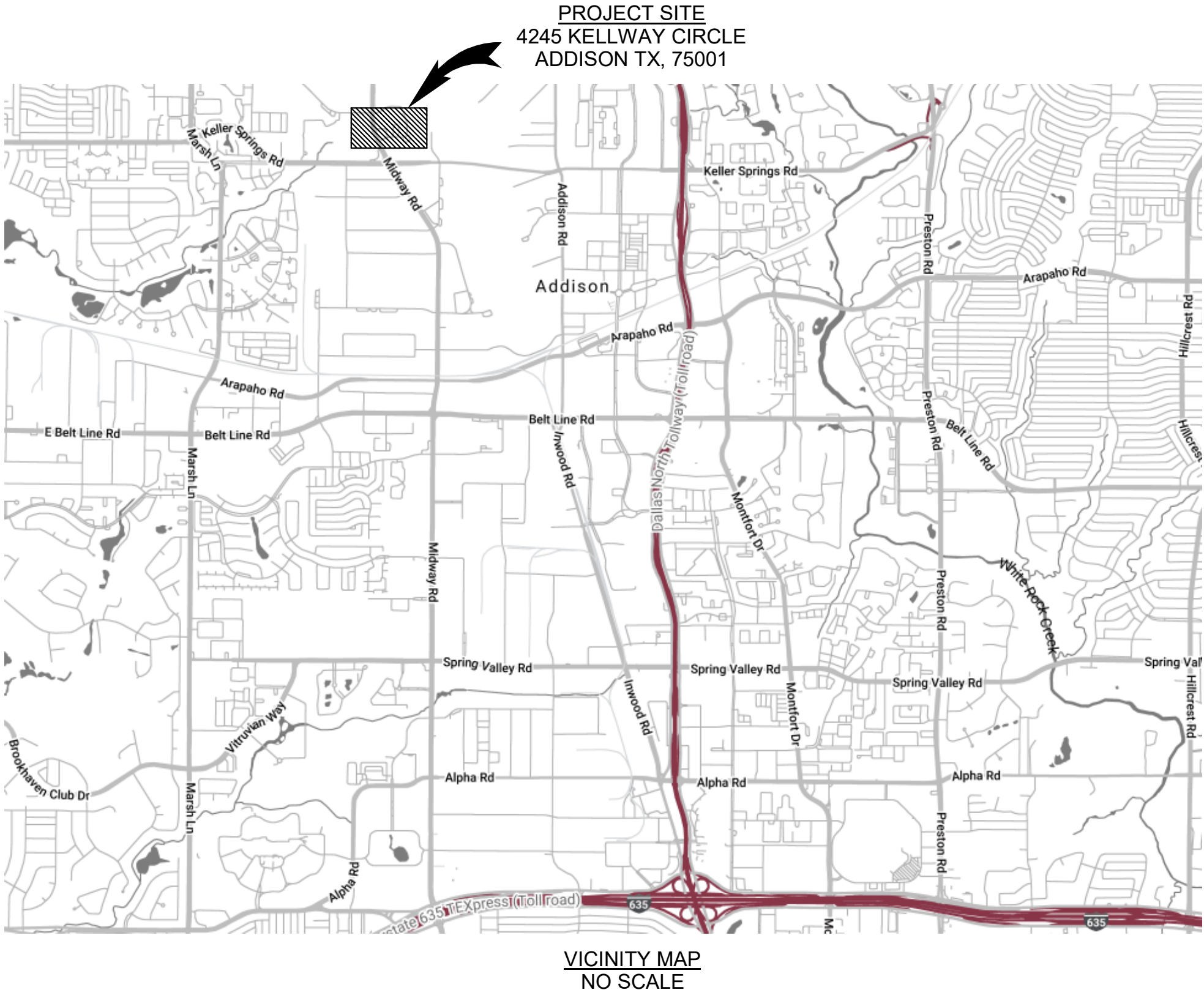
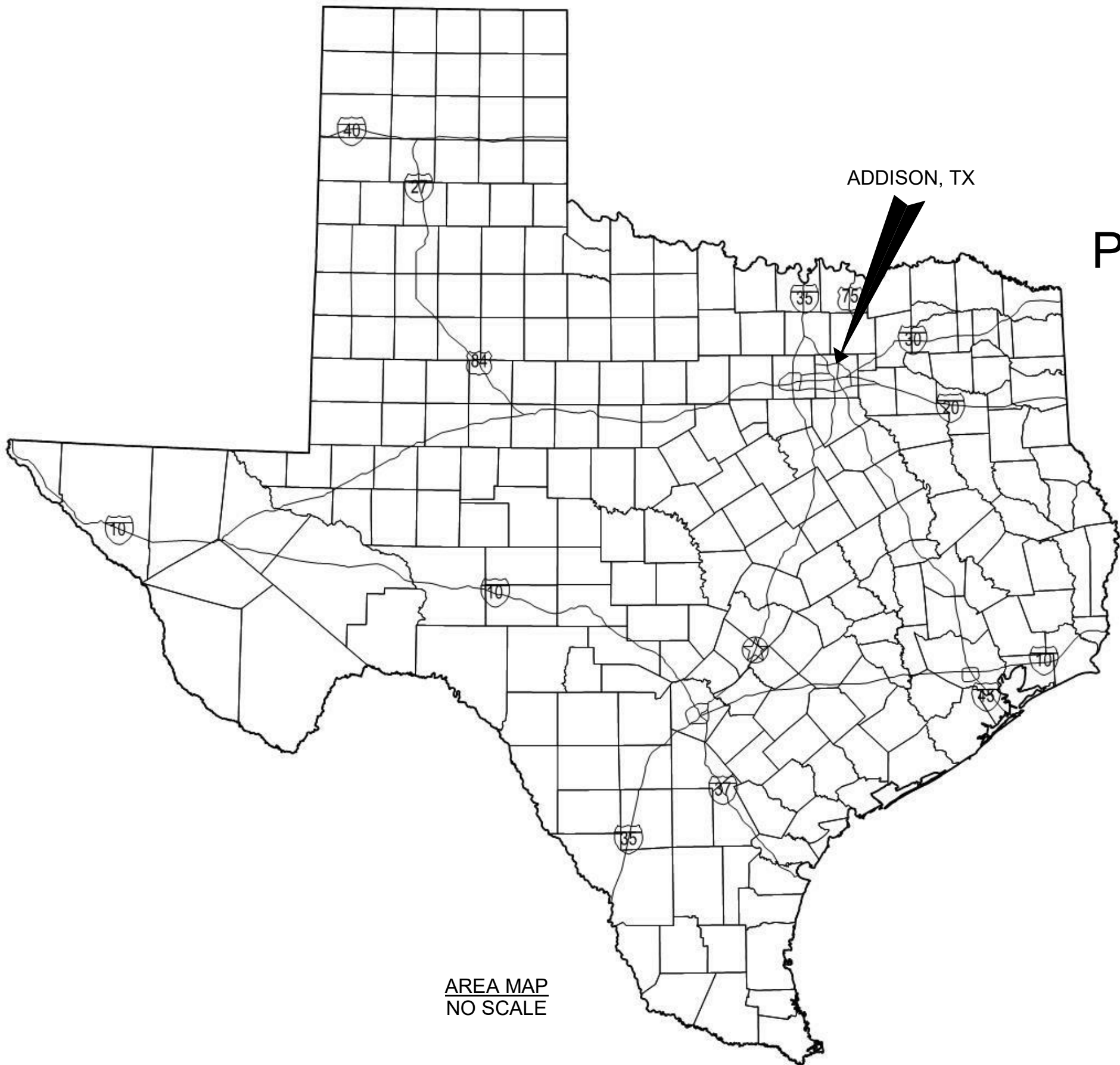


TOWN OF ADDISON, TX

KELLWAY LIFT STATION BY-PASS PROJECT



PUBLIC WORKS AND ENGINEERING
DEPARTMENT
BID #21-53



CLIENT PROJECT NO. 2021-03C
GARVER PROJECT NO. 20W05015
MARCH 2021



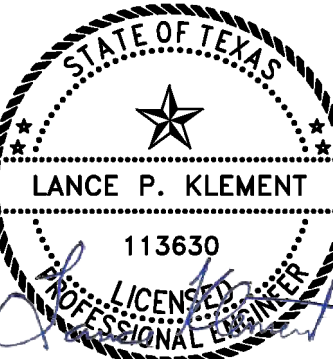
3010 Gaylord Parkway Suite 190
Frisco, TX 75034
Phone: 972-377-7480

01 - GENERAL		
SHEET NO.	DWG. NO.	DESCRIPTION
01	01-G001	COVER SHEET
02	01-G002	CIVIL NOTES, LEGENDS, AND ABBREVIATIONS
03	01-G003	PROCESS MECHANICAL NOTES, LEGENDS, AND ABBREVIATIONS
04	01-G004	ELECTRICAL NOTES, LEGENDS, AND ABBREVIATIONS
05 - SITE CIVIL		
SHEET NO.	DWG. NO.	DESCRIPTION
05	05-C103	PROPOSED SITE PLAN
06	05-C501	CIVIL DETAILS I
07	05-C502	CIVIL DETAILS II
10 - LIFT STATION		
SHEET NO.	DWG. NO.	DESCRIPTION
08	10-M101	LIFT STATION LOWER FLOOR PLAN
09	10-M301	SECTION I
10	10-M302	SECTION II
11	10-M401	DETAILS I
12	10-E101	LIFT STATION ELECTRICAL ROOM PLAN
13	10-E102	LIFT STATION LOWER POWER PLAN
90 - ELECTRICAL		
SHEET NO.	DWG. NO.	DESCRIPTION
14	90-E501	ELECTRICAL ONELINE DIAGRAM
15	90-E701	DETAIL SHEET I
16	90-E702	DETAIL SHEET II



© 2021 GARVER, LLC
THIS DOCUMENT, ALONG WITH THE
IDEAS AND DESIGNS CONVEYED
HEREIN, SHALL BE CONSIDERED
INSTRUMENTS OF PROFESSIONAL
SERVICE AND ARE PROPERTY OF
GARVER, LLC. ANY USE,
REPRODUCTION, OR DISTRIBUTION
OF THIS DOCUMENT, ALONG WITH
THE IDEAS AND DESIGN CONTAINED
HEREIN, IS PROHIBITED UNLESS
AUTHORIZED IN WRITING BY
GARVER, LLC OR EXPLICITLY
ALLOWED IN THE GOVERNING
PROFESSIONAL SERVICES
AGREEMENT FOR THIS WORK.

REGISTRATION NO.
F-5713



Digitally Signed 3/15/2021

REV	DATE	DESCRIPTION	BY

TOWN OF ADDISON, TX
4245 KELLWAY CIRCLE
ADDISON TX, 75001
KELLWAY LIFT STATION BY-PASS
PROJECT

COVER SHEET

JOB NO.: 20W05015
DATE: MARCH 2021
DESIGNED BY: CAT
DRAWN BY: AEG

BAR IS ONE INCH ON
ORIGINAL DRAWING 1"
IF NOT ONE INCH ON THIS SHEET,
ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER

01-G001

SHEET
NUMBER **01**

File: L:\2020\20W05015 - Addison Kellway LS Bypass Pump Imps\Drawings\01-G002.dwg Last Save: 2/10/2021 11:44 AM Last saved by: MA\Walker
Last plotted by: Walker, Mark A. Plot Style: AECmono.ctb Plot Scale: 1:0.4255 Plot Date: 3/12/2021 4:15 PM Plotter used: DWG To PDF.pc3

GENERAL CIVIL NOTES

1. SAFETY SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR SAFETY, MEANS, OR METHODS OF THE CONTRACTOR.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL APPROPRIATE AGENCIES BEFORE WORK COMMENCES TO VERIFY THE TYPE LOCATION, PROTECTION REQUIREMENTS, DEPTH OF ALL EXISTING UTILITIES, DRAINAGE FACILITIES, AND OTHER OBSTRUCTIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH REPAIRING AND/OR REPLACING ANY SUCH ITEMS DAMAGED DURING CONSTRUCTION.
3. CAUTION: UNDERGROUND UTILITIES SHOWN ARE TAKEN FROM EXISTING RECORDS AND ARE SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. THE CONTRACTOR SHALL CONTACT ALL UTILITY OWNERS AND CONFIRM LOCATIONS OF UTILITIES AT LEAST 48 HOURS BEFORE BEGINNING CONSTRUCTION. THE CONTRACTOR SHALL ACCURATELY LOCATE AND UNCOVER ALL EXISTING UTILITIES BEFORE BEGINNING CONSTRUCTION. ANY DAMAGE RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. WHERE CROSSING OF EXISTING UTILITIES OCCUR, PROVIDE 12" MINIMUM CLEARANCE EXCEPT WATER MAINS SHALL BE 24". CROSS UNDER ALL WATER MAINS WHERE NOT POSSIBLE TO PROVIDE 18" CLEARANCE.
4. SEWER AND WATER SERVICE SHALL BE MAINTAINED DURING ENTIRE CONSTRUCTION PERIOD OR TEMPORARY FACILITIES PROVIDED.
5. CONTRACTOR IS RESPONSIBLE FOR ALL DEWATERING ACTIVITIES AND ASSOCIATED PERMITS REQUIRED FOR ALL EXCAVATIONS REQUIRED TO COMPLETE THE PROJECT.
6. APPROXIMATE LOCATIONS OF OVERHEAD POWER LINES MAY OR MAY NOT BE SHOWN ON PLANS. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR VERIFYING ALL LOCATIONS IN THE FIELD AND PLAN WORK IN THESE AREAS ACCORDINGLY.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE DRAINAGE AND COMPLIANCE WITH ALL GOVERNMENTAL STORM WATER REGULATIONS AND PERMITS (SWPPP) AS REQUIRED.
8. IT SHALL BE THE CONTRACTOR'S SOLE RESPONSIBILITY TO PROVIDE TRAFFIC CONTROL AND SIGNAGE FOR THE DURATION OF PROJECT AS REQUIRED BY THE NATIONAL MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES - PART VI, AND/OR ALL OTHER APPLICABLE GUIDELINES OF TXDOT, COUNTY, CITY OR ANY OTHER AUTHORITIES HAVING JURISDICTION OVER THE PROJECT AREAS.
9. CONTRACTOR SHALL MAINTAIN TRAFFIC FLOW TO RESIDENCES AND BUSINESS WITH MINIMUM DISRUPTION OF ACCESS.
10. ALL STREETS AND DRIVEWAYS SHALL BE OPEN CUT UNLESS NOTED OTHERWISE.
11. ALL EXCAVATION BACKFILL OUTSIDE TRAFFIC WAYS SHALL BE COMPACTED TO MIN 95% STANDARD PROCTOR DENSITY TO PREVENT SETTLEMENT.



















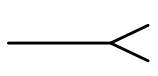








PAVING AND GRADING NOTES

1. ANY PAVEMENT DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED TO EQUAL OR BETTER CONDITION AT THE CONTRACTORS EXPENSE.
2. ANY DISTURBED AREAS NOT SPECIFICALLY DESIGNATED TO BE GRADED SHALL BE RESTORED TO EQUAL OR BETTER CONDITION AND SHALL BE GRADED TO DRAIN AS APPROVED BY THE ENGINEER.
3. FINAL PAVEMENT SURFACES SHALL NOT BE PLACED UNTIL ALL MAJOR CONSTRUCTION ACTIVES HAVE CONCLUDED.
4. ANY CHANGES TO FINAL GRADE ELEVATIONS AS SHOWN ON THE PLANS SHALL BE APPROVED BY THE ENGINEER.
5. ALL ASPHALT AND CONCRETE PAVING REMOVED AND REPLACED SHALL BE NEAT SAW CUT.
6. ALL OPEN CUT TRAFFIC WAYS (ROADS, PARKING LOTS, DRIVES, ETC.) AND ALL AREAS LYING WITHIN PRISM OF TRAFFIC WAYS, SHALL HAVE CRUSHED STONE BACKFILL COMPACTED WITH VIBRATORY COMPACTOR MAXIMUM 6" LIFTS AND COMPACTED TO MINIMUM 100%-98% MODIFIED PROCTOR DENSITY TO PREVENT SETTLEMENT FOR ITS ENTIRE TRENCH HEIGHT AND WIDTH. COMPACTED "PUG-MIX" SHALL BE USED AND MAINTAINED IN TOP 12" OF TRENCH HEIGHT AS REQUIRED TO PREVENT AGGREGATE LOSS DUE TO TRAFFIC.

YARD PIPING NOTES

1. MINIMUM COVER OVER PIPING SHALL BE 3'-0", BELOW FINISHED GRADE.
2. PROVIDE MINIMUM PIPE COVER, AS SPECIFIED. IN GENERAL LAY PIPE TO UNIFORM GRADES BETWEEN THE ELEVATIONS SHOWN, UNLESS OTHERWISE APPROVED. IN SOME CASES, EXISTING CONDITIONS PROHIBIT UNIFORM GRADES BETWEEN THE ELEVATIONS SHOWN, AND FIELD ADJUSTMENTS TO UNIFORM GRADES ARE REQUIRED AS APPROVED BY ENGINEER.
3. SIZE OF FITTINGS SHOWN ON PLANS SHALL CORRESPOND TO ADJACENT STRAIGHT RUN OF PIPE, UNLESS OTHERWISE INDICATED. TYPE OF JOINT AND FITTING MATERIAL SHALL BE AS SPECIFIED FOR ADJACENT STRAIGHT RUN OF PIPE.
4. ALL JOINTS SHALL BE WATERTIGHT.
5. ALL BURIED PIPING SPECIFIED TO BE PRESSURE TESTED, EXCEPT FLANGED, WELDED, OR SCREWED PIPING. SHALL BE PROVIDED WITH THRUST RESTRAINT. THRUST RESTRAINT FOR ALL PIPING SHALL BE BY CONCRETE THRUST BLOCKS AT ALL DIRECTION CHANGES, UNLESS OTHERWISE NOTED. SEE THRUST RESTRAINT DETAILS
6. CONTRACTOR SHALL LOCATE AND UNCOVER ALL CONNECTIONS TO EXISTING LINES, AND ANY POSSIBLE CONFLICTS WITH PROPOSED FACILITIES AND VERIFY LOCATION, ELEVATION, PIPE MATERIAL, AND PIPE O.D. PRIOR TO ANY CONSTRUCTION.
7. CONTRACTOR SHALL MAINTAIN AND PROTECT ALL EXISTING BURIED PIPING AND UTILITIES. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGED UNDERGROUND FACILITIES.
8. ALL SMALL DIAMETER PIPING SHALL BE INSTALLED AS SHOWN ON DRAWINGS WITH ALL FITTINGS AND VALVES AS REQUIRED TO PROVIDE A FUNCTIONAL PIPELINE AS SPECIFIED.
9. ALL BURIED VALVES SHALL BE INSTALLED WITH VALVE BOX PER STANDARD DETAIL D40-2343-006.
10. ALL PIPELINE SHUTDOWNS SHALL BE COORDINATED WITH THE OPERATORS. A WRITTEN WORK PLAN SHALL BE SUBMITTED AND APPROVED BY THE ENGINEER AND OWNER 24 HOURS PRIOR TO ANY SHUTDOWNS.
11. ROCK SHALL BE UNDERCUT A MINIMUM OF 4" AND PIPE BEDDED IN STONE. NO SEPARATE PAY ITEM EXISTS FOR ROCK EXCAVATION. ALL EXCAVATION SHALL BE CONSIDERED TO BE UN-CLASSIFIED EXCAVATION AND SUBSIDIARY TO OTHER BID ITEMS.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER DISPOSAL OF THE EXISTING PIPE, EXISTING MANHOLES, AND ANY EXCESS MATERIALS RESULTING FROM THE WORK.
13. WHERE BYPASS PUMPING IS REQUIRED DURING THE PROJECT, PUMPING SHALL BE HELD TO A MINIMUM. ROUND-THE-CLOCK BYPASS PUMPING IS NOT ALLOWED. AT END OF EACH DAYLIGHT CONSTRUCTION PERIOD, EXISTING WASTEWATER WILL BE TEMPORARILY ROUTED TO NEW OR EXISTING PIPES WITH FITTINGS, PIPE, HOSE, OR OTHER APPURTENANCES AS REQUIRED AND DITCH LINES SHALL BE BACKFILLED TO EXISTING GRADE. COST OF THIS WORK SHALL BE INCLUDED IN PIPE INSTALLATION UNLESS LISTED AS A SEPARATE BID ITEM.
14. CONTRACTOR SHALL PREVENT STORM WATER AND DEBRIS FROM ENTERING PIPES AND MANHOLES AT ALL TIMES. ALL PIPES AND MANHOLES SHALL BE SECURELY PLUGGED AT THE END OF EACH DAY.
15. THE CONTRACTOR SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION. THE TRENCH EXCAVATION AND SHORING SAFETY SYSTEM, AS OUTLINED IN THE TECHNICAL SPECIFICATIONS, WILL BE REQUIRED AS A MINIMUM TRENCH SAFETY MEASURE. THE CONTRACTOR SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND PROCEDURES. THE SEAL OF THE PROFESSIONAL ENGINEER(S) HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED IN THE WORK.

CIVIL LEGEND

SYMBOL	DESCRIPTION
LINE "A" 24" DI	PROPOSED SANITARY SEWER
CTV	CABLE TV
SS _x	EXISTING SANITARY SEWER
W _x	EXISTING WATER MAIN
GM	EXISTING GAS MAIN
E	EXISTING UNDERGROUND ELECTRIC
E _x	EXISTING OVERHEAD ELECTRIC
PM	EXISTING PROCESS MAIN
FW	FILTERED WATER
C/E	CONSTRUCTION EASEMENT
PL	PROPERTY LINE
PD	PROCESS DRAIN
RW	RAW WATER
SW	SETTLED WATER
WW	WASH WATER
=====	EXISTING STORM SEWER
-----	GRAVEL ROAD OR DRIVE
-----X-----	FENCE
-----	WATER EDGE
~~~~~	TREE LINE
	TREE OR SHRUB
	EXISTING FIRE HYDRANT
	EXISTING YARD HYDRANT
	EXISTING VALVE
	PROPOSED VALVE
	EXISTING WATER METER
	EXISTING ELECTRIC MANHOLE
	PROPOSED SEWER MANHOLE
	EXISTING SEWER MANHOLE
	CATCH BASIN
	SIGN
	TELEPHONE PEDESTAL
	EXISTING STORM SEWER INLET
	BENCH MARK
	SURVEY CONTROL POINT
	UTILITY POLE
	GUIDE WIRE ANCHOR
	CONCRETE WING WALL
	SLOPE DIRECTION INDICATOR
	PROPERTY PIN
	LIGHT POLE
	DEMOLISH OR REMOVE
	EXISTING ASPHALT
	PROPOSED ASPHALT
	PROPOSED STRUCTURE
	EXISTING CONCRETE
	PROPOSED CONCRETE

GENERAL CONVENTIONS LEGEND

SYMBOL	DESCRIPTION
	PROJECT NORTH
	CALLOUT DENOTES A CUT SECTION TYPICAL REFERENCE (THIS EXAMPLE OCCURS ON SHEET A101 REFERENCING SECTION No. 1 ON SHEET A301)
	CALLOUT DENOTES AN ELEVATION REFERENCE (THIS EXAMPLE OCCURS ON SHEET A101 REFERENCING ELEVATION No. 1 ON SHEET A201)
	CALLOUT DENOTES AN ENLARGED AREA TYPICAL REFERENCE (THIS EXAMPLE OCCURS ON SHEET A101 REFERENCING DETAIL No. 1 ON SHEET A401)
	CALLOUT DENOTES A STANDARD DETAIL REFERENCE
	CALLOUT DENOTES A KEYED NOTE REFERENCE
	SYMBOL INDICATES NORTH DIRECTION
	SYMBOL INDICATES A GRAPHICAL BAR SCALE
	CLOUDED REGION INDICATES A REVISED AREA
	SYMBOL INDICATES A ROOM / AREA DESIGNATION WITH ROOM NUMBER AND SQUARE FOOTAGE
	SYMBOL INDICATES A STRUCTURAL GRIDLINE OR DATUM
	SYMBOL INDICATES A DATUM IN A SECTION OR ELEVATION

© 2018 GARVER, LLC  
THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGNS CONVEYED HEREIN, SHALL BE CONSIDERED INSTRUMENTS OF PROFESSIONAL SERVICE AND ARE PROPERTY OF GARVER, LLC. ANY USE, REPRODUCTION, OR DISTRIBUTION OF THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGN CONTAINED HEREIN, IS PROHIBITED UNLESS AUTHORIZED IN WRITING BY GARVER, LLC OR EXPLICITLY ALLOWED IN THE GOVERNING PROFESSIONAL SERVICES AGREEMENT FOR THIS WORK.

REGISTRATION NO.  
F-5713

BY				
DESCRIPTION				
DATE				
REV.				

TOWN OF ADDISON  
ADDISON, TEXAS

KELLWAY LIFT STATION  
BY-PASS PUMP IMPROVEMENTS

CIVIL NOTES LEGEND  
& GENERAL LEGEND

JOB NO.: 20W05015  
DATE: MARCH 2021  
DESIGNED BY: SJM  
DRAWN BY: MAW

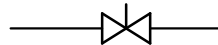
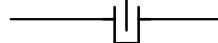
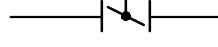



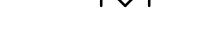


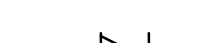
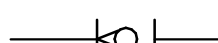
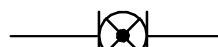
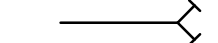

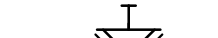

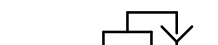
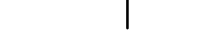

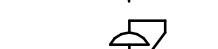
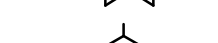

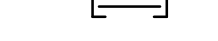

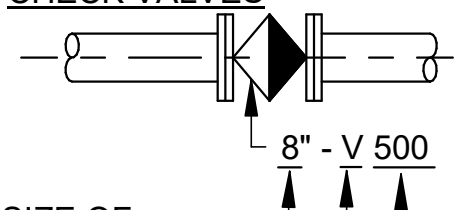
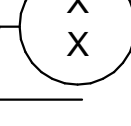






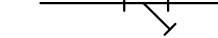
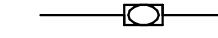
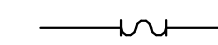


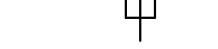
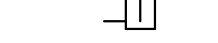
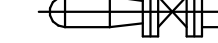

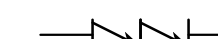



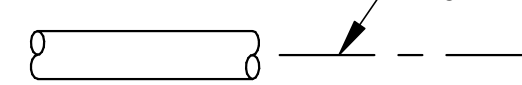
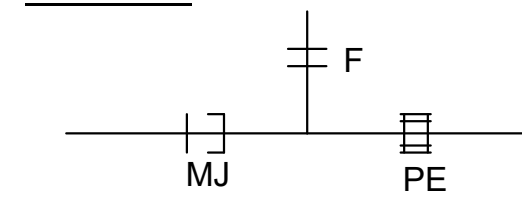

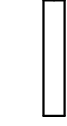
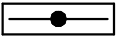

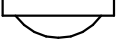




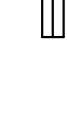


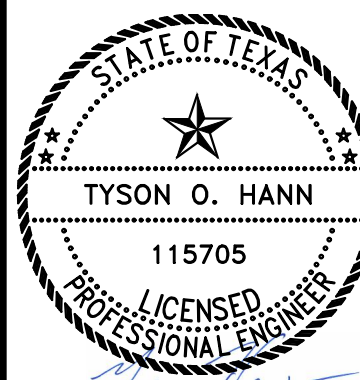
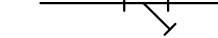
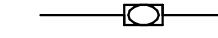
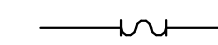


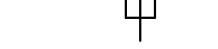
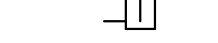
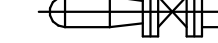

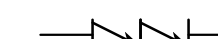



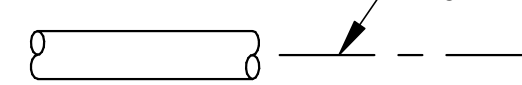
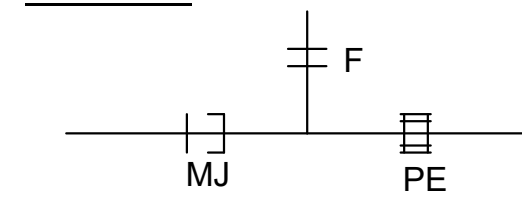

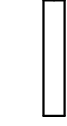
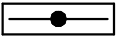

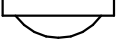




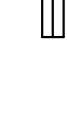


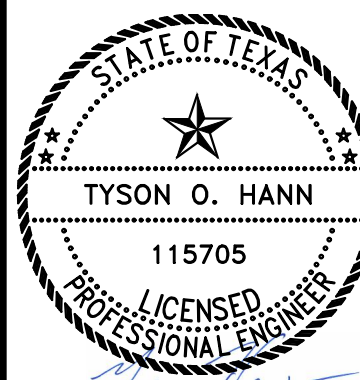
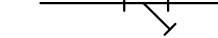
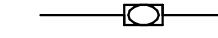
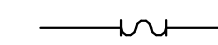


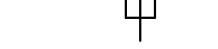
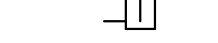
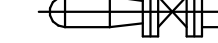

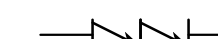



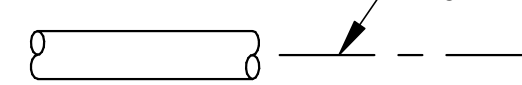
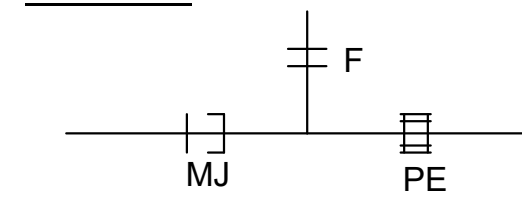

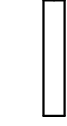
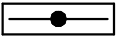

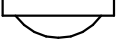




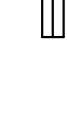


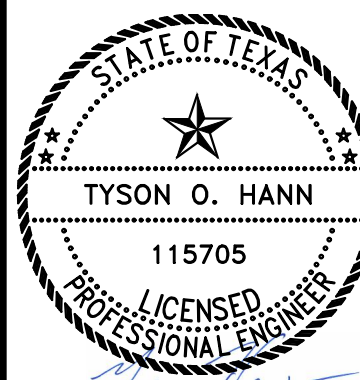
BAR IS ONE INCH ON ORIGINAL DRAWING  
0 1"  
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER  
01-G002

SHEET  
NUMBER 02



Revit File: BIM 360/20W05015 - Addison Kellway LS Bypass Pump Imps 20W05015 - Addison Kellway.rvt  
Plot Date: 3/15/2021 11:01:05 AM

<div>VALVE SYMBOLS</div> <div><div> GATE</div><div> KNIFE GATE</div><div> BUTTERFLY</div><div> GLOBE</div><div> BALL</div><div> VEE-BALL</div><div> PLUG OR COCK</div><div> NEEDLE</div><div> DIAPHRAGM</div><div> PINCH</div><div> SWING CHECK</div><div> BALL CHECK</div><div> ROTARY</div><div> HOSE VALVE (HV-X) OR (V-X) X = NO. IN SPECS</div><div> SAMPLE</div><div> MUD</div><div> PRESSURE RELIEF</div><div> AIR RELEASE</div><div> VACUUM RELIEF</div><div> PRESSURE CONTROL</div><div> TELESCOPING</div><div> SLIDE GATE</div><div> STOP GATE</div><div> THREE-WAY / FOUR-WAY VALVE</div></div> <div>VALVE DESIGNATIONS</div> <div><div>MANUAL VALVES AND CHECK VALVES</div><div><p>8" - V 500</p></div><div>SIZE OF VALVE</div><div>VALVE DESIGNATION</div><div>VALVE TYPE, SEE SPECIFICATIONS</div><div>CONTROL VALVES</div><div><p>X X</p></div><div>FLOW DIRECTION</div><div>VALVE SYMBOL</div><div>BUBBLE WITH FUNCTION AND THE TAG NUMBER DESIGNATION (SEE I&amp;C LEGEND FOR TAGGING INSTRUMENT IDENTIFICATION)</div><div>ACTUATOR SYMBOLS</div><div><div> PNEUMATIC DIAPHRAGM</div><div>SPRING-OPPOSED, SINGLE OR DOUBLE ACTING</div><div> PNEUMATIC CYLINDER</div><div>SINGLE OR DOUBLE ACTING ACTUATED BY ONE INPUT</div><div> ELECTRIC MOTOR</div><div> HYDRAULIC</div><div> MANUAL</div><div> SOLENOID</div></div></div> <tr><td><div>MISCELLANEOUS PIPING SYMBOLS</div><div><div> STRAINER</div><div> SIGHT GLASS</div><div> FLEXIBLE (ELASTOMER) PIPE CONNECTION</div><div> GAUGE WITH COCK</div><div> THERMOMETER</div><div> ROTAMETER</div><div> PIG LAUNCHER</div><div> PIG CATCHER</div><div> BACKFLOW PREVENTER</div><div> REDUCER</div><div> FLEXIBLE HOSE</div><div> FLEXIBLE CONNECTOR</div><div> TYPICAL INSTRUMENT SYMBOL (SEE I&amp;C LEGEND)</div></div><div>PIPING DESIGNATION</div><div><div>EXAMPLE:</div><div><p>16" RAS</p></div><div>16" RAS</div><div>FLOW STREAM IDENTIFICATION</div><div>PIPE DIAMETER</div><div>PIPE FITTING AND END PATTERNS</div><div><div>B</div><div>BELL</div><div>F</div><div>FLANGE</div><div>S</div><div>SPIGOT</div><div>PE</div><div>PLAIN END</div><div>GE</div><div>GROOVED END</div><div>MJ</div><div>MECHANICAL JOINT</div></div><div>EXAMPLE:</div><div><p>MJ F PE</p></div></div></td><td><div>PIPE AND FITTING SYMBOLS</div><div><div>DOUBLE LINE</div><div>SINGLE LINE</div><div>EXISTING PIPE</div><div>NEW PIPE</div><div>EXISTING PIPE TO BE ABANDONED</div><div>EXISTING PIPE TO BE REMOVED</div><div>WELDED JOINT</div><div>GROOVED END JOINT</div><div>FLANGED JOINT</div><div>MECHANICAL JOINT</div><div>BELL &amp; SPIGOT JOINT (LEADED)</div><div>HUB &amp; SPIGOT JOINT (RUBBER GASKET)</div><div>BALL JOINT</div><div>ADAPTER SIDE GROOVED END ADAPTER FLANGE</div><div>FLANGED COUPLING ADAPTER</div><div>FLANGED COUPLING ADAPTER WITH THRUST TIES</div><div>FLEXIBLE COUPLING</div><div>FLEXIBLE COUPLING WITH THRUST TIES</div><div>STEEL BELLOWS EXP. JOINT</div><div>ELASTOMER BELLOWS EXP. JOINT</div></div><div>DOUBLE LINE</div><div>SINGLE LINE</div><div>ELBOW UP</div><div>ELBOW DOWN</div><div>TEE UP</div><div>TEE DOWN</div><div>LATERAL UP</div><div>LATERAL DOWN</div><div>CONCENTRIC REDUCER</div><div>ECCENTRIC REDUCER</div><div>REDUCING BUSHING</div><div>UNION</div><div>CAP</div><div>ANCHOR</div><div>ELBOW, 90 DEGREE</div><div>CROSS</div><div>TEE</div><div>ELBOW, 45 DEGREE</div><div>LATERAL</div></td><td><div>ABBREVIATIONS</div><div><div>ABBREV</div><div>DESCRIPTION</div><div>AWWA</div><div>AMERICAN WATER WORKS ASSOCIATION</div><div>CPVC</div><div>CHLORINATED POLYVINYL CHLORIDE</div><div>DX</div><div>DIRECT EXPANSION</div><div>ECC</div><div>ECCENTRIC</div><div>EQUIP</div><div>EQUIPMENT</div><div>FLEX</div><div>FLEXIBLE</div><div>FOB</div><div>FLAT ON BOTTOM</div><div>FPM</div><div>FEET PER MINUTE</div><div>GAL</div><div>GALLON</div><div>GPD</div><div>GALLONS PER DAY</div><div>GPH</div><div>GALLONS PER HOUR</div><div>GPM</div><div>GALLONS PER MINUTE</div><div>N.O.</div><div>NORMALLY OPEN</div><div>NC</div><div>NORMALLY CLOSED</div><div>OS&amp;Y</div><div>OUSIDE STEM AND YOKE</div><div>RPM</div><div>REVOLUTIONS PER MINUTE</div><div>SP</div><div>STATIC PRESSURE</div><div>VAC</div><div>VACUUM</div><div>VTR</div><div>VENT THROUGH ROOF</div><div>WC</div><div>WATER COLUMN</div><div>WPD</div><div>WATER PRESSURE DROP</div></div><div>FLOW STREAM IDENTIFICATION</div><div><div>ABBREV</div><div>DESCRIPTION</div><div>RS</div><div>RAW SEWAGE</div><div>SS</div><div>SANITARY SEWER</div></div><div>FLOW STREAM IDENTIFICATION</div><div><div>ABBREV</div><div>DESCRIPTION</div></div></td></tr> <tr><td><div>SPECIAL INSTALLATION NOTE:</div><div>INSTALLATION DETAILS FOR DIVISION 26 ELECTRICAL ARE NOT SHOWN ON MECHANICAL DRAWINGS FOR CLARITY. REFER TO DIVISION 26 INSTRUMENT SPECIFICATIONS, INSTRUMENT LIST, AND DESIGN DETAILS. COORDINATE MATERIAL AND INSTALLATION REQUIREMENTS.</div></td><td><div>NOTES:</div><div><div>1.</div><div>ONLY FLANGED END CONNECTIONS ARE SHOWN HERE FOR DOUBLE LINE FITTINGS; FITTINGS WITH OTHER END PATTERNS ARE SHOWN SIMILARLY ON THE CONSTRUCTION DRAWINGS. ALSO SEE PIPING SPECIFICATIONS.</div><div>2.</div><div>SYMBOLS SHOWN HERE FOR SINGLE LINE FITTINGS ARE GENERIC ONLY. REFER TO PIPING SPECIFICATIONS FOR SPECIFIC END CONNECTIONS FOR SINGLE LINE PIPE AND FITTINGS.</div><div>3.</div><div>EXISTING PIPE AND EQUIPMENT IS SHOWN WITH A DASHED LINE AND/OR SCREENED AND IS NOTED AS EXISTING. NEW PIPING AND EQUIPMENT IS SHOWN WITH A HEAVY LINE.</div></div><div>GENERAL PIPING NOTES:</div><div><div>1.</div><div>LAY PIPE TO UNIFORM GRADE BETWEEN INDICATED ELEVATION POINTS.</div><div>2.</div><div>SIZE OF FITTINGS SHOWN ON PLANS SHALL CORRESPOND TO ADJACENT STRAIGHT RUN OF PIPE, UNLESS OTHERWISE INDICATED. TYPE OF JOINT AND FITTING MATERIAL SHALL BE THE SAME AS SHOWN FOR ADJACENT STRAIGHT RUN OF PIPE.</div><div>3.</div><div>LOCATION AND NUMBER OF PIPE HANGERS AND PIPE SUPPORTS SHOWN IS ONLY APPROXIMATE. FINAL SUPPORT REQUIREMENTS SHALL BE DETERMINED IN THE FIELD AND REVIEWED BY THE ENGINEER PRIOR TO INSTALLATION. MAXIMUM SPACING SHALL BE AS SPECIFIED.</div><div>4.</div><div>ALL JOINTS SHALL BE WATERTIGHT. WALL PIPES OR PENETRATION SEALS SHALL BE USED WHEREVER PIPING PASSES FROM A STRUCTURE TO BACKFILL.</div><div>5.</div><div>ALL FLEXIBLE CONNECTORS OR FLANGED COUPLING ADAPTERS SHALL BE PROVIDED WITH THRUST TIES, BLOCKS, OR ANCHORS, UNLESS OTHERWISE NOTED. THRUST PROTECTION SHALL BE ADEQUATE FOR TEST PRESSURES SPECIFIED.</div><div>6.</div><div>SYMBOLS, LEGENDS, AND PIPE USE IDENTIFICATIONS SHOWN SHALL BE FOLLOWED THROUGHOUT THE PLANS, WHEREVER APPLICABLE. NOT ALL OF THE VARIOUS PIPING COMPONENTS ARE NECESSARILY USED IN THE PROJECT.</div><div>7.</div><div>NUMBER AND LOCATION OF UNIONS SHOWN ON PLANS IS ONLY APPROXIMATE. PROVIDE ALL UNIONS NECESSARY TO FACILITATE CONVENIENT REMOVAL OF VALVES AND MECHANICAL EQUIPMENT.</div><div>8.</div><div>WHERE A GROOVED END COUPLING IS SHOWN, IT SHALL BE THE RIGID JOINT TYPE, UNLESS OTHERWISE SPECIFIED. WHERE A FLANGED COUPLING ADAPTER IS SHOWN, A STANDARD FLANGE SHALL BE JOINED TO THE COUPLING ADAPTER.</div></div><div>GATE SYMBOLS</div><div><div>ELEVATION VIEW</div><div>PLAN VIEW</div><div> SLUICE</div><div> BUTTERFLY</div><div> FLAP</div><div> SHEAR</div><div> FABRICATED SLIDE</div><div> STOP LOG</div></div></td></tr> <tr><td></td><td><div>REGISTRATION NO. F-5713</div><div><p>115705</p></div><div>Digitally Signed 03/15/2021</div><table><tr><td>BY</td><td></td><td></td><td></td></tr><tr><td>DESCRIPTION</td><td></td><td></td><td></td></tr><tr><td>DATE</td><td></td><td></td><td></td></tr><tr><td>REV</td><td></td><td></td><td></td></tr></table><div>ADDISON</div><div>ADDISON, TX</div><div>4245 KELLWAY CIRCLE</div><div>ADDISON TX, 75001</div><div>ADDISON KELLWAY LIFT STATION</div><div>BY-PASS PROJECT</div><div>PROCESS MECHANICAL NOTES, LEGENDS, AND ABBREVIATIONS</div><div>JOB NO.: 20W05015</div><div>DATE: MARCH 2021</div><div>DESIGNED BY: CAT</div><div>DRAWN BY: AEG</div><div>BAR IS ONE INCH ON ORIGINAL DRAWING 1"</div><div>IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.</div><div>DRAWING NUMBER</div><div>01-G003</div><div>SHEET NUMBER</div><div>03</div></td></tr>	<div>MISCELLANEOUS PIPING SYMBOLS</div> <div><div> STRAINER</div><div> SIGHT GLASS</div><div> FLEXIBLE (ELASTOMER) PIPE CONNECTION</div><div> GAUGE WITH COCK</div><div> THERMOMETER</div><div> ROTAMETER</div><div> PIG LAUNCHER</div><div> PIG CATCHER</div><div> BACKFLOW PREVENTER</div><div> REDUCER</div><div> FLEXIBLE HOSE</div><div> FLEXIBLE CONNECTOR</div><div> TYPICAL INSTRUMENT SYMBOL (SEE I&amp;C LEGEND)</div></div> <div>PIPING DESIGNATION</div> <div><div>EXAMPLE:</div><div><p>16" RAS</p></div><div>16" RAS</div><div>FLOW STREAM IDENTIFICATION</div><div>PIPE DIAMETER</div><div>PIPE FITTING AND END PATTERNS</div><div><div>B</div><div>BELL</div><div>F</div><div>FLANGE</div><div>S</div><div>SPIGOT</div><div>PE</div><div>PLAIN END</div><div>GE</div><div>GROOVED END</div><div>MJ</div><div>MECHANICAL JOINT</div></div><div>EXAMPLE:</div><div><p>MJ F PE</p></div></div>	<div>PIPE AND FITTING SYMBOLS</div> <div><div>DOUBLE LINE</div><div>SINGLE LINE</div><div>EXISTING PIPE</div><div>NEW PIPE</div><div>EXISTING PIPE TO BE ABANDONED</div><div>EXISTING PIPE TO BE REMOVED</div><div>WELDED JOINT</div><div>GROOVED END JOINT</div><div>FLANGED JOINT</div><div>MECHANICAL JOINT</div><div>BELL &amp; SPIGOT JOINT (LEADED)</div><div>HUB &amp; SPIGOT JOINT (RUBBER GASKET)</div><div>BALL JOINT</div><div>ADAPTER SIDE GROOVED END ADAPTER FLANGE</div><div>FLANGED COUPLING ADAPTER</div><div>FLANGED COUPLING ADAPTER WITH THRUST TIES</div><div>FLEXIBLE COUPLING</div><div>FLEXIBLE COUPLING WITH THRUST TIES</div><div>STEEL BELLOWS EXP. JOINT</div><div>ELASTOMER BELLOWS EXP. JOINT</div></div> <div>DOUBLE LINE</div> <div>SINGLE LINE</div> <div>ELBOW UP</div> <div>ELBOW DOWN</div> <div>TEE UP</div> <div>TEE DOWN</div> <div>LATERAL UP</div> <div>LATERAL DOWN</div> <div>CONCENTRIC REDUCER</div> <div>ECCENTRIC REDUCER</div> <div>REDUCING BUSHING</div> <div>UNION</div> <div>CAP</div> <div>ANCHOR</div> <div>ELBOW, 90 DEGREE</div> <div>CROSS</div> <div>TEE</div> <div>ELBOW, 45 DEGREE</div> <div>LATERAL</div>	<div>ABBREVIATIONS</div> <div><div>ABBREV</div><div>DESCRIPTION</div><div>AWWA</div><div>AMERICAN WATER WORKS ASSOCIATION</div><div>CPVC</div><div>CHLORINATED POLYVINYL CHLORIDE</div><div>DX</div><div>DIRECT EXPANSION</div><div>ECC</div><div>ECCENTRIC</div><div>EQUIP</div><div>EQUIPMENT</div><div>FLEX</div><div>FLEXIBLE</div><div>FOB</div><div>FLAT ON BOTTOM</div><div>FPM</div><div>FEET PER MINUTE</div><div>GAL</div><div>GALLON</div><div>GPD</div><div>GALLONS PER DAY</div><div>GPH</div><div>GALLONS PER HOUR</div><div>GPM</div><div>GALLONS PER MINUTE</div><div>N.O.</div><div>NORMALLY OPEN</div><div>NC</div><div>NORMALLY CLOSED</div><div>OS&amp;Y</div><div>OUSIDE STEM AND YOKE</div><div>RPM</div><div>REVOLUTIONS PER MINUTE</div><div>SP</div><div>STATIC PRESSURE</div><div>VAC</div><div>VACUUM</div><div>VTR</div><div>VENT THROUGH ROOF</div><div>WC</div><div>WATER COLUMN</div><div>WPD</div><div>WATER PRESSURE DROP</div></div> <div>FLOW STREAM IDENTIFICATION</div> <div><div>ABBREV</div><div>DESCRIPTION</div><div>RS</div><div>RAW SEWAGE</div><div>SS</div><div>SANITARY SEWER</div></div> <div>FLOW STREAM IDENTIFICATION</div> <div><div>ABBREV</div><div>DESCRIPTION</div></div>	<div>SPECIAL INSTALLATION NOTE:</div> <div>INSTALLATION DETAILS FOR DIVISION 26 ELECTRICAL ARE NOT SHOWN ON MECHANICAL DRAWINGS FOR CLARITY. REFER TO DIVISION 26 INSTRUMENT SPECIFICATIONS, INSTRUMENT LIST, AND DESIGN DETAILS. COORDINATE MATERIAL AND INSTALLATION REQUIREMENTS.</div>	<div>NOTES:</div> <div><div>1.</div><div>ONLY FLANGED END CONNECTIONS ARE SHOWN HERE FOR DOUBLE LINE FITTINGS; FITTINGS WITH OTHER END PATTERNS ARE SHOWN SIMILARLY ON THE CONSTRUCTION DRAWINGS. ALSO SEE PIPING SPECIFICATIONS.</div><div>2.</div><div>SYMBOLS SHOWN HERE FOR SINGLE LINE FITTINGS ARE GENERIC ONLY. REFER TO PIPING SPECIFICATIONS FOR SPECIFIC END CONNECTIONS FOR SINGLE LINE PIPE AND FITTINGS.</div><div>3.</div><div>EXISTING PIPE AND EQUIPMENT IS SHOWN WITH A DASHED LINE AND/OR SCREENED AND IS NOTED AS EXISTING. NEW PIPING AND EQUIPMENT IS SHOWN WITH A HEAVY LINE.</div></div> <div>GENERAL PIPING NOTES:</div> <div><div>1.</div><div>LAY PIPE TO UNIFORM GRADE BETWEEN INDICATED ELEVATION POINTS.</div><div>2.</div><div>SIZE OF FITTINGS SHOWN ON PLANS SHALL CORRESPOND TO ADJACENT STRAIGHT RUN OF PIPE, UNLESS OTHERWISE INDICATED. TYPE OF JOINT AND FITTING MATERIAL SHALL BE THE SAME AS SHOWN FOR ADJACENT STRAIGHT RUN OF PIPE.</div><div>3.</div><div>LOCATION AND NUMBER OF PIPE HANGERS AND PIPE SUPPORTS SHOWN IS ONLY APPROXIMATE. FINAL SUPPORT REQUIREMENTS SHALL BE DETERMINED IN THE FIELD AND REVIEWED BY THE ENGINEER PRIOR TO INSTALLATION. MAXIMUM SPACING SHALL BE AS SPECIFIED.</div><div>4.</div><div>ALL JOINTS SHALL BE WATERTIGHT. WALL PIPES OR PENETRATION SEALS SHALL BE USED WHEREVER PIPING PASSES FROM A STRUCTURE TO BACKFILL.</div><div>5.</div><div>ALL FLEXIBLE CONNECTORS OR FLANGED COUPLING ADAPTERS SHALL BE PROVIDED WITH THRUST TIES, BLOCKS, OR ANCHORS, UNLESS OTHERWISE NOTED. THRUST PROTECTION SHALL BE ADEQUATE FOR TEST PRESSURES SPECIFIED.</div><div>6.</div><div>SYMBOLS, LEGENDS, AND PIPE USE IDENTIFICATIONS SHOWN SHALL BE FOLLOWED THROUGHOUT THE PLANS, WHEREVER APPLICABLE. NOT ALL OF THE VARIOUS PIPING COMPONENTS ARE NECESSARILY USED IN THE PROJECT.</div><div>7.</div><div>NUMBER AND LOCATION OF UNIONS SHOWN ON PLANS IS ONLY APPROXIMATE. PROVIDE ALL UNIONS NECESSARY TO FACILITATE CONVENIENT REMOVAL OF VALVES AND MECHANICAL EQUIPMENT.</div><div>8.</div><div>WHERE A GROOVED END COUPLING IS SHOWN, IT SHALL BE THE RIGID JOINT TYPE, UNLESS OTHERWISE SPECIFIED. WHERE A FLANGED COUPLING ADAPTER IS SHOWN, A STANDARD FLANGE SHALL BE JOINED TO THE COUPLING ADAPTER.</div></div> <div>GATE SYMBOLS</div> <div><div>ELEVATION VIEW</div><div>PLAN VIEW</div><div> SLUICE</div><div> BUTTERFLY</div><div> FLAP</div><div> SHEAR</div><div> FABRICATED SLIDE</div><div> STOP LOG</div></div>		<div>REGISTRATION NO. F-5713</div> <div><p>115705</p></div> <div>Digitally Signed 03/15/2021</div> <table><tr><td>BY</td><td></td><td></td><td></td></tr><tr><td>DESCRIPTION</td><td></td><td></td><td></td></tr><tr><td>DATE</td><td></td><td></td><td></td></tr><tr><td>REV</td><td></td><td></td><td></td></tr></table> <div>ADDISON</div> <div>ADDISON, TX</div> <div>4245 KELLWAY CIRCLE</div> <div>ADDISON TX, 75001</div> <div>ADDISON KELLWAY LIFT STATION</div> <div>BY-PASS PROJECT</div> <div>PROCESS MECHANICAL NOTES, LEGENDS, AND ABBREVIATIONS</div> <div>JOB NO.: 20W05015</div> <div>DATE: MARCH 2021</div> <div>DESIGNED BY: CAT</div> <div>DRAWN BY: AEG</div> <div>BAR IS ONE INCH ON ORIGINAL DRAWING 1"</div> <div>IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.</div> <div>DRAWING NUMBER</div> <div>01-G003</div> <div>SHEET NUMBER</div> <div>03</div>	BY				DESCRIPTION				DATE				REV			
<div>MISCELLANEOUS PIPING SYMBOLS</div> <div><div> STRAINER</div><div> SIGHT GLASS</div><div> FLEXIBLE (ELASTOMER) PIPE CONNECTION</div><div> GAUGE WITH COCK</div><div> THERMOMETER</div><div> ROTAMETER</div><div> PIG LAUNCHER</div><div> PIG CATCHER</div><div> BACKFLOW PREVENTER</div><div> REDUCER</div><div> FLEXIBLE HOSE</div><div> FLEXIBLE CONNECTOR</div><div> TYPICAL INSTRUMENT SYMBOL (SEE I&amp;C LEGEND)</div></div> <div>PIPING DESIGNATION</div> <div><div>EXAMPLE:</div><div><p>16" RAS</p></div><div>16" RAS</div><div>FLOW STREAM IDENTIFICATION</div><div>PIPE DIAMETER</div><div>PIPE FITTING AND END PATTERNS</div><div><div>B</div><div>BELL</div><div>F</div><div>FLANGE</div><div>S</div><div>SPIGOT</div><div>PE</div><div>PLAIN END</div><div>GE</div><div>GROOVED END</div><div>MJ</div><div>MECHANICAL JOINT</div></div><div>EXAMPLE:</div><div><p>MJ F PE</p></div></div>	<div>PIPE AND FITTING SYMBOLS</div> <div><div>DOUBLE LINE</div><div>SINGLE LINE</div><div>EXISTING PIPE</div><div>NEW PIPE</div><div>EXISTING PIPE TO BE ABANDONED</div><div>EXISTING PIPE TO BE REMOVED</div><div>WELDED JOINT</div><div>GROOVED END JOINT</div><div>FLANGED JOINT</div><div>MECHANICAL JOINT</div><div>BELL &amp; SPIGOT JOINT (LEADED)</div><div>HUB &amp; SPIGOT JOINT (RUBBER GASKET)</div><div>BALL JOINT</div><div>ADAPTER SIDE GROOVED END ADAPTER FLANGE</div><div>FLANGED COUPLING ADAPTER</div><div>FLANGED COUPLING ADAPTER WITH THRUST TIES</div><div>FLEXIBLE COUPLING</div><div>FLEXIBLE COUPLING WITH THRUST TIES</div><div>STEEL BELLOWS EXP. JOINT</div><div>ELASTOMER BELLOWS EXP. JOINT</div></div> <div>DOUBLE LINE</div> <div>SINGLE LINE</div> <div>ELBOW UP</div> <div>ELBOW DOWN</div> <div>TEE UP</div> <div>TEE DOWN</div> <div>LATERAL UP</div> <div>LATERAL DOWN</div> <div>CONCENTRIC REDUCER</div> <div>ECCENTRIC REDUCER</div> <div>REDUCING BUSHING</div> <div>UNION</div> <div>CAP</div> <div>ANCHOR</div> <div>ELBOW, 90 DEGREE</div> <div>CROSS</div> <div>TEE</div> <div>ELBOW, 45 DEGREE</div> <div>LATERAL</div>	<div>ABBREVIATIONS</div> <div><div>ABBREV</div><div>DESCRIPTION</div><div>AWWA</div><div>AMERICAN WATER WORKS ASSOCIATION</div><div>CPVC</div><div>CHLORINATED POLYVINYL CHLORIDE</div><div>DX</div><div>DIRECT EXPANSION</div><div>ECC</div><div>ECCENTRIC</div><div>EQUIP</div><div>EQUIPMENT</div><div>FLEX</div><div>FLEXIBLE</div><div>FOB</div><div>FLAT ON BOTTOM</div><div>FPM</div><div>FEET PER MINUTE</div><div>GAL</div><div>GALLON</div><div>GPD</div><div>GALLONS PER DAY</div><div>GPH</div><div>GALLONS PER HOUR</div><div>GPM</div><div>GALLONS PER MINUTE</div><div>N.O.</div><div>NORMALLY OPEN</div><div>NC</div><div>NORMALLY CLOSED</div><div>OS&amp;Y</div><div>OUSIDE STEM AND YOKE</div><div>RPM</div><div>REVOLUTIONS PER MINUTE</div><div>SP</div><div>STATIC PRESSURE</div><div>VAC</div><div>VACUUM</div><div>VTR</div><div>VENT THROUGH ROOF</div><div>WC</div><div>WATER COLUMN</div><div>WPD</div><div>WATER PRESSURE DROP</div></div> <div>FLOW STREAM IDENTIFICATION</div> <div><div>ABBREV</div><div>DESCRIPTION</div><div>RS</div><div>RAW SEWAGE</div><div>SS</div><div>SANITARY SEWER</div></div> <div>FLOW STREAM IDENTIFICATION</div> <div><div>ABBREV</div><div>DESCRIPTION</div></div>																					
<div>SPECIAL INSTALLATION NOTE:</div> <div>INSTALLATION DETAILS FOR DIVISION 26 ELECTRICAL ARE NOT SHOWN ON MECHANICAL DRAWINGS FOR CLARITY. REFER TO DIVISION 26 INSTRUMENT SPECIFICATIONS, INSTRUMENT LIST, AND DESIGN DETAILS. COORDINATE MATERIAL AND INSTALLATION REQUIREMENTS.</div>	<div>NOTES:</div> <div><div>1.</div><div>ONLY FLANGED END CONNECTIONS ARE SHOWN HERE FOR DOUBLE LINE FITTINGS; FITTINGS WITH OTHER END PATTERNS ARE SHOWN SIMILARLY ON THE CONSTRUCTION DRAWINGS. ALSO SEE PIPING SPECIFICATIONS.</div><div>2.</div><div>SYMBOLS SHOWN HERE FOR SINGLE LINE FITTINGS ARE GENERIC ONLY. REFER TO PIPING SPECIFICATIONS FOR SPECIFIC END CONNECTIONS FOR SINGLE LINE PIPE AND FITTINGS.</div><div>3.</div><div>EXISTING PIPE AND EQUIPMENT IS SHOWN WITH A DASHED LINE AND/OR SCREENED AND IS NOTED AS EXISTING. NEW PIPING AND EQUIPMENT IS SHOWN WITH A HEAVY LINE.</div></div> <div>GENERAL PIPING NOTES:</div> <div><div>1.</div><div>LAY PIPE TO UNIFORM GRADE BETWEEN INDICATED ELEVATION POINTS.</div><div>2.</div><div>SIZE OF FITTINGS SHOWN ON PLANS SHALL CORRESPOND TO ADJACENT STRAIGHT RUN OF PIPE, UNLESS OTHERWISE INDICATED. TYPE OF JOINT AND FITTING MATERIAL SHALL BE THE SAME AS SHOWN FOR ADJACENT STRAIGHT RUN OF PIPE.</div><div>3.</div><div>LOCATION AND NUMBER OF PIPE HANGERS AND PIPE SUPPORTS SHOWN IS ONLY APPROXIMATE. FINAL SUPPORT REQUIREMENTS SHALL BE DETERMINED IN THE FIELD AND REVIEWED BY THE ENGINEER PRIOR TO INSTALLATION. MAXIMUM SPACING SHALL BE AS SPECIFIED.</div><div>4.</div><div>ALL JOINTS SHALL BE WATERTIGHT. WALL PIPES OR PENETRATION SEALS SHALL BE USED WHEREVER PIPING PASSES FROM A STRUCTURE TO BACKFILL.</div><div>5.</div><div>ALL FLEXIBLE CONNECTORS OR FLANGED COUPLING ADAPTERS SHALL BE PROVIDED WITH THRUST TIES, BLOCKS, OR ANCHORS, UNLESS OTHERWISE NOTED. THRUST PROTECTION SHALL BE ADEQUATE FOR TEST PRESSURES SPECIFIED.</div><div>6.</div><div>SYMBOLS, LEGENDS, AND PIPE USE IDENTIFICATIONS SHOWN SHALL BE FOLLOWED THROUGHOUT THE PLANS, WHEREVER APPLICABLE. NOT ALL OF THE VARIOUS PIPING COMPONENTS ARE NECESSARILY USED IN THE PROJECT.</div><div>7.</div><div>NUMBER AND LOCATION OF UNIONS SHOWN ON PLANS IS ONLY APPROXIMATE. PROVIDE ALL UNIONS NECESSARY TO FACILITATE CONVENIENT REMOVAL OF VALVES AND MECHANICAL EQUIPMENT.</div><div>8.</div><div>WHERE A GROOVED END COUPLING IS SHOWN, IT SHALL BE THE RIGID JOINT TYPE, UNLESS OTHERWISE SPECIFIED. WHERE A FLANGED COUPLING ADAPTER IS SHOWN, A STANDARD FLANGE SHALL BE JOINED TO THE COUPLING ADAPTER.</div></div> <div>GATE SYMBOLS</div> <div><div>ELEVATION VIEW</div><div>PLAN VIEW</div><div> SLUICE</div><div> BUTTERFLY</div><div> FLAP</div><div> SHEAR</div><div> FABRICATED SLIDE</div><div> STOP LOG</div></div>																						
	<div>REGISTRATION NO. F-5713</div> <div><p>115705</p></div> <div>Digitally Signed 03/15/2021</div> <table><tr><td>BY</td><td></td><td></td><td></td></tr><tr><td>DESCRIPTION</td><td></td><td></td><td></td></tr><tr><td>DATE</td><td></td><td></td><td></td></tr><tr><td>REV</td><td></td><td></td><td></td></tr></table> <div>ADDISON</div> <div>ADDISON, TX</div> <div>4245 KELLWAY CIRCLE</div> <div>ADDISON TX, 75001</div> <div>ADDISON KELLWAY LIFT STATION</div> <div>BY-PASS PROJECT</div> <div>PROCESS MECHANICAL NOTES, LEGENDS, AND ABBREVIATIONS</div> <div>JOB NO.: 20W05015</div> <div>DATE: MARCH 2021</div> <div>DESIGNED BY: CAT</div> <div>DRAWN BY: AEG</div> <div>BAR IS ONE INCH ON ORIGINAL DRAWING 1"</div> <div>IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.</div> <div>DRAWING NUMBER</div> <div>01-G003</div> <div>SHEET NUMBER</div> <div>03</div>	BY				DESCRIPTION				DATE				REV									
BY																							
DESCRIPTION																							
DATE																							
REV																							



Revit File: BIM 360/20W05015 - Addison Kellway LS Bypass Pump Imps 20W05015_Addison Kellway.rvt  
Plot Date: 3/15/2021 11:01:07 AM

GENERAL NOTES:				ABBREVIATIONS			
1.	THESE NOTATIONS ARE INTENDED TO BE GENERAL IN NATURE. THEY MAY OR MAY NOT APPLY TO SOME OR ALL OF THE PLAN SHEETS AND SPECIFICATIONS.	16.	IN AREAS WHERE THERE ARE OVERHEAD BRIDGE CRANES, HOISTS, DOORS OR OTHER SIMILAR ITEMS, NO CONDUITS SHALL BE INSTALLED IN SUCH A MANNER AS TO CONFLICT WITH PROPER OPERATION OF SUCH EQUIPMENT.	ABBREV	DESCRIPTION	ABBREV	DESCRIPTION
2.	ALL RACEWAYS AND EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE AND APPLICABLE LOCAL CODES.	17.	CONTRACTOR SHALL FURNISH AND INSTALL ITEMS AS NECESSARY FOR COMPLETE AND FUNCTIONAL SYSTEMS INCLUDING THE CHEMICAL FEED SYSTEMS, MECHANICAL SYSTEMS, AND PLANT INSTRUMENTATION SYSTEM/DISTRIBUTED CONTROL SYSTEM. THE CONTRACTOR SHALL REFER TO THE SPECIFICATIONS AND OTHER SECTIONS OF THE PLANS FOR ITEMS AS MAY BE REQUIRED AND SHALL PROVIDE CONDUIT, WIRING AND TERMINATIONS FOR ALL ITEMS AS REQUIRED.	A, AMP	AMPERES	LV	LOW VOLTAGE
3.	CONDUIT RUNS INDICATED ON THE PLAN SHEETS ARE INTENDED TO BE SCHEMATIC ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD ROUTING ALL CONDUIT RUNS AND SHALL COORDINATE ANY DEVIATION FROM ROUTING AS INDICATED HEREIN WITH THE ENGINEER. ALL CONDUIT SHALL BE INSTALLED IN SUCH A MANNER AS TO PREVENT CONFLICTS WITH EQUIPMENT. EXPOSED CONDUIT SHALL BE INSTALLED PARALLEL OR PERPENDICULAR TO BEAMS OR STRUCTURAL CONDITIONS.	18.	CONTRACTOR SHALL REFER TO OTHER PLAN SHEETS FOR LOCATIONS OF FIREWALLS. ALL CONDUIT PENETRATIONS IN THESE WALLS SHALL BE ACCOMPLISHED IN SUCH A MANNER AS TO NOT REDUCE THE RATING OF THE FIREWALL THROUGH THE USE OF BOXES, SEALANTS AND OTHER ACCESSORIES AS MAY BE REQUIRED.	ABC	ABOVE COUNTER	MBTU, MBH	1000 BTU PER HOUR
4.	THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD ROUTING ALL CONDUITS NOT INDICATED ON THE PLAN SHEETS. THIS INCLUDES CIRCUITS FOR LIGHTING, RECEPTACLES AND OTHER MISCELLANEOUS EQUIPMENT CIRCUITS.	19.	CONTRACTOR SHALL REFER TO MECHANICAL PLAN SHEETS AND SPECIFICATIONS FOR ITEMS RELATED TO THE MECHANICAL SYSTEMS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ALL ITEMS AS NECESSARY FOR COMPLETE AND OPERABLE MECHANICAL HEREIN INCLUDING, BUT NOT LIMITED TO; CONTROL POWER TRANSFORMERS, STARTERS, THERMOSTATS, CONTROL STATIONS, AND OTHER ELECTRICAL ITEMS AS RELATED TO THE INSTALLATION OF THE MECHANICAL SYSTEMS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING DISCONNECTS FOR ALL MECHANICAL MOTORS UNLESS THE EQUIPMENT IS FURNISHED WITH AN INTEGRAL DISCONNECT FROM THE MANUFACTURER. IN ADDITION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL CONDUIT, WIRING AND TERMINATIONS FOR ALL COMPONENTS AS MAY BE NECESSARY FOR THE MECHANICAL SYSTEMS.	ACS	ACCESS CONTROL SYSTEM	MCA	MINIMUM CIRCUIT AMPACITY
5.	ALL CONDUITS SHALL BE ROUTED AND SUPPORTED IN SUCH A MANNER AS TO NOT COMPROMISE THE STRUCTURAL INTEGRITY OF WALLS, FLOORS, CEILINGS, AND ROOFS. WHERE REQUIRED, THE CONTRACTOR SHALL PROVIDE ADDITIONAL STRUCTURAL SUPPORTING MEMBERS FOR THE INSTALLATION AND SHALL COORDINATE SUCH MEMBERS WITH ENGINEER.	20.	ALL RECEPTACLES IN OUTDOOR AND ANTICIPATED WET AREAS SHALL BE GROUND FAULT CIRCUIT INTERRPUTER RECEPTACLES WITH WEATHERPROOF COVERS.	ACU	AIR CONDITIONING UNIT	MCB	MAIN CIRCUIT BREAKER
6.	THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF CONDUIT ENTRANCES FOR ALL EQUIPMENT WITH SHOP DRAWINGS BEFORE STUBBING UP CONDUITS.	21.	EQUIPMENT LOCKOUTS SHALL BE IN STRICT ACCORDANCE WITH OWNER'S REQUIREMENTS.	AFG	ABOVE FINISHED GRADE	MCC	MOTOR CONTROL CENTER
7.	ALL SURFACE MOUNTED PANELS AND PANELBOARDS ON THE INTERIOR OF EXTERIOR WALLS OR IN OTHER LOCATIONS CONSIDERED DAMP OR WET SHALL BE MOUNTED SO AS TO MAINTAIN A 1/4" MINIMUM AIR SPACE BETWEEN THE ENCLOSURE AND THE WALL.	22.	ALL CONDUITS SHALL HAVE A GROUNDING CONDUCTOR, SIZED PER NEC.	AIC	AIMPS INTERRUPTING CAPACITY	MCP	MOTOR CIRCUIT PROTECTOR
8.	PULLBOXES, IF SHOWN ON THE PLANS, ARE SCHEMATIC IN NATURE. THE CONTRACTOR SHALL PROVIDE ADDITIONAL PULLBOXES WHERE REQUIRED TO MAKE A WORKABLE INSTALLATION.	23.	ALL LIGHTING FIXTURES INSTALLED IN INSULATED LOCATIONS SHALL BE RATED FOR SUCH INSTALLATION REGARDLESS OF THE FIXTURE SCHEDULE DESIGNATION.	AM	AMP-METER	MLO	MAIN LUGS ONLY
9.	ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE DETAILS AND SPECIFICATIONS WHETHER OR NOT THEY ARE REFERENCED ON THE DRAWINGS.	24.	THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF NEW SERVICE INSTALLATIONS WITH OWNER, ENGINEER AND SERVICE UTILITY. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL ITEMS AS REQUIRED BY SERVICE UTILITY FOR NEW SERVICE CONNECTIONS.	ANN	ANNUNCIATOR	MOCP	MAXIMUM OVER CURRENT PROTECTION
10.	ALL CONDUIT RUNS PASSING THROUGH EXPANSION JOINTS SHALL HAVE EXPANSION OR EXPANSION AND DEFLECTION TYPE FITTINGS. FOR LOCATIONS OF EXPANSION JOINTS, REFER TO THE STRUCTURAL DRAWINGS.	25.	UNLESS NOTED OTHERWISE, ALL CONTROL PANELS SHALL BE FABRICATED SUCH THAT ALL OPERATORS AND INDICATING DEVICES INDICATED ON THE SCHEMATICS BE LOCATED ON THE FRONT DOOR OR COVER OF THE PANEL. OPERATING AND INDICATING DEVICES SHALL BE VISIBLE AND OPERABLE WITHOUT HAVING TO OPEN THE CONTROL PANEL.	AP	AERIAL PRIMARY	MS	MOTOR STARTER
11.	THE WIRING DIAGRAMS, QUANTITY AND SIZE OF WIRES AND CONDUITS REPRESENT A SUGGESTED ARRANGEMENT BASED UPON SELECTED STANDARD COMPONENTS OF ELECTRICAL EQUIPMENT. IF EQUIPMENT SUPPLIED BY THE MANUFACTURER HAS A LARGER LOAD THAN THE VALUE SHOWN OR INDICATED, THE CABLE, CONDUIT AND ELECTRICAL EQUIPMENT MAY BE ENLARGED AS REQUIRED TO ACCOMMODATE THE HIGHER LOADING. HOWEVER, THE BASIC SEQUENCE AND METHOD OF CONTROL MUST BE MAINTAINED AS INDICATED ON THE DRAWINGS AND/OR SPECIFICATIONS.	26.	DUCT BANKS INDICATED ARE FOR REFERENCE ONLY; THE CONTRACTOR SHALL REVIEW PLAN SHEETS RELATED TO INDIVIDUAL STRUCTURES AND VERIFY CONDUITS THAT MAY BE REQUIRED. THE CONTRACTOR SHALL VERIFY NUMBER OF CONDUITS AS INDICATED IN THE DUCT BANK PRIOR TO INSTALLATION WITH THE ENGINEER. PROVIDE A SPARE CONDUIT, EQUAL IN SIZE TO THE LARGEST CONDUIT IN USE, FOR EACH SET OF FOUR USED CONDUITS IN EACH DUCT BANK.	AS	AERIAL SECONDARY	MTD	MOUNTED
12.	ALL MOTOR STARTER CONTROL POWER TRANSFORMERS SHALL BE SIZED TO PROVIDE SUFFICIENT VOLT-AMPERE CAPACITY FOR OPERATING ALL LOCAL AND REMOTE ELECTRICAL DEVICES ASSOCIATED WITH CONTROL OF THE MOTOR IN ADDITION TO THE STARTER COIL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL LOADING REQUIREMENTS FOR CONTROL POWER TRANSFORMERS.	27.	THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING HEAT TRACING FOR ALL EXPOSED WATER LINES TO BE INSTALLED UNDER THIS PROJECT. THE CONTRACTOR SHALL REVIEW OTHER SECTIONS OF THE PLANS AND SPECS AND PROVIDE SUITABLE HEAT TRACING COMPONENTS AS MAY BE REQUIRED, WHETHER INDICATED ON THE ELECTRICAL PLAN SHEETS OR NOT.	ATS	AUTOMATIC TRANSFER SWITCH	N.O.	NORMALLY OPEN
13.	THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING PROPERLY SIZED STARTER OVERLOADS FOR ALL EQUIPMENT INSTALLED.			BFI	BLOWN FUSE INDICATOR	NCTO	NORMALLY CLOSED TIMED OPEN
14.	MOTOR CONTROL CENTERS AND ALL FREE STANDING PANELS SHALL BE SET ON CONCRETE HOUSEKEEPING PADS WITH LEVELING CHANNELS EMBEDDED IN THE PAD.			BI	BYPASS ISOLATION	NEC	NATIONAL ELECTRICAL CODE
15.	IN GENERAL, SEPARATE POWER, CONTROL AND INSTRUMENTATION WIRING. PROVIDE SEPARATE CONDUIT, PULL AND JUNCTION BOXES. PROVIDE SUITABLE CABLE BARRIER WITHIN PULL OR JUNCTION BOXES WHERE SEPARATION OF WIRING IS NOT SHOWN ON THE DRAWINGS.			C	CONDUIT	NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
EQUIPMENT LINE TYPES		GENERAL NOTES:		ABBREVIATIONS			
———— PROPOSED OR NEW EQUIPMENT	— · — · — EQUIPMENT PACKAGE	1.	SOME SYMBOLS OR ABBREVIATIONS MAY APPEAR ON THIS SHEET BUT NOT BE UTILIZED ON THE PROJECT.				
———— EXISTING EQUIPMENT	----- GROUND RING OR UNDERGROUND	2.	LIGHTING LEGEND SHOWS EXAMPLE IDENTIFIERS, REFER TO LIGHT FIXTURE SCHEDULE FOR SPECIFIC REQUIREMENTS.				
LIGHTING, POWER & SYSTEM LEGEND				CONTROL SCHEMATIC LEGEND			
	1x4 FLUORESCENT LIGHT FIXTURE		H ₁ HANDHOLE, IDENTIFIER SHOWN, REFER TO HANDHOLE SCHEDULE FOR SIZE		TRANSFORMER, RATINGS AS SHOWN		PRESSURE SWITCH
	FLUORESCENT LIGHT FIXTURE WITH EMERGENCY LIGHT (EL) BATTERY PACK, 1400 LUMENS MINIMUM FOR 2 LAMPS		GROUND		FUSE, CURRENT LIMITING, AMPERE RATING AS SHOWN OR REQUIRED, "BFI" INDICATES "BLOWN FUSE INDICATOR" TYPE		LIMIT SWITCH CONTACT, NORMALLY OPEN
	SWITCH, SINGLE POLE		20 AMP DUPLEX RECEPTACLE, MTD, 20" AFF TO BOTTOM, WITH #12 GROUND WIRE, "GFCI" INDICATES GROUND FAULT CIRCUIT INTERRUPTER, "WP" INDICATES WEATHERPROOF WHILE-IN-USE ENCLOSURE AND COVER, BOX INDICATES FLOOR OUTLET WITH RECESSED CAST JUNCTION BOX		ELECTRIC MOTOR, HORSEPOWER AS SHOWN		LIMIT SWITCH CONTACT, NORMALLY CLOSED
	SWITCH, DOUBLE POLE		DATA AND TELEPHONE DUAL OUTLET		MOTOR STARTER, SIZE AS SHOWN OR REQUIRED, FVNR UNLESS NOTED		LIMIT SWITCH CONTACT, NORMALLY CLOSED
	SWITCH, THREE WAY		DUCT BANK, IDENTIFIER SHOWN, REFER TO DUCT BANK SCHEDULE FOR SIZE AND CONFIGURATION		CIRCUIT BREAKER, TRIP RATING SHOWN, 3-POLE UNLESS NOTED OTHERWISE		LIMIT SWITCH CONTACT, HELD OPEN
	SWITCH, FOUR WAY		GENERATOR, RATINGS AS SHOWN		CAPACITOR, KVAR AS SHOWN		RELAY COIL, "TR" INDICATES "TIMING RELAY"
	SWITCH, DIMMER		GROUND ROD AND TEST WELL		AIRTERMINAL		PILOT LIGHT;
	NON-FUSED DISCONNECT SWITCH, SIZE AS NOTED		3/4" x 10' COPPER CLAD GROUND ROD		ELECTRICAL CONNECTION		"A" INDICATES "AMBER LENS" "G" INDICATES "GREEN LENS" "R" INDICATES "RED LENS"
	COMBINATION DISCONNECT AND MOTOR STARTER, SIZE AS NOTED, FUSED TYPE SHOWN				ELAPSED TIME METER		
	FUSED DISCONNECT SWITCH, SIZE AS NOTED				TERMINAL BLOCK		
					GROUND CONNECTION TO ENCLOSURE GROUND BAR		

© 2021 GARVER, LLC  
THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGNS CONVEYED HEREIN, SHALL BE CONSIDERED INSTRUMENTS OF PROFESSIONAL SERVICE AND ARE PROPERTY OF GARVER, LLC. ANY USE, REPRODUCTION, OR DISTRIBUTION OF THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGN CONTAINED HEREIN, IS PROHIBITED UNLESS AUTHORIZED IN WRITING BY GARVER, LLC OR EXPLICITLY ALLOWED IN THE GOVERNING PROFESSIONAL SERVICES AGREEMENT FOR THIS WORK.

REGISTRATION NO.  
F-5713

DIGITALLY SIGNED: 03/15/2021

BY				
DESCRIPTION				
DATE				
REV				

ADDISON, TX  
4245 KELLWAY CIRCLE  
ADDISON TX, 75001

ADDISON KELLWAY LIFT STATION  
BY-PASS PROJECT

ELECTRICAL NOTES, LEGENDS, AND ABBREVIATIONS

JOB NO.: 20W05015  
DATE: MARCH 2021  
DESIGNED BY: KAD  
DRAWN BY: CM

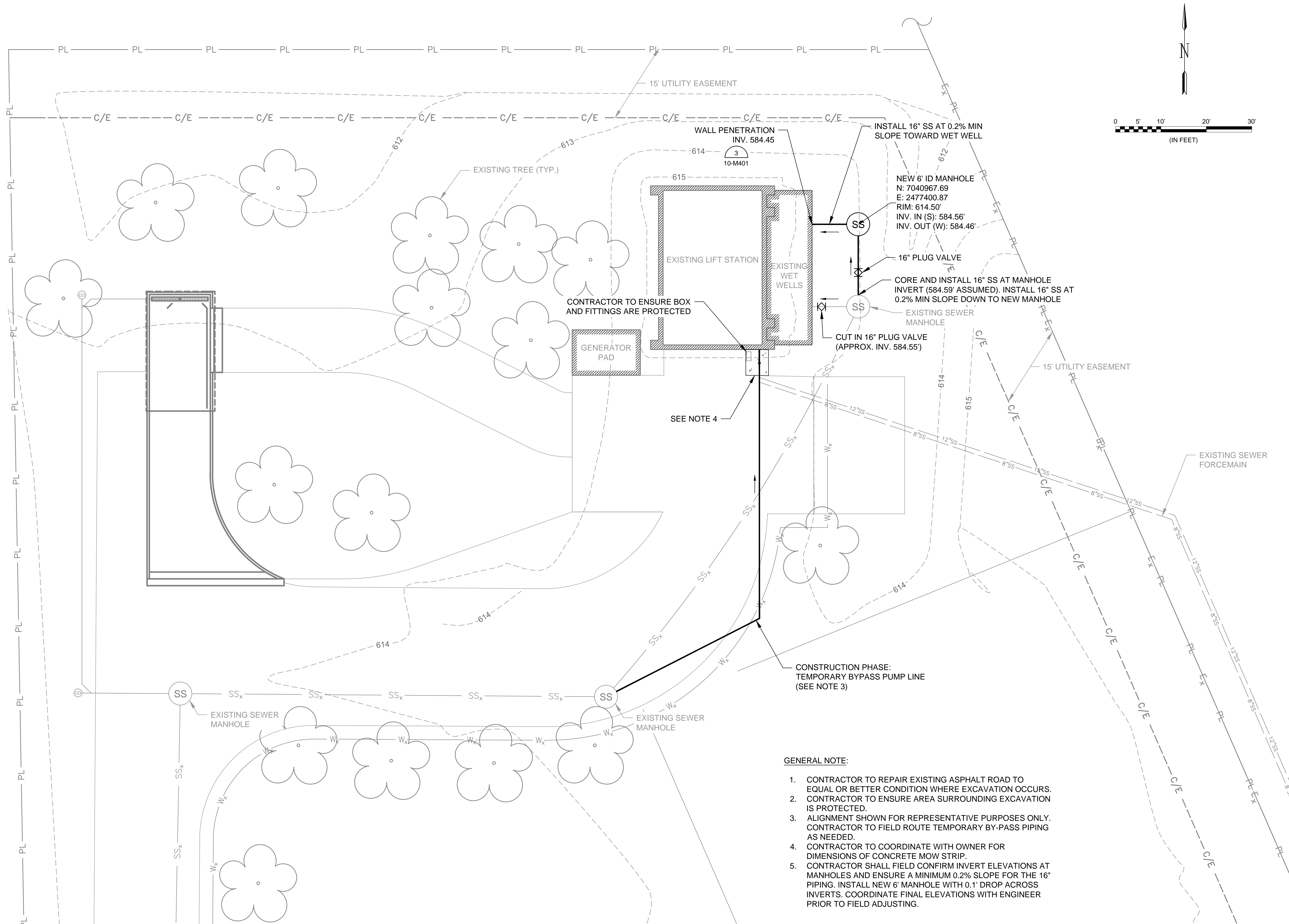
BAR IS ONE INCH ON ORIGINAL DRAWING 1"  
0  
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER  
**01-G004**

SHEET NUMBER  
**04**



File: L:\2020\20W05015 - Addison Kellway LS Bypass Pump Imps\Drawings\05-C101.dwg Last Save: 2/10/2021 11:44 AM Last saved by: MAWalker  
Last plotted by: Walker, Mark A. Plot Style: AECmono.ctb Plot Scale: 1/0.4255 Plot Date: 3/12/2021 4:11 PM Plotter used: DWG To PDF.pc3



**GENERAL NOTE:**

1. CONTRACTOR TO REPAIR EXISTING ASPHALT ROAD TO EQUAL OR BETTER CONDITION WHERE EXCAVATION OCCURS.
2. CONTRACTOR TO ENSURE AREA SURROUNDING EXCAVATION IS PROTECTED.
3. ALIGNMENT SHOWN FOR REPRESENTATIVE PURPOSES ONLY. CONTRACTOR TO FIELD ROUTE TEMPORARY BY-PASS PIPING AS NEEDED.
4. CONTRACTOR TO COORDINATE WITH OWNER FOR DIMENSIONS OF CONCRETE MOW STRIP.
5. CONTRACTOR SHALL FIELD CONFIRM INVERT ELEVATIONS AT MANHOLES AND ENSURE A MINIMUM 0.2% SLOPE FOR THE 16" PIPING. INSTALL NEW 6" MANHOLE WITH 0.1' DROP ACROSS INVERTS. COORDINATE FINAL ELEVATIONS WITH ENGINEER PRIOR TO FIELD ADJUSTING.



© 2018 GARVER, LLC  
THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGNS CONVEYED HEREIN, SHALL BE CONSIDERED INSTRUMENTS OF PROFESSIONAL SERVICE AND ARE PROPERTY OF GARVER, LLC. ANY USE, REPRODUCTION, OR DISTRIBUTION OF THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGN CONTAINED HEREIN, IS PROHIBITED UNLESS AUTHORIZED IN WRITING BY GARVER, LLC OR EXPLICITLY ALLOWED IN THE GOVERNING PROFESSIONAL SERVICES AGREEMENT FOR THIS WORK.

REGISTRATION NO.  
F-5713



REV.	DATE	DESCRIPTION	BY

**TOWN OF ADDISON**  
ADDISON, TEXAS

**KELLWAY LIFT STATION BY-PASS PUMP IMPROVEMENTS**

**SITE PLAN**

JOB NO.: 20W05015  
DATE: MARCH 2021  
DESIGNED BY: SJM  
DRAWN BY: MAW

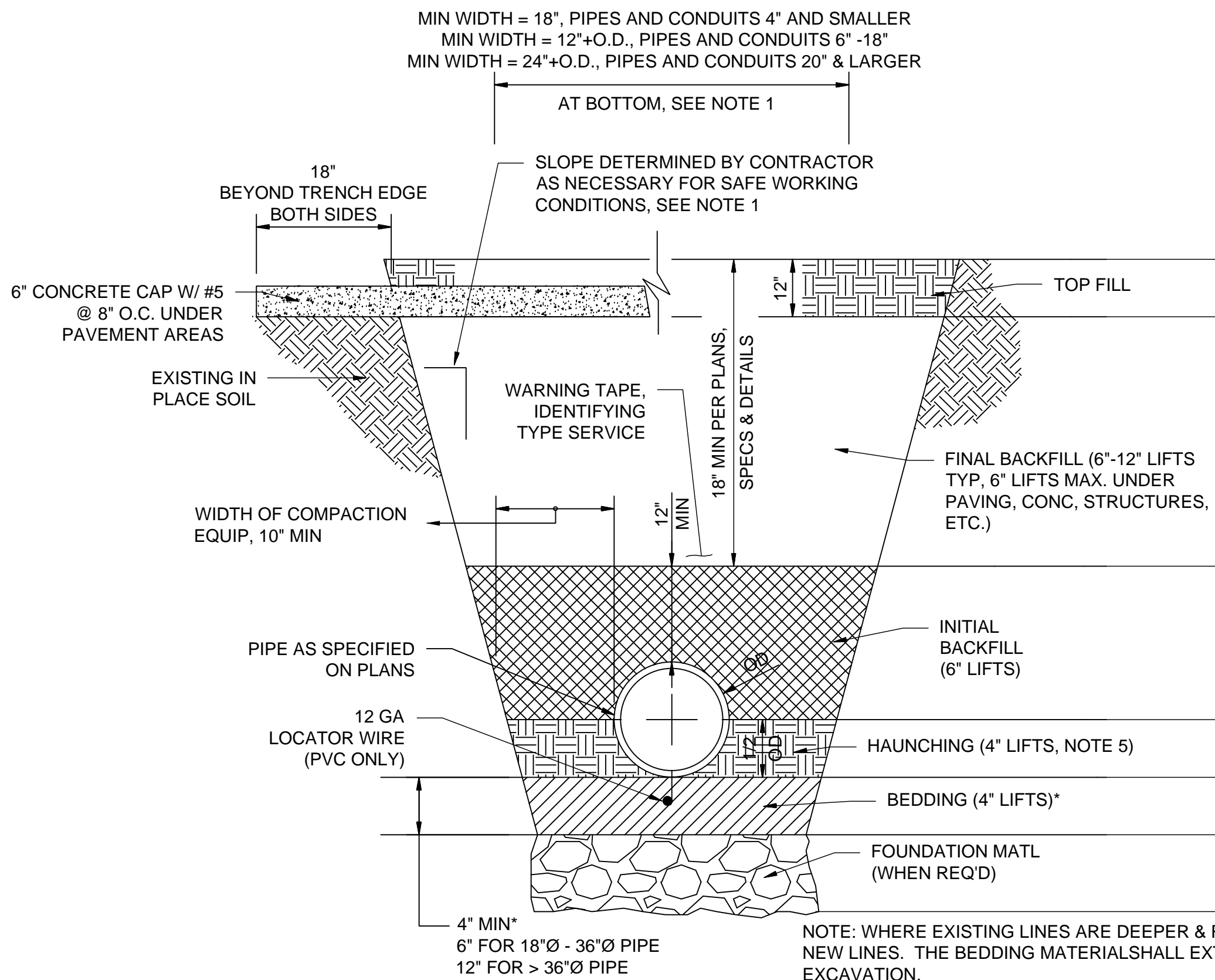
BAR IS ONE INCH ON ORIGINAL DRAWING  
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER  
**05-C101**

SHEET NUMBER  
**05**



File: L:\2020\20W05015 - Addison Kellway LS Bypass Pump Imps\Drawings\05-C501.dwg, Last Save: 2/10/2021 11:44 AM, Last saved by: MAWalker, Last plotted by: Walker, Mark A., Plot Style: AECmono.ctb, Plot Scale: 1:0.4255, Plot Date: 3/12/2021 4:12 PM, Plotter used: DWG To PDF.pc3



BEDDING/BACKFILL REQUIREMENTS & MAT'L DESIGNATIONS (SEE MATERIAL DESIGNATION/DESCRIPTOINS TABLE)								
PRESSURE MAINS			GRAVITY LINES			PAVED AREAS		
DI	CONC	HDPE, PVC & FRP	DI	CONC	HDPE, PVC & FRP	DI	CONC	HDPE, PVC & FRP
5	5	5	5	5	5	6**	6**	6**
4	4	4	4	4	4	7	7	7
3	3	*** 2/3	3	3	*** 2/3	1	3	*** 2/3
2	3	*** 2/3	2	3	*** 2/3	2	3	*** 2/3
2	1	2	2	1	2	2	1	2
RIP-RAP OR CRUSHED STONE CLASS 1B (USCS IN ASTM D2487)								

NOTE: WHERE EXISTING LINES ARE DEEPER & REMOVED FOR THE INSTALLATION OF NEW LINES. THE BEDDING MATERIALSHALL EXTEND TO THE FULL DEPTH AND WIDTH OF EXCAVATION.

* SEE NOTE 2  
** SEE NOTE 4  
*** LINES SMALLER THAN 18" SHALL BE NO.67 BEDDING, LINES 18" AND LARGER NO.67 OR NO.57 BEDDING.

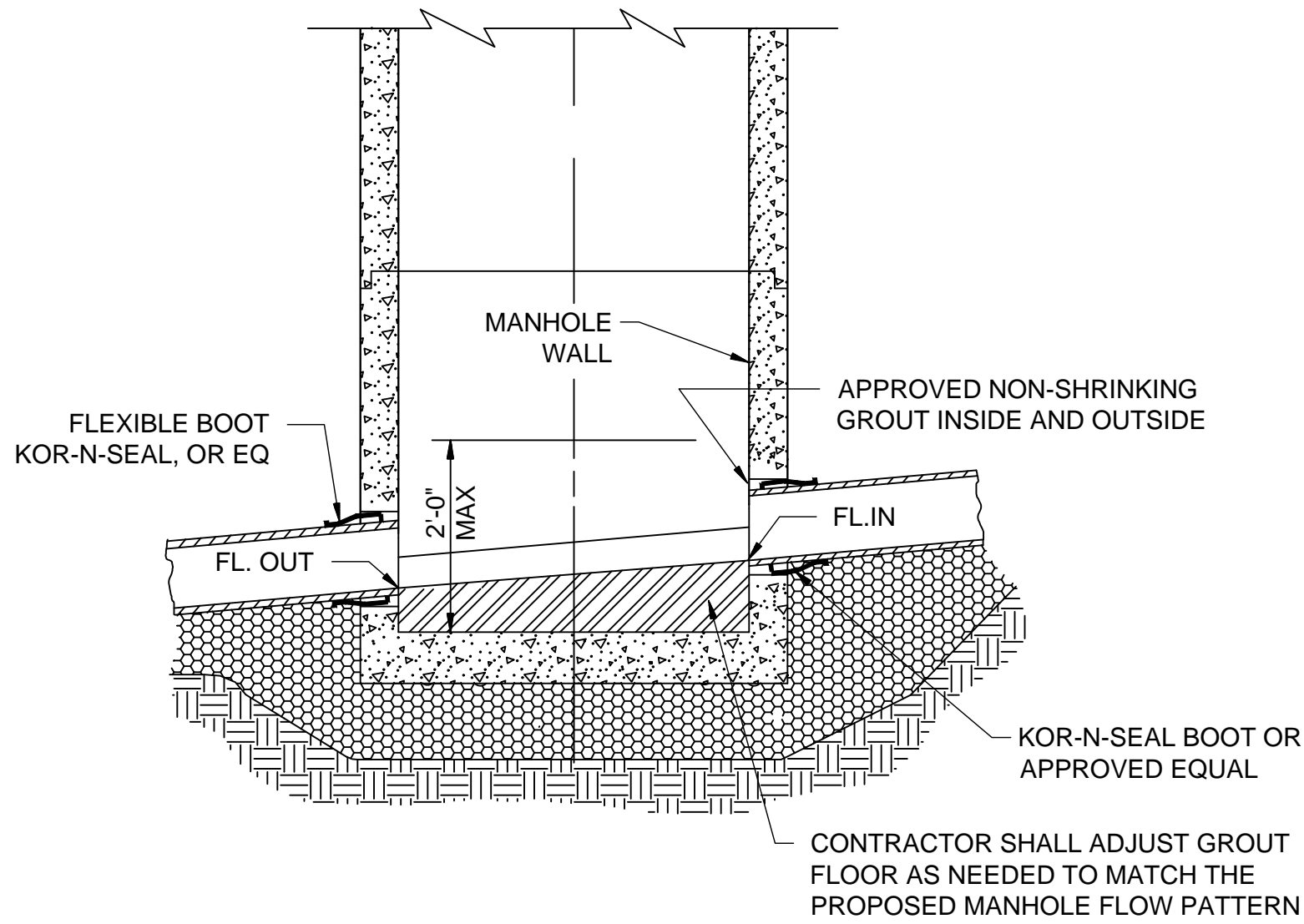
- NOTES:
- SLOPE, BENCHING, SHORING, ETC. AS DETERMINED AND DESIGNED BY THE CONTRACTOR. CONTRACTOR IS SOLELY RESPONSIBLE FOR COMPLYING WITH ALL APPLICABLE OSHA REGULATIONS FOR "OPEN TRENCH EXCAVATIONS".
  - BEDDING REQ'D FOR ALL GRAVITY LINES, ALL PVC LINES AND ALL CONCRETE LINES. BEDDING REQUIRED IN ALL AREAS OF ROCK EXCAVATION OR UNSUITABLE SOILS. BELL HOLES REQ'D FOR PIPES > 4" DIA. FOR DUCTILE IRON PRESSURE MAINS, SELECT EARTH MAY BE USED FOR BEDDING IN AREAS OF ROCK EXCAVATION.
  - ALL MATERIALS SHALL BE COMPACTED TO MINIMUM 95% MODIFIED PROCTOR DENSITY AT 2%± OPTIMUM MOISTURE CONTENT. MATERIALS UNDER PAVING, CONCRETE, STRUCTURES, ETC. SHALL BE COMPACTED TO TO MIN 98%-100% MODIFIED PROCTOR. MECHANICAL COMPACTION SHALL BE BY VIBRATORY SHEEPSFOOT OR OTHER EQUIP. SPECIFICALLY DESIGNED FOR THE COMPACTION OF EARTH. COMPACTION EQUIP. SHALL BE ON-SITE PRIOR TO BEGINNING OF WORK. MECHANICAL COMPACTION SHALL BE COMPLETED IN LOOSE LIFTS AS SHOWN ON THE DETAIL.
  - TEMPORARY COMPACTED PUG-MIX BACKFILL REQ'D UNTIL PAVEMENT PLACEMENT IS COMPLETE. THE CONTRACTOR SHALL CONTINUOUSLY MAINTAIN THIS PUGMIX TO KEEP IT FLUSH WITH THE ADJACENT PAVING, ETC. UNTIL THE FINAL PAVING IS PLACED. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY ASPHALT OR CONCRETE PATCHES WHEN NEEDED FOR PUBLIC SAFETY AND/OR CONVENIENCE.
  - THE CONTRACTOR SHALL BE RESPONSIBLE FOR SELECTING AND UTILIZE APPROPRIATE MEANS AND METHODS OF CONSTRUCTION TO ENSURE THAT THE ENTIRE AREAS UNDER THE HAUNCHES OF THE PIPE ARE FILLED WITH THE REQUIRED MATERIALS AND COMPACTED APPROPRIATELY.
  - ADDITIONAL AND/OR SPECIAL REQUIREMENTS MAY BE REQ'D BY THE PLANS, SPECIFICATIONS AND/OR CONTRACT DOCUMENTS.
  - TO THE EXTENT POSSIBLE, AS DETERMINED BY THE CONTRACTOR, TRENCH WALL SHORING METHODS SHALL BE USED IN PAVED AREAS TO MINIMIZE PAVING REPAIR REQUIREMENTS.

MATERIAL DESIGNATION/DESCRIPTOINS TABLE	
DESIGNATION/ MATERIALS	DESCRIPTION
1	CRUSHED STONE, ASTM-448 NO. 57 GRADATION
2	CRUSHED STONE, ASTM-448 NO. 67 GRADATION.
3	GRANULAR MAT'L REASONABLE DRY (WITHIN LIMITS REQ'D FOR COMPACTION) COMPACTED TO 90% OF STANDARD PROCTOR DENSITY
4	EXCAVATED MAT'L REASONABLY DRY (WITHIN LIMITS REQ'D FOR COMPACTION) NO STONES > 12" DIA.
5	SELECT TOPSOIL MAT'L TO SUPPORT VEGETATION, NO STONES OR ROCK ALLOWED
6	PAVEMENT MATCHING EXISTING PAVEMENT OR AS SPECIFIED ON THE PLANS
7	AGGREGATE BASE COARSE OR CONTROLLED LOW STRENGTH FILL

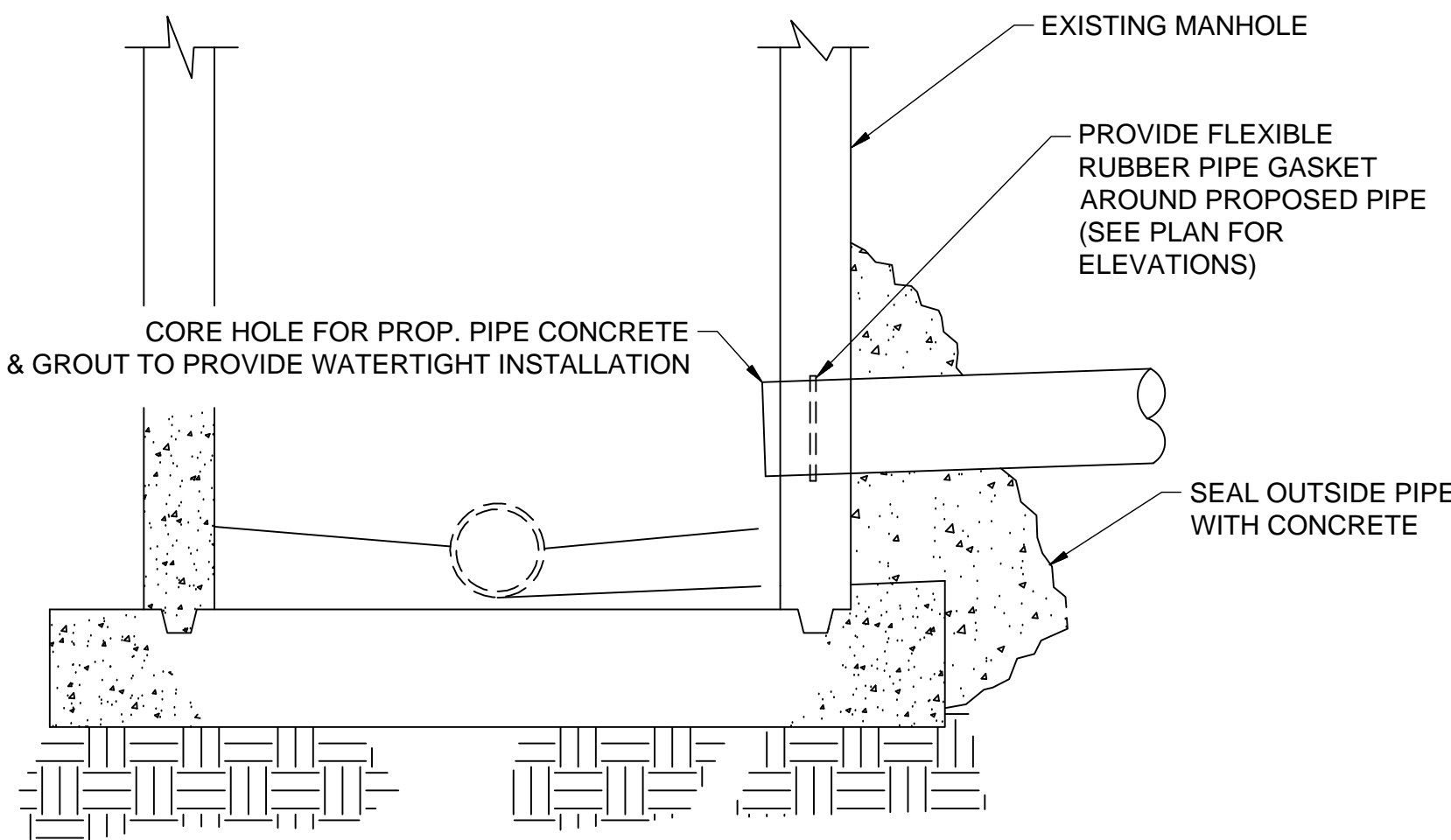
1  
05-C501

## BEDDING AND BACKFILL FOR TRENCHES

SCALE: NONE



MANHOLE CORING DETAILS



SEWER CONNECTION IN EXISTING MANHOLE

2  
05-C501

## MANHOLE CORING DETAILS SEWER CONNECTION IN EXISTING MANHOLE

SCALE: NONE



© 2018 GARVER, LLC  
THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGNS CONVEYED HEREIN, SHALL BE CONSIDERED INSTRUMENTS OF PROFESSIONAL SERVICE AND ARE PROPERTY OF GARVER, LLC. ANY USE, REPRODUCTION, OR DISTRIBUTION OF THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGN CONTAINED HEREIN, IS PROHIBITED UNLESS AUTHORIZED IN WRITING BY GARVER, LLC OR EXPLICITLY ALLOWED IN THE GOVERNING PROFESSIONAL SERVICES AGREEMENT FOR THIS WORK.

REGISTRATION NO.  
F-5713



BY	DESCRIPTION	DATE	REV.



TOWN OF ADDISON  
ADDISON, TEXAS  
KELLWAY LIFT STATION  
BY-PASS PUMP IMPROVEMENTS

CIVIL DETAILS 1

JOB NO.: 20W05015  
DATE: MARCH 2021  
DESIGNED BY: SJM  
DRAWN BY: MAW

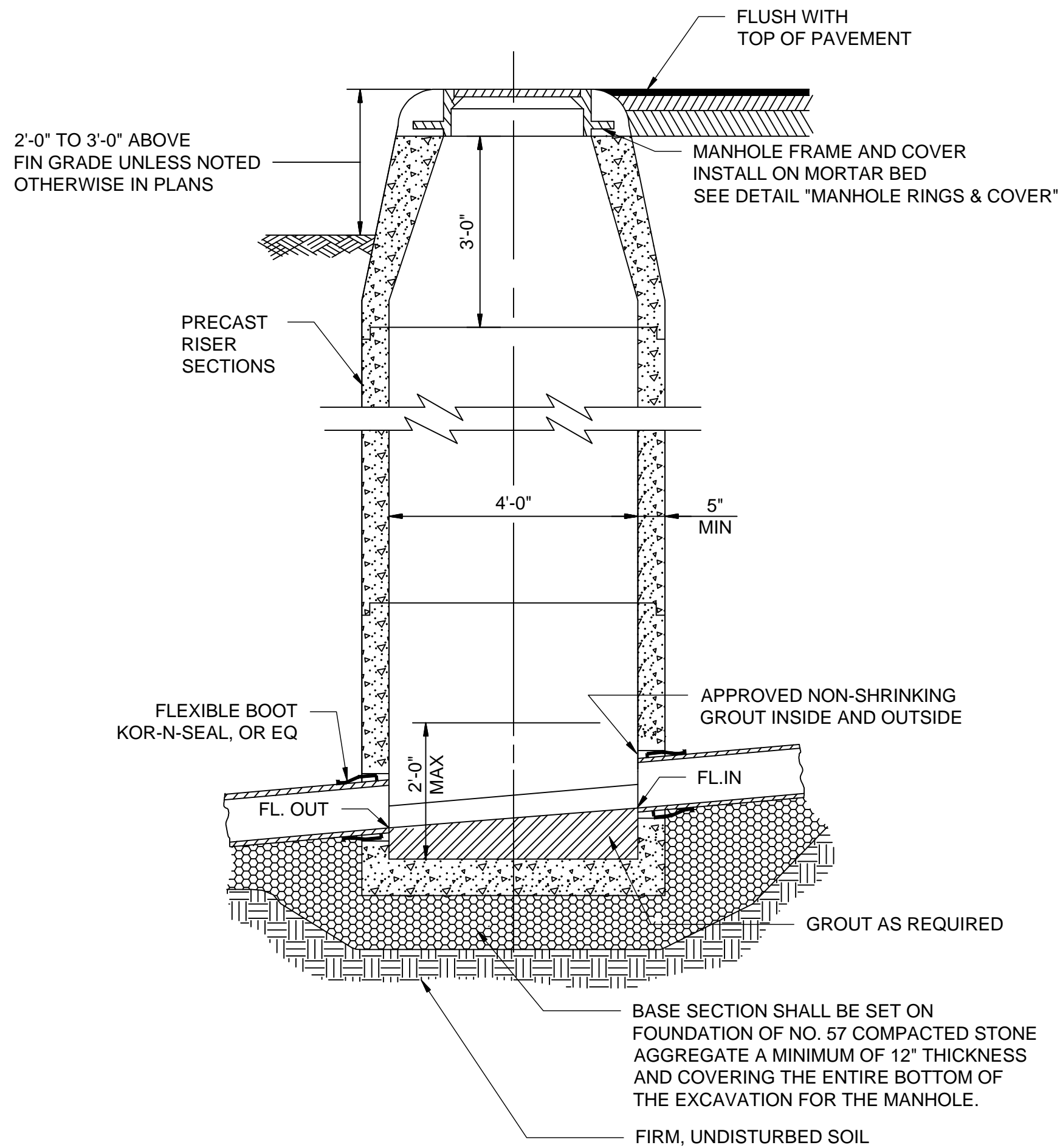
BAR IS ONE INCH ON ORIGINAL DRAWING  
0 1"  
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER  
05-C501

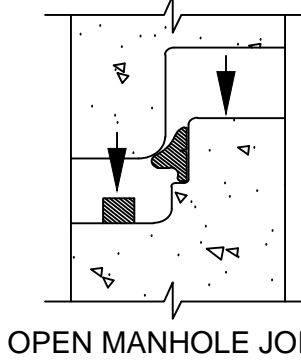
SHEET  
NUMBER 06



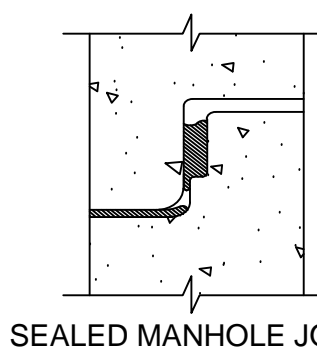
File: L:\2020\20W05015 - Addison Kellway LS Bypass Pump Imps\Drawings\05-C502.dwg Last Save: 2/12/2021 4:34 PM Last saved by: MAV\alker  
Last plotted by: Walker, Mark A. Plot Style: AECmono.ctb Plot Date: 3/12/2021 4:12 PM Plotter used: DWG To PDF.pc3



TYLOX-SUPER (OR EQ) SEAL SIZE CHART	
48" OD	3/8
60" ID	3/8
72" ID	3/8
84" ID	3/4
96" ID	3/4

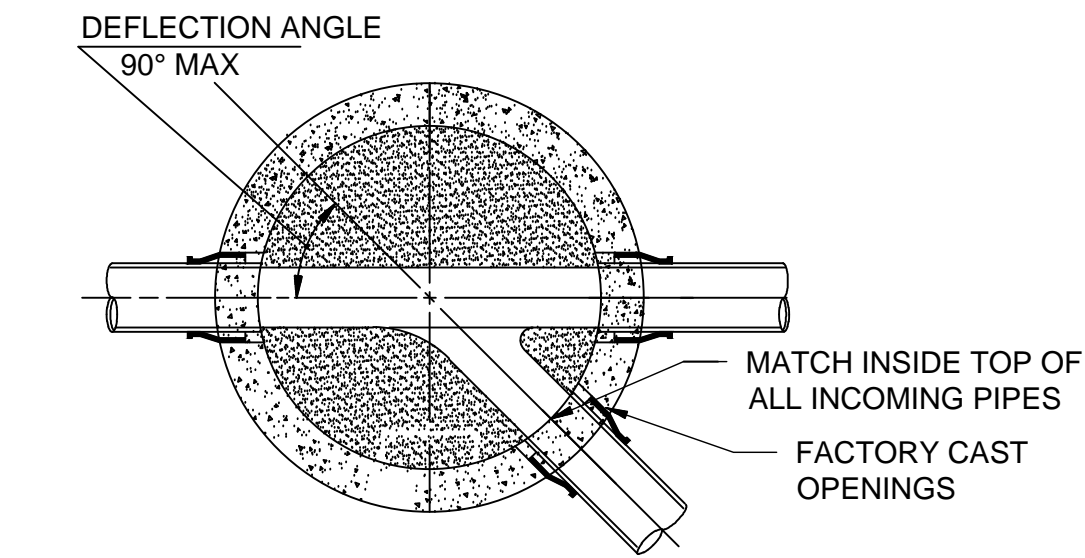


OPEN MANHOLE JOINT

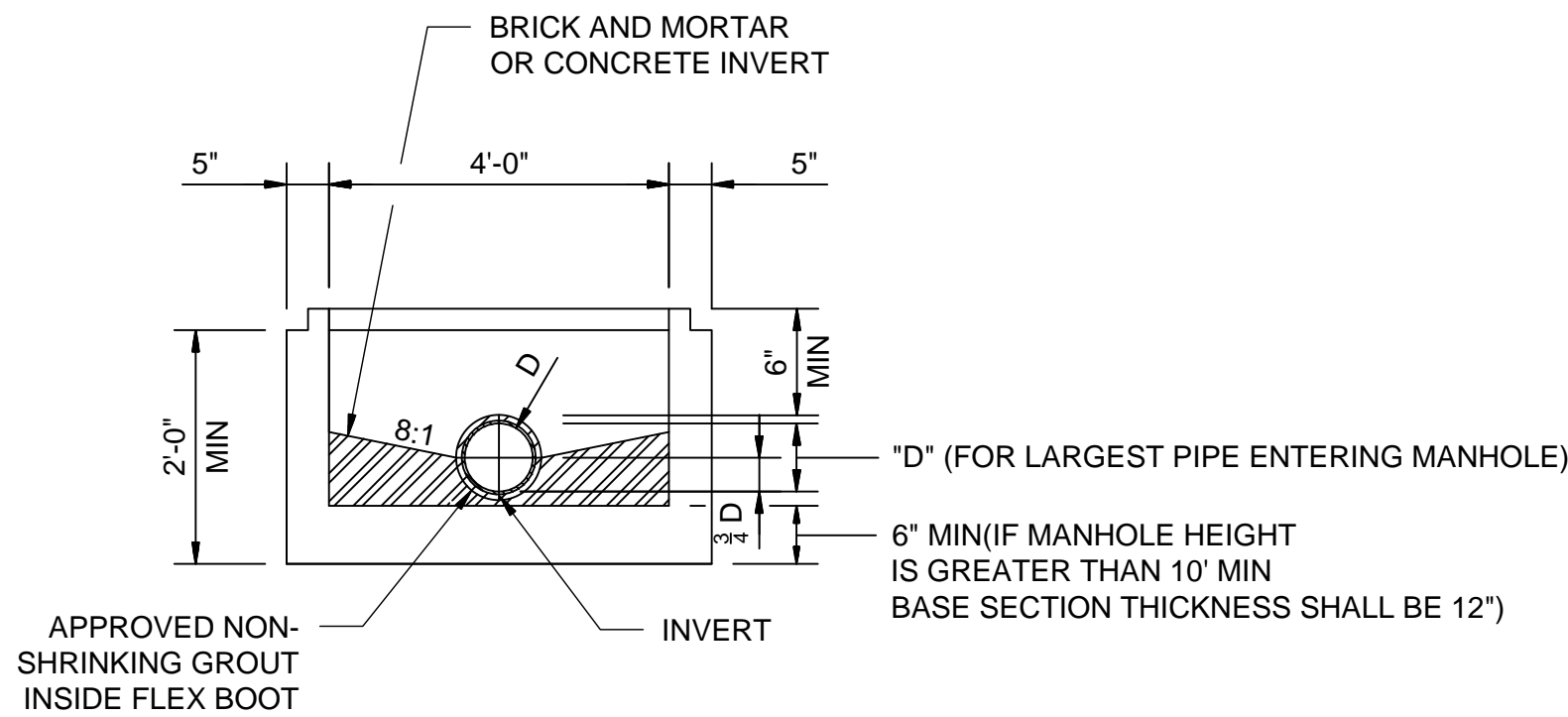


SEALED MANHOLE JOINT

JOINT DETAIL TYP ALL SIZES



MANHOLE BASE PLAN



BASE SECTION

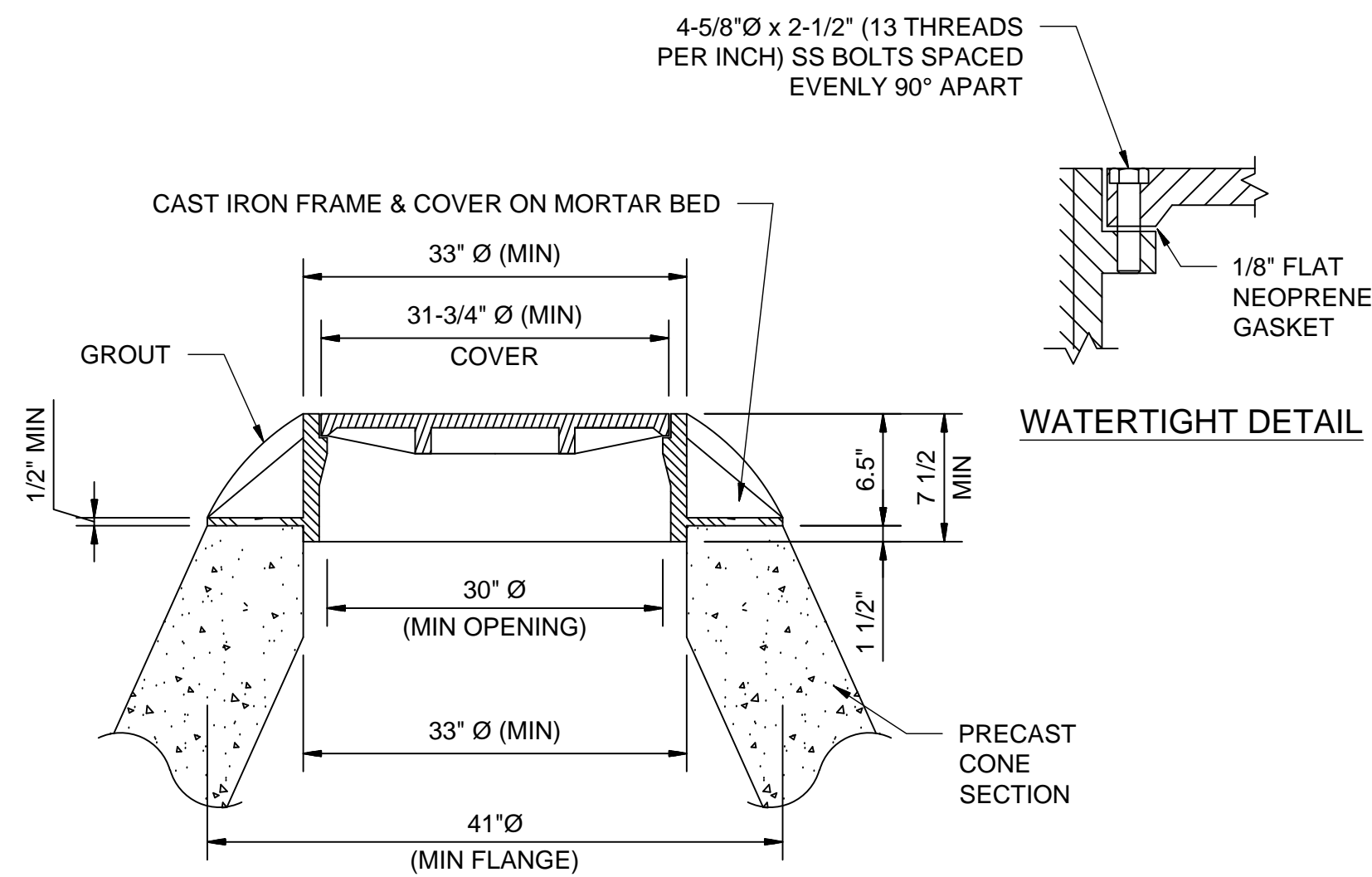
NOTES:

1. ALL MANHOLES WITH PIPE ENTERING WITH DIAMETER OF 24" D.I.P OR LESS SHALL BE SUPPLIED WITH KOR-N-SEAL FLEXIBLE BOOTS OR APPROVED EQUAL. LINES > 24" SHALL HAVE A-LOK (OR EQ) FLEX BOOTS CAST INTO MH WALLS, GROUT CONN (2" MIN CL OPNG) ONLY WHEN CALLED FOR IN PLANS
2. PRECAST SECTIONS SHALL BE REINFORCED PER ASTM C-478
3. UNLESS OTHERWISE INDICATED ON PLANS OR PROFILES, ALL MANHOLES SHALL BE 48" DIAMETER

1  
05-C502

TYPE A PRECAST MANHOLE

SCALE: NONE

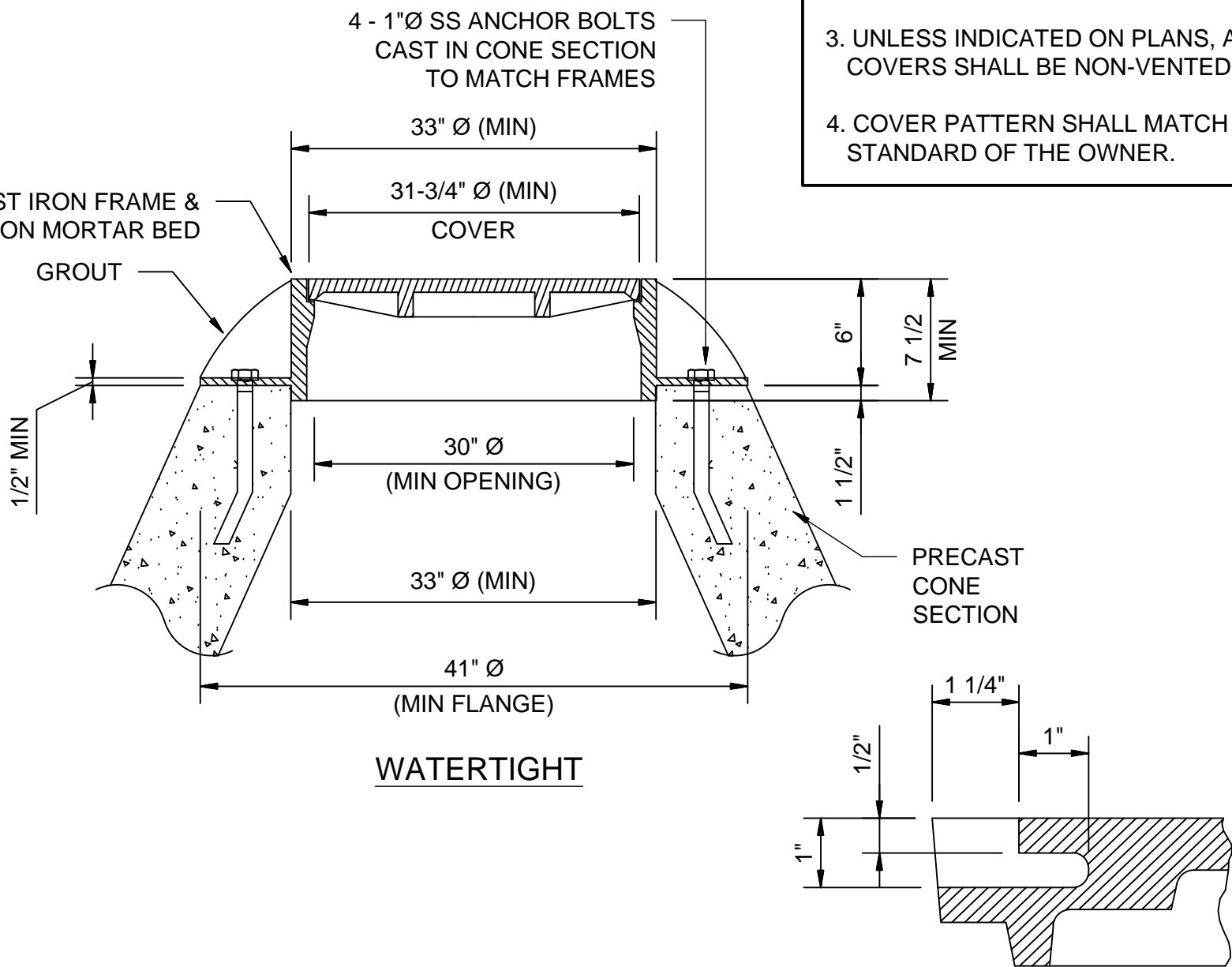


STANDARD

NOTES:

1. CONTACTING/SEALING SURFACES OF FRAME AND COVER SHALL BE MACHINED.
2. MINIMUM WEIGHTS:  
FRAME - 180 LB  
COVER - 120 LB
3. UNLESS INDICATED ON PLANS, ALL COVERS SHALL BE NON-VENTED.
4. COVER PATTERN SHALL MATCH THE STANDARD OF THE OWNER.

C.  
COVE



WATERTIGHT

2  
05-C502

TYPICAL MANHOLE RINGS & COVERS

SCALE: NONE



© 2018 GARVER, LLC  
THIS DOCUMENT, ALONG WITH THE  
IDEAS AND DESIGNS CONVEYED  
HEREIN, SHALL BE CONSIDERED  
INSTRUMENTS OF PROFESSIONAL  
SERVICE AND ARE PROPERTY OF  
GARVER, LLC. ANY USE,  
REPRODUCTION, OR DISTRIBUTION  
OF THIS DOCUMENT, ALONG WITH  
THE IDEAS AND DESIGN CONTAINED  
HEREIN, IS PROHIBITED UNLESS  
AUTHORIZED IN WRITING BY  
GARVER, LLC OR EXPLICITLY  
ALLOWED IN THE GOVERNING  
PROFESSIONAL SERVICES  
AGREEMENT FOR THIS WORK.

REGISTRATION NO.  
F-5713



BY	DESCRIPTION	DATE	REV.



TOWN OF ADDISON  
ADDISON, TEXAS

KELLWAY LIFT STATION  
BY-PASS PUMP IMPROVEMENTS

CIVIL DETAILS 2

JOB NO.: 20W05015  
DATE: MARCH 2021  
DESIGNED BY: SJM  
DRAWN BY: MAW

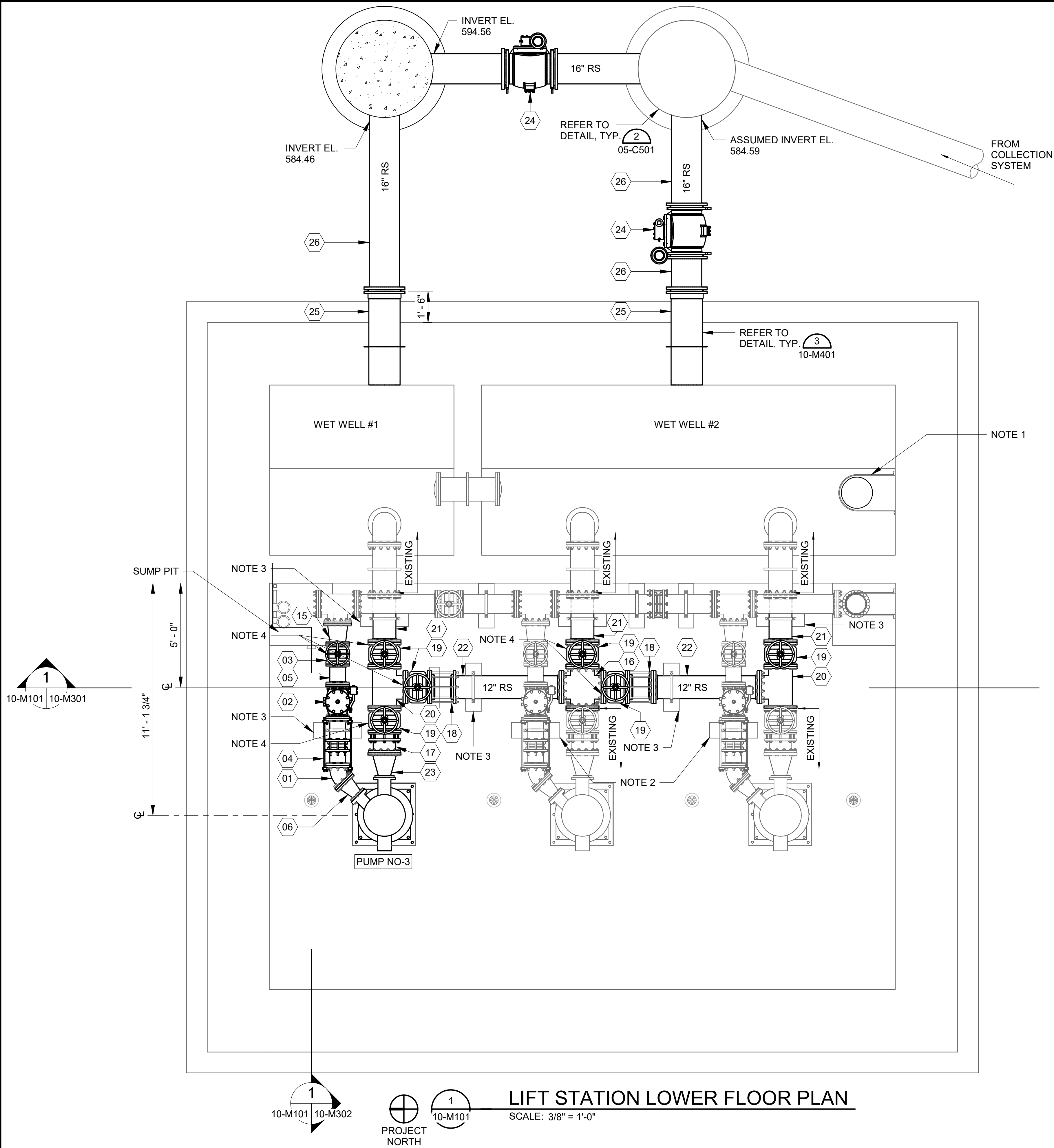
BAR IS ONE INCH ON  
ORIGINAL DRAWING  
0 1"  
IF NOT ONE INCH ON THIS SHEET,  
ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER  
05-C502

SHEET  
NUMBER 07



Revit File: BIM 360/20W05015 - Addison Kellway LS Bypass Pump Imps/20W05015 - Addison Kellway.rvt  
Plot Date: 3/15/2021 11:01:10 AM



KEYNOTES:		DENOTED BY SYMBOL
01	8" 45° BEND (FLG x FLG)	
02	8" AIR CUSHIONED SWING CHECK VALVE V609 (FLG x FLG)	
03	8" GATE VALVE V142 (FLG x FLG)	
04	8" RESTRAINED COUPLING (FLG x FLG)	
05	8" x LENGTH AS REQ'D SPOOL (FLG x FLG)	
06	8" x 5" REDUCER (FLG x FLG)	
07	10" 90 BEND (FLG x FLG)	
08	10" GATE VALVE V142 (FLG x FLG)	
09	10" PLUG VALVE V405 (FLG x FLG) MANUAL OPERATOR W/ WHEEL	
10	10" PLUG VALVE V405 (MJ x MJ) MANUAL OPERATOR W/ STEM KIT	
11	10" TEE (MJ x MJ x MJ)	
12	10" x LENGTH AS REQ'D SPOOL (FLG x PE)	
13	10" x LENGTH AS REQ'D SPOOL (MJ x FLG)	
14	10" COUPLING (FLG x MJ)	
15	10" x 8" REDUCER (FLG x FLG)	
16	12" CROSS (FLG x FLG x FLG x FLG)	
17	12" DISMANTLING JOINT (FLG x FLG)	
18	12" FLANGED COUPLING ADAPTER	
19	12" GATE VALVE V142 (FLG x FLG)	
20	12" TEE (FLG x FLG x FLG)	
21	12" x LENGTH AS REQ'D SPOOL (FLG x FLG)	
22	12" x LENGTH AS REQ'D SPOOL (FLG x PE)	
23	12" x 6" ECCENTRIC REDUCER (FLG x FLG)	
24	16" PLUG VALVE V406 (MJ x MJ)	
25	16" WALL PIPE (PE x MJ)	
26	16" x LENGTH AS REQ'D SPOOL (PE x PE)	

LEGEND

- EXISTING CONSTRUCTION
- NEW CONSTRUCTION

NOTES:

- CONTRACTOR TO CONFIRM WITH OWNER AND ENGINEER WHICH PIPE SUPPORTS TO BE REMOVED. CONTRACTOR TO COORDINATE NEW PIPE SUPPORT AND LOCATION AS SHOWN ON DRAWINGS.
- NEW CONCRETE PIPE SUPPORT. SEE DETAIL 10-M401
- ADJUSTABLE PIPE SUPPORT. SEE DETAIL 10-M401
- CONTRACTOR IS LIABLE FOR CONFINED SPACE ENTRY

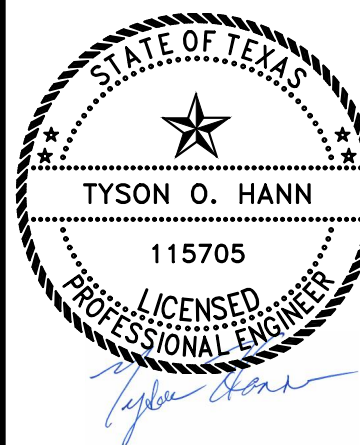
DEMOLITION NOTES:

- ELEVATIONS AND DIMENSIONS PROVIDED ARE BASED ON RECORD DRAWINGS AND ARE PROVIDED FOR THE CONTRACTOR'S REFERENCE. CONTRACTOR SHALL CONFIRM ALL ELEVATIONS PRIOR TO BEGINNING WORK, AND OWNER AND ENGINEER SHALL NOT BE HELD RESPONSIBLE FOR VARIANCES BETWEEN DRAWING AND ACTUAL ELEVATIONS. CONTRACTOR IS RESPONSIBLE FOR THE PRE-MEASURING OF EQUIPMENT AND EXISTING OPENINGS PRIOR TO REMOVAL.
- CONTRACTOR SHALL RESTORE ALL SURFACE CONCRETE OR SIDEWALKS DAMAGED AS PART OF THE CONSTRUCTION PROCESS AT NO ADDITIONAL COST TO THE OWNER.
- CONTRACTOR TO PROTECT ALL ELECTRICAL WIRING, CONTROL INSTRUMENTS, AND ELECTRICAL APPURTENANCES. DAMAGED ITEMS SHALL BE REPLACED AT NO ADDITIONAL COST TO OWNER
- REMOVE AND DISPOSE OF ALL SOLIDS AND/OR LIQUIDS INCLUDING SLUDGE IN BASINS AND WELLS TO BE DEMOLISHED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW ALL APPLICABLE CODES AND REQUIREMENTS FOR SOLIDS REMOVAL AND OFFSITE DISPOSAL AND TO OBTAIN ANY REQUIRED PERMITS. REFER TO SPECIFICATION 02 41 00.
- CONTRACTOR TO REMOVE STILLING WELL AND SUPPORTS. REPAIR CONCRETE AS REQUIRED.



© 2021 GARVER, LLC  
THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGNS CONVEYED HEREIN, SHALL BE CONSIDERED INSTRUMENTS OF PROFESSIONAL SERVICE AND ARE PROPERTY OF GARVER, LLC. ANY USE, REPRODUCTION, OR DISTRIBUTION OF THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGN CONTAINED HEREIN, IS PROHIBITED UNLESS AUTHORIZED IN WRITING BY GARVER, LLC OR EXPLICITLY ALLOWED IN THE GOVERNING PROFESSIONAL SERVICES AGREEMENT FOR THIS WORK.

REGISTRATION NO.  
F-5713



Digitally Signed 03/15/2021

REV	DATE	DESCRIPTION	BY

ADDISON  
4245 KELLWAY CIRCLE  
ADDISON TX, 75001  
ADDISON KELLWAY LIFT STATION  
BY-PASS PROJECT

LIFT STATION LOWER  
FLOOR PLAN

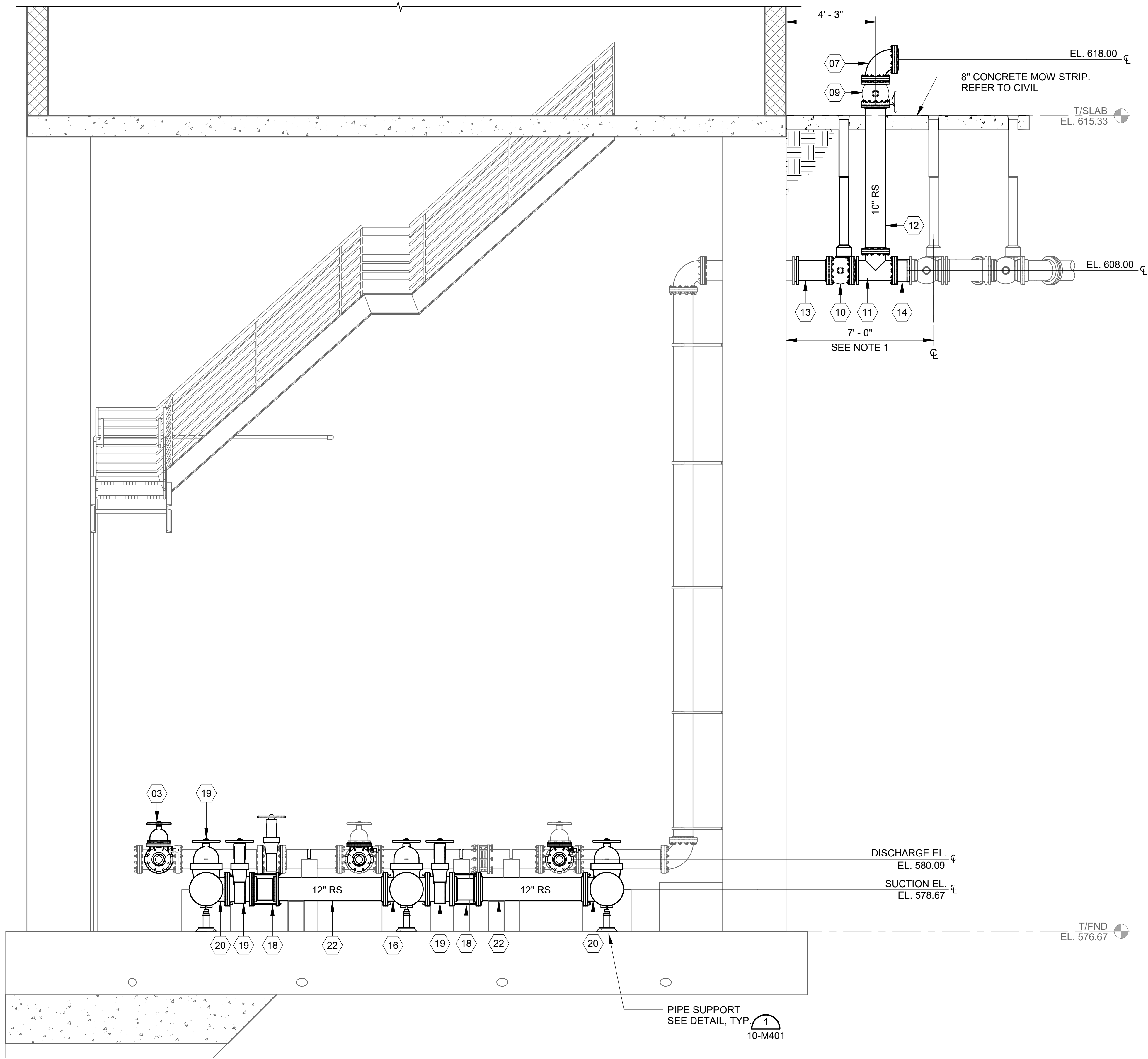
JOB NO.: 20W05015  
DATE: MARCH 2021  
DESIGNED BY: CAT  
DRAWN BY: AEG

BAR IS ONE INCH ON  
ORIGINAL DRAWING  
IF NOT ONE INCH ON THIS SHEET,  
ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER  
**10-M101**  
SHEET  
NUMBER **08**



Revit File: BIM 360/20W05015 - Addison Kellway LS Bypass Pump Imps/20W05015_Addison Kellway.rvt  
Plot Date: 3/15/2021 11:01:15 AM




KEYNOTES:		DENOTED BY SYMBOL	X
01	8" 45° BEND (FLG x FLG)		
02	8" AIR CUSHIONED SWING CHECK VALVE V609 (FLG x FLG)		
03	8" GATE VALVE V142 (FLG x FLG)		
04	8" RESTRAINED COUPLING (FLG x FLG)		
05	8" x LENGTH AS REQ'RD SPOOL (FLG x FLG)		
06	8" x 5" REDUCER (FLG x FLG)		
07	10" 90 BEND (FLG x FLG)		
08	10" GATE VALVE V142 (FLG x FLG)		
09	10" PLUG VALVE V405 (FLG x FLG) MANUAL OPERATOR W/ WHEEL		
10	10" PLUG VALVE V405 (MJ x MJ) MANUAL OPERATOR W/ STEM KIT		
11	10" TEE (MJ x MJ x MJ)		
12	10" x LENGTH AS REQ'RD SPOOL (FLG x PE)		
13	10" x LENGTH AS REQ'RD SPOOL (MJ x FLG)		
14	10" COUPLING (FLG x MJ)		
15	10" x 8" REDUCER (FLG x FLG)		
16	12" CROSS (FLG x FLG x FLG x FLG)		
17	12" DISMANTLING JOINT (FLG x FLG)		
18	12" FLANGED COUPLING ADAPTER		
19	12" GATE VALVE V142 (FLG x FLG)		
20	12" TEE (FLG x FLG x FLG)		
21	12" x LENGTH AS REQ'RD SPOOL (FLG x FLG)		
22	12" x LENGTH AS REQ'RD SPOOL (FLG x PE)		
23	12" x 6" ECCENTRIC REDUCER (FLG x MJ)		
24	16" PLUG VALVE V406 (MJ x MJ)		
25	16" WALL PIPE (PE x MJ)		
26	16" x LENGTH AS REQ'RD SPOOL (PE x PE)		

- NOTES:
- CONTRACTOR TO CONFIRM FITTING TYPE, EITHER FLANGE OR MECHANICAL JOINT, AND DIMENSIONS, IN THIS AREA PRIOR TO INSTALLATION.

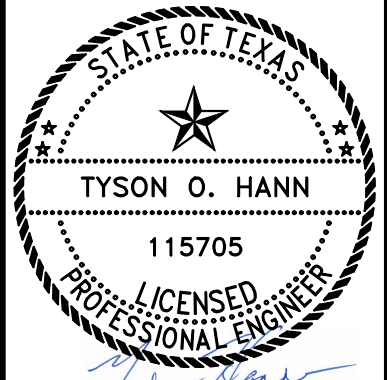
- DEMOLITION NOTES:
- ELEVATIONS AND DIMENSIONS PROVIDED ARE BASED ON RECORD DRAWINGS AND ARE PROVIDED FOR THE CONTRACTOR'S REFERENCE. CONTRACTOR SHALL CONFIRM ALL ELEVATIONS PRIOR TO BEGINNING WORK, AND OWNER AND ENGINEER SHALL NOT BE HELD RESPONSIBLE FOR VARIANCES BETWEEN DRAWING AND ACTUAL ELEVATIONS. CONTRACTOR IS RESPONSIBLE FOR THE PRE-MEASURING OF EQUIPMENT AND EXISTING OPENINGS PRIOR TO REMOVAL.
  - CONTRACTOR SHALL RESTORE ALL SURFACE CONCRETE OR SIDEWALKS DAMAGED AS PART OF THE CONSTRUCTION PROCESS AT NO ADDITIONAL COST TO THE OWNER.
  - CONTRACTOR TO PROTECT ALL ELECTRICAL WIRING, CONTROL INSTRUMENTS, AND ELECTRICAL APPURTENANCES. DAMAGED ITEMS SHALL BE REPLACED AT NO ADDITIONAL COST TO OWNER
  - REMOVE AND DISPOSE OF ALL SOLIDS AND/OR LIQUIDS INCLUDING SLUDGE IN BASINS AND WELLS TO BE DEMOLISHED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW ALL APPLICABLE CODES AND REQUIREMENTS FOR SOLIDS REMOVAL AND OFFSITE DISPOSAL AND TO OBTAIN ANY REQUIRED PERMITS. REFER TO SPECIFICATION 02 41 00.

1  
10-M101 | 10-M301  
LIFT STATION AND BYPASS CONNECTION SECTION  
SCALE: 3/8" = 1'-0"



© 2021 GARVER, LLC  
THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGNS CONVEYED HEREIN, SHALL BE CONSIDERED INSTRUMENTS OF PROFESSIONAL SERVICE AND ARE PROPERTY OF GARVER, LLC. ANY USE, REPRODUCTION, OR DISTRIBUTION OF THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGN CONTAINED HEREIN, IS PROHIBITED UNLESS AUTHORIZED IN WRITING BY GARVER, LLC OR EXPLICITLY ALLOWED IN THE GOVERNING PROFESSIONAL SERVICES AGREEMENT FOR THIS WORK.


REGISTRATION NO.  
F-5713



115705  
TYSON O. HANN  
LICENSED PROFESSIONAL ENGINEER

Digitally Signed 03/15/2021

BY	DESCRIPTION	DATE	REV



ADDISON, TX  
4245 KELLWAY CIRCLE  
ADDISON TX, 75001

ADDISON KELLWAY LIFT STATION  
BY-PASS PROJECT

SECTION I

JOB NO.: 20W05015  
DATE: MARCH 2021  
DESIGNED BY: CAT  
DRAWN BY: AEG

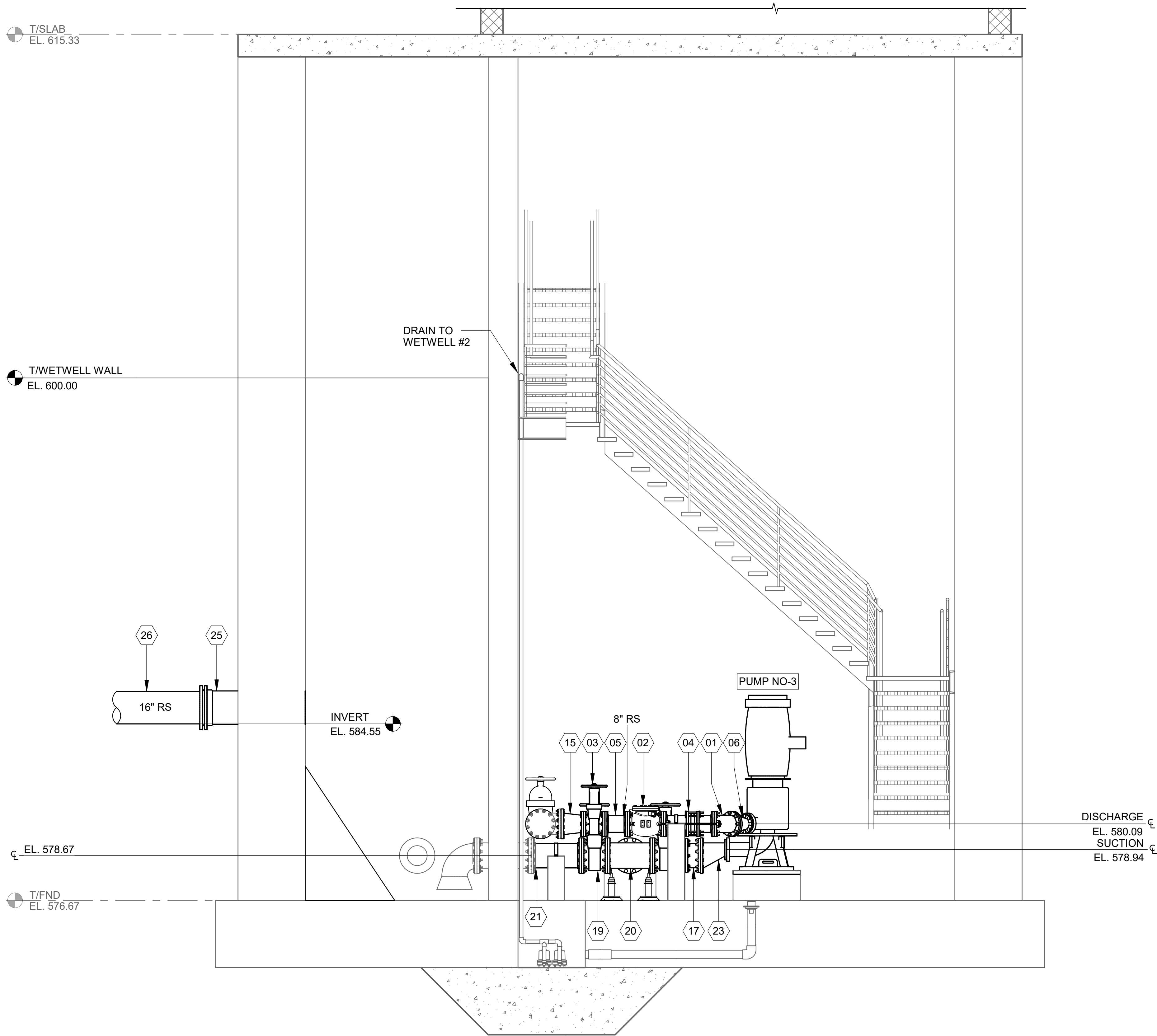
BAR IS ONE INCH ON ORIGINAL DRAWING  
0"   
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER  
**10-M301**

SHEET  
NUMBER **09**



Revit File: BIM 360/20W05015 - Addison Kellway LS Bypass Pump Imps/20W05015_Addison Kellway.rvt  
PLOT Date: 3/15/2021 11:01:17 AM



KEYNOTES:		DENOTED BY SYMBOL	X
01	8" 45° BEND (FLG x FLG)		
02	8" AIR CUSHIONED SWING CHECK VALVE V609 (FLG x FLG)		
03	8" GATE VALVE V142 (FLG x FLG)		
04	8" RESTRAINED COUPLING (FLG x FLG)		
05	8" x LENGTH AS REQ'RD SPOOL (FLG x FLG)		
06	8" x 5" REDUCER (FLG x FLG)		
07	10" 90 BEND (FLG x FLG)		
08	10" GATE VALVE V142 (FLG x FLG)		
09	10" PLUG VALVE V405 (FLG x FLG) MANUAL OPERATOR W/ WHEEL		
10	10" PLUG VALVE V405 (MJ x MJ) MANUAL OPERATOR W/ STEM KIT		
11	10" TEE (MJ x MJ x MJ)		
12	10" x LENGTH AS REQ'RD SPOOL (FLG x PE)		
13	10" x LENGTH AS REQ'RD SPOOL (MJ x FLG)		
14	10" COUPLING (FLG x MJ)		
15	10" x 8" REDUCER (FLG x FLG)		
16	12" CROSS (FLG x FLG x FLG x FLG)		
17	12" DISMANTLING JOINT (FLG x FLG)		
18	12" FLANGED COUPLING ADAPTER		
19	12" GATE VALVE V142 (FLG x FLG)		
20	12" TEE (FLG x FLG x FLG)		
21	12" x LENGTH AS REQ'RD SPOOL (FLG x FLG)		
22	12" x LENGTH AS REQ'RD SPOOL (FLG x PE)		
23	12" x 6" ECCENTRIC REDUCER (FLG x FLG)		
24	16" PLUG VALVE V406 (MJ x MJ)		
25	16" WALL PIPE (PE x MJ)		
26	16" x LENGTH AS REQ'RD SPOOL (PE x PE)		

DEMOLITION NOTES:

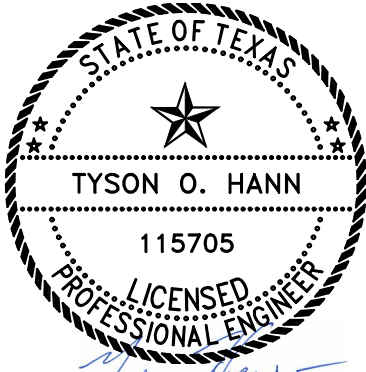
- ELEVATIONS AND DIMENSIONS PROVIDED ARE BASED ON RECORD DRAWINGS AND ARE PROVIDED FOR THE CONTRACTOR'S REFERENCE. CONTRACTOR SHALL CONFIRM ALL ELEVATIONS PRIOR TO BEGINNING WORK, AND OWNER AND ENGINEER SHALL NOT BE HELD RESPONSIBLE FOR VARIANCES BETWEEN DRAWING AND ACTUAL ELEVATIONS. CONTRACTOR IS RESPONSIBLE FOR THE PRE-MEASURING OF EQUIPMENT AND EXISTING OPENINGS PRIOR TO REMOVAL.
- CONTRACTOR SHALL RESTORE ALL SURFACE CONCRETE OR SIDEWALKS DAMAGED AS PART OF THE CONSTRUCTION PROCESS AT NO ADDITIONAL COST TO THE OWNER.
- CONTRACTOR TO PROTECT ALL ELECTRICAL WIRING, CONTROL INSTRUMENTS, AND ELECTRICAL APPURTENANCES. DAMAGED ITEMS SHALL BE REPLACED AT NO ADDITIONAL COST TO OWNER
- REMOVE AND DISPOSE OF ALL SOLIDS AND/OR LIQUIDS INCLUDING SLUDGE IN BASINS AND WELLS TO BE DEMOLISHED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW ALL APPLICABLE CODES AND REQUIREMENTS FOR SOLIDS REMOVAL AND OFFSITE DISPOSAL AND TO OBTAIN ANY REQUIRED PERMITS. REFER TO SPECIFICATION 02 41 00.
- CONTRACTOR TO VERIFY FORCE MAIN DISCHARGE ELEVATION.

1  
10-M101 | 10-M302  
WETWELL AND LIFT STATION SECTION  
SCALE: 3/8" = 1'-0"



© 2021 GARVER, LLC  
THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGNS CONVEYED HEREIN, SHALL BE CONSIDERED INSTRUMENTS OF PROFESSIONAL SERVICE AND ARE PROPERTY OF GARVER, LLC. ANY USE, REPRODUCTION, OR DISTRIBUTION OF THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGN CONTAINED HEREIN, IS PROHIBITED UNLESS AUTHORIZED IN WRITING BY GARVER, LLC OR EXPLICITLY ALLOWED IN THE GOVERNING PROFESSIONAL SERVICES AGREEMENT FOR THIS WORK.

REGISTRATION NO.  
F-5713



Digitally Signed 03/15/2021

BY	DESCRIPTION	DATE	REV

ADDISON  
4245 KELLWAY CIRCLE  
ADDISON TX, 75001  
ADDISON KELLWAY LIFT STATION  
BY-PASS PROJECT

SECTION II

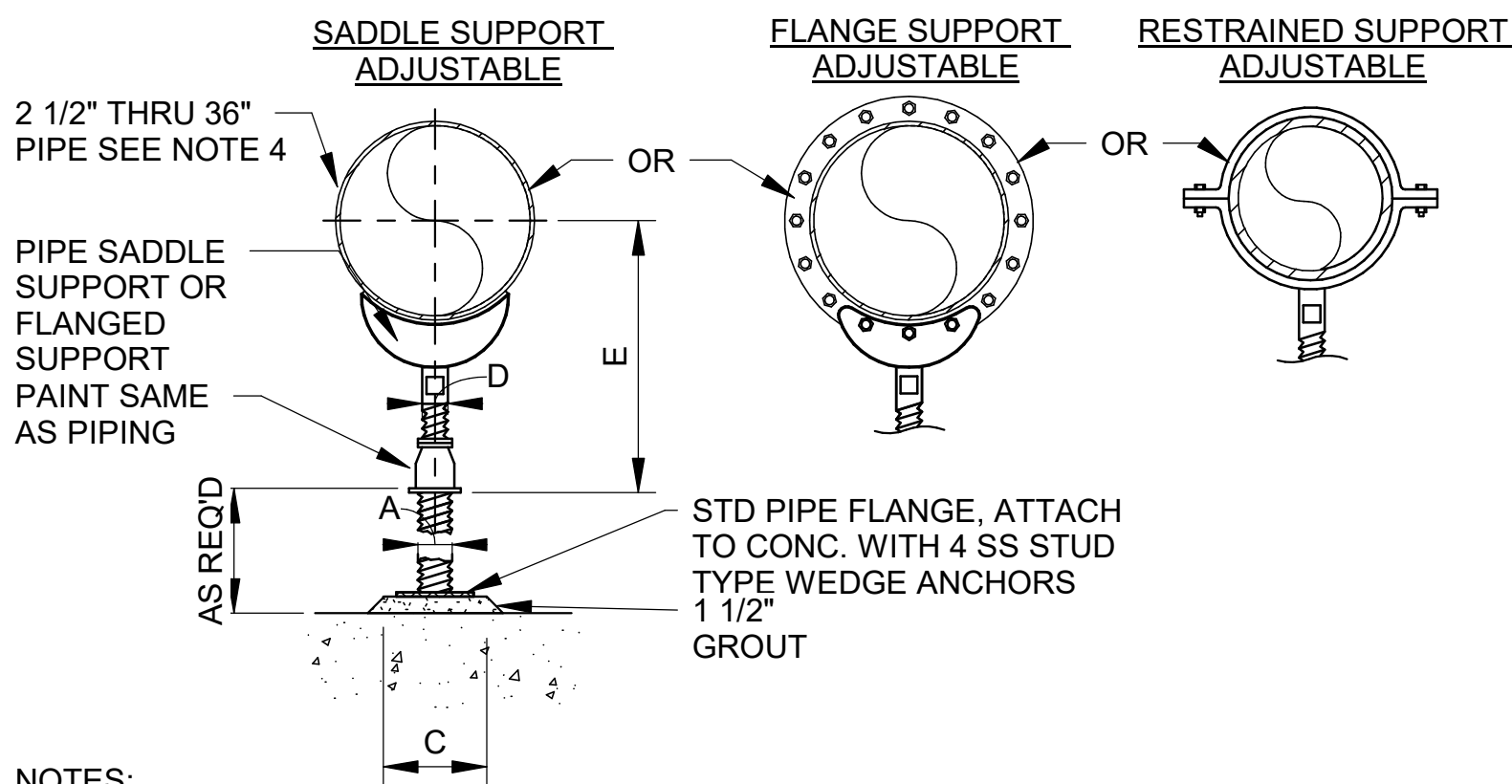
JOB NO.: 20W05015  
DATE: MARCH 2021  
DESIGNED BY: CAT  
DRAWN BY: AEG

BAR IS ONE INCH ON ORIGINAL DRAWING 1"  
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER  
**10-M302**  
SHEET NUMBER  
**10**



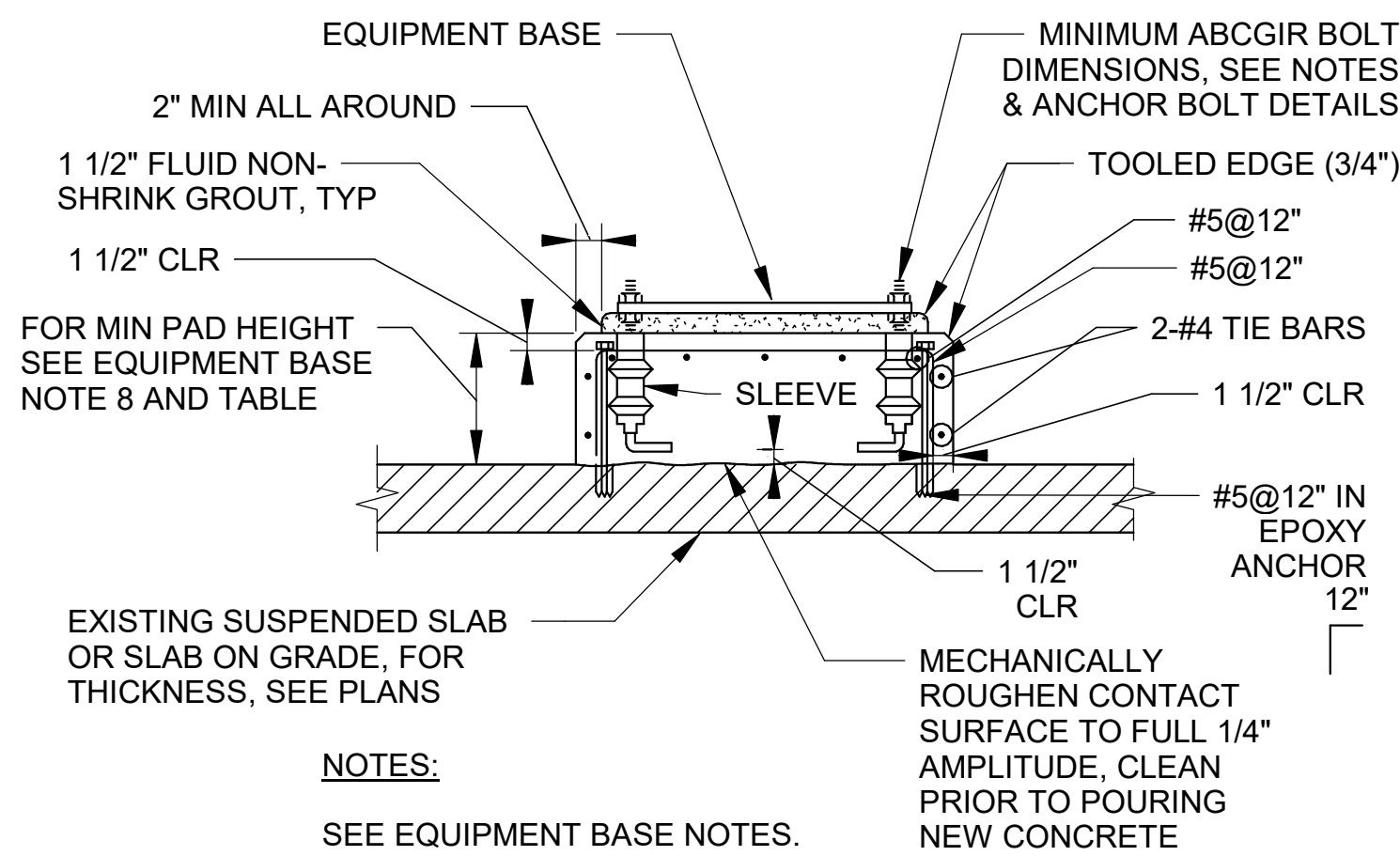
Revit File: BIM 360/20W05015 - Addison Kellway LS Bypass Pump Imps 20W05015 - Addison Kellway.rvt  
Plot Date: 3/15/2021 11:01:19 AM



#### NOTES:

- PROVIDE HALF ROUND RIGID INSULATION AND INSULATION PROTECTION SHIELD WHERE PIPING IS INSULATED.
- PROVIDE NEOPRENE WAFFLE INSULATION PAD, SIMILAR TO MASON TYPE "W" OR KORFUND 40, UNDER SUPPORT FOOT WHEN PIPING IS ISOLATED OR SUPPORT IS ADJACENT TO MECHANICAL EQUIPMENT.
- FOR BASE, HEIGHT AND FLANGE DIMENSIONS, SEE TABLE.
- USE 2 1/2" SUPPORTS FOR PIPES LESS THAN 2 1/2" DIAMETER.

PIPE SIZE	DIMENSION TABLE					
	A	B	C	D	E	
					MIN	MAX
2-1/2"	2-1/2"	3-1/2"	6"	1-1/2"	8"	13"
3"	2-1/2"	3-3/4"	8"	1-1/2"	8-1/4"	13-1/4"
3-1/2"	2-1/2"	4"	8"	1-1/2"	8-1/2"	13-1/2"
4"	3"	4-1/4"	8"	2-1/2"	9-1/4"	14"
5"	3"	4-7/8"	8"	2-1/2"	10"	14-3/4"
6"	3"	5-1/2"	10"	2-1/2"	10-1/2"	15-1/4"
8"	3"	6-7/8"	10"	2-1/2"	11-3/4"	15-1/2"
10"	3"	8-1/2"	14"	2-1/2"	13-1/2"	18-1/4"
12"	3"	9-15/16"	18"	2-1/2"	15"	19-3/4"
14"	4"	10-15/16"	18"	3"	16-1/4"	20-3/4"
16"	4"	12-3/8"	20"	3"	17-3/4"	22-1/4"
18"	6"	13-7/8"	22"	3-1/2"	19-1/2"	24"
20"	6"	15-3/8"	22"	3-1/2"	21"	25-1/2"
24"	6"	17-15/16"	24"	4"	23-3/4"	28-1/4"
30"	6"	21-5/16"	30"	4"	27"	31-1/2"
32"	6"	22-1/2"	30"	4"	28-1/4"	32-3/4"
36"	6"	24-1/2"	30"	4"	30-1/4"	34-3/4"



#### NOTES:

SEE EQUIPMENT BASE NOTES.

#### TYPE D

#### EQUIPMENT BASE NOTES:

- PAD SIZE SHALL BE MINIMUM INDICATED OR AS SHOWN ON THE PLANS. VERIFY ALL PAD SIZE REQUIREMENTS WITH SHOP DRAWINGS OF ACTUAL EQUIPMENT FURNISHED AND OBTAIN ENGINEER'S APPROVAL OF FINAL DIMENSIONS.
- THE SIZE, NUMBER, TYPE, LOCATION, AND THREAD PROJECTION OF THE ANCHOR BOLTS SHALL BE DETERMINED BY THE EQUIPMENT MANUFACTURER, AND SHALL BE AS APPROVED BY THE ENGINEER. ANCHOR BOLTS SHALL BE HELD IN POSITION WITH A ONE PIECE TEMPLATE, MATCHING THE BASE PLATE, WHILE PAD IS BEING POURED.
- ANCHOR BOLT A MINIMUM MOVEMENT OF 1/2" IN ALL DIRECTIONS. THE MINIMUM SLEEVE LENGTH SHALL BE 8 TIMES THE BOLT DIAMETER. SLEEVES SHALL BE FILLED WITH NON-SHRINK GROUT.
- ANCHOR BOLT SLEEVES SHALL HAVE A MINIMUM INTERNAL DIAMETER 1" GREATER THAN BOLT DIAMETER AND A MAXIMUM INTERNAL DIAMETER 3" GREATER THAN ANCHOR BOLT DIAMETER. SLEEVES SHALL BE FILLED WITH NON-SHRINK GROUT.
- EQUIPMENT BASES SHALL BE INSTALLED LEVEL UNLESS SPECIFIED OTHERWISE.
- WEDGES OR SHIMS SHALL BE USED TO SUPPORT THE BASE WHILE THE NON-SHRINK GROUT IS PLACED. TEMPORARY LEVELING NUTS SHALL BE BACKED OFF. IF LEFT IN THE WEDGES OR SHIMS SHALL NOT BE EXPOSED TO VIEW.
- HEIGHT OF PADS SHALL BE MINIMUM REQUIRED FOR ANCHOR BOLT CLEARANCE TO KEEP ANCHOR BOLT OUT OF SLAB (SEE TABLE BELOW). WHERE EQUIPMENT OR PIPING ELEVATION REQUIRE A PAD HEIGHT LESS THAN THE MINIMUM SHOW, USE TYPE B WITH B LOCKOUT.

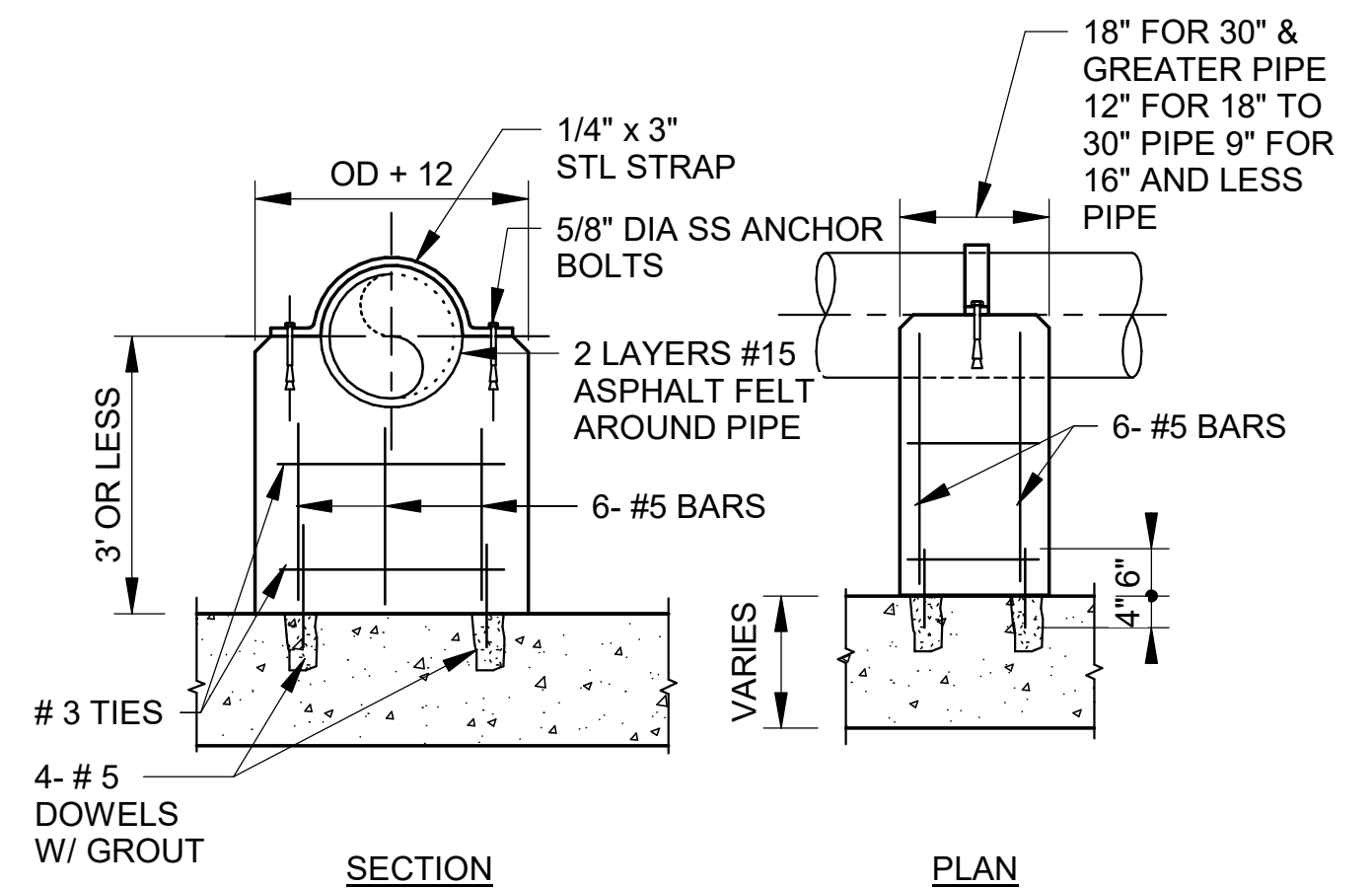
AB DIA (IN.)	1/2	5/8	3/4	7/8	1	1 1/4	1 3/8	1 1/2	1 3/4	2
MIN PAD HT (IN.)	7	8 1/2	10	11	12 1/2	15	16 1/2	18	21	24

- TYPE "D" PADS MAY BE SUBSTITUTED FOR TYPE "A" PADS FOR LOCATIONS APPROVED IN WRITING BY THE ENGINEER.
- SEE ANCHOR BOLT AND BLOCKOUT DETAILS.

2  
10-M401  
EQUIPMENT BASE DETAIL  
SCALE: NOT TO SCALE

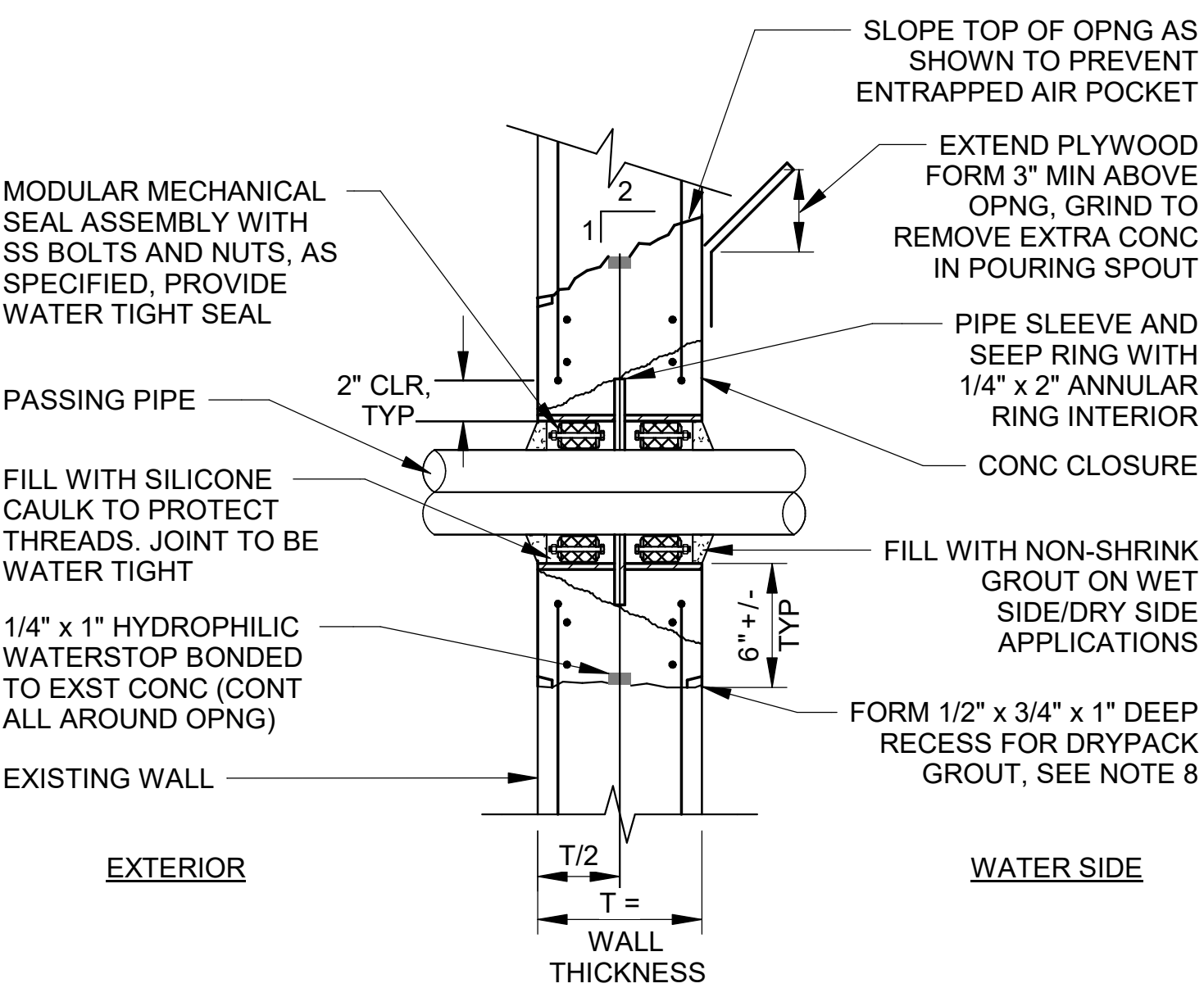
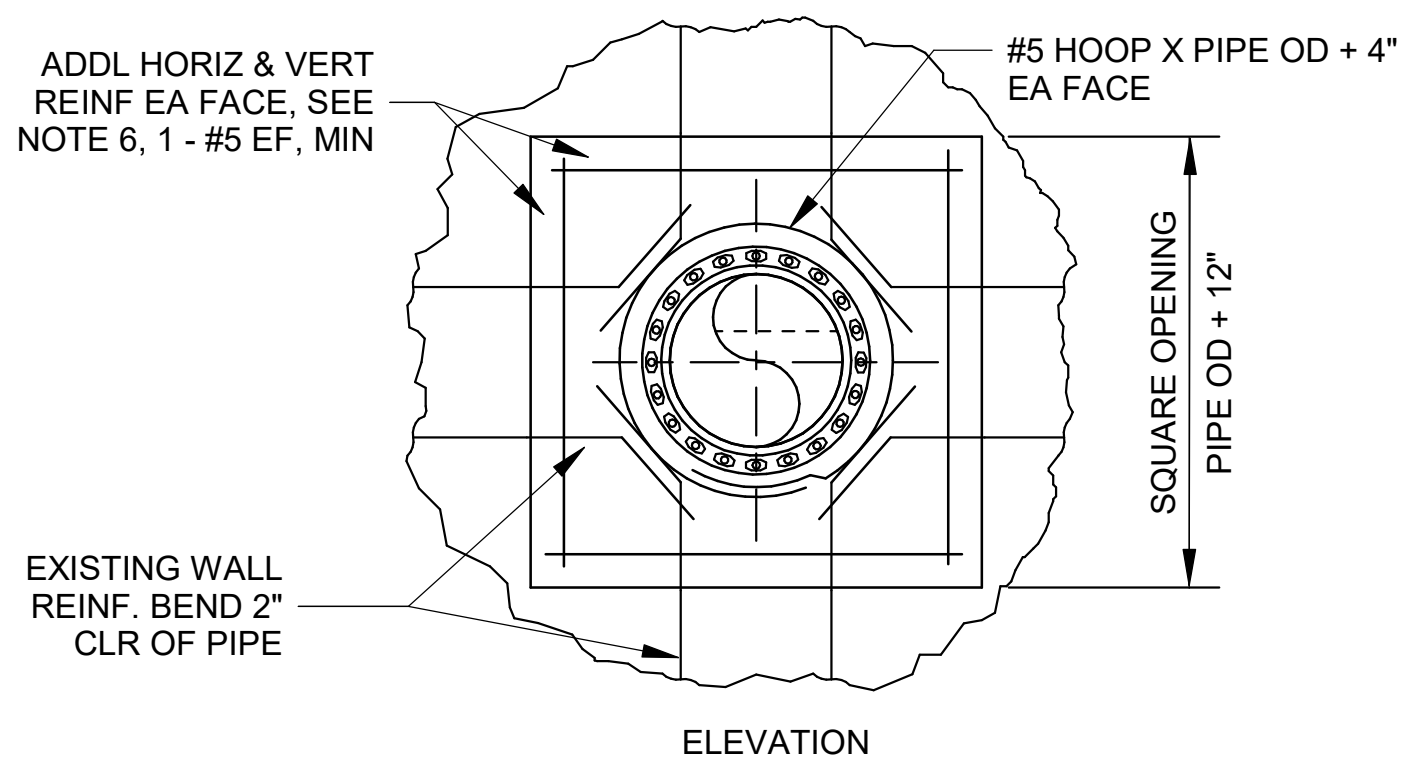
#### GENERAL CONCRETE NOTES:

- CONCRETE SHALL HAVE A SPECIFIED COMPRESSIVE STRENGTH OF 4,500 PSI UNO.
- HOLD SUMP TO 3 TO 4 INCHES IN ALL FLOOR SLABS.
- ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 3/4".
- NON-PRESTRESSED CONCRETE REINFORCEMENT SHALL CONFORM TO ASTM A 615 GRADE 60
- REINFORCEMENT LAP SPLICES SHALL CONFORM TO ACI 318.
- CONCRETE COVER OVER REINFORCMENT SHALL CONFORM TO THE MINIMUM REQUIRED BY ACI 318, UNO.
- REINFORCEMENT DETAILING AND PLACEMENT SHALL CONFORM TO ACI 318 AND ACI 315.
- NO REINFORCING BAR SHALL BE WELDED OR FIELD BENT IN ANY MANNER, UNLESS SPECIFICALLY SHOWN OR NOTED ON THE DRAWINGS
- TREMIES REQUIRED ON ALL POURS DEEPER THAN 5 FEET.
- PROVIDE A MINIMUM OF SEVEN (7) DAYS BETWEEN ADJACENT POURS. CONCRETE SHALL MEET OR EXCEED DESIGN COMPRESSIVE STRENGTH PRIOR TO PLACING ADJACENT POURS.
- CONTRACTOR SHALL SUBMIT TO ENGINEER FOR APPROVAL A SCHEDULE AND SEQUENCE OF CONCRETE PLACEMENT. SEQUENCE SHALL INCLUDE PERMITTING CURE TIME BETWEEN PLACEMENTS AT ADJACENT PROPOSED PLACEMENTS.
- ALL CONSTRUCTION JOINGS SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE INCORPORATED INTO THE STRUCTURE. ADDITIONAL CONSTRUCTION JOINTS TO FACILITATE CONSTRUCTION SHALL BE LOCATED AND DETAILED ON THE SHOP DRAWINGS FOR REVIEW. HORIZONTAL CONSTRUCTION JOINTS SHALL NOT BE PERMITTED IN WALLS AND BEAMS, UNLESS SHOWN ON THE STRUCTURAL DRAWINGS.
- SUBSTITUTION OF EXPANSION OR DRILLED AND GROUTED-IN ANCHORS FOR EMBEDDED ANCHORS SHOWN ON THE DRAWINGS WILL NOT BE PERMITTED UNLESS APPROVED BY ENGINEER.
- USE MANUFACTURER'S CERTIFIED DRAWINGS AND SPECIFICATIONS FOR EQUIPMENT ANCHORAGE AND DETAILS. VERIFY EQUIPMENT SIZE AND WEIGHTS WITH ENGINEER PRIOR TO CONSTRUCTION OF ANY AND ALL EQUIPMENT PADS.



4  
10-M401  
CONCRETE PIPE SUPPORT DETAIL  
SCALE: NOT TO SCALE

1  
10-M401  
ADJUSTABLE FLOOR MOUNTED PIPE SUPPORT  
SCALE: NOT TO SCALE



EXTERIOR

WATER SIDE

3  
10-M401  
PIPE PENETRATION - EXISTING WALL  
SCALE: NOT TO SCALE

#### NOTES:

- SAW-CUT 1-INCH DEEP x PIPE OD + 12" SQUARE SCORE LINE ON EACH FACE OF WALL. (VERIFY DEPTH OF CUT TO CLEAR REINFORCING.) (INCREASE HEIGHT AS NOTED AT TOP ON WATERSIDE FACE FOR POURING.)
- CHIP TO REMOVE THE CONCRETE WITHIN THE SCORE LINE, WHILE PRESERVING THE EXISTING WALL REINFORCING.
- CUT EXISTING REINFORCING AT CENTER OF OPENING AND BEND TO CLEAR PIPE.
- GRIND 1 1/2" WIDE x CONT SMOOTH SURFACE ALL AROUND THE OPENING AT CENTER OF WALL. CLEAN SURFACES AND BOND CONTINUOUS HYDROPHILIC WATERSTOP IN PLACE.
- INSTALL WALL PIPE. (COAT CONCRETE ENCASED PORTION OF PIPE WITH SPECIFIED COATING SYSTEM.)
- INSTALL ADDITIONAL REINFORCING EACH FACE, EACH SIDE, ABOVE, AND BELOW PIPE. HORIZONTAL REINFORCING TO HAVE COMBINED AREA EQUAL TO AREA OF HORIZONTAL REINFORCING CUT. VERTICAL REINFORCING TO HAVE COMBINED AREA EQUAL TO AREA OF VERTICAL REINFORCING CUT.
- SOAK CONCRETE SURFACES AND WITHIN 15-MINUTES CAST CONCRETE CLOSURE. (CONCRETE CLOSURES MUST BE CAST BEFORE HYDROPHILIC WATERSTOP EXPANDS.) FORM GROOVE ON ALL SIDES OF OPENING EXCEPT AT TOP ON THE POUR SIDE.
- CLEAN SURFACES OF FORMED GROOVE WITH POWER WIRE BRUSH OR SANDBLASTING AND DRY-PACK WITH NON-SHRINK GROUT AFTER NEW CONCRETE MIN 28-DAYS OLD.
- WHERE EXISTING CONCRETE STRUCTURE IS TO BE CORE DRILLED, THE CONTRACTOR SHALL ULTRASONIC TEST OR X-RAY THE AREA FOR EMBEDDED ITEMS BEFORE CORE DRILLING CAN PROCEED. IF EMBEDDED ITEMS ARE FOUND, NOTIFY THE ENGINEER IMMEDIATELY.
- SLEEVES LARGER THAN 6" DIAMETER SHALL BE 1/4" THICK STEEL PIPE.
- IN WALLS THICKER THAN 12", LINK SEAL SHALL BE INSTALLED AT BOTH ENDS OF THE WALL SLEEVE.
- SLEEVE SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.



© 2021 GARVER, LLC  
THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGNS CONVEYED HEREIN, SHALL BE CONSIDERED INSTRUMENTS OF PROFESSIONAL SERVICE AND ARE PROPERTY OF GARVER, LLC. ANY USE, REPRODUCTION, OR DISTRIBUTION OF THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGN CONTAINED HEREIN, IS PROHIBITED UNLESS AUTHORIZED IN WRITING BY GARVER, LLC OR EXPLICITLY ALLOWED IN THE GOVERNING PROFESSIONAL SERVICES AGREEMENT FOR THIS WORK.

REGISTRATION NO.  
F-5713



Digitally Signed 03/15/2021

REV	DATE	DESCRIPTION	BY

ADDISON  
4245 KELLWAY CIRCLE  
ADDISON TX, 75001  
ADDISON KELLWAY LIFT STATION  
BY-PASS PROJECT

#### DETAILS I

JOB NO.: 20W05015  
DATE: MARCH 2021  
DESIGNED BY: CAT  
DRAWN BY: GRN

BAR IS ONE INCH ON ORIGINAL DRAWING 1"  
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

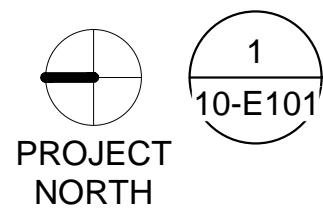
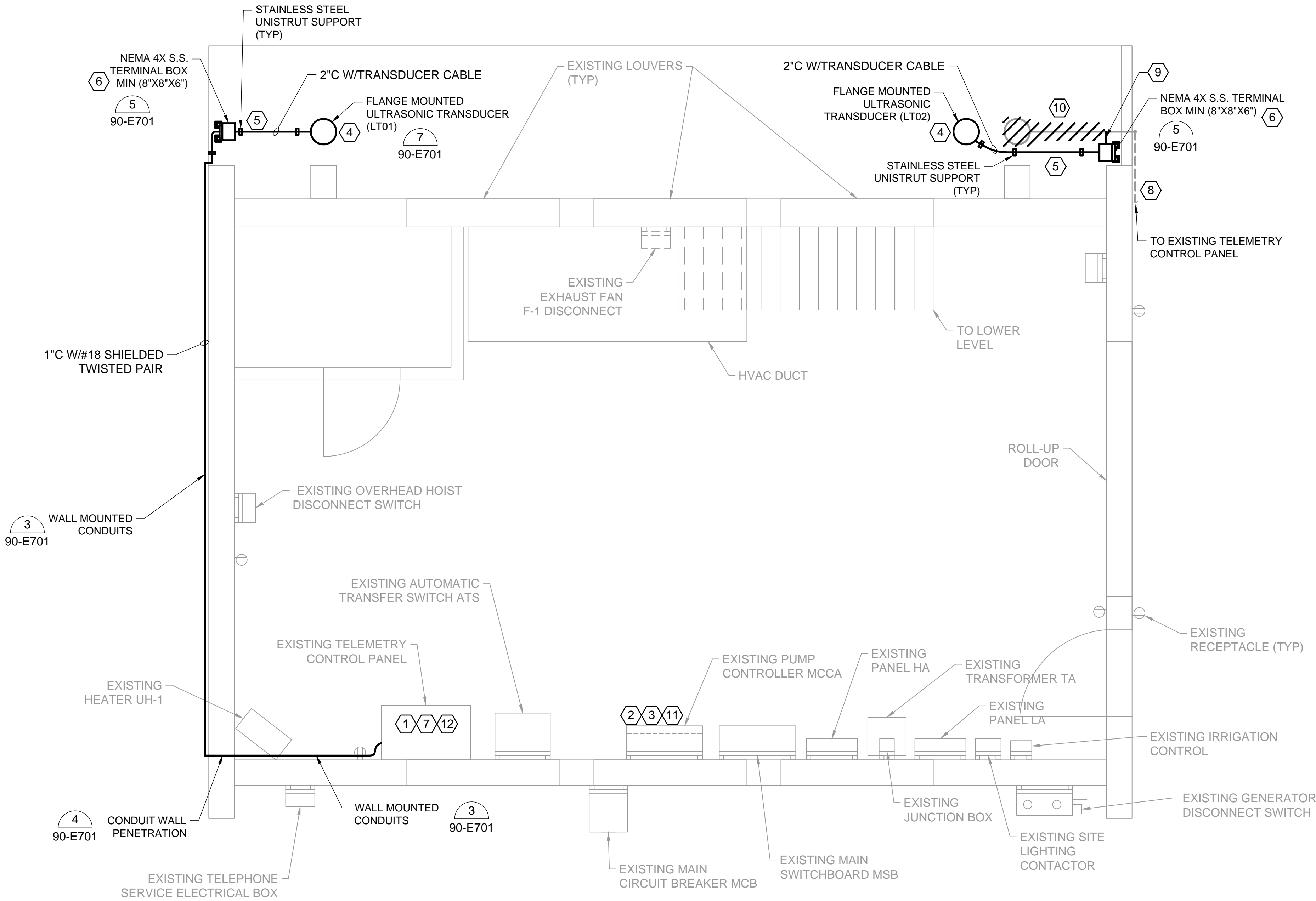
DRAWING NUMBER

10-M401

SHEET NUMBER 11



File: L:\2020\20W05015 - Addison Kellway LS Bypass Pump\ImpsDrawings\05-E101-UP_PROP.dwg Last Save: 3/12/2021 10:15 AM Last saved by: KADominguez  
Last plotted by: Medina, Carlos Plot Date: 3/15/2021 8:12 AM Plotter used: DWG To PDF.pc3



**LIFT STATION ELECTRICAL ROOM PLAN**  
SCALE: 3/8" = 1'-0"

**GENERAL NOTES:**

1. UNLESS OTHERWISE NOTED ALL CONDUIT TO BE ROUTED BELOW GRADE. ALL EXPOSED CONDUIT AND PORTIONS OF THE CONDUIT SYSTEM FOR THIS STRUCTURE SHALL BE SURFACE MOUNTED AND THE CONDUIT SYSTEM SHALL BE PVC COATED RIGID GALVANIZED STEEL. ALL BOXES, SUPPORTS, HANGERS, UNISTRUT AND ALL OTHER PORTIONS OF THE CONDUIT SYSTEM SHALL BE PVC-COATED STEEL. ALL BELOW GRADE CONDUIT SHALL BE SCHEDULE 40 PVC WITH GALVANIZED ELBOWS IN CONCRETE DUCT BANK.
2. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL CONDUIT, WIRING, TERMINATIONS, DISCONNECTS, CONTROL RELAYS, CONTROL ENCLOSURES AND OTHER ITEMS AS NECESSARY FOR COMPLETE AND FUNCTIONAL SYSTEM. THE CONTRACTOR SHALL REFER TO THE SPECIFICATIONS AND OTHER SECTIONS OF THE PLANS FOR ITEMS AS MAY BE REQUIRED.
3. FIELD LOCATE FINAL LOCATIONS OF ALL DUCT BANKS AND PULLBOXES. PROVIDE PULLBOXES AS REQUIRED FOR A WORKABLE INSTALLATION. ALL PULLBOXES SHALL BE APPROPRIATELY SIZED BY THE CONTRACTOR AS REQUIRED BY THE NUMBER OF CONDUITS IN THE DUCT BANK FOR A WORKABLE INSTALLATION WITH MINIMUM SIZES AS INDICATED WITHIN THE DETAILS. COORDINATE ALL WORK WITH APPLICABLE MATERIAL SUPPLIERS, AND OWNER REPRESENTATIVES.
4. NUMEROUS UNDERGROUND UTILITIES EXIST THROUGHOUT THE PROJECT SITE. MARK OR CAUSE TO BE MARKED ALL UTILITIES PRIOR TO WORK.
5. BELOW GRADE CONDUIT ROUTING AS SHOWN IS DIAGRAMMATIC IN NATURE AND SHOWN FOR REFERENCE ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING NUMBER OF REQUIRED CONDUITS AND PLACEMENT OF THESE CONDUITS. THE CONTRACTOR SHALL DEVELOP AND SUBMIT A BELOW GRADE CONDUIT ROUTING PLAN FOR REVIEW PRIOR TO INSTALLATION.

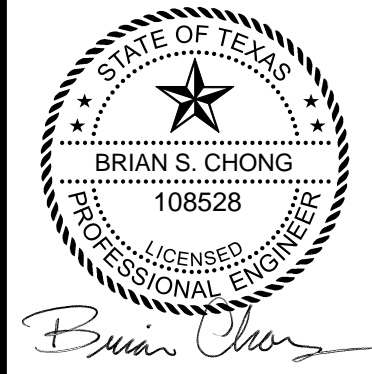
**KEYED NOTES:**

- 1 CITY'S INTERGRATOR, PRIME CONTROLS, SHALL REPLACE THE EXISTING MILLTRONICS MULTIRANGER PLUS WITH TWO (2) NEW SIEMENS HYDRORANGER 200HMI INSIDE THE EXISTING TELEMETRY CONTROL PANEL. HYDRORANGER SHALL INCLUDE THE FOLLOWING FEATURES: 120V INPUT VOLTAGE, DUAL 4-20 mA INPUT CAPABILITY, AND ENGLISH OPERATING INSTRUCTIONS. HYDRORANGERS SHALL RECEIVE LEVEL SIGNAL FROM NEW ULTRASONIC TRANSDUCERS INSTALLED IN WET PIT NO. 1 AND WET PIT NO. 2 AND EACH SHALL TRANSMIT ITS CORRESPONDING WET PIT LEVEL TO THE EXISTING PLC LOCATED INSIDE THE TELEMETRY CONTROL PANEL. BOTH HYDRORANGERS SHALL BE POWERED BY THE CIRCUIT POWERING THE EXISTING MILLTRONICS MULTIRANGER. ONE HYDRORANGER SHALL BE PROGRAMMED AND USED AS A SECONDARY CONTROL SYSTEM TO CONTROL ALL THREE PUMPS IN CASE OF PLC FAILURE.
- 2 CONTRACTOR SHALL REPLACE EXISTING TWO PUMP ALTERNATING RELAY INSIDE EXISTING PUMP CONTROLLER MCCA WITH A NEW THREE PUMP DIVERSIFIED ELECTRONICS ARM-120-AAE TRIPLEX ALTERNATING RELAY OR EQUAL.
- 3 CONTRACTOR SHALL TRACE EXISTING LIFT PUMP NO. 3 CONTROL CONDUCTORS INSIDE THE EXISTING PUMP CONTROLLER MCCA PANEL. LIFT PUMP NO. 3 CONTROL CONDUCTORS SHALL BE TAGGED AND ROUTED TO THE EXISTING PLC LOCATED INSIDE THE EXISTING TELEMETRY CONTROL PANEL. LIFT PUMP NO. 3 CONTROL SIGNALS TO BE SENT TO THE EXISTING PLC SHALL INCLUDE BUT WILL NOT BE LIMITED TO THE FOLLOWING: PUMP NO. 3 RUNNING, PUMP NO. 3 OFF, PUMP NO. 3 HAND/OFF/ AUTO STATUS, PUMP NO. 3 FAIL, AND ALL OTHER SIGNALS NECESSARY FOR A FULLY FUNCTIONAL THREE PUMP LIFT STATION SYSTEM.
- 4 CONTRACTOR SHALL CORE THROUGH EXISTING WET PIT NO. 1 AND NO. 2 TOP SLAB TO INSTALL FLANGE MOUNTED TRANSDUCER. TRANSDUCER SHALL BE SIEMENS ECHOMAX XPS-15 F SERIES LEVEL TRANSDUCER.
- 5 CONTRACTOR SHALL INSTALL CONDUIT ON WET PIT NO. 1 AND NO. 2 TOP SLAB AND SECURE USING STAINLESS STEEL UNISTRUT, CONDUIT STRAPS, AND HARDWARE. CONDUIT SUPPORTS SHALL BE PROVIDE EVERY FOOT AT BENDS AND EVERY 4 FEET IN STRAIGHT RUNS.
- 6 CONTRACTOR SHALL PROVIDE AND INSTALL A NEMA 4X STAINLESS STEEL TERMINAL BOX WHICH WILL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING ITEMS: 4 POINT, 30A, 300 VOLT RATED TERMINAL BLOCKS, PAINTED STEEL BACK PANEL, QUARTER TURN PADLOCKABLE LATCH, AND OZ GEDNEY CSBE TYPE CONDUIT SEALING BUSHINGS.
- 7 REPROGRAMMING OF EXISTING PLC AND SCADA UPDATES SHALL BE PERFORMED BY PRIME CONTROLS AS PART OF THIS CONTRACT.
- 8 CONTRACTOR SHALL REMOVE EXISTING CONDUCTORS AND REPLACE WITH #18 SHIELDED TWISTED PAIR FROM THE EXISTING TELEMETRY CONTROL PANEL TO NEW TRANSDUCER LT02 TERMINAL BOX.
- 9 CONTRACTOR SHALL EXTEND EXISTING CONDUIT TO NEW TERMINAL BOX. PROVIDE ANY ADDITIONAL HARDWARE AS REQUIRED FOR A COMPLETE WORKING SYSTEM.
- 10 CONTRACTOR SHALL REMOVE EXISTING TRANSDUCER AND ALL ELECTRICAL COMPONENTS ASSOCIATED WITH IT.
- 11 CONTRACTOR SHALL COORDINATE CONDUCTOR TRACING WITH PRIME CONTROLS TO ENSURE ALL SIGNALS NECESSARY FOR A FULLY FUNCTIONAL THREE PUMP SYSTEM ARE INCLUDED.
- 12 PRIME CONTROLS TO INCLUDE ADDITIONAL I/O MODULE AS REQUIRED FOR EXISTING MOTOROLA PLC, FOR SIGNALS FROM NEW PUMP NO. 3.



© 2018 GARVER, LLC  
THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGNS CONVEYED HEREIN, SHALL BE CONSIDERED INSTRUMENTS OF PROFESSIONAL SERVICE AND ARE PROPERTY OF GARVER, LLC. ANY USE, REPRODUCTION, OR DISTRIBUTION OF THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGN CONTAINED HEREIN, IS PROHIBITED UNLESS AUTHORIZED IN WRITING BY GARVER, LLC OR EXPLICITLY ALLOWED IN THE GOVERNING PROFESSIONAL SERVICES AGREEMENT FOR THIS WORK.

REGISTRATION NO.  
F-5713



DIGITALLY SIGNED: 03/15/2021

BY				
DESCRIPTION				
DATE				
REV.				



**TOWN OF ADDISON**  
ADDISON, TEXAS

**KELLWAY LIFT STATION**  
BY-PASS PUMP IMPROVEMENTS

**LIFT STATION  
ELECTRICAL ROOM  
PLAN**

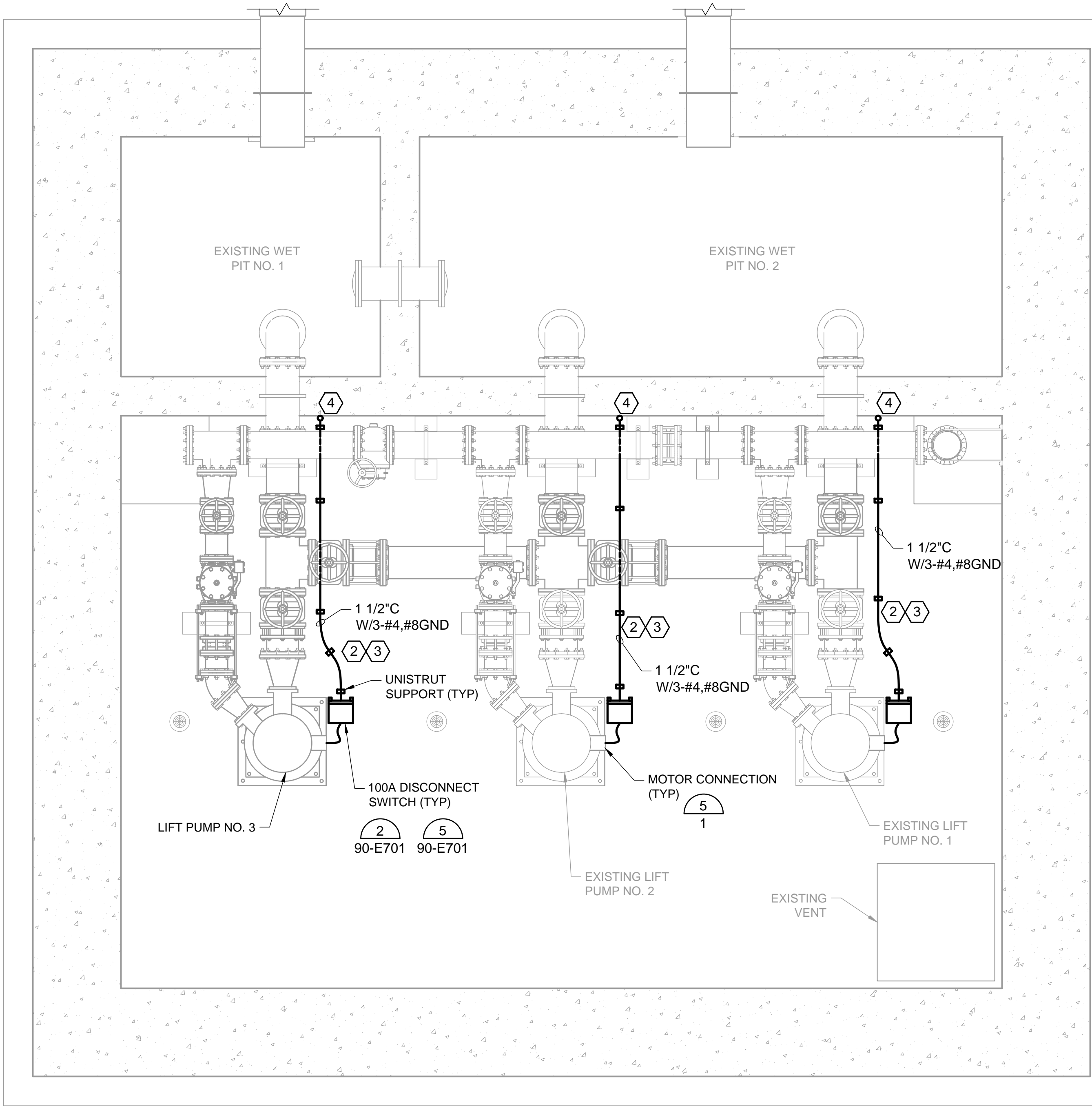
JOB NO.: 20W05015  
DATE: MARCH 2021  
DESIGNED BY: KAD  
DRAWN BY: CM

BAR IS ONE INCH ON ORIGINAL DRAWING  
0 1"  
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER  
**10-E101**  
SHEET NUMBER **12**



File: L:\2020\20W05015 - Addison Kellway LS Bypass Pump Imps Drawings\05-E102-LP.dwg, Last Save: 2/3/2021 2:28 PM Last saved by: CMedina  
Last plotted by: Medina, Carlos Plot Date: 3/15/2021 8:12 AM Plotter used: DWG To PDF.pc3

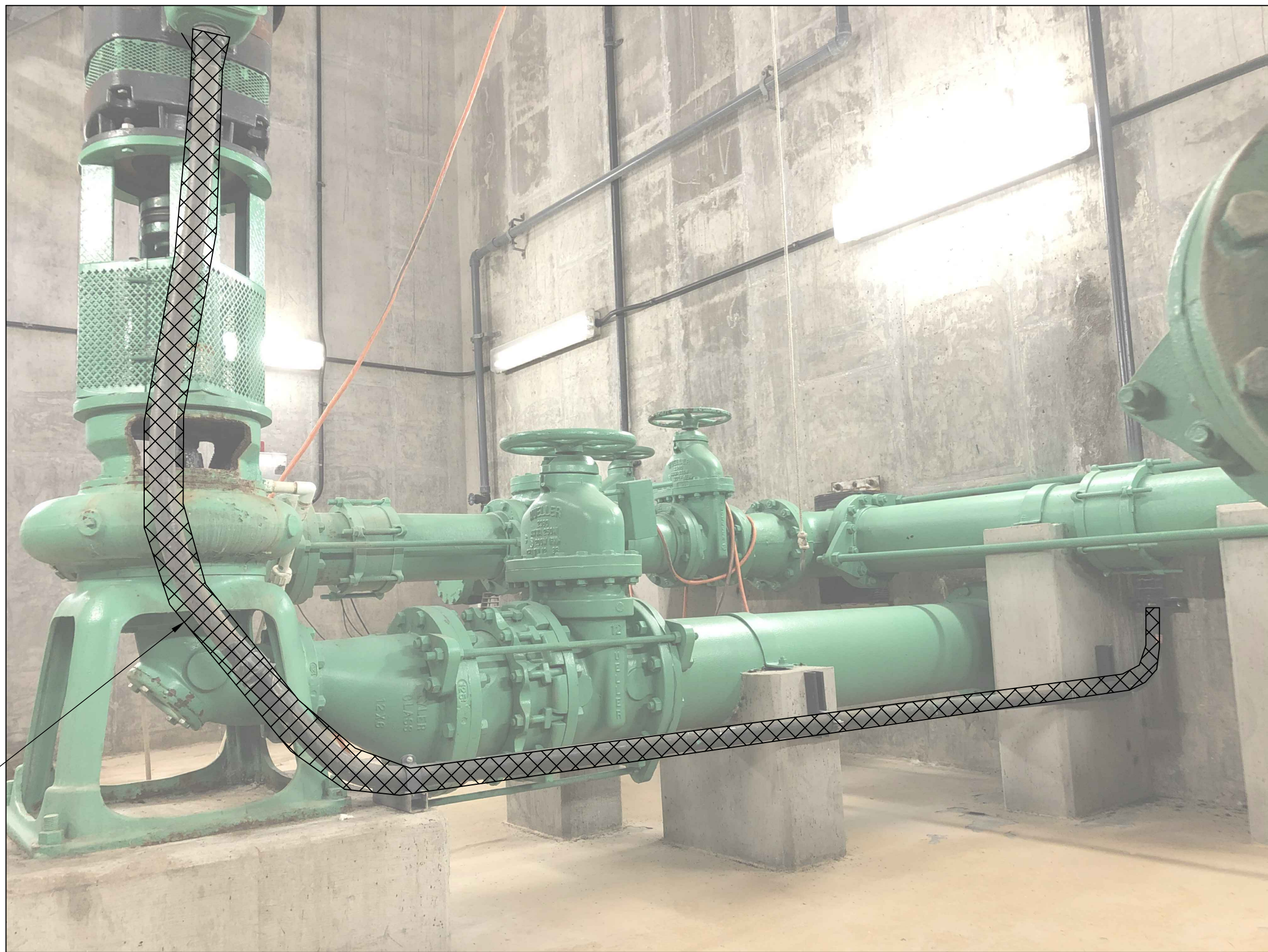


1  
10-E102

### LIFT STATION LOWER POWER PLAN

SCALE: 3/8" = 1'-0"

1 CONDUIT DEMOLITION



2  
E102

### LIFT PUMP CONDUIT DEMOLITION

SCALE: NONE

#### GENERAL NOTES:

1. UNLESS OTHERWISE NOTED ALL CONDUIT TO BE ROUTED ABOVE GRADE. ALL EXPOSED CONDUIT AND PORTIONS OF THE CONDUIT SYSTEM FOR THIS STRUCTURE SHALL BE SURFACE MOUNTED AND THE CONDUIT SYSTEM SHALL BE PVC COATED RIGID GALVANIZED STEEL. ALL BOXES, SUPPORTS, HANGERS, UNISTRUT AND ALL OTHER PORTIONS OF THE CONDUIT SYSTEM SHALL BE PVC-COATED STEEL. ALL BELOW GRADE CONDUIT SHALL BE SCHEDULE 40 PVC WITH GALVANIZED ELBOWS IN CONCRETE DUCT BANK.
2. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL CONDUIT, WIRING, TERMINATIONS, DISCONNECTS, CONTROL RELAYS, CONTROL ENCLOSURES AND OTHER ITEMS AS NECESSARY FOR COMPLETE AND FUNCTIONAL SYSTEM. THE CONTRACTOR SHALL REFER TO THE SPECIFICATIONS AND OTHER SECTIONS OF THE PLANS FOR ITEMS AS MAY BE REQUIRED.
3. FIELD LOCATE FINAL LOCATIONS OF ALL DUCT BANKS AND PULLBOXES. PROVIDE PULLBOXES AS REQUIRED FOR A WORKABLE INSTALLATION. ALL PULLBOXES SHALL BE APPROPRIATELY SIZED BY THE CONTRACTOR AS REQUIRED BY THE NUMBER OF CONDUITS IN THE DUCT BANK FOR A WORKABLE INSTALLATION WITH MINIMUM SIZES AS INDICATED WITHIN THE DETAILS. COORDINATE ALL WORK WITH APPLICABLE MATERIAL SUPPLIERS, AND OWNER REPRESENTATIVES.

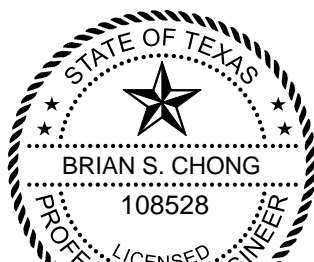
#### KEYED NOTES:

- 1 CONTRACTOR SHALL DEMOLISH THE CONDUITS FROM EXISTING LIFT PUMP NO. 1 & 2 FROM THE MOTOR TO THE WALL AS SHOWN. EXISTING CONDUITS RISING UP THE WALL ARE TO REMAIN.
- 2 CONTRACTOR SHALL ROUTE CONDUITS ALONG FLOOR AND SECURE THE CONDUITS USING STAINLESS STEEL UNISTRUT, CONDUIT STRAPS, AND HARDWARE. CONDUIT SUPPORTS SHALL BE PROVIDED AT A MINIMUM EVERY 4 FEET IN STRAIGHT RUNS AND EVERY FOOT AT BENDS.
- 3 CONDUITS ROUTED ALONG FLOOR SHALL BE PAINTED "CAUTION" YELLOW TO PREVENT A TRIPPING HAZARD.
- 4 CONTRACTOR SHALL CONNECT NEW CONDUITS TO EXISTING CONDUITS LOCATED ON WALL.



© 2018 GARVER, LLC  
THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGNS CONVEYED HEREIN, SHALL BE CONSIDERED INSTRUMENTS OF PROFESSIONAL SERVICE AND ARE PROPERTY OF GARVER, LLC. ANY USE, REPRODUCTION OR DISTRIBUTION OF THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGN CONTAINED HEREIN, IS PROHIBITED UNLESS AUTHORIZED IN WRITING BY GARVER, LLC OR EXPLICITLY ALLOWED IN THE GOVERNING PROFESSIONAL SERVICES AGREEMENT FOR THIS WORK.

REGISTRATION NO.  
F-5713



*Brian S. Chong*

DIGITALLY SIGNED: 03/15/2021

BY	DESCRIPTION	DATE	REV.



TOWN OF ADDISON  
ADDISON, TEXAS

KELLWAY LIFT STATION  
BY-PASS PUMP IMPROVEMENTS

LIFT STATION LOWER  
POWER PLAN

JOB NO.: 20W05015  
DATE: MARCH 2021  
DESIGNED BY: KAD  
DRAWN BY: CM

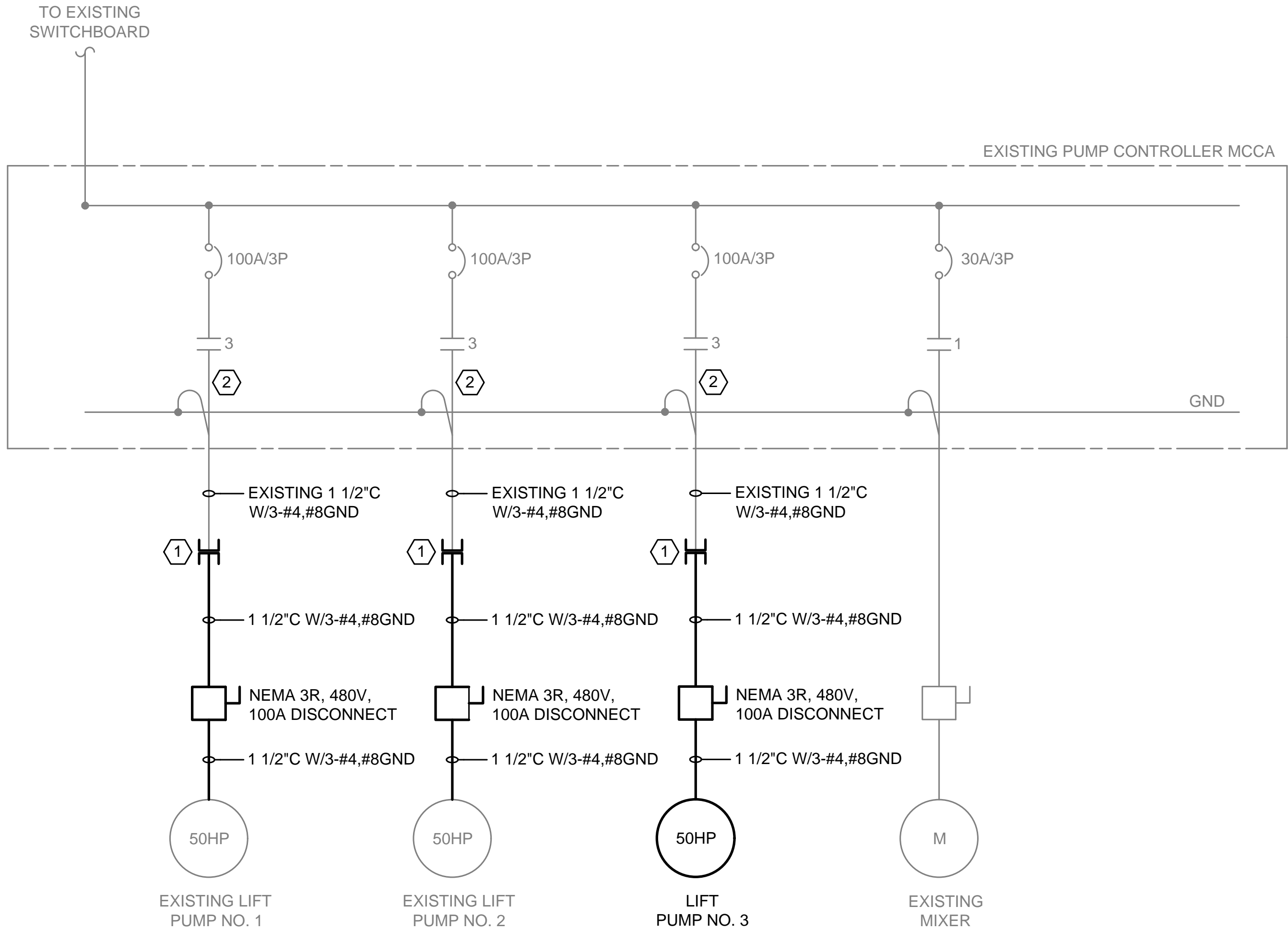
BAR IS ONE INCH ON ORIGINAL DRAWING  
0 1"  
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER  
10-E102

SHEET  
NUMBER 13



File: L:\2020\20W05015 - Addison Kellway LS Bypass Pump ImpsDrawings\90-E501-OL.dwg, Last Save: 2/1/2021 9:23 AM Last saved by: SAEgler  
Last plotted by: Medina, Carlos Plot Style: AECmon.ctb Plot Scale: 1:0 4255 Plot Date: 3/15/2021 8:12 AM Plotter used: DWG To PDF.pc3



1  
90-E501

## ELECTRICAL ONE LINE DIAGRAM

SCALE: NONE

### GENERAL NOTES:

1. ALL CONDUIT FILL AND WIRE BEND RADIUS REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE.
2. CONTRACTOR SHALL COORDINATE WITH THE ENGINEER FOR ALL EQUIPMENT LAYOUTS, CLEARANCES, LOCATIONS, AND CONDUIT ROUTINGS PRIOR TO CONSTRUCTION.
3. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL CONDUIT, WIRING, TERMINATIONS, ENCLOSURES, AND OTHER ITEMS AS NECESSARY FOR COMPLETE AND FUNCTIONAL SYSTEM. CONTRACTOR SHALL REFER TO THE SPECIFICATIONS AND OTHER SECTIONS OF THE PLANS FOR ITEMS AS MAY BE REQUIRED.
4. CONTRACTOR SHALL COORDINATE CONDUIT, WIRE, AND INTERCONNECTIONS AS REQUIRED BY EQUIPMENT SUPPLIER. NOT ALL CONNECTIONS SHOWN.

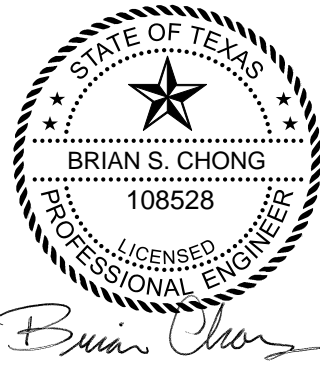
### KEYED NOTES:

- (1) CONTRACTOR SHALL MAKE CONNECTION BETWEEN EXISTING AND NEW CONDUIT.
- (2) CONTRACTOR SHALL REMOVE EXISTING CONDUCTORS FROM STARTER TO MOTOR AND REPLACE WITH NEW CONDUCTORS. CONDUCTORS SHALL BE SIZED AS SHOWN.



© 2018 GARVER, LLC  
THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGNS CONVEYED HEREIN, SHALL BE CONSIDERED INSTRUMENTS OF PROFESSIONAL SERVICE AND ARE PROPERTY OF GARVER, LLC. ANY USE, REPRODUCTION, OR DISTRIBUTION OF THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGN CONTAINED HEREIN, IS PROHIBITED UNLESS AUTHORIZED IN WRITING BY GARVER, LLC OR EXPLICITLY ALLOWED IN THE GOVERNING PROFESSIONAL SERVICES AGREEMENT FOR THIS WORK.

REGISTRATION NO.  
F-5713



DIGITALLY SIGNED: 03/15/2021

BY	DESCRIPTION	DATE	REV.



TOWN OF ADDISON  
ADDISON, TEXAS

KELLWAY LIFT STATION  
BY-PASS PUMP IMPROVEMENTS

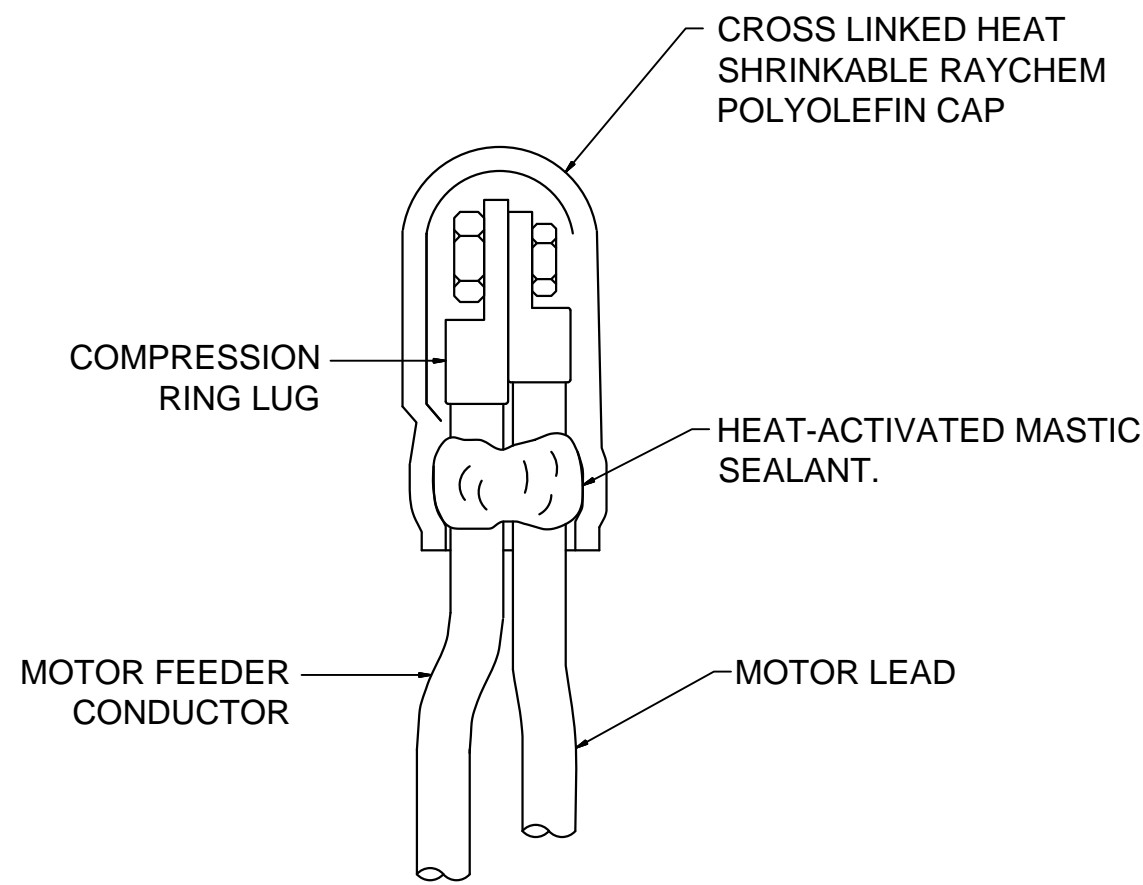
ELECTRICAL ONE  
LINE DIAGRAM

JOB NO.: 20W05015  
DATE: MARCH 2021  
DESIGNED BY: KAD  
DRAWN BY: CM

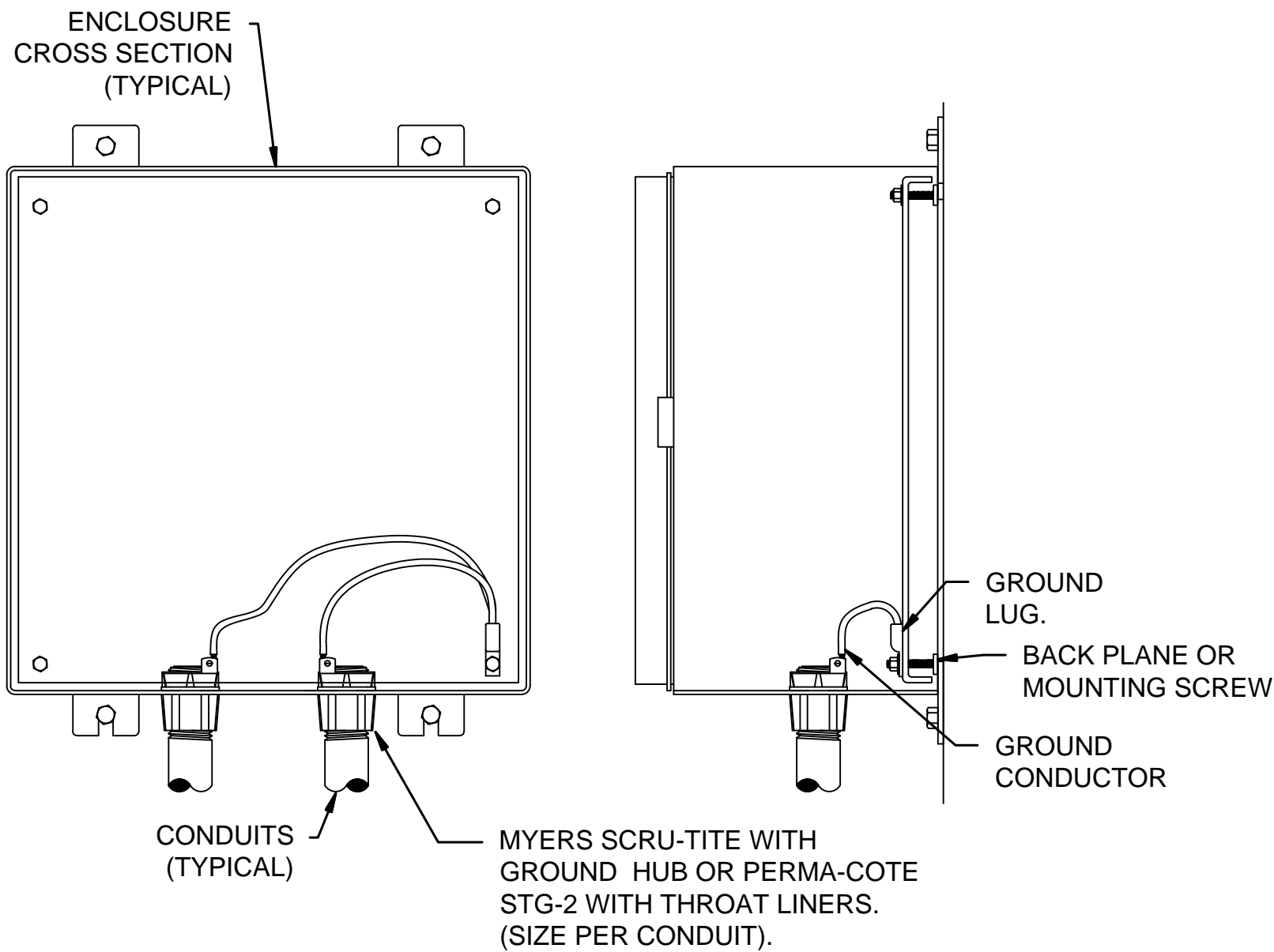
BAR IS ONE INCH ON  
ORIGINAL DRAWING  
0 1"  
IF NOT ONE INCH ON THIS SHEET,  
ADJUST SCALES ACCORDINGLY.

DRAWING NUMBER  
90-E501

SHEET  
NUMBER 14



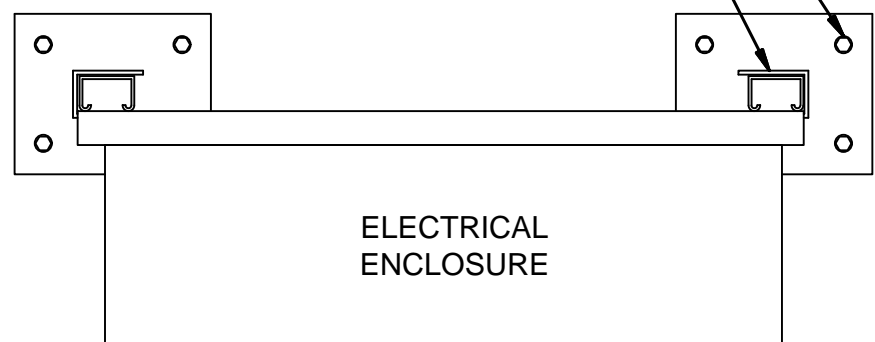
1  
90-E701  
TYPICAL MOTOR LEAD DETAIL  
SCALE: NOT TO SCALE



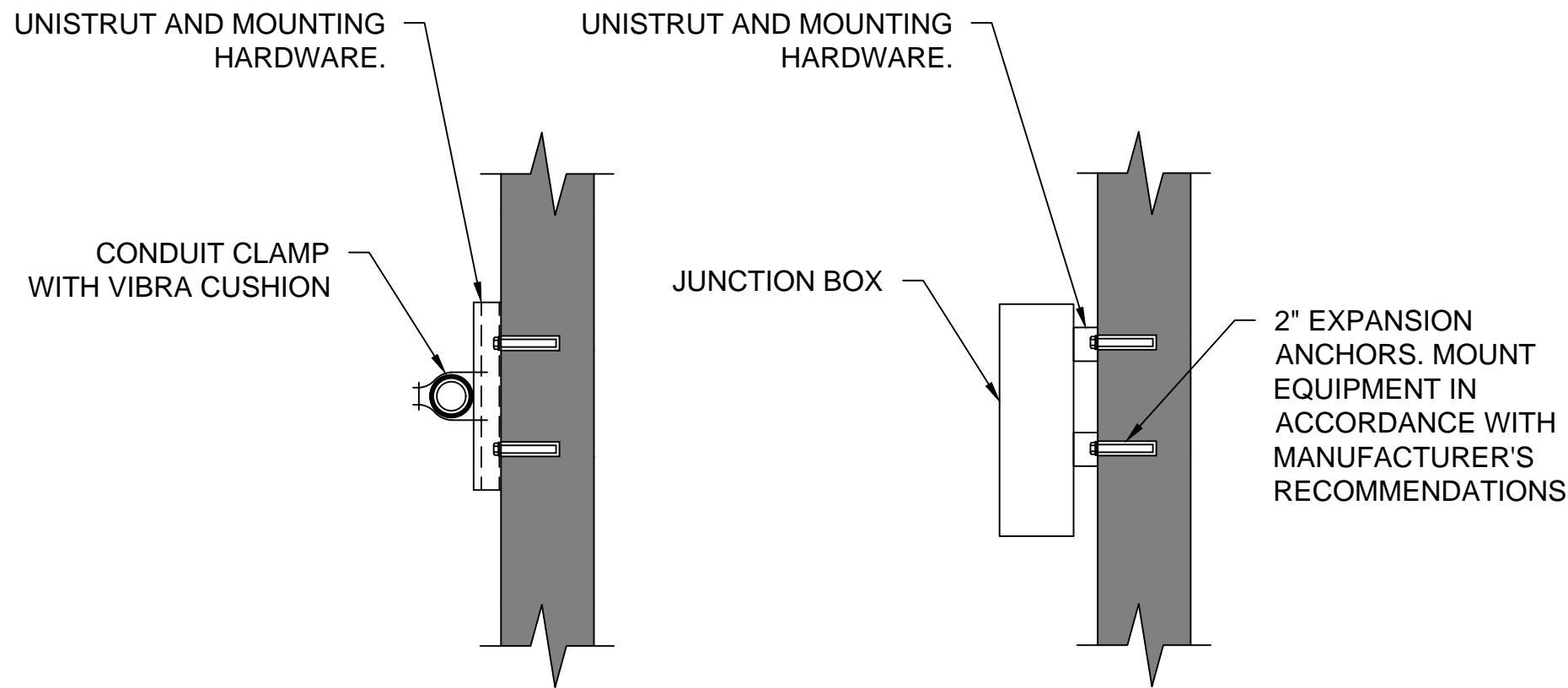
- NOTES:
1. ALL SERVICE, FEEDER AND CONTROL CONDUITS SHALL BE GROUNDED ON BOTH ENDS.

2  
90-E701  
CONDUIT GROUNDING DETAIL  
SCALE: NOT TO SCALE

STAINLESS STEEL MOUNTING BRACKET, FOUR HOLE, DOUBLE POST, SECURE TO FRAME WITH STAINLESS STEEL BOLTS, LOCK WASHERS, WASHERS AND LOCKNUTS, SECURE TO CONCRETE PAD WITH 4" MIN. STAINLESS STEEL WEDGE ANCHOR BOLTS (TYPICAL).

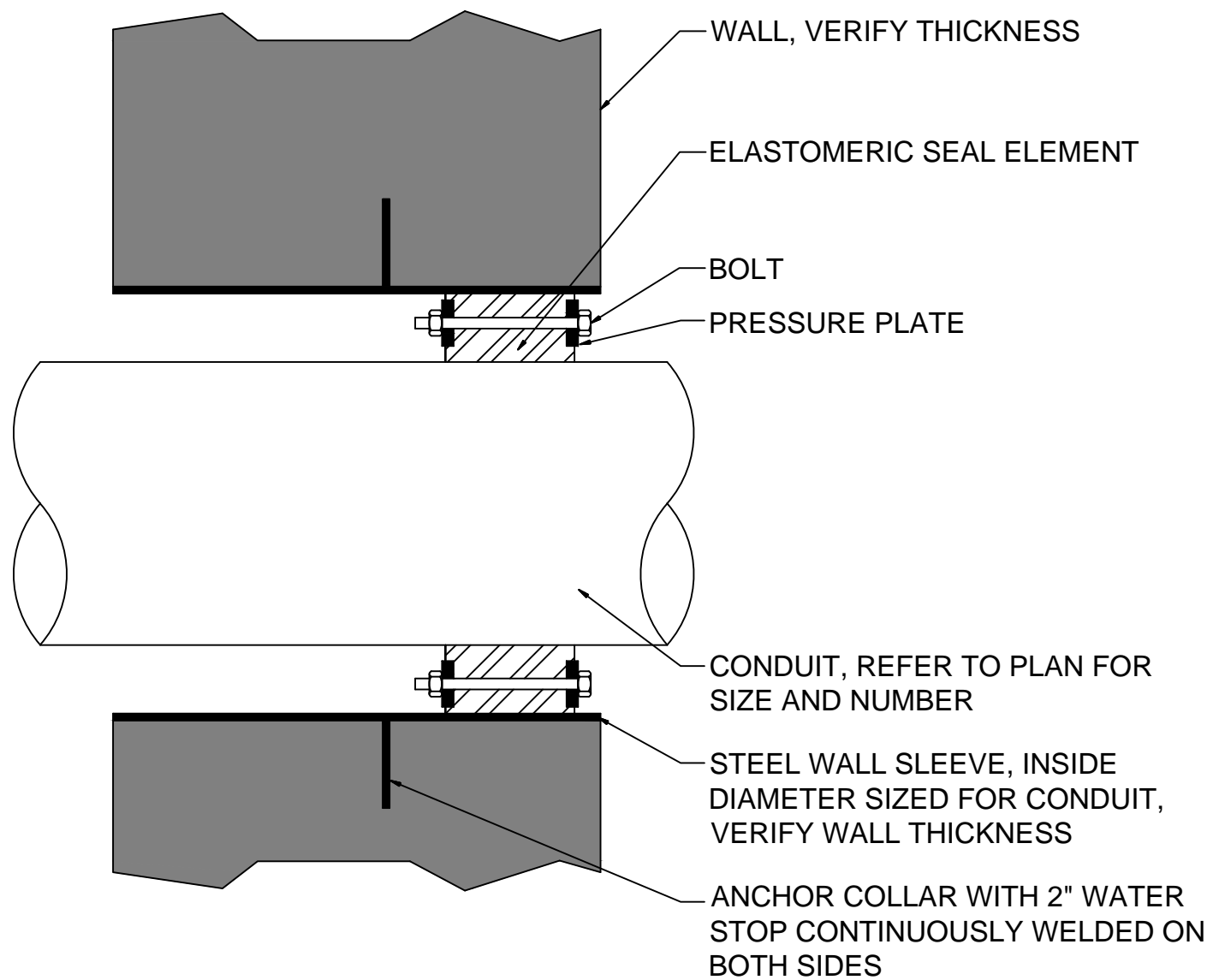


5  
90-E701  
UNISTRUT STAND DETAIL (TYP.) (TOP VIEW)  
SCALE: NOT TO SCALE



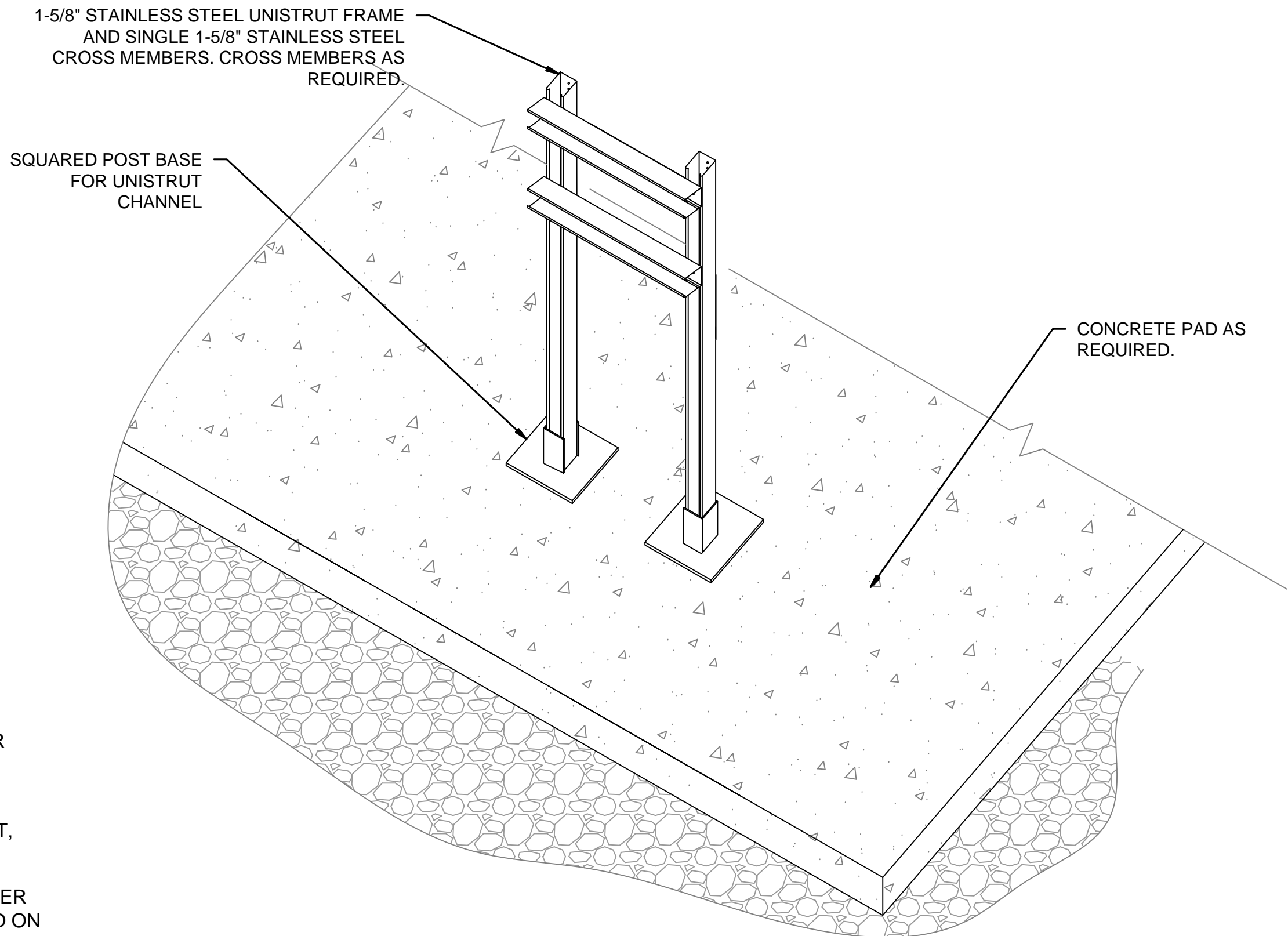
- NOTES:
1. UNISTRUT AND MOUNTING HARDWARE MATERIAL AS CALLED OUT IN ELECTRICAL PLAN SHEETS AND SPECIFICATIONS.
  2. SINGLE CONDUIT SHOWN. SIMILAR FOR MULTIPLE CONDUITS.
  3. SIMILAR FOR ALL ELECTRICAL ENCLOSURES AND PANELS.
  4. VIBRA CUSHION ONLY REQUIRED WHERE NEEDED TO PREVENT METAL TO METAL CONTACT OF DISSIMILAR METAL TYPES OR WHERE EXCESSIVE VIBRATION MAY OCCUR.

3  
90-E701  
CONDUIT AND JUNCTION BOX SUPPORT DETAIL  
SCALE: NOT TO SCALE



"LINK-SEAL" MODULAR SEAL WITH MODEL 'WS' STEEL WALL SLEEVES

4  
90-E701  
TYPICAL WATERSTOP SEALING DETAIL  
SCALE: NOT TO SCALE



1. ALL BOLTS, NUTS, WASHERS, ANCHORS, PLATES, AND OTHER MOUNTING STEMS SHALL BE CORROSION RESISTANT, STAINLESS STEEL.
2. UTILIZE 5/16" STAINLESS STEEL WEDGE ANCHORS AS REQUIRED.
3. OMIT PAD WHERE NOT SHOWN.

5  
90-E701  
UNISTRUT STAND DETAIL (TYP.)  
SCALE: NOT TO SCALE



© 2018 GARVER, LLC  
THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGNS CONVEYED HEREIN, SHALL BE CONSIDERED INSTRUMENTS OF PROFESSIONAL SERVICE AND ARE PROPERTY OF GARVER, LLC. ANY USE, REPRODUCTION, OR DISTRIBUTION OF THIS DOCUMENT, ALONG WITH THE IDEAS AND DESIGN CONTAINED HEREIN, IS PROHIBITED UNLESS AUTHORIZED IN WRITING BY GARVER, LLC OR EXPLICITLY ALLOWED IN THE GOVERNING PROFESSIONAL SERVICES AGREEMENT FOR THIS WORK.

REGISTRATION NO.  
F-5713



DIGITALLY SIGNED: 03/15/2021

BY	DESCRIPTION	DATE	REV.



TOWN OF ADDISON  
ADDISON, TEXAS

KELLYWAY LIFT STATION  
BY-PASS PUMP IMPROVEMENTS

ELECTRICAL  
DETAILS I

JOB NO.: 20W05015  
DATE: MARCH 2021  
DESIGNED BY: KAD  
DRAWN BY: CM

BAR IS ONE INCH ON ORIGINAL DRAWING  
0 1"  
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

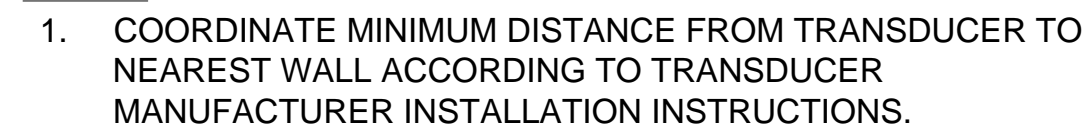
DRAWING NUMBER  
90-E701

SHEET  
NUMBER 15

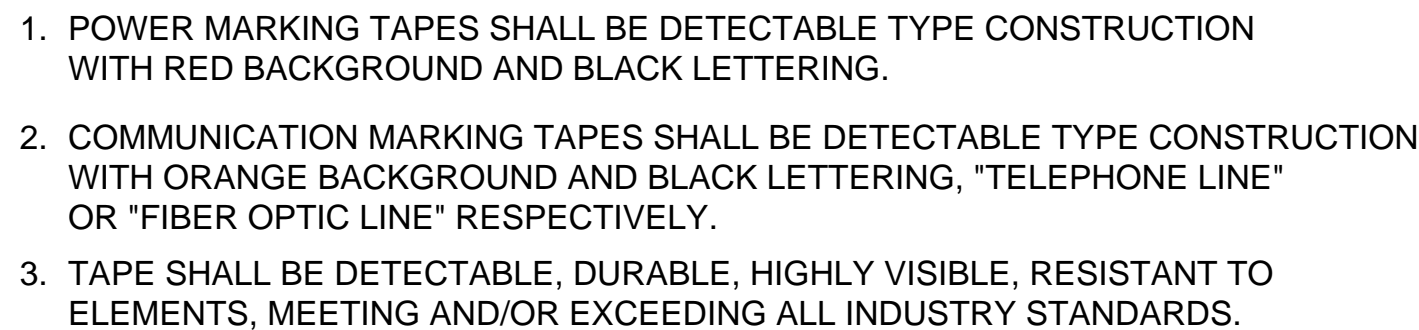




1. CONTRACTOR SHALL STAKE THE DUCT INSTALLATION IN PLAN AND ELEVATION FOR NEW ELECTRICAL DUCTS TO AVOID EXISTING UTILITIES. STAKING PLAN SHALL BE APPROVED BY OWNER AND ENGINEER PRIOR TO WORK.
2. CONTRACTOR SHALL ADJUST THE DEPTH OF THE ELECTRICAL DUCTS AS REQUIRED TO MAINTAIN THE MINIMUM COVER REQUIREMENT INDICATED AND AVOID EXISTING UTILITIES.
3. SIMILAR CONSTRUCTION FOR OTHER DUCT SIZES. SEE ELECTRICAL PLAN SHEETS FOR QUANTITY AND SIZES.
4. INSTALL DUCT CONDUIT SUPPORTS AT 5'-0" O.C. MAXIMUM SPACING. UTILIZE LOCKING COLLARS OR HOLD DOWN BARS WITH ANCHORS TO PREVENT DUCT FLOTATION. (TYPICAL ALL DUCTS).
5. OFFSETS AND BENDS OVER 10 DEGREES AND ELBOWS IN PVC CONDUIT RUNS SHALL BE GRSC.
6. NO PVC SHALL EMERGE FROM THE GROUND OR CONCRETE SLAB OR ENCASEMENT. PVC SHALL CONVERT TO PVC COATED GALVANIZED RIGID STEEL CONDUIT PRIOR TO ITS EMERGENCE UNLESS NOTED OTHERWISE.
7. SPARE PVC COATED GALVANIZED RIGID STEEL CONDUITS SHALL STUB UP 6" ABOVE FINISHED GRADE OR CONCRETE PAD SURFACE AND BE CAPPED WATERTIGHT.
8. INSTALL GROUND RODS AT ENDS OF ELECTRICAL DUCT AND CONNECT TO GROUND RING.
9. INSTALL CONDUCTORS AND CABLES AS NOTED ON DRAWINGS. INSTALL PULL ROPE IN ALL SPARE DUCTS.
10. MINIMUM COVER REQUIREMENT FOR DUCT BANKS UNDER ROADS, DRIVEWAYS AND PARKING LOTS SHALL BE 24".
11. MINIMUM COVER REQUIREMENTS FOR ELECTRICAL SECONDARY SERVICE DUCT BANKS SHALL BE 30".
12. MINIMUM COVER REQUIREMENTS FOR ELECTRICAL PRIMARY SERVICE DUCT BANKS SHALL BE 36".
13. VERTICAL AND HORIZONTAL DISTANCES BETWEEN CONDUITS SHALL BE 3" MINIMUM FOR DUCTS CONTAINING CIRCUITS OVER 600 VOLTS.
14. DUCT UTILITIES TO EXTEND BELOW FLOOR SLABS.
15. ELECTRICAL UTILITIES SIMILAR TO DETAIL D31 2323-001



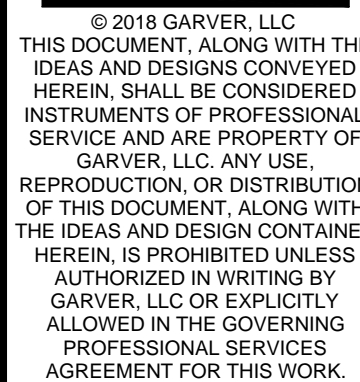
## ULTRASONIC TRANSDUCER INSTALLATION



# 90-E702 UNDERGROUND DETECTABLE WARNING TAPE DETAIL SCALE: NOT TO SCALE



9 TYPICAL DUCTBANK SPACING AND COUPLING DETAIL  
90-E702 SCALE: NOT TO SCALE



REGISTRATION NO  
F-5713



DIGITALLY SIGNED: 03/15/202

REV.	DATE	DESCRIPTION	BY



## KELLWAY LIFT STATION BY-PASS PUMP IMPROVEMENTS

## ELECTRICAL DETAILS II

JOB NO.: 20W05015  
DATE: MARCH 2021  
DESIGNED BY: KA  
DRAWN BY: CM

BAR IS ONE INCH ON  
ORIGINAL DRAWING

0  1"

DRAWING NUMBER

90-E702	
SHEET NUMBER	16

## Council Meeting

7.

**Meeting Date:** 05/25/2021

**Department:** Parks & Recreation

**Pillars:** Excellence in Transportation Systems  
Optimize the Addison Brand

**Milestones:** Improve all modes of transportation with infrastructure in an acceptable condition and well maintained

---

### AGENDA CAPTION:

Present, Discuss, and Consider Action on a **Resolution Approving and Adopting the City-Wide Trails Master Plan and Providing an Effective Date.**

### BACKGROUND:

A City-Wide Trails Master Plan was recommended by the Parks, Recreation & Open Space Plan (PROS) which was adopted by Council on April 25, 2019. Funds to hire a consultant were included in the Fiscal Year 2019-2020 Budget. On February 13, 2020 Council approved a contract with Moore Iacofano Goltsman, Inc. (MIG) in an amount not to exceed \$122,284 to develop the City-Wide Trails Master Plan. On April 14, 2020 Council appointed a Trails Master Plan Advisory Committee (PAC) and those members have advised and provided feedback throughout the process.

The four phases to the project are listed below with the schedule.

Phase	Duration
Phase 1 - Project Initiation	March 2020 - May 2020
Phase 2 - Vision, Goals and Strategies	June 2020 - August 2020
Phase 3 - Trail Recommendations	September 2020 - November 2020
Phase 4 - Action Plan	December 2020 - February 2021

Public input was an important component for developing the plan, and feedback was gathered throughout the process. A progress update was made to Council on August 25, 2020 during Phase 2 of the development. Council toured the proposed trail alignments and feedback was gathered by staff and provided to MIG. A draft was prepared by MIG and presented to Council on February 23, 2021. Following Council's discussion, staff and the consultant received feedback from Council, members of the PAC, and residents that resulted in adjustments to the plan. At the request of residents, staff held two additional public meetings in North Addison and Southeast Addison to gather

additional input. Staff will present an overview of updates that have been made to the plan and identify how the plan responded to feedback received from Council, PAC members and residents. Following the presentation, Council will have the opportunity to consider the plan's adoption.

**RECOMMENDATION:**

Administration recommends approval.

---

**Attachments**

Resolution - Trails Master Plan

Presentation - City Wide Trails Master Plan

Report - Trails Master Plan

---

**RESOLUTION NO. _____**

**A RESOLUTION OF THE CITY COUNCIL OF THE TOWN OF ADDISON, TEXAS  
APPROVING AND ADOPTING THE CITY-WIDE TRAILS MASTER PLAN; AND  
PROVIDING AN EFFECTIVE DATE.**

**WHEREAS**, Addison residents were engaged through various methods and mediums including on-line surveys, pop-up events and special-project committee participation in order to identify and formulate the community's vision and goals for continued development of recreation trails within the Town of Addison, the "City-Wide Trails Master Plan".

**WHEREAS**, the City Council has determined that it is in the best interest of the Town of Addison and its residents to adopt the City-Wide Trails Master Plan.

**NOW, THEREFORE BE IT RESOLVED BY THE CITY COUNCIL OF THE  
TOWN OF ADDISON, TEXAS:**

**SECTION 1.** The recitals set forth above are true and correct and are incorporated as if fully set forth herein.

**SECTION 2.** The future trail network illustrated in and attached as **Exhibit A**, and The City-Wide Trails Master Plan Report, a copy of which is available at the City Secretary's office, are hereby approved and adopted conjunctively as the City-Wide Trails Master Plan.

**SECTION 3.** This Resolution shall take effect from and after its date of adoption.

**DULY RESOLVED AND ADOPTED** by the City Council of the Town of Addison, Texas,  
on this the **25th** day of **MAY** **2021**.

**TOWN OF ADDISON, TEXAS**

_____  
Joe Chow, Mayor

**ATTEST:**

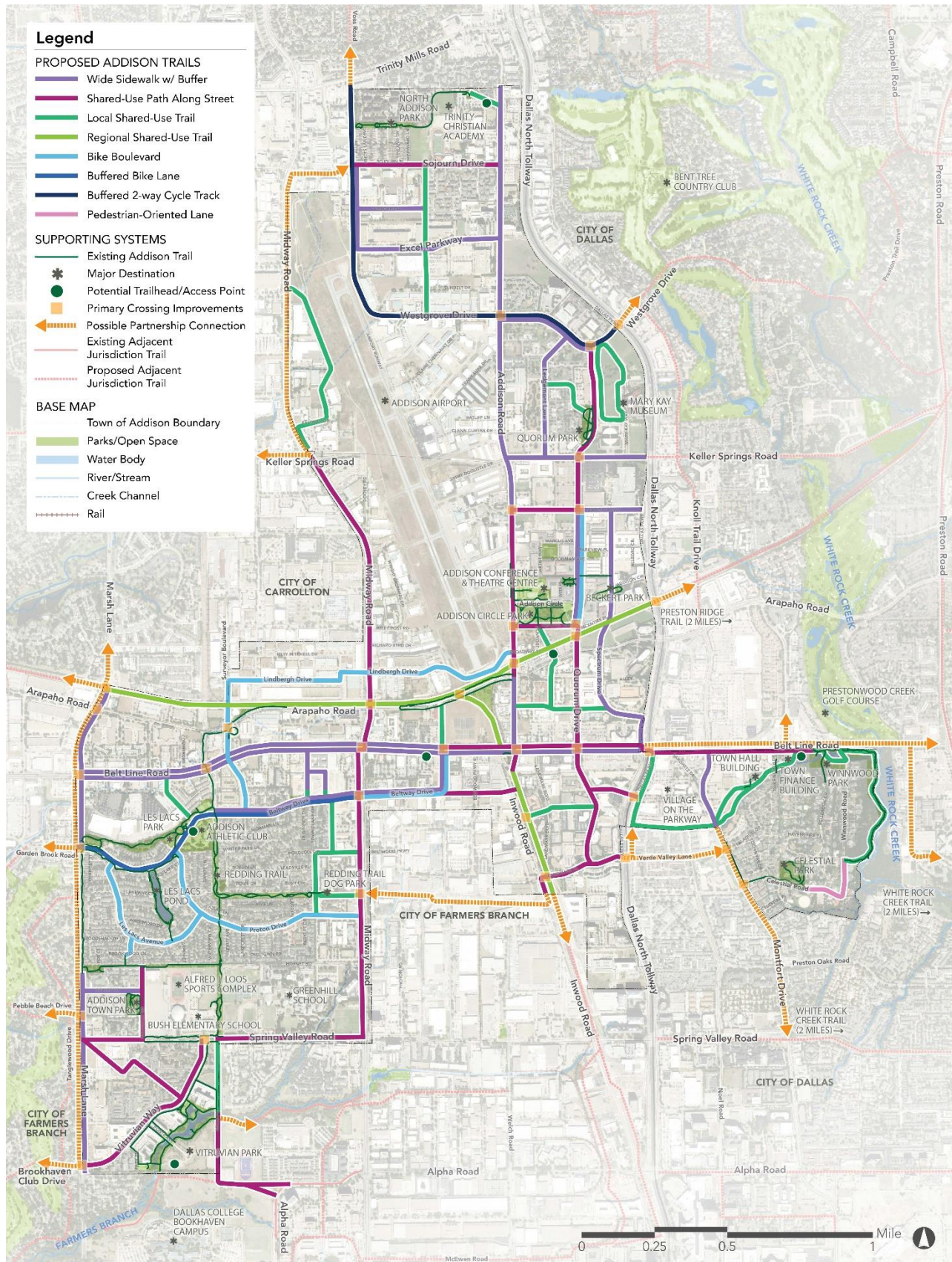
**APPROVED AS TO FORM:**

_____  
Irma Parker, City Secretary

_____  
Brenda N. McDonald, City Attorney



# EXHIBIT A





# Addison City-Wide Trails Master Plan



# Council Presentation for Consideration of Adoption



# Background

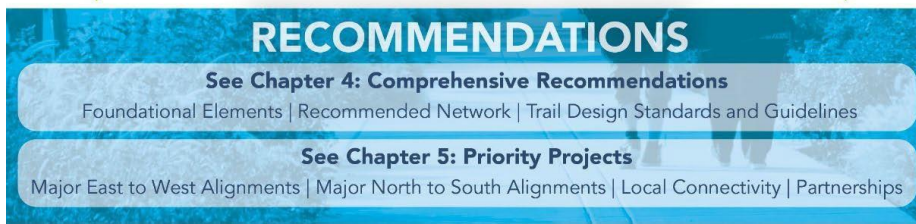
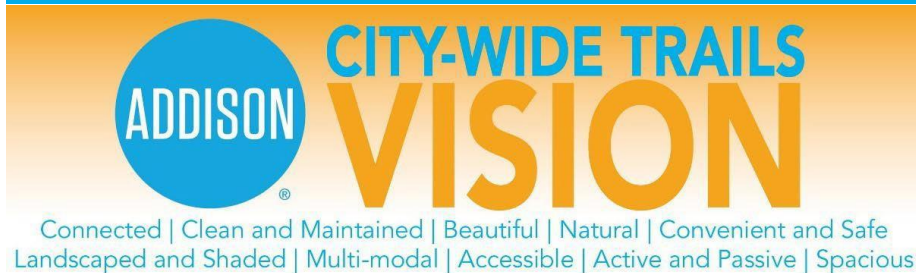
The City-Wide Trails Master Plan has been developed on the foundation of an extensive public input process.

- A City-Wide Trails Master Plan was recommended by the Parks, Recreation & Open Space Plan adopted on April 25, 2019.
- February 13, 2020 Council approved a contract with Moore Iacofano Goltsman, Inc. (MIG) to develop a City-Wide Trails Master Plan for Addison.
- April 14, 2020 Council appointed a Trails Master Plan Advisory Committee (PAC) to provide input and feedback for the plan. Members Include:

Al Angell	Joseph Hornisher
Ruth Ann Becker	David Schwarz
Megan Bedera	Charles L. “Skip” Shaw
Brandon Bowers	Tom Souers
Chris Burt	Austen Spoonts
Al Cioffi	Gennie Stringfellow
David Collins	Robert Weeks
Jenn Cook	Jessica Zazzara
Jason Ennis	



# Background



- May 8 – June 16, 2020 Public Input was gathered for the plan.
- November – December 2020 pop-up events presented a map of Draft Trail Alignments to the community to capture feedback.
- August 25, 2020 a progress presentation was made to Council for feedback.
- December 20, 2020 Council was taken on a tour of the proposed trail alignments.
- February 23, 2021 a Draft City-Wide Trails Master Plan was approved by the PAC and presented to Council for feedback.
- March - April 2021 – Additional Feedback was gathered from Council, the PAC and residents. Two additional public input meetings were held in North Addison and Southeast Addison.
- Refinements were made to draft plan and are being presented to Council for consideration of adoption.



## Legend

### PROPOSED ADDITION TRAILS

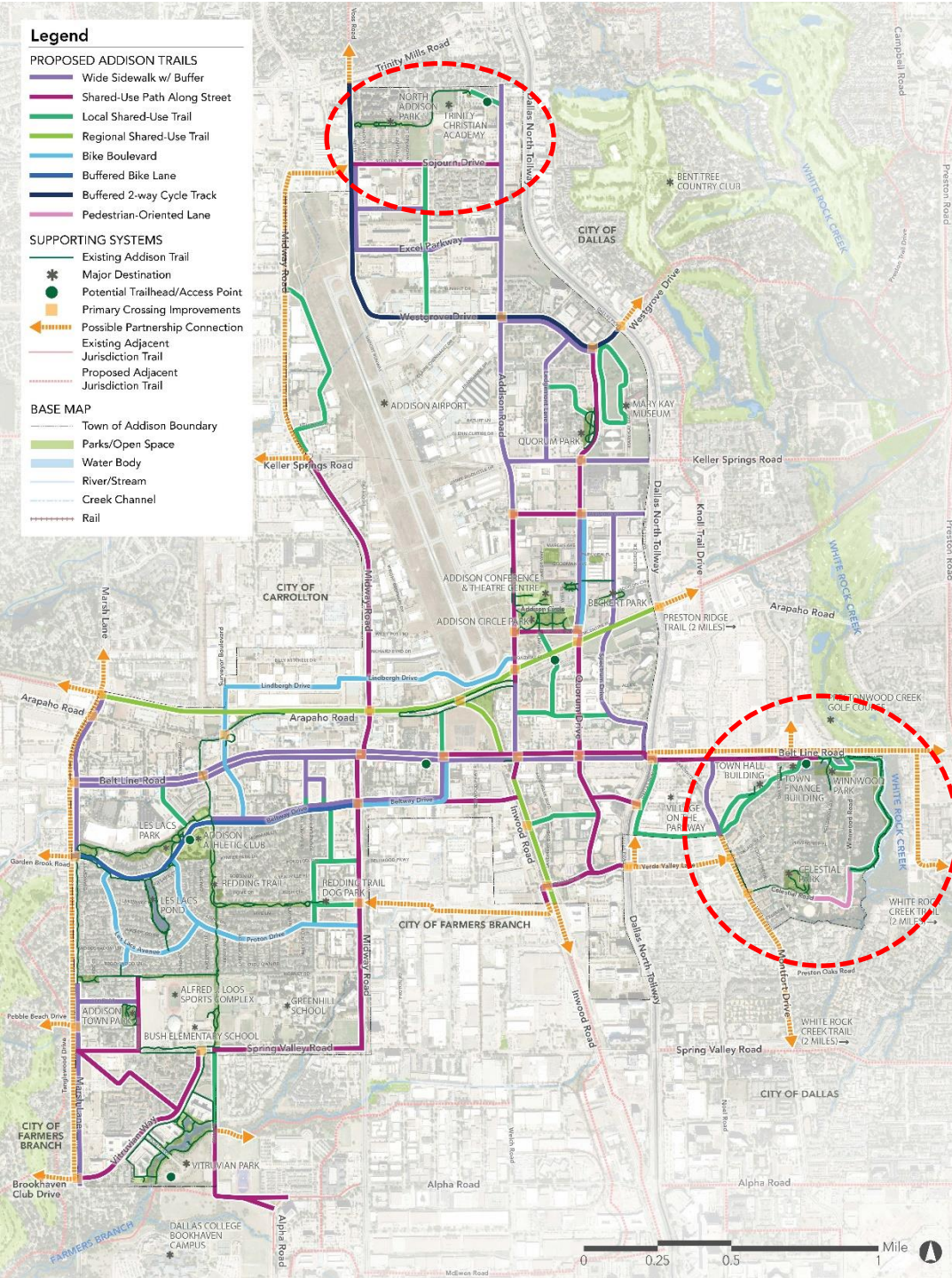
- Wide Sidewalk w/ Buffer
- Shared-Use Path Along Street
- Local Shared-Use Trail
- Regional Shared-Use Trail
- Bike Boulevard
- Buffered Bike Lane
- Buffered 2-way Cycle Track
- Pedestrian-Oriented Lane

### SUPPORTING SYSTEMS

- Existing Addition Trail
- Major Destination
- Potential Trailhead/Access Point
- Primary Crossing Improvements
- Possible Partnership Connection
- Existing Adjacent Jurisdiction Trail
- Proposed Adjacent Jurisdiction Trail

### BASE MAP

- Town of Addison Boundary
- Parks/Open Space
- Water Body
- River/Stream
- Creek Channel
- Rail



# Draft Plan Feedback

Following the draft presentation to Council additional feedback identified the following concerns:

- Potential safety concerns related to the trail access point located on Westgrove Road in North Addison. As a result, the plan was updated to remove the access point.
- Potential safety concerns regarding the extension of White Rock Creek Trail to connect with the City of Dallas White Rock Creek Trail was voiced. As a result, the plan was updated to remove the bridge connection. Alternative routes were discussed, and language was included in the plan to record the conversation. A potential partnership connection was also shown on the plan.
- Input from southeast Addison reinforced the importance of an east – west trail connection and a trailhead near the Town of Addison Finance Building.

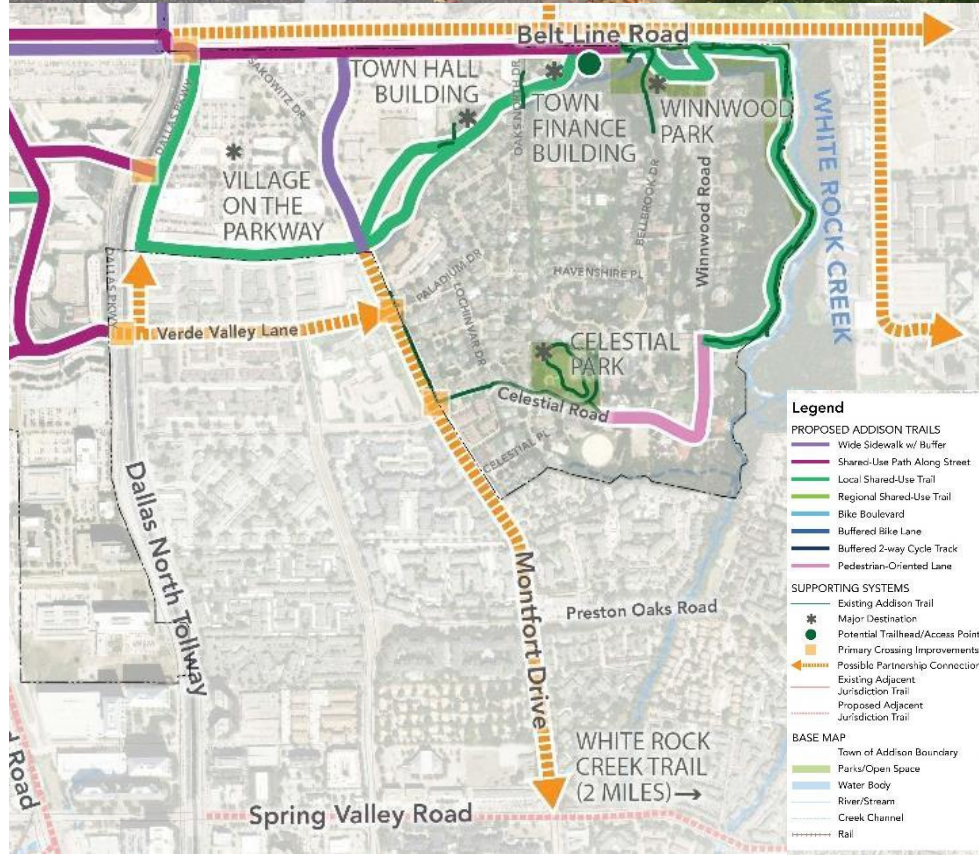


# Draft Plan Feedback



The additional feedback gathered identified the following concerns: (cont'd.)

- Residents of Southeast Addison had concerns that Bike Boulevards would cause impactful bike traffic through the neighborhood where roads very narrow. Staff clarified the intent was to provide safer on street pedestrian connections to reflect how the neighborhood was currently using the roads to connect to walks and trails. The plan was adjusted to remove buffered bike lanes on streets that were narrow and had existing sidewalks. The remaining buffered bike lanes were reclassified as pedestrian oriented lanes which will include pedestrian signage / graphics to increase motorist awareness of the pedestrians.

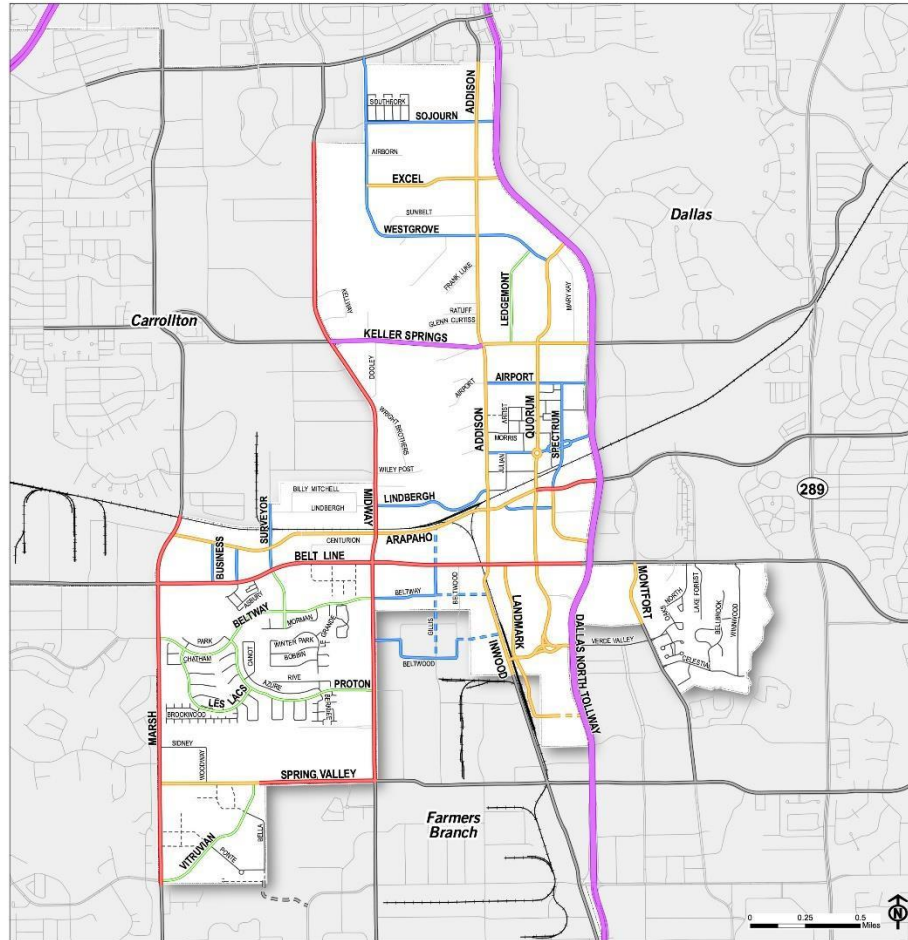


# Draft Plan Feedback

## Master Thoroughfare Plan Map

Addison Master Transportation Plan

ADDISON



### LEGEND

<b>Functional Classification</b>	Minor Arterial	Future Commercial Collector	Residential Local	Major Roadway Outside Addison
Toll Road	Future Minor Arterial	Future Residential Local	Future Connection Outside Addison	
Principal Arterial	Commercial Collector	Residential Collector	Local	Rail Lines

The additional feedback gathered identified the following concerns: (cont'd.)

- The feasibility of the shared use path extension from Beltway Road to Inwood Road was questioned. This extension follows the alignment of a future commercial collector identified in Master Transportation Plan which was adopted by Council.
- The construction of the shared use path would occur in conjunction with the road extension. The plan was not updated.



## Legend

### PROPOSED ADDITION TRAILS

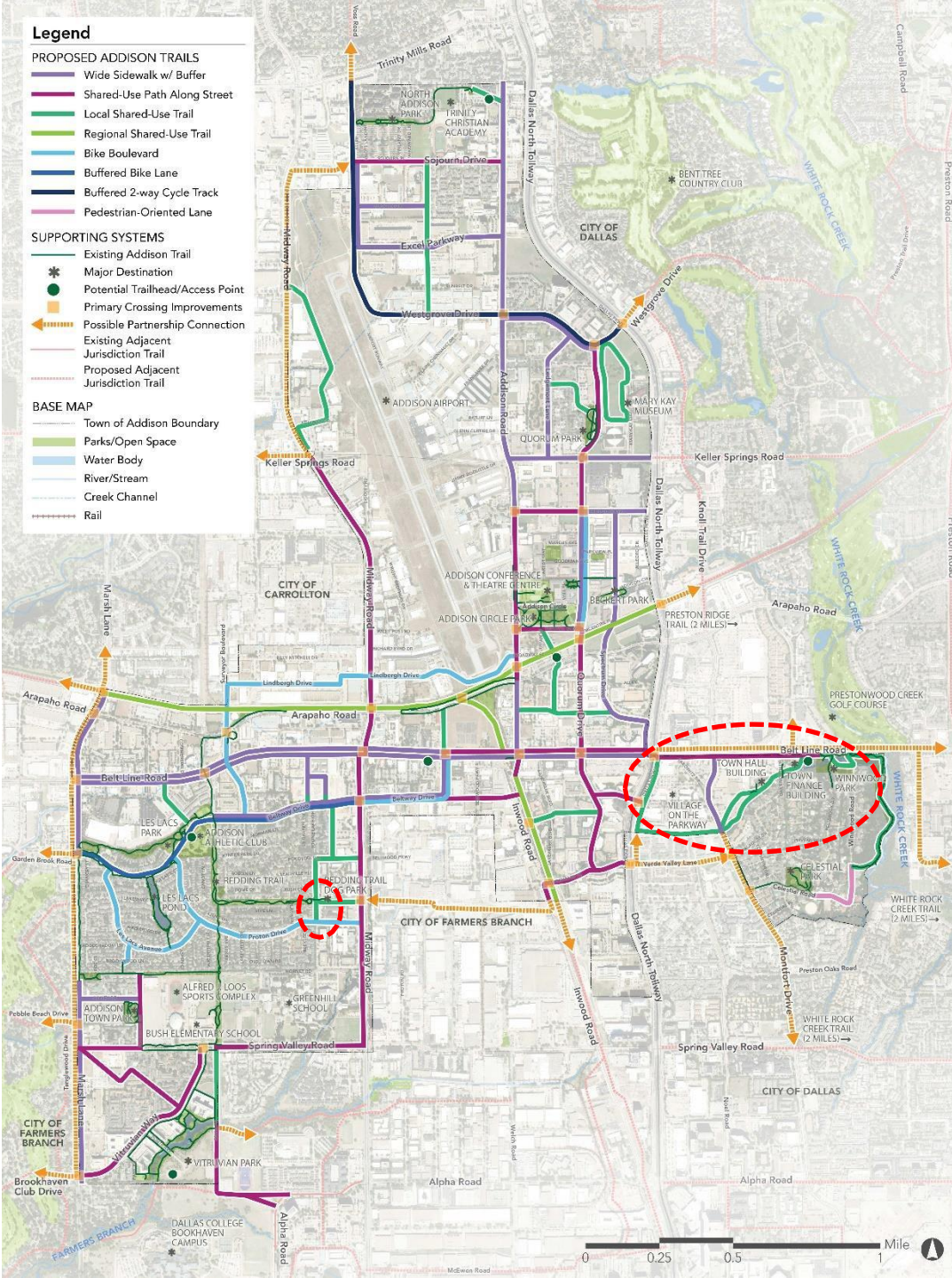
- Wide Sidewalk w/ Buffer
- Shared-Use Path Along Street
- Local Shared-Use Trail
- Regional Shared-Use Trail
- Bike Boulevard
- Buffered Bike Lane
- Buffered 2-way Cycle Track
- Pedestrian-Oriented Lane

### SUPPORTING SYSTEMS

- Existing Addition Trail
- Major Destination
- Potential Trailhead/Access Point
- Primary Crossing Improvements
- Possible Partnership Connection
- Existing Adjacent Jurisdiction Trail
- Proposed Adjacent Jurisdiction Trail

### BASE MAP

- Town of Addison Boundary
- Parks/Open Space
- Water Body
- River/Stream
- Creek Channel
- Rail



# Draft Plan Feedback

The additional feedback gathered identified the following items: (cont'd.)

- Feasibility of the shared-use trail between Dallas North Tollway and Winwood Park was questioned based on existing site conditions. The plan was not updated because Including the proposed alignments through the commercial properties gives staff a tool to use if the properties were to be redeveloped.
- Extension of Redding Trail south to Proton Drive was questioned based on perceived impacts to existing trees in this area. The intent of the plan is not to remove the trees but to have this alignment shown on the plan in case the property is ever redeveloped.

# Edits to the Draft Report

Page 26 – Added language about additional popup events.

Page 33 – Adjusted the Vision Framework Graphic language to better reflect the Goals and Guiding Principles.

Page 38 – Added a paragraph that identified the importance for the town to look for ways to improve regional trail connections adjacent to Southeast Addison.

Page 39-45, 84 – Revised the future trail network maps.

- Changed legend item to “Potential Trailhead or Access Point”
- Changed legend item to “Possible Partnership Connection”
- Eliminated the route through Greenhill School Property.
- Updated to show more existing trails at Vitruvian.
- Removed the access point on Westgrove Road.
- Removed the extension of the White Rock Creek Trail from the Southeast Addison Neighborhood.
- Added an alternative “Possible Partnership Connection” trail connecting Belt Line Road to Preston Road.
- Added Pedestrian-Oriented Lane on Celestial Road starting at Bellbrook and then on Winnwood.
- Removed bike boulevards from Bellbrook, Oaks North and Palladium.





# Edits to the Draft Report

Page 46-53 – Color coded the typology depictions to correspond with the proposed map alignments.

Page 50 – Added a new typology Pedestrian-Oriented Lane.

Page 56 – Added a note to the trailhead description speaking about the security impact of parking, the importance of neighborhood safety and the need for additional public input as part of the design process.

Page 75 & 77 – Updated on street trail buffer language to reflect the Master Transportation Plans recommendations of “8 feet or greater where possible.”

Page 78 – Updated the description of the Midway Road Trail to better reflect the improvements.

Page 88 – Added language about trailhead development requiring additional public involvement.

Page 89,90 – Updated the cost estimates responding to the alignment edits and including more clarity about the assumptions made.

Page 91 – Added a new section describing the importance of education throughout trail implementation.

Added an Appendix to include the existing trail inventory, community engagement summaries, trail prioritization criteria, funding strategies and revisions to the MTP Active Transportation Map.

Fixed various working and grammatical edits.



# Addison City-Wide Trails Master Plan



## Questions



# CITY-WIDE TRAILS MASTERPLAN

DRAFT PLAN | MAY 2021







# CITY-WIDE TRAILS MASTERPLAN

DRAFT PLAN | MAY 2021



in association with:



## Acknowledgments

We appreciate the guidance provided by City Council, our Project Advisory Committee and the Project Management Team, plus the input of stakeholders, Town staff and community members who provided their time and shared ideas that are incorporated into this Master Plan. Together, we have established the foundation to implement Addison's city-wide trail system.

### MAYOR AND CITY COUNCIL

Joe Chow, Mayor  
Lori Ward, Mayor Pro Tempore  
Guillermo Quintanilla, Deputy Mayor Pro Tempore  
Ivan Hughes, Council Member  
Paul Walden, Council Member  
Tom Braun, Council Member  
Marlin Willesen, Council Member

### PROJECT MANAGEMENT TEAM

Janna Tidwell, Director of Parks and Recreation  
Shannon Hicks, Director of Public Works and Engineering Services  
Olga Chernomoretz, IDS Senior Planner for Development  
Charles Goff, Former IDS Assistant Director of Development  
Wilson Kerr, Economic Development Manager  
Ashley Mitchell, Deputy City Manager  
JR Phillips, Senior Landscape Architect  
Randy Rodgers, Former Assistant Director of Parks and Recreation  
Todd Weinheimer, Assistant Director of Public Works and Engineering Services

### PROJECT ADVISORY COMMITTEE

Al Angell  
RuthAnn Becker  
Megan Bedera  
Brandon Bowers  
Chris Burt  
Al Cioffi  
David Collins  
Jenn Cook  
Jason Ennis  
Joseph Hornisher  
David Schwartz  
Charles L. "Skip" Shaw  
Tom Souers  
Austen Spoons  
Gennie Stringfellow  
Robert Weeks  
Jessica Zazzara

### CONSULTANTS

Jay Renkens, MIG Principal  
Cole Gehler, MIG Project Manager  
Elly Brophy, MIG Project Associate  
Kurt Shulte, WPM Principal

## Table of Contents

ACKNOWLEDGMENTS .....	ii
CHAPTER 1: INTRODUCTION .....	1
Purpose of the Plan .....	2
Plan Development Process .....	3
The Future of Addison Trails .....	4
Plan Organization and Overview .....	5
CHAPTER 2: EXISTING CONDITIONS .....	7
The Addison Community .....	8
Snapshot of the System .....	10
Opportunities and Constraints .....	12
CHAPTER 3: COMMUNITY VISION AND GOALS .....	25
Outreach and Engagement Process .....	26
Community Input Themes .....	28
Vision Framework .....	32
CHAPTER 4: COMPREHENSIVE RECOMMENDATIONS .....	35
Foundational Elements .....	36
Recommended Network .....	39
Trail Design Standards and Guidelines .....	46
CHAPTER 5: PRIORITY PROJECTS .....	73
Major East to West Alignments .....	74
Major North to South Alignments .....	78
Local Connectivity .....	83
Partnerships .....	87
Summary of Planning Level Costs .....	89
Education, Encouragement and Enforcement .....	91
APPENDICES .....	
Appendix A: Existing Trail Inventory .....	A-1
Appendix B: Community Engagement Summaries .....	B-1
Appendix C: Trail Prioritization Criteria .....	C-1
Appendix D: Funding Strategies .....	D-1
Appendix E: MTP Active Transportation Map Revisions .....	E-1

# Figures, Maps and Tables

## FIGURES

- Figure 1-1: Planning Process
- Figure 3-1: Safety Evaluation Criteria Ranking
- Figure 3-2: Tollway Crossing Location Preference
- Figure 3-3: Enhanced Trail Loop Preference
- Figure 3-4: "What is your Vision for Addison Trails?"
- Figure 3-5: New Trail Type Preference
- Figure 3-6: Trail Opportunities Identification
- Figure 3-7: Trail Amenities Preference
- Figure 3-8: Top Priority Projects
- Figure 4-1: Wide Sidewalk with Buffer Typology
- Figure 4-2: Separated Shared-Use Path Along the Street Typology
- Figure 4-3: Local Shared Use Trail Typology
- Figure 4-4: Regional Shared-Use Trail Street Typology
- Figure 4-5: Bike Boulevard with Wayfinding Typology
- Figure 4-6: Bike Lane Typologies
- Figure 4-7: Two-Way Cycle Track Typology
- Figure 4-8: Park Trail Typologies
- Figure 4-9: Prototypical Access Point with Basic Amenities
- Figure 4-10: Prototypical Trailhead with Basic Amenities
- Figure 4-11: Access Amenities Toolkit
- Figure 4-12: Prototypical Belt Line Road Bike and Pedestrian Crossing
- Figure 4-13: Prototypical Bike and Pedestrian Crossing (Westgrove and Addison)
- Figure 4-14: Prototypical Arterial Street Mid-Block Crossing (Belt Line Road)
- Figure 5-1: Cotton Belt Trail Connection to the "Rail Trail"
- Figure 5-2: Beltway Drive Bike Lanes and Wide Sidewalk

- Figure 5-3: "Power Line" Trail Connections
- Figure 5-4: Belt Line Road Shared-Use Path
- Figure 5-5: Midway Road Construction Drawings
- Figure 5-6: Inwood Road "Rail Trail"
- Figure 5-7: Addison Road Shared-Use Path
- Figure 5-8: Quroum Drive Bike Boulevard
- Figure 5-9: Westgrove Drive Cycle Track and Wide Sidewalk
- Figure 5-10: Valley Verde Underpass

## MAPS

- Map 2-1: Addison Areas
- Map 2-2: Quality of Life
- Map 2-3: Recreation and Nature
- Map 2-4: Employees, Employers and Economic Development
- Map 2-5: Corridors
- Map 2-6: Active Transportation
- Map 2-7: Regional Connectivity
- Map 4-1: Future Trail Network
- Map 4-2: Phase 1 Network
- Map 4-3: Phase 2 Network
- Map 4-4: Phase 3 Network
- Map 5-1: Proposed Trails Loop Concept

## TABLES

- Table 2-1: Existing Trail Inventory Summary
- Table 4-1: Trail Systems and Design Themes Example
- Table 5-1: Nested Loops Identification
- Table 5-2: Estimated Construction Cost by Phase
- Table 5-3: Cost and Linear Feet by Trail Type



# 1

## Introduction

The first chapter of the City-Wide Trails Master Plan provides a call to action and summarizes the need for a more comprehensive and deliberate approach to developing trails in Addison. The chapter also includes overviews of the planning process and Plan organization.





## Purpose of the Plan

The City-Wide Trails Master Plan is a critical effort in continuing to maintain and enhance the quality of life for residents, visitors and employees in Addison. Many residents enjoy trails and other pedestrian and bicycle facilities today, but many areas of Addison lack trail access and some lack any safe and comfortable connections for people who want to walk or bike.

The lack of walking and biking amenities is especially pronounced when trying get from one part of Addison to another or from Addison to the trail networks that are growing in neighboring communities.

The purpose of the City-Wide Trails Master Plan for Addison is to identify safe and comfortable pedestrian

and bicycle facilities that connect residents, visitors and employees to local and regional recreation, amenities and destinations. The Master Plan articulates a long-term vision for a fully built out trail network throughout Addison that is a critical piece of the larger regional trail network, but also delineates short-term and medium-term priorities to:

- Establish the core armature for the larger vision;
- Fill critical gaps and overcome challenging barriers;
- Introduce new and creative solutions, and perhaps most importantly;
- Connect Addison residents to each other and to the places they love.



## Plan Development Process

This Master Plan involved technical analyses and extensive community engagement over a 1-year process. Advisory groups comprised of Town staff, stakeholders and community leaders provided guidance and input throughout the process. The approach also involved a variety of outreach activities and encouraged participation from residents in numerous ways during the COVID-19 pandemic. In total, about 1,100 residents and workers weighed in through online surveys, phone interviews, intercept events, advisory group meetings, and email exchanges. This community input and advisory group guidance was gained throughout the plan development during four phases (Figure 1-1).

## ENGAGEMENT AND OUTREACH IN A PANDEMIC:

This planning process occurred during the COVID-19 pandemic. As such, the engagement and outreach process required extra attention and thought. Most meetings and workshops were conducted virtually, and when in person, social distancing and mask wearing was required. However, meaningful input was gained through creative interventions throughout all plan phases. The process involved three advisory groups and offered four different community input opportunities. See Chapter 3 and Appendix B for summaries and detailed reports.



Figure 1-1: Planning Process

## The Future of Addison Trails

While certain areas of Addison celebrate high quality neighborhood trails, there are limited opportunities to use trails or other safe walking and biking facilities to get from one neighborhood to another or from residential areas to nearby recreational and commercial destinations. If Addison were planned and built out today, it would undoubtedly include a complete network of loop trails, cross town trails and regional trail connections. Trails are highly desirable because they separate walkers, bikers and joggers from traffic while anchoring linear greenways, connecting neighborhoods, and enhancing the community.

Trails have multiple benefits including recreation, transportation, and economic development. Surveys conducted during the development of the *Parks, Recreation and Open Space (PROS) Master Plan* showed that trails were one of the most heavily used and desired recreational amenities in Addison. Similarly, input received during the development of the *Master Transportation Plan (MTP)* adopted in

2016 indicated that residents prioritized active and healthy lifestyles, trail improvements, more sidewalks, and other walking and biking improvements, in addition to addressing traffic congestion, efficiency and safety. As a result, the *MTP* laid out a strategy for improving pedestrian and bicycle facilities as roadways are improved through a combination of wider and buffered sidewalks, bike lanes and generous sidepath trails. And a growing number of studies now show that trails benefit property owners and business owners by improving property values, increasing access for businesses and boosting overall sales.

Since the Town of Addison is largely built out, the Trails Master Plan builds on recommendations laid out in the *PROS Master Plan* and the *MTP*. Namely, seize the opportunity to improve and create traditional off-street trails where opportunities still exist or can be created and integrate creative trail solutions into public roadway and private development projects over time to create a safe, inviting and complete trail network for Addison residents, visitors and employees.





## Plan Organization and Overview

The Master Plan is a guiding document that will provide direction over the next twenty years. The remainder of this document is organized as follows:

**Chapter 2: Existing Conditions** provides a summary of the existing trail system and assesses its opportunities and constraints.

**Chapter 3: Community Vision and Goals** highlights community priorities and needs that helped form the guiding principles, trail goals and community vision framework.

**Chapter 4: Comprehensive Recommendations** provides recommendations, standards and guidelines to enhance and develop new and existing trails.

**Chapter 5: Priority Projects** emphasizes key trails along major alignments and in neighborhoods, describes partnership opportunities, and presents an approach to implementation.

**Appendix A: Existing Trail Inventory** summarizes and classifies existing data.

**Appendix B: Community Engagement Summaries** provides detailed results of the community outreach efforts.

**Appendix C: Trail Prioritization Criteria** describes the planning and design criteria used to prioritize trail development.

**Appendix D: Funding Strategies** identifies funding solutions for future trail projects.

**Appendix E: MTP Active Transportation Map Revisions** presents a map detailing how the changes in this Master Plan affect the *Master Transportation Plan*.











# 2

## Existing Conditions

Chapter 2 provides a summary of existing conditions in Addison, including an overview of the community and the existing trail system. The chapter concludes with a set of maps and discussions framing the opportunities and constraints that influenced the Vision and Recommendations throughout the rest of the Plan.







## Addison Community

Addison, Texas, is the place “where it all comes together.” With over 15,000 residents, 180 restaurants, 23 hotels, and 12 million square feet of office space all in 4.4 square miles, Addison blends community livability with iconic parks and trails, new urbanist development and unique special events that draw people from throughout the Dallas Metroplex.

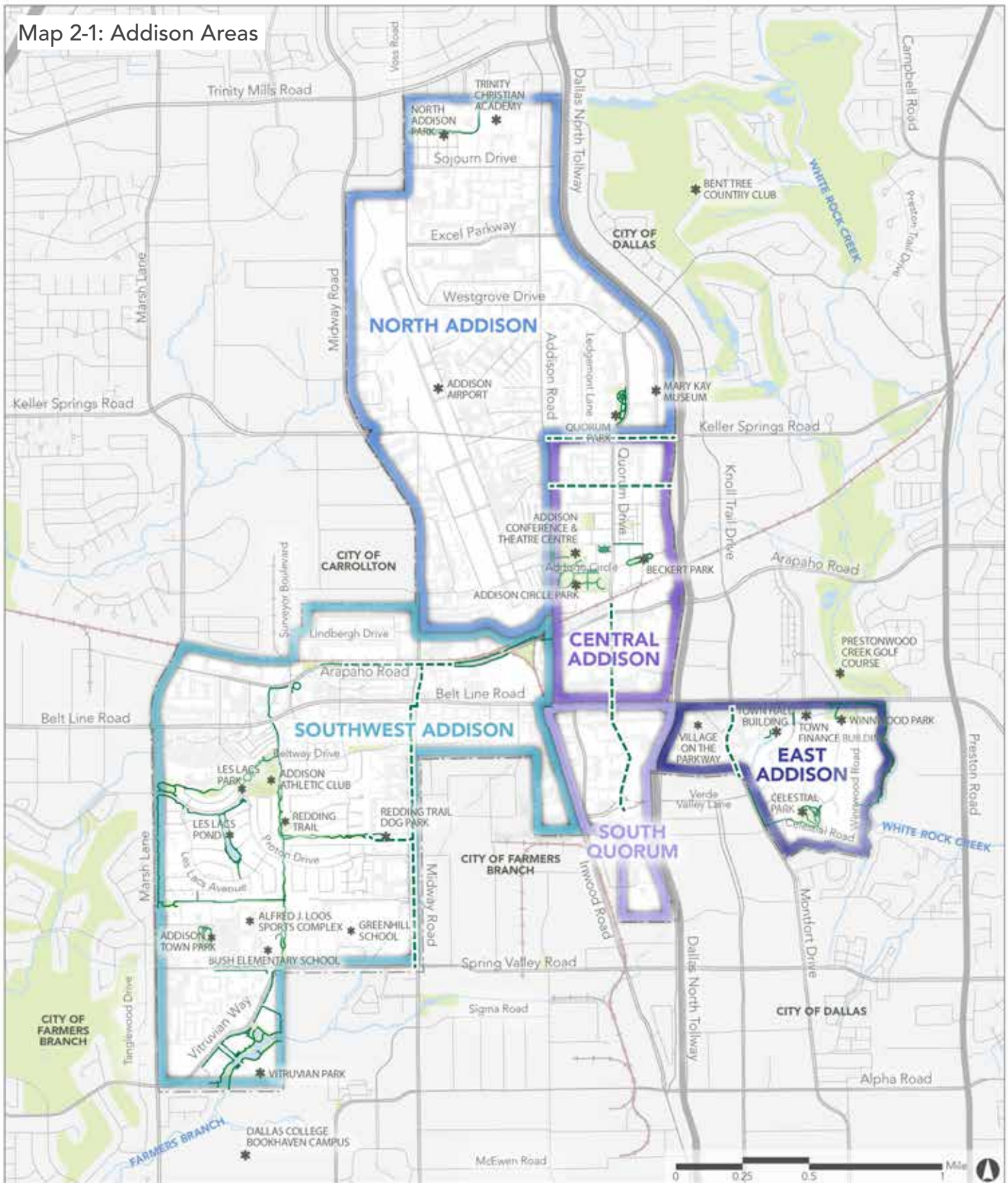
For this planning effort, Addison was evaluated using five areas divided by neighborhoods, land uses and corridors (Map 2-1). Each area possesses different demographic and land use characteristics, yet each area deserves great trails. As such, this Master Plan defines these areas to assess trail opportunities and constraints, and recommends enhanced trail connectivity in all areas.

### ADDISON BY THE NUMBERS

- 15,626 residents live in Addison
- 50,513 people work in Addison
- 11,049 people work and live in Addison
- 80% of households are renter-occupied
- 17% of households have children
- 62% of residents are White
- 16% of residents are Black or African American
- 25% are of Hispanic origin
- 33% are young professionals (ages 25-34)
- 8% are older residents and retirees ages 65+

Sources: 2019 U.S. Census American Community Survey; NCTCOG 2018 Daytime Population Estimates

Map 2-1: Addison Areas



## LEGEND

- Addison Boundary
- Roadway
- Pavement
- Parks/Open Space/Golf
- Water Body
- * Major Destination

- River/Stream
- Creek Channel
- Rail
- Existing Addison Trail
- Funded Trail Project (5-year Capital Improvements Program)

## AREAS OF ADDISON

- North Addison
- Central Addison
- Southwest Addison
- South Quorum
- East Addison



## Snapshot of the System

Addison’s existing trail system is primarily off-street and is located in parks or greenbelts. Greenbelt trails offer extensive mobility by linking to other greenbelts, parks and enhanced sidewalks. These trails are found running parallel to corridors such as power lines, rail lines, and creeks. The longest continuous trail stretch is the Redding Trail in Southwest Addison, which runs 3 miles and connects to other trails, establishing a neighborhood loop system. In contrast to greenbelt trails, most park trails are contained within the park, but in most cases connect to a sidewalk system. Furthermore, some parks such as Addison Circle Park and Vitruvian Park boast around 1 mile of off-street trails that residents use for exercise and leisure.

Addison currently has two miles of enhanced pedestrian paths within street rights-of-way. These paths are essentially wide sidewalks.

These trail segments are found as piecemeal improvements throughout the Town, apart from the contiguous Vitruvian streetscape. While currently only comprising two total miles of trails in town, this “along-the-street” trail typology is planned to grow, connecting missing sidewalk links and various neighborhoods throughout the Town. See a summary of the existing trail inventory in Table 2-1 and the complete inventory in Appendix A.

Existing trail miles per area of Addison are summarized below. (Map 2-1 references these Addison Areas)

- North Addison – 1.35 miles
- Central Addison – 1.87 miles
- Southwest Addison – 8.29 miles
- South Quorum – 0.03 miles
- East Addison – 1.62 miles

*Note: Only 1% of all Addison trails are soft surface trails*

Table 2-1: Existing Trail Inventory Summary

Categories	Miles	Function	Addison Area	Examples
<b>Off-Street Trail Alignments</b>				
Greenbelts Trails	5.2	Multi-purpose	Southwest, East	Cotton Belt Trail, Redding Trail, White Rock Creek Trail
Park Trails	5.8	Multi-purpose and Walking Paths	North, Central, Southwest, South Quorum, East	Addison Circle Park Walking Paths, Redding Trail South, North Addison Park Walking Paths
Public Space Trails	0.2	Walking Paths	Central, Southwest, East	City Hall Walking Paths, Surveyor Water Tower
<i>Subtotal</i>	<i>11.2</i>			
<b>Trail Alignments in Rights-of-Way</b>				
Enhanced Pedestrian Path	2.0	Multi-purpose and Walking Paths	North, Central, Southwest, East	Oaks North Drive, Spring Valley Road, Vitruvian Streetscape
<i>Subtotal</i>	<i>2.0</i>			
<b>Grand Total</b>	<b>13.2</b>			

## FUNDED AND PLANNED TRAILS

While the purpose of this plan is to identify and prioritize Addison's trail system, the network is already developing. As a part of the Fiscal Year (FY) 2020-21 five-year Capital Improvements Program, six bond projects will add 3.5 miles of greenbelt trails, enhanced pedestrian paths, and shared-use paths along the street. These projects are included in this plan and additional recommendations have been made to improve connectivity in these areas (see Chapters 4 and 5). The following list summarizes the funded projects (plus 3 other planned projects) and Map 2-1 locates them.

1. Midway Road Reconstruction – As a part of the road construction a shared-use trail with vegetative buffers will extend from Spring Valley Road to Cotton Belt Railway. This project also includes completing a missing trail link adjacent to the Cotton Belt Railway and below Arapaho Road.
  2. Keller Springs Reconstruction – Sidewalks with landscaping from Addison Road to the Dallas North Tollway.
  3. Airport Parkway Reconstruction – Sidewalks with landscaping from Addison Road to the Dallas North Tollway.
  4. Trail Rehab and Expansion of Redding Trail – Improve the existing trail's drainage and ADA accessibility, and extend the trail from Redding Dog Park to Midway Road. Additionally, this project includes updating other greenbelt trails with wayfinding signage and safety improvements, plus installing fitness equipment near Les Lacs Park.
  5. Quorum Drive Reconstruction – Sidewalks with landscaping buffers from the Cotton Belt Railway to the North Dallas Tollway.
  6. Montfort Drive Reconstruction – Sidewalks with landscaping buffers from Belt Line Road to Addison city limits.
- PARTNERSHIP TRAIL: Bella Lane Construction to Alpha Road – A trail connecting the Vitruvian Park area to the Farmers Branch trail system with a shared-use trail.
  - PARTNERSHIP TRAIL: Silver Line Project – Future DART passenger rail service running on the Cotton Belt Regional Rail Corridor will include the construction of a shared-use regional trail that connects through Addison.
  - OTHER TRAIL: Addison Groves Streetscape – Wide sidewalks and local access points will provide residents access to two pocket parks and retail on Belt Line Road.



## Opportunities and Constraints

The existing trail network and collection of pedestrian and bicycle amenities throughout Addison provide opportunities and constraints that help to frame and inform the recommendations included in the remainder of the City-Wide Trails Master Plan. The most prominent opportunities and constraints are organized into several categories and summarized below.

### QUALITY OF LIFE

One of the primary benefits of investing in Addison's trail network is to enhance the quality of life for residents. For easier reference throughout this document, five general areas have been defined to make it easier to describe loops, crosstown connections and regional linkages. Four of the five areas include housing and a residential population, although each has a unique mix of housing options and resident populations.

**North Addison:** Approximately half of the area delineated as North Addison comprises the Addison Airport. The other half of North Addison is a mix of employment uses, institutional uses, and attached

single-family and multifamily residential development. Trails in North Addison are currently limited to North Addison Park.

**Central Addison:** Central Addison is anchored by Addison Circle Park and a relatively large concentration of rental and for ownership multifamily housing. The DART Silver Line rail is planned to stop in Central Addison and a regional trail is being designed as part of the rail corridor improvements.

**Southwest Addison:** Southwest Addison includes the vast majority of existing trail connections in Addison. The northern portion of the area is largely defined by commercial development along and near Belt Line Road. Addison's largest collection of single-family homes is situated around Les Lacs Pond, the Addison Athletic Club and the Redding Trail. Another large concentration of multifamily housing is situated along Marsh Lane and adjacent to Vitruvian Park.

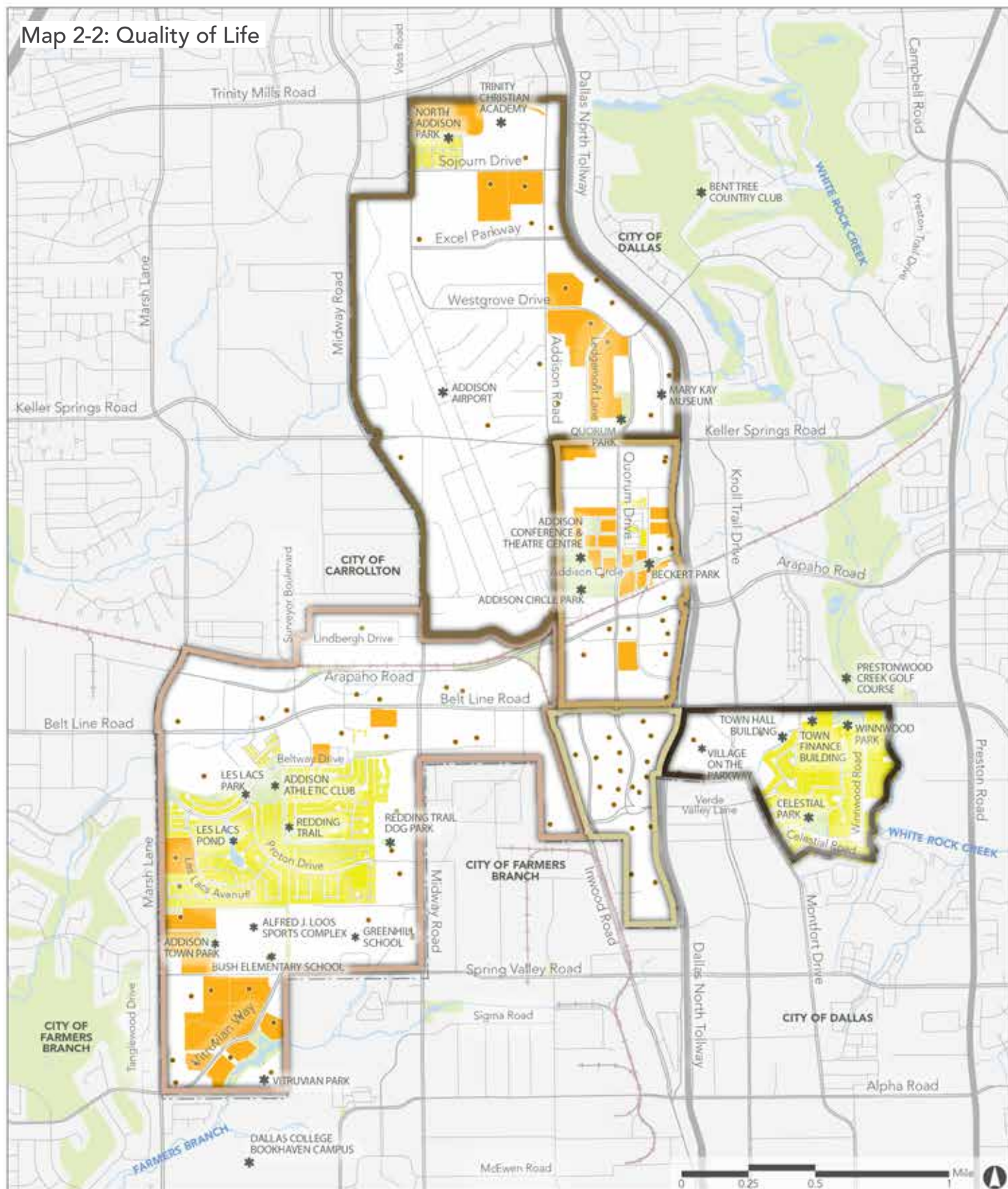
**East Addison:** The area delineated as East Addison is east of the Dallas North Tollway and south of Belt Line Road. In addition to a handful of Town facilities and commercial development in the west portion of this area, the majority of East Addison is occupied by White Rock Creek, Winnwood Park, Celestial Park, and larger single-family homes. Trails exist in East Addison in the two parks and along White Rock Creek.

Throughout the planning process, residents described walking and biking within the area that they live, but having few, if any options to connect to other areas of Addison or neighboring communities. The trail network is seen as an opportunity to significantly improve recreation and transportation options for all Addison residents.





Map 2-2: Quality of Life



## LEGEND

- Addison Boundary
- Roadway
- Parks/Open Space/Golf
- Water Body
- River/Stream
- Creek Channel
- Rail

## RESIDENTIAL LAND USE

- Single-Family Residential Parcel
- Multi-Family Residential Parcel

## DESTINATIONS

- ★ Major Destination
- Point of Interest

## AREAS OF ADDISON

- North Addison
- Central Addison
- Southwest Addison
- South Quorum
- East Addison

## RECREATION AND NATURE

As introduced above, the existing and potential trail network provide a number of recreational opportunities for residents. In addition, the envisioned trail network could also create an even more inviting and desirable experience for visitors, employers and employees by better connecting people to the natural areas and urban respite.

**Natural Areas and Open Space:** The majority of trails that exist in Addison today are situated adjacent to waterways and water bodies or with Town parks and greenways. New off-street trails in natural areas will be relatively limited. The Parks, Recreation and Open Space Master Plan does recommend several pathways and trail improvements within existing parks.

**Health and Wellness:** Walking, jogging and biking for exercise and transportation provide tremendous health benefits. Research shows that trail loops, trail variety, and trail amenities all contribute to greater trail usage (more frequent and longer trips). A trail network

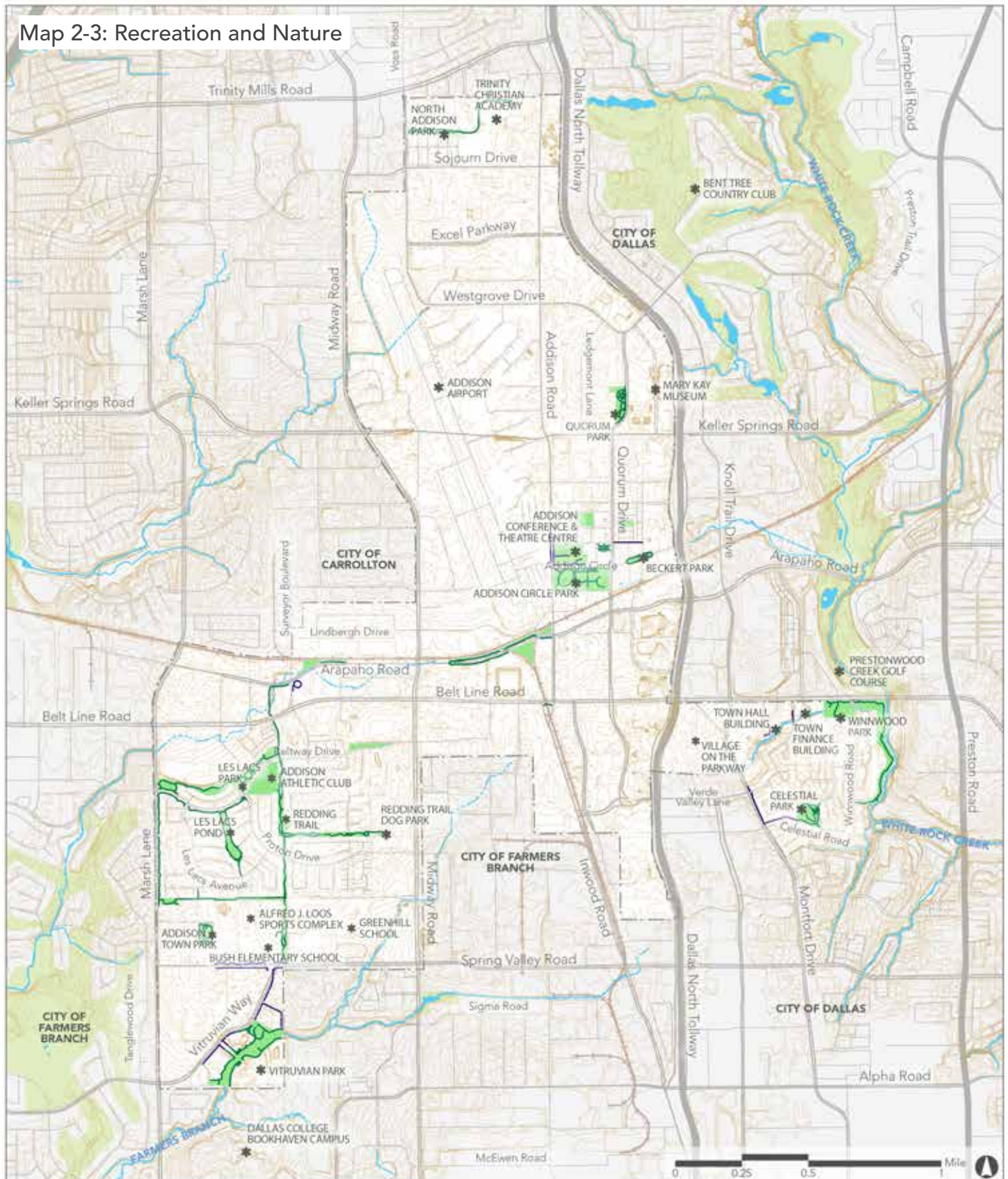
that provides a series of interconnected and nested loops provides a host of options for frequent users and can have measurable benefits for community health and wellness.

**Topography and Drainage:** As previously noted, very few opportunities remain to create new trail experience within natural areas of Addison. Natural drainage ways can provide such opportunities, but very few exist in Addison that have not already been incorporated into parks and greenways. There is a short section running through the Greenhill School Campus in Southwest Addison, but the majority of that drainage way lies in Farmers Branch and is not included in their Trails Master Plan. The other opportunity runs from Marsh Road and behind the Town Hall and Town Finance Buildings leading to Winnwood Park in East Addison. Steep grades and property constraints will make this connection challenging but could create a new natural trail connection in Addison.





Map 2-3: Recreation and Nature



## LEGEND

- |  |                   |  |                                   |  |               |
|--|-------------------|--|-----------------------------------|--|---------------|
|  | Addison Boundary  |  | Addison Parks                     |  | Water Body    |
|  | Roadway           |  | Parks/Open Space/Golf             |  | River/Stream  |
|  | Rail              |  | Existing Park or Greenway Trail   |  | Creek Channel |
|  | Major Destination |  | Existing Enhanced Pedestrian Path |  | 2' Contours   |

## EMPLOYEES, EMPLOYERS AND ECONOMIC DEVELOPMENT

Addison is somewhat unique in that its daytime population far exceeds its overnight resident population, especially when you account for short-term temporary stays in hotels and other types of lodging. Thus, it is important to consider the opportunities and constraints related to employees and visitors to Addison.

**Employment Lands:** As was previously discussed, the Addison Airport occupies a large portion of North Addison. An examination of other employment land shows large concentrations north and west of the airport, south along Marsh Road, along Belt Line Road, and in South Quorum. Many of these employment areas will be important to the envisioned trail network in Addison. They provide critical linkages between residential neighborhoods, include many of the destinations that residents want to visit when walking and biking, and—with the exceptions of Belt Line Road and Marsh Road—tend to be quieter and lower traffic on nights and weekends when residents will likely use trails most.

### **Amenitization for Employers and Employees:**

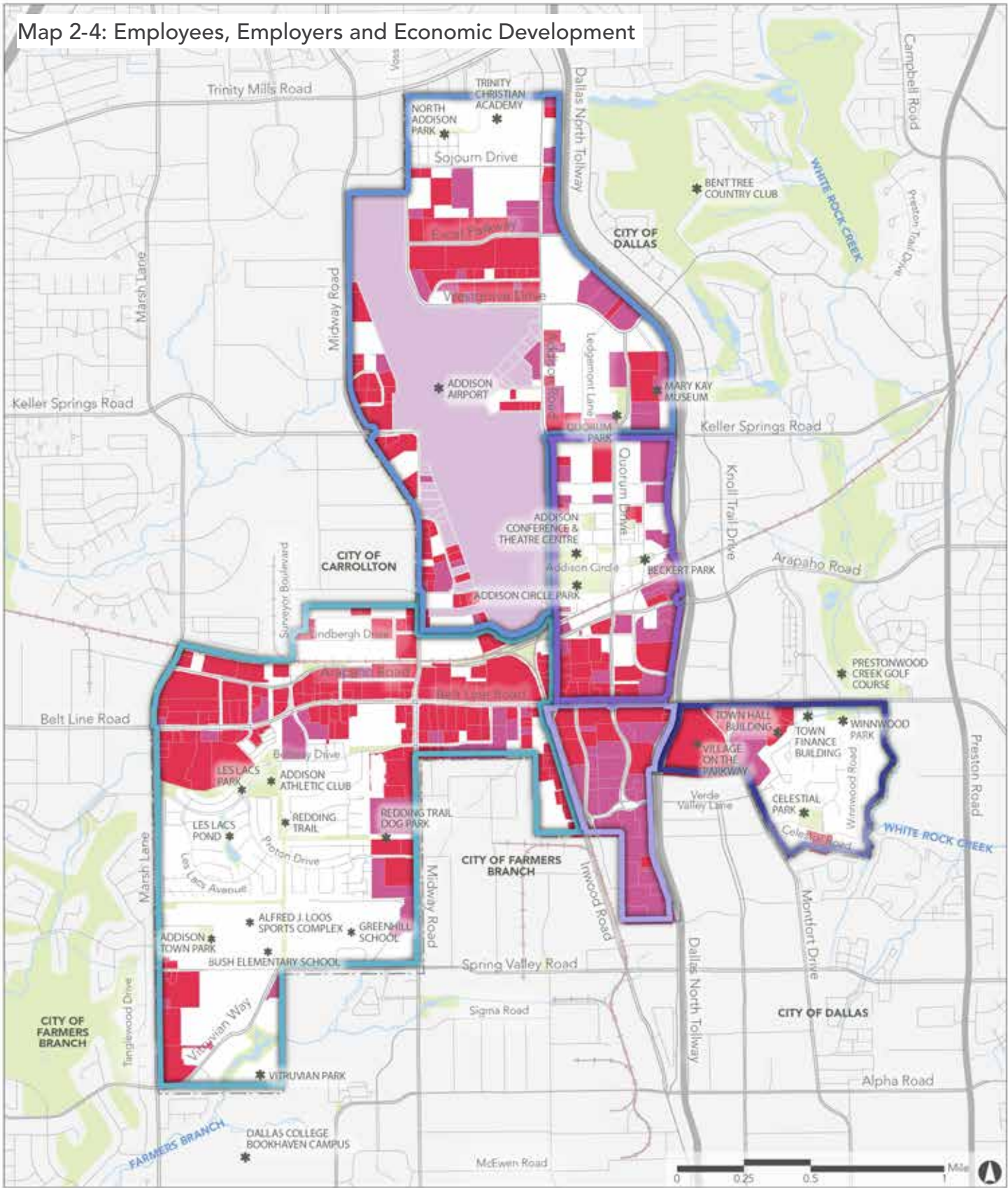
Another benefit of planning and constructing trail connections through employment areas is that it provides access to existing and potential employers and employees. Trails and the access they can provide to existing dining and entertainment destinations can help Addison business and property owners better compete in what will undoubtedly be an even more competitive commercial real estate market over the next several years and beyond.

**Economic Development:** It was noted earlier, but trails can contribute to economic development and the financial success of existing businesses by providing additional ways to access businesses; amenities for visitors and employees; and a more attractive community overall to attract spending from outside Addison. Finally, studies show that people walking and biking to businesses tend to make more frequent visits. While spending on each individual trip may be less than someone arriving by car, the increased number of transactions tends to result in more spending by customers walking and biking.





Map 2-4: Employees, Employers and Economic Development



LEGEND

- |                         |                     |                               |                   |
|-------------------------|---------------------|-------------------------------|-------------------|
| --- Addison Boundary    | — River/Stream      | COMMERCIAL LAND USE           | AREAS OF ADDISON  |
| — Roadway               | — Creek Channel     | Commercial/Retail Parcel      | North Addison     |
| — Parks/Open Space/Golf | — Rail              | Office Parcel                 | Central Addison   |
| — Water Body            | * Major Destination | Airport Transportation Parcel | Southwest Addison |
|                         |                     |                               | South Quorum      |
|                         |                     |                               | East Addison      |



## CORRIDORS

Several of Addison's existing trails are located along utility easements and natural drainage ways. One of the most significant regional trail connections planned for Addison is planned as part of DART's Silver Line Rail project. Thus, corridors of all types should be examined for their ability to accommodate improved or new trail connections.

**Rail Corridors:** In addition to the Cotton Belt Trail being planned and designed along the future Silver Line Rail connection, the existing freight rail network extends south from Central Addison along Inwood Road and into Farmers Branch. Farmers Branch has plans to add trail connections along the rail line within their boundaries and to connect to their local and regional trail network.

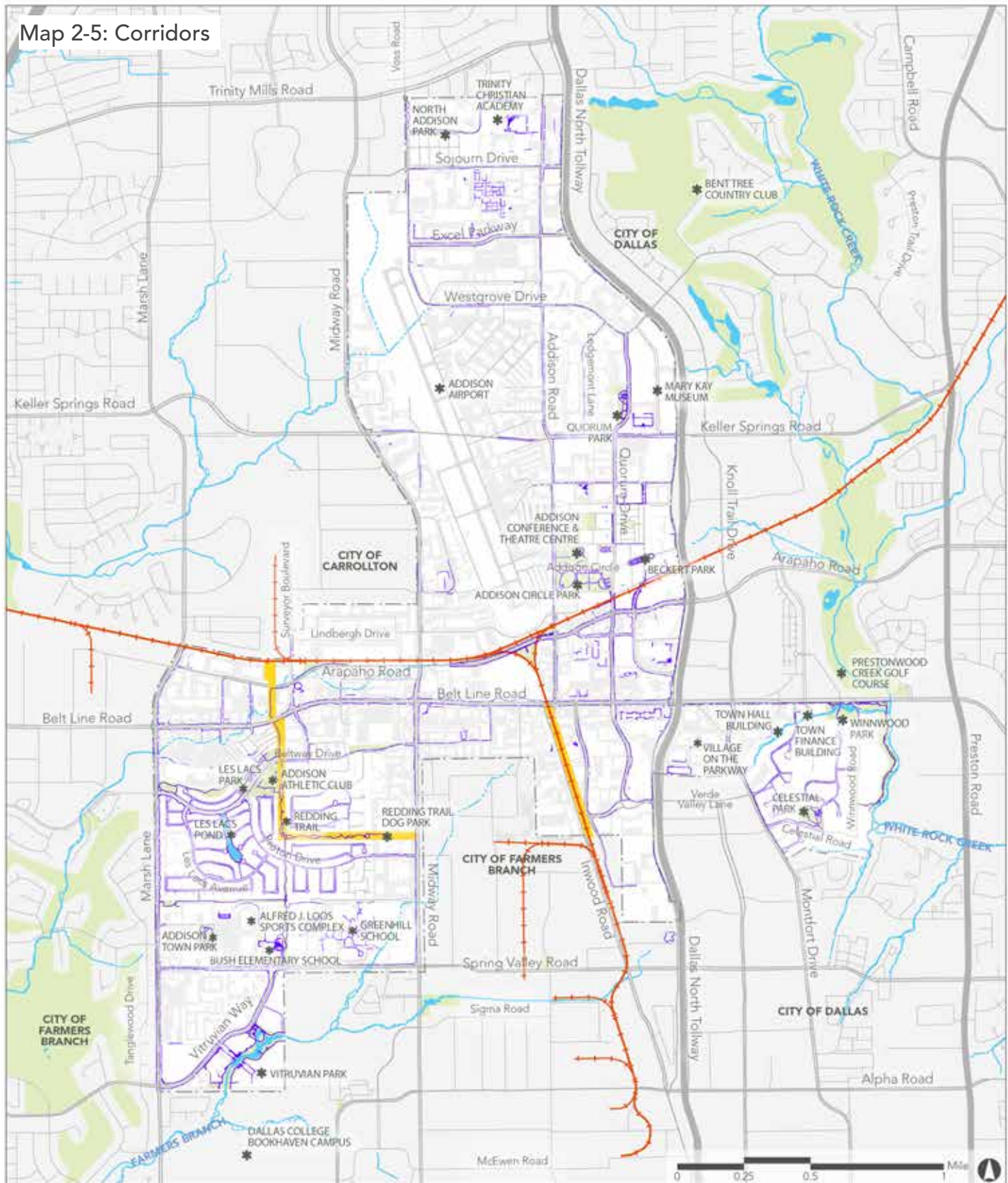
**Utility Corridors:** Addison's popular Redding Trail exists within a utility easement through a partnership with Oncor. This example of partnering with a utility company shines a light on other opportunities within Southwest Addison and in partnership with Farmers Branch connecting Southwest Addison to South Quorum.

**Roadways:** The *Master Transportation Plan (MTP)* included wide and buffered sidewalks, bike lanes, as well as wide sidepaths along many of the arterials and collector roads in Addison. In most cases, these pedestrian and bicycle facilities can be accommodated within the existing right-of-way (ROW), but certain roads or segments of roadway will require ROW acquisition and/or cooperation with adjacent property owners. The Trails Master Plan has examined each of the recommended routes in the *MTP* in greater detail, adjusted some to better respond to opportunities on the ground, and in a few instances, added additional recommendations to leverage new opportunities.

**Creeks:** As was mentioned above in the section discussing Recreation and Nature, new creek trail connections are very limited in Addison. In addition to the potential connection running behind the Town Hall and Town Finance Buildings, a regional connection to the Dallas White Rock Creek Trail should be explored through partnership opportunities.



Map 2-5: Corridors



## LEGEND

- Addison Boundary
- Roadway
- Pavement
- Parks/Open Space/Golf
- Water Body
- * Major Destination

## EXISTING NETWORK

- Paved Sidewalks and Trails*
- Highway
- Major Road
- Local Road

*Includes all public and some private paved sidewalks and trails

## CORRIDORS

- Utility or Transportation Easement
- River/Stream
- Creek Channel
- Rail



## ACTIVE TRANSPORTATION

The *Master Transportation Plan* provides a strong foundation for the current effort. Its inclusion of Off-Street Trails, Enhanced Pedestrian Paths, and other Active Transportation Corridors as part of an Active Transportation Network provided a great starting point for the Trails Master Plan. In addition, the City of Farmers Branch and the City of Dallas have plans for more complete streets and other active transportation connections.

**A Variety of Users:** Wide sidewalks and bike lanes can provide safety for pedestrians and bicyclists commuting to work or accessing businesses along busy corridors. These active transportation connections can help fill critical gaps in a more comprehensive trail network. With that said, it is important to remember that the trail network in Addison should accommodate all different skill levels, comfort levels and ages. Supplementing the active transportation network along busier roadways with off-street trails and connections along low traffic streets will provide a more inclusive and enjoyable trail network.

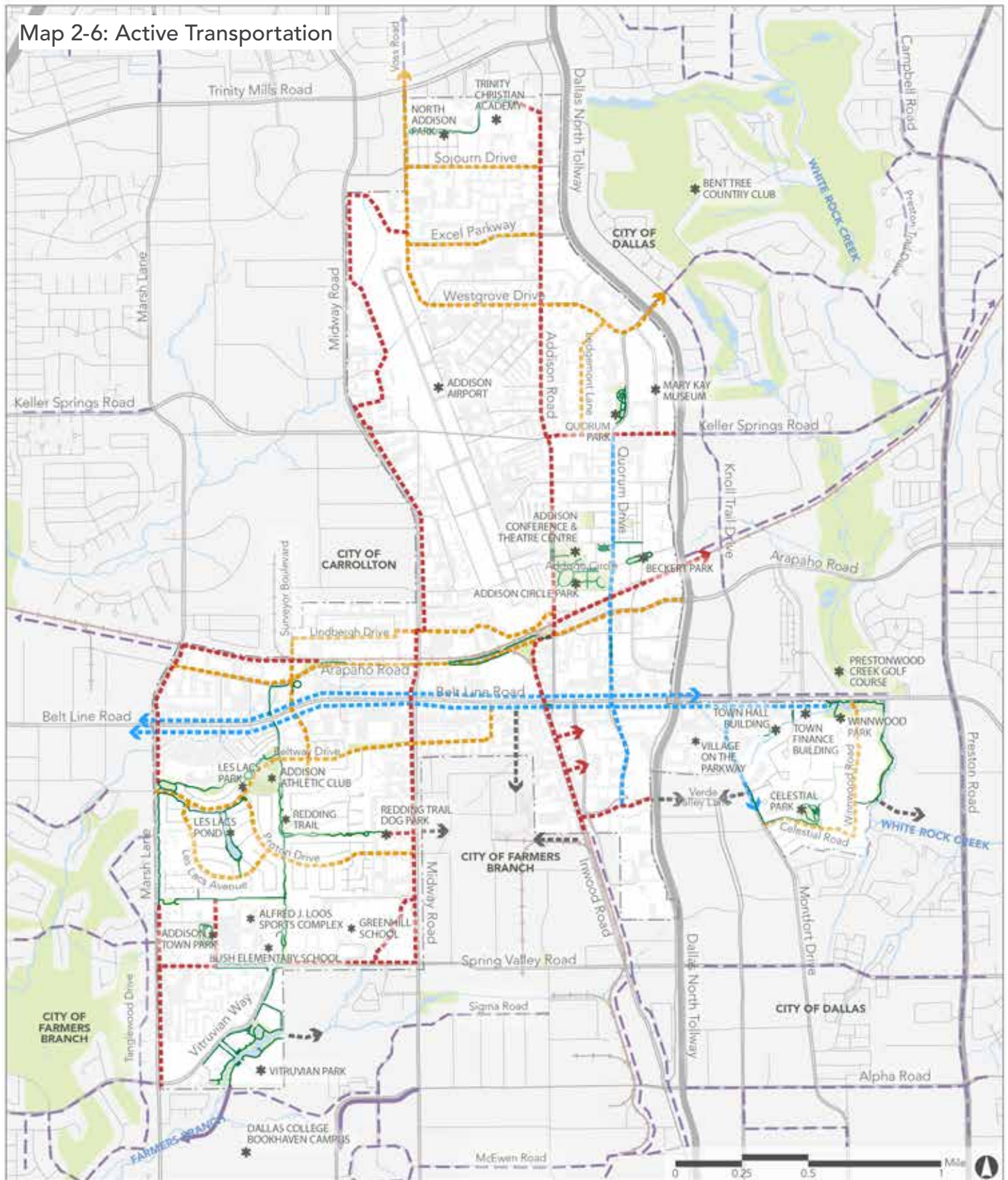


**Short-Term and Long-Term Connections:** It should be noted that some of the recommended trail connections included in this plan may require 10 to 20 years to realize. Factors include the need for property acquisition and/or coordination, the timing of redevelopment, partnerships, and cost. Pedestrian and bicycle facilities in the street ROW can provide opportunities to create connections in the shorter term while a more ideal trail solution is planned, designed and implemented.

**Redundancy:** There are many instances where redundancy is desired in a trail network. Parallel facilities that generally connect the same origins and destinations can provide separation of fast-moving cyclists from slower cyclists, walkers and joggers. Similarly, an off-street trail alternative to an on-street facility or a pathway in the street ROW can create separation of recreational users and commuters and those using the trail network for active transportation.



Map 2-6: Active Transportation



## LEGEND

- Addison Boundary
- Roadway
- Pavement
- Parks/Open Space/Golf
- Water Body
- River/Stream
- Creek Channel
- Rail
- * Major Destination

## EXISTING NETWORK

- Highway
- Major Road
- Local Road
- Addison Trail

## ADJACENT TRAIL CONNECTIONS

- Existing Trail
- Proposed Trail

## PROPOSED ACTIVE TRANSPORTATION*

- Off-Street Trail
- Enhanced Pedestrian Path
- Active Transportation Corridor
- Preferred Future Connectivity

*Proposed Active Transportation Connectivity recommended in the 2016 Master Transportation Plan





## REGIONAL CONNECTIVITY

The development of this plan and the implementation of the trail network it recommends will have an even more significant impact for Addison when regional connectivity is considered. A more complete and connected network of trails in Addison that is connected to surrounding jurisdictions creates a number of noteworthy opportunities.

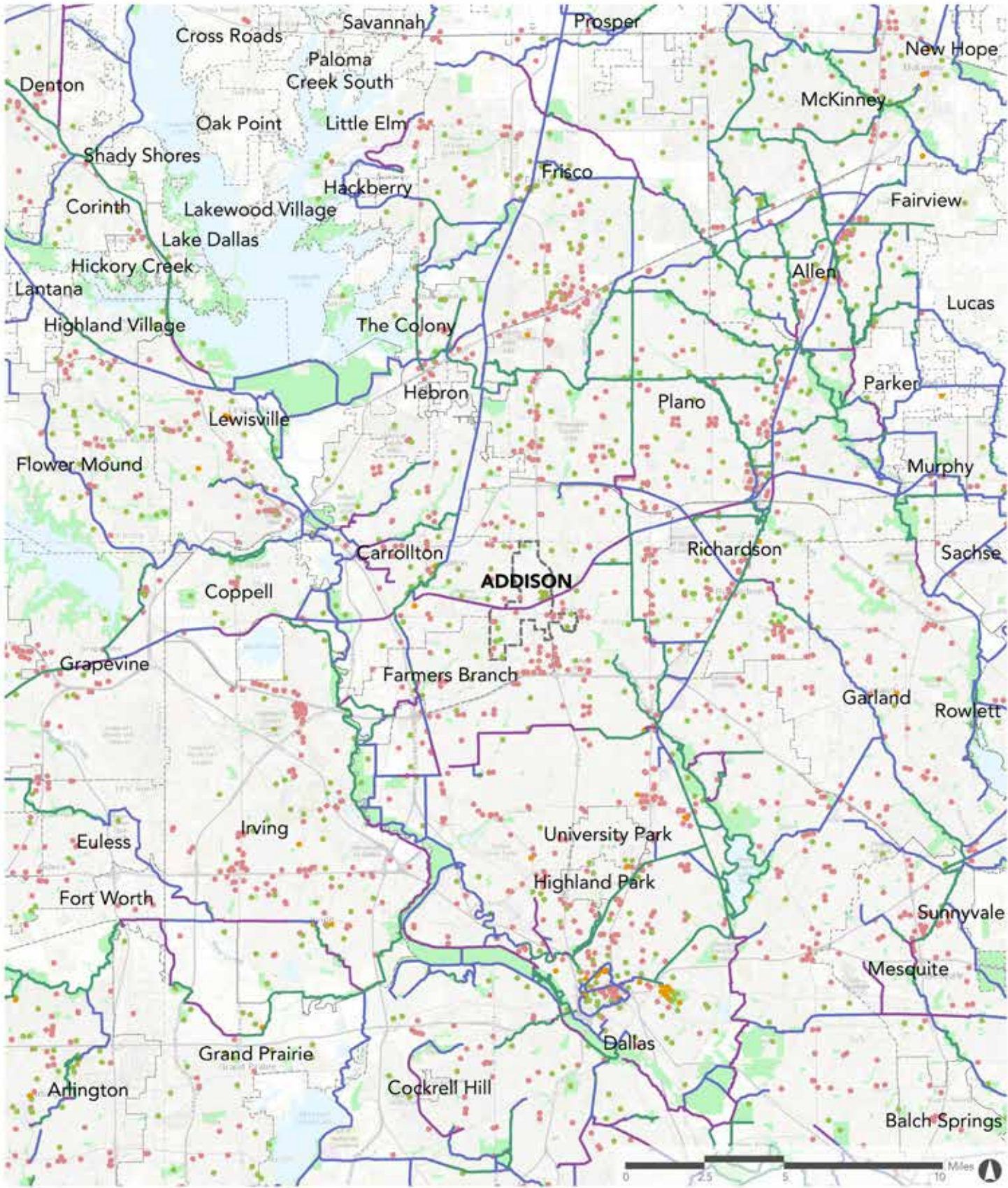
**Access to Neighboring and Regional Trails:** By connecting to adjacent trails, pathways and active transportation connections, Addison residents also gain safe and comfortable access to hundreds of miles of additional pedestrian and bicycle facilities and amenities throughout the region.

**Access to Nearby Destinations:** Regional connectivity can make Addison an even more desirable place to live without adding a single park, restaurant or entertainment destination. A regionally connected trail network will allow residents to explore neighboring jurisdictions and other parts of the region on foot and by bike.

**Adding to the Collective Good:** Addison's recommended trail network will help to fill gaps in the regional trail network and improve access for walkers, joggers and cyclists traveling to and through Addison.



Map 2-7: Regional Connectivity



LEGEND

- Addison Boundary
- City Boundaries
- Major Road
- Parks/Open Space

REGIONAL VELOWEB TRAILS*

- Existing Trail
- Funded Trail
- Planned Trail

REGIONAL DESTINATIONS

- Major Retail Location
- Major Recreational Location
- Major Cultural Location

* North Central Texas Council of Governments (NCTCOG) adopted 2040 Regional Veloweb







# 3

## Community Vision and Goals

While there are many tried and true methods of retrofitting communities with trail connections, planning a network that uniquely fits Addison requires a greater understanding of the community's values and desires. This chapter highlights the engagement process, key advisory groups, and themes uncovered in the community discussions. The chapter concludes with a presentation of the Vision Framework for trails in Addison.





## Outreach and Engagement Process

To ensure that the city-wide trail system effectively serves residents and the entire community, an adaptive outreach and engagement process involved three advisory groups and offered four different community input opportunities. The following groups convened during the COVID-19 pandemic which was met with new challenges and opportunities. The result was a robust effort that sought safe and productive ways to gain feedback.

### COMMUNITY INPUT OPPORTUNITIES

#### Addison Trails Community Questionnaire:

Throughout May 2020, 706 residents, employees and trail/park visitor answered questions about the trail system. The results helped identify what is missing, what trail connections need to be made and what types of connections are most important.

**Virtual Community Visioning Workshop:** On July 30th, 2020, 39 residents joined a virtual workshop to identify trail needs and establish a vision for the future. The workshop featured a presentation and a fun and interactive polling exercise. For those unable to attend the meeting, a recording of the presentation was posted on the Town's website with direction on how to fill out the electronic poll.

**Large Map Pop-Up Events:** Five pop-up events were held in parks and at existing community meetings and special outreach events in November and December 2020 and in April 2021. All events featured a large 10 by 15-foot floor map depicting the proposed trail route. Residents were prompted discuss the alignments with staff or add their comments directly to the map with sticky notes.

- Three 2020 pop-ups were held at the Addison Athletic Club and Addison Circle Park, attracting a total of about 150 residents, employees and visitors who shared their thoughts and ideas about Addison's future system.
- Two 2021 pop-ups were targeted neighborhood outreach events held in parks in North and Southeast Addison. These two events were conducted in response to proposed trails and access points. About 40 residents participated at each neighborhood event (80 total).

**Draft Future Trail Network Questionnaire:** In tandem with the large map pop-up events, the project team launched another map-based survey over a six-week period, from November to December 2020. Targeted specifically at residents, over 250 community members participated and assessed proposed draft alignments and trail typologies. Additionally, they added new trails, trailheads and identified important connections with map pins.



## ADVISORY GROUPS

**Project Advisory Committee:** The Project Advisory Committee (PAC) was created to advise the project team throughout the development of the Master Plan. The Committee met four times to offer insight about the local community, to provide technical feedback through online polling and mapping, and ensure the Master Plan addresses the needs of all Addison community members.

**Project Management Team:** The Project Management Team included staff members from different Town departments who reviewed materials, discussed project directions, and ensured the Master Plan incorporated relevant data and was consistent with concurrent Town planning efforts. The Project Management Team met five times during the planning process (four of which were virtual and one was in person, utilizing the large floor map).

**City Council:** City Council provided direction through stakeholder interviews, received regular updates on plan deliverables and findings, and went on a guided tour of all proposed routes to provide input.

**Stakeholder Interviews:** Twenty-eight interviews were conducted throughout the process with Council members and PAC members to discuss trail opportunities and constraints.

From these community meetings and activities, eight key outreach themes emerged as priorities for the city-wide trail system. Described on the next pages, these themes reflect the community's needs and aspirations for Addison's trails. (See Appendix B for additional details.)



## Community Input Themes

### TRAIL SAFETY

Community members and stakeholders emphasized that safe and comfortable trails are the top priority in Addison. New and existing trails should maximize safety for pedestrians and bicyclists.

#### Stakeholder Quote:

*"Future pedestrian paths of arterial streets needs to offer better protection from automobiles than what we provide now."*



Figure 3-1: Safety Evaluation Criteria Ranking (results from the Virtual Community Visioning Workshop)

#### Stakeholder Quote:

*"We need to emphasize safely crossing our major barriers which are Belt Line, Midway and the Tollway."*

### PHYSICAL BARRIERS TO CROSS-TOWN CONNECTIVITY

Plan participants frequently identified major barriers like the Tollway and Belt Line Road as the biggest challenge in creating a city-wide trail network and a major contribution to feeling unsafe walking and biking in Addison today.

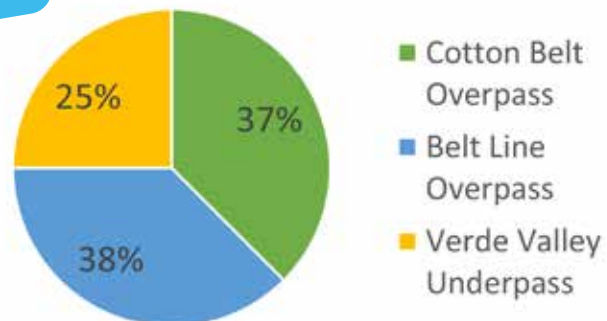
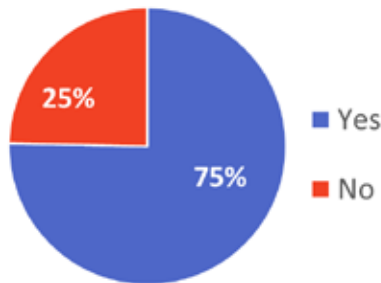


Figure 3-2: Tollway Crossing Location Preference: "Given safety improvements, which tollway crossing would provide the most ideal connection?" (results from the PAC Scenario Workshop Survey)



## NEIGHBORHOOD LOOPS

Influenced by the popularity of existing trails in Southwest and East Addison, community members expressed strong desires for expanding existing loop trails and adding new loop trails throughout the Town.



### Stakeholder Quote:

*"Establish individual neighborhood loops with neighborhood trail connectors."*

Figure 3-3: Enhanced Trail Loop

Preference: "Would you like to see an enhanced loop trail in Addison similar to the example photo (the Cultural Trail in Indianapolis)?" (from the Draft Future Trail Network Questionnaire)

## OFF-STREET TRAILS AND CONNECTIONS TO NATURE

Participants in the planning process acknowledged that opportunities for new off-street trails are limited, but encouraged the planning team to think creatively about protecting existing nature trails and creating new trails connecting residents to nature.

### Stakeholder Quote:

*"Nature trails supports mental health. Winnwood Park is a good example, but we need to develop another one in Addison."*



Figure 3-4: "What is your Vision for Addison Trails?" (results from the Virtual Community Visioning Workshop)

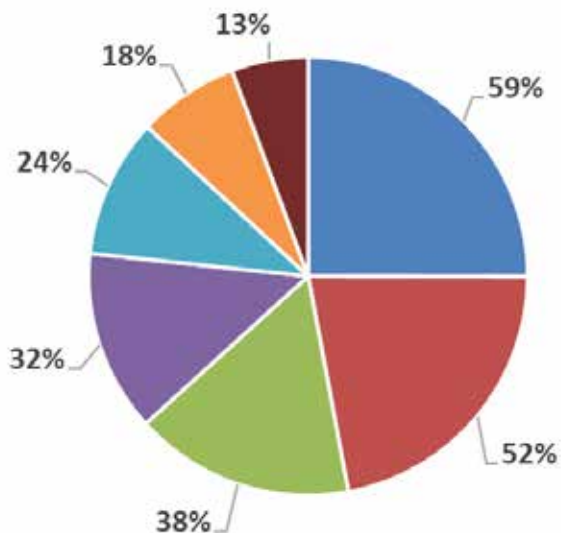
### Stakeholder Quote:

*"Our trails are designed and used by walkers/ dog walkers and walks within neighborhoods are most common among Addison residents."*

## PRIMARY TRAIL USERS

Throughout the process, community members and stakeholders reminded the project team that the trail system should accommodate walkers, dog walkers, joggers, and bikers of all ages and ability levels. Community conversations also highlighted desires to create a trail network that serves recreation and transportation needs.

Answer	Count
Off-street multi-use paths	417
Wide walking paths and sidewalks	367
Unpaved or park trails	270
Multi-use paths in the public right-of-way	223
Separated bike lanes	171
Bike lanes	124
Two-way cycle tracks	94
Not completed or Not displayed	102



**Figure 3-5: New Trail Type Preference:**  
"What types of trail connections do you want to see more of around Town?" (results from the Addison Trails Community Questionnaire)

## TRAIL INFORMATION, EDUCATION AND COMMUNICATION

Community members identified existing conflicts between trail users and expressed concerns about increased conflicts with an expanded system. Participants suggested supplementing physical improvements with enhanced information, education and communication about trail use and etiquette.

### Stakeholder Quote:

*"Some trails are too narrow to accommodate bike and other modes. More posted information/ education is needed about trail etiquette/rules for all users and modes."*



**Figure 3-6: Trail Opportunities Identification** (results from the PAC SWOT Workshop Discussion)

## TRAIL DESIGN AND AMENITIES

Participants expressed an interest in improving the design and amenitization of existing trails and being thoughtful about establishing expectations for future trail design. The community wants trail designs and amenities to be context sensitive.

### Stakeholder Quote:

*"Provide amenities along trails, like pods of activity and meeting places that are shaded."*



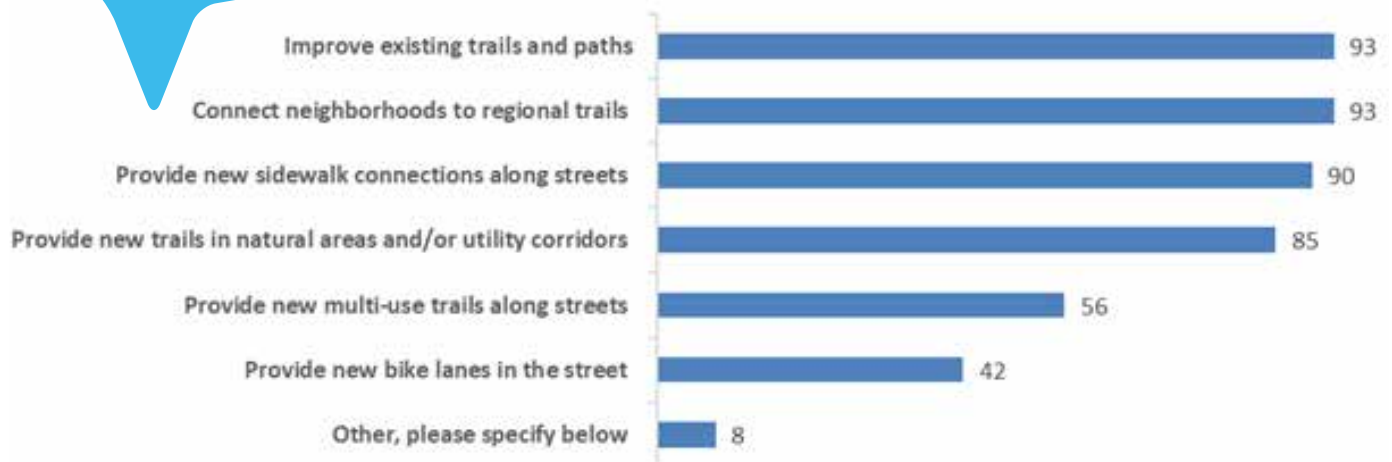
**Figure 3-7: Trail Amenities Preference:** "Pick your top three choices for amenities that should be included along the Cotton Belt Trail in Addison." (from the Draft Future Trail Network Questionnaire)

### Stakeholder Quote:

*"The future Cotton Belt Trail provides numerous opportunities such as... Regional connections... Interconnection of transit and trails... Proximity to the Circle... Trails as a conduit to bring people in and activate businesses... Provides neighborhood access and connections."*

## REGIONAL CONNECTIVITY

Many community members and stakeholders expressed a strong desire to implement the Cotton Belt Trail and make other connections to neighboring local and regional trails, as well as other pedestrian and bicycle facilities.



**Figure 3-8: Top Priority Projects:** "What is the highest priority projects from the list above?" (results from the Addison Trails Community Questionnaire)



## Vision Framework

The priorities, values and aspirations are the guiding forces for Addison's City-Wide Trails Master Plan. Through meetings with the Project Advisory Committee and input received from the community, these themes were integrated into a Vision Framework (see Figure 3-9). The Vision Framework provides the foundation for the Master Plan and is aligned with the Master Transportation Plan and the Parks, Recreation and Open Space Master Plan.

The Vision Framework includes the following elements:

**Values:** The qualities and ideals that guide the trail system.

**Goals:** Directions for long-range change. Goals represent the Town's overarching directions for the trail network.

**Prioritization Criteria:** Determinants of prioritizing projects in each phase. These were vetted by community members and Town staff.

**Recommendations:** Specific projects and initiatives that will achieve one or more trail goal. Recommendations are described at the system-wide level and at the project level.



Figure 3-9: Vision Framework







The background image shows a park scene. In the foreground, a paved path leads towards a river. A person is walking a dog on the path. In the middle ground, there is a concrete bridge with a red metal railing. The river flows under the bridge. The background is filled with trees and a clear blue sky.

# 4

## **Comprehensive Recommendations**

The chapter includes the recommended trail network, suggested phasing, direction for trail design, and recommendations for a number of features and amenities to support the overall trail network and user experience. The first section highlights several elements of the planning approach that are foundational to the recommended trail network presented in the following section.





## Foundational Elements

The Guiding Principles, Vision and Goals discussed in Chapter 3 provided strong guidance for the development of the recommendations included in this chapter and the remainder of the Trails Master Plan. With that said, several key concepts emerged through community and stakeholder discussions, site touring and on-the-ground exploration, and coordination with Town of Addison departments and partners. These elements are considered foundational to the recommended trail network and aid in understanding both the intent and nuance of the recommendations that follow.

### IMPROVEMENTS TO EXISTING TRAILS

When planning for the future, it is sometimes easy to overlook what already exists or take those assets for granted. A foundational element of the City-Wide Trails Master Plan for Addison is maintaining and enhancing the trails that already exist in the community.

Improvements to existing trails should include, but not be limited to, proactively resurfacing trails on a regular maintenance schedule prior to their condition becoming a noticeable and more costly issue; better signing trails, especially where they end or connect to on-street facilities; designating bike free areas and/or dismount trail segments or entire trails if quality bicycle facilities can provide the same or similar connection; and widening trails existing trails where possible to provide greater opportunity to accommodate two-way traffic and a variety of user types.

## INTEGRATION WITH MASTER TRANSPORTATION PLAN

With a relatively small number and miles of trails in Addison today, envisioning a complete trail network could have been an overwhelming charge. Fortunately, the *Master Transportation Plan* provided the next foundational element for the Trails Master Plan. The Master Transportation Plan identified a relatively robust network of Active Transportation corridors and connections within the public right-of-way as a part of planning for the transportation network.

Integration with the *MTP* helps to accomplish several important objectives and will significantly contribute to the implementation of the envisioned trail network. First, the *MTP* created an expectation and set of recommendations whereby a large portion of pedestrian and bicycle facilities are integrated into the re-design and construction of roadways throughout the community. As such, the Trail Master Plan is able to fine tune those recommendations and supplement them with additional off-street connections, critical crossing improvements, and trail access and amenities.

The integrated approach to active transportation in the *MTP* also helps in two other important ways. With Addison being largely built out, a network comprised entirely of off-street trails would be relatively sparse and very disconnected. The Trails Master Plan relies on a creative approach that leverages critical pedestrian and bicycle facilities in the street rights-of-way and uses those connections to link off-street facilities. A more integrated approach to transportation and recreation will also help to leverage available resources and provide more funding opportunities when seeking grant dollars, as well as regional, state, and federal allocations.

## PROACTIVE PLANNING IN DEVELOPING AND REDEVELOPING AREAS

It was stated above that Addison is largely built out. While that may be true, there are a handful of significant development and redevelopment projects in various stages of implementation in Central and Southwest Addison. It will be important to continue to work with the developers of these important areas to integrate trail connections into development that is still planned and to help realize the larger vision articulated in the Trails Master Plan.

With the planned DART rail line running east and west through Southwest and Central Addison, there is a relatively significant transit-oriented development opportunity between Addison Road and the Dallas North Tollway. As part of this development, additional trail connections should be integrated into the design for the area to provide critical linkages to the DART Station, the Cotton Belt Trail, and existing Addison Circle recreation and entertainment destinations.

Another longer-term redevelopment is planned for the area along and west of Inwood Road. Conceptual plans for this redevelopment include important pedestrian and bicycle connections running parallel to Inwood Road and connecting west from Inwood Road through the future redevelopment. The Trails Master Plan integrates these conceptual alignments and provides recommendations to ensure they are well connected to the larger trail network.

The successful Vitruvian development in Southwest Addison includes additional phases that include trails and pedestrian promenades as key organizing elements tying future development to the completed portions of Vitruvian and the popular trails in and around Vitruvian Park.

## CREATION OF NESTED LOOPS

One of the original drivers for the Trails Master Plan was a resounding chorus of input heard during the development of the *Parks, Recreation and Open Space Master Plan* calling for new and improved trails connecting to parks and other destinations throughout Addison. Participants in that planning process began to highlight the benefit of loops within parks, within neighborhoods, and extending out to other neighborhoods. Community and stakeholder input throughout the planning process for the Trails Master Plan underscored the passion around creating a set of interconnected trail loops that can be used for recreation and transportation.

Responding to community input and feedback, a fundamental element of the recommended trail network is the creation of nested trail loops. The general idea is smaller loops are nested within and become part of larger loops. This approach provides the optimal balance of connectivity and choice for trail users. With the number of nested loops achieved in the envisioned future trail network, the variety of trail experiences is nearly endless. The recommended trail network will allow walkers, joggers and bikers to create a range of preferred trail routes with a diversity of trail types, surrounding contexts and lengths.



## ENHANCEMENT OF REGIONAL CONNECTIVITY

The footprint of Addison is approximately four-square miles, so it is easy to head in one direction and quickly find oneself in another neighboring jurisdiction. The Trails Master Plan embraces this quality to maximize trail connections to the surrounding communities and maximize regional connectivity.

The Cotton Belt Trail along the DART Silver Line will provide a high-quality multi-use trail cutting across the northern part of the region from Dallas-Fort Worth International Airport east to Plano. This important connection will be supplemented with approximately one dozen additional local connections to Carrollton, Farmers Branch and Dallas. These more localized linkages connecting the Addison trail network to those of the trail and active transportation networks of the surrounding communities will maximize the recreation and transportation benefits for Addison residents.

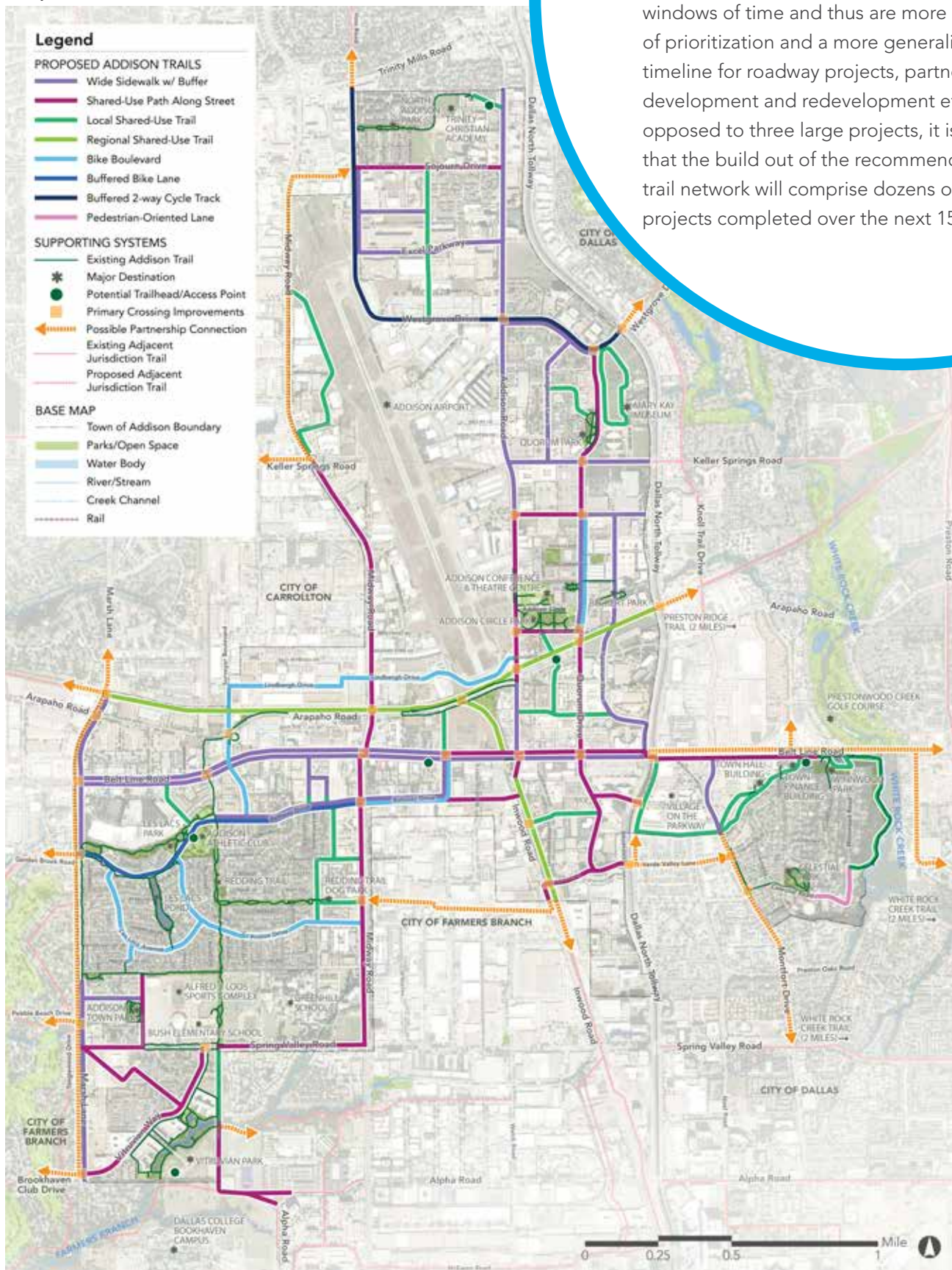
There could be the potential to connect a trail corridor in Southeast Addison to the White Rock Creek Trail System in Dallas. This connection was discussed by residents during pop-up events and due to safety concerns residents were strongly opposed to making this connection to Addison's existing White Rock Creek Trail. Some participants identified that an on-street connection along Belt Line Road or Montfort Drive could be made to the Dallas Trail System. These potential connections would require coordinated efforts between Addison and Dallas, would require extensive neighborhood input and would only be imaginable during implementation of long-range phases of the plan. Therefore, it is listed here in the plan to document the discussions that took place and to help guide future decisions.



## Recommended Network

The recommended trail network for Addison builds upon the foundational elements summarized above and is presented in three phases below. The three phases represent windows of time and thus are more suggestive of prioritization and a more generalized timeline for roadway projects, partnerships, and development and redevelopment efforts. As opposed to three large projects, it is anticipated that the build out of the recommended Addison trail network will comprise dozens of smaller projects completed over the next 15 to 20 years.

## Map 4-1: Future Trail Network



# PHASE 1: SHORT-TERM (0-5 YEARS)

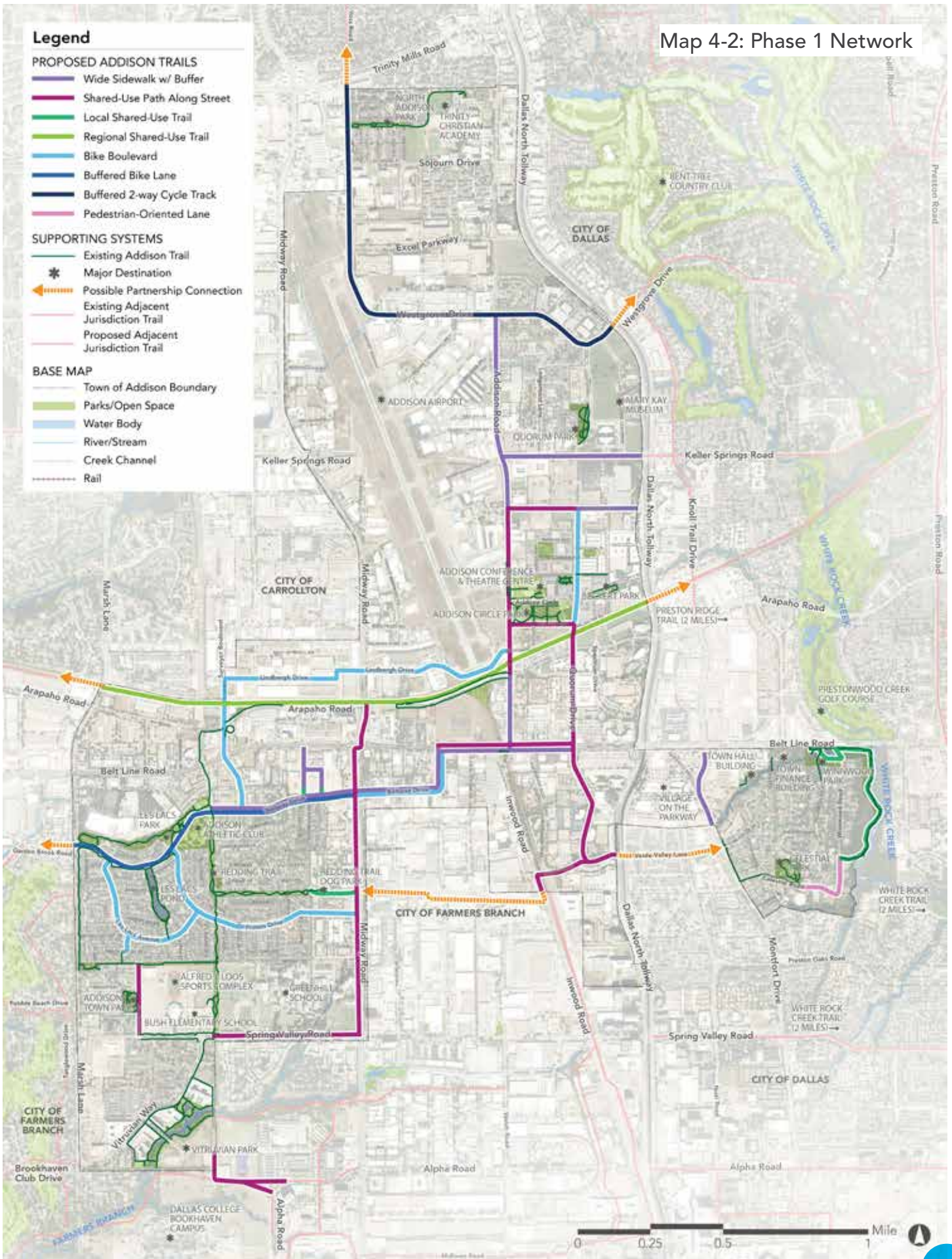
The first phase of the Future Trail Network will establish the primary armature of an enhanced pedestrian and bicycle infrastructure throughout Addison. This initial phase of projects establishes connections between the various areas in Addison and completes many connections within many neighborhoods and districts. It should also be noted that the initial set of recommended improvements includes examples of nearly all trail types and several projects that will be part of roadway improvements that are already underway or scheduled to be in the next several years. Alignments highlighted in yellow on the map of Phase 1 trail improvements are already identified in the 5-Year Capital Improvements Program (CIP) for the Town.

## Key aspects of Phase 1 of the Future Trail Network include:

- **Critical east-west and north-south connections** that cross Addison and connect trail users to other areas of the Town, as well as neighboring communities. These connections include:
  - A shared-use path along Spring Valley Road connecting existing paths near Bush Elementary School west to Midway Road.
  - An extension of the Redding Trail alignment westward through a combination of shared-use trails and shared-use path long the street and utilizing partnership connections to extend along an Oncor utility easement through Farmers Branch, through South Quorum along Landmark Place and Quorum Drive and continuing east along Verde Valley Lane in the City of Dallas over to new bike boulevards on Paladium Drive and Oaks North Drive in East Addison.
  - Another east-west alignment connecting Southwest Addison to Central Addison using a combination of bike lanes, bike boulevard, and widened sidewalks with buffers along Beltway Drive and continuing east along Belt Line Road with widened sidewalks and a shared-use path along the street.
  - Implementation of the Cotton Belt Trail with the construction of the DART Silver Line Regional Rail.
  - Bike Boulevard improvements along Lindbergh Drive.
  - Important improvements to Westgrove Drive including a 2-way cycle track that creates north-south and east-west connectivity in North Addison and a connection eastward across the Dallas North Tollway into the City of Dallas.
  - Completion of the Midway Road improvements with the shared-use path along the street.
  - A combination of widened and buffered sidewalks along with shared-use paths along the street extending from Belt Line Road north to Westgrove Drive.
  - Shared-use path along Quorum Drive from Landmark Place in South Quorum north to Festival Way and then bike boulevard treatments complementing the already generous sidewalks extending from Festival Way north to Airport Parkway.
- **New local loops and connections** within several areas of Addison, including:
  - Shared-use path along Woodway Drive along the east edge of Addison Town Park.
  - Bike boulevard improvements along Les Lacs Avenue and Proton Drive in the Les Lacs Pond area.
  - Widened sidewalks extending through the new development between Beltway Drive and Belt Line Road.
  - Bike boulevards in East Addison along Celestial Road, Palladium Drive, Oaks North Drive, and portions of Bellbrook Drive and Winwood Road.
  - Sidewalk improvements to Montfort Drive south of Belt Line Road within the Town of Addison.
  - A combination of shared-use path and widened sidewalks along Airport Parkway.
  - Widened and buffered sidewalks along Keller Springs Road.
- **Partnership connections** connecting Phase 1 trail improvements to surrounding jurisdictions. In addition to those already noted above as part of the Cotton Belt Trail and other east-west crosstown connections, these include:
  - A connection to the Brookhaven Campus and Farmers Branch trails with an extension of Bella Lane.
  - A crossing of Marsh Lane at Garden Brook Road.
  - An improved crossing of the Dallas North Tollway along Westgrove Drive.
  - An improved crossing of Trinity Mills Road to make a connection north from Westgrove Drive to Voss Road.



Map 4-2: Phase 1 Network





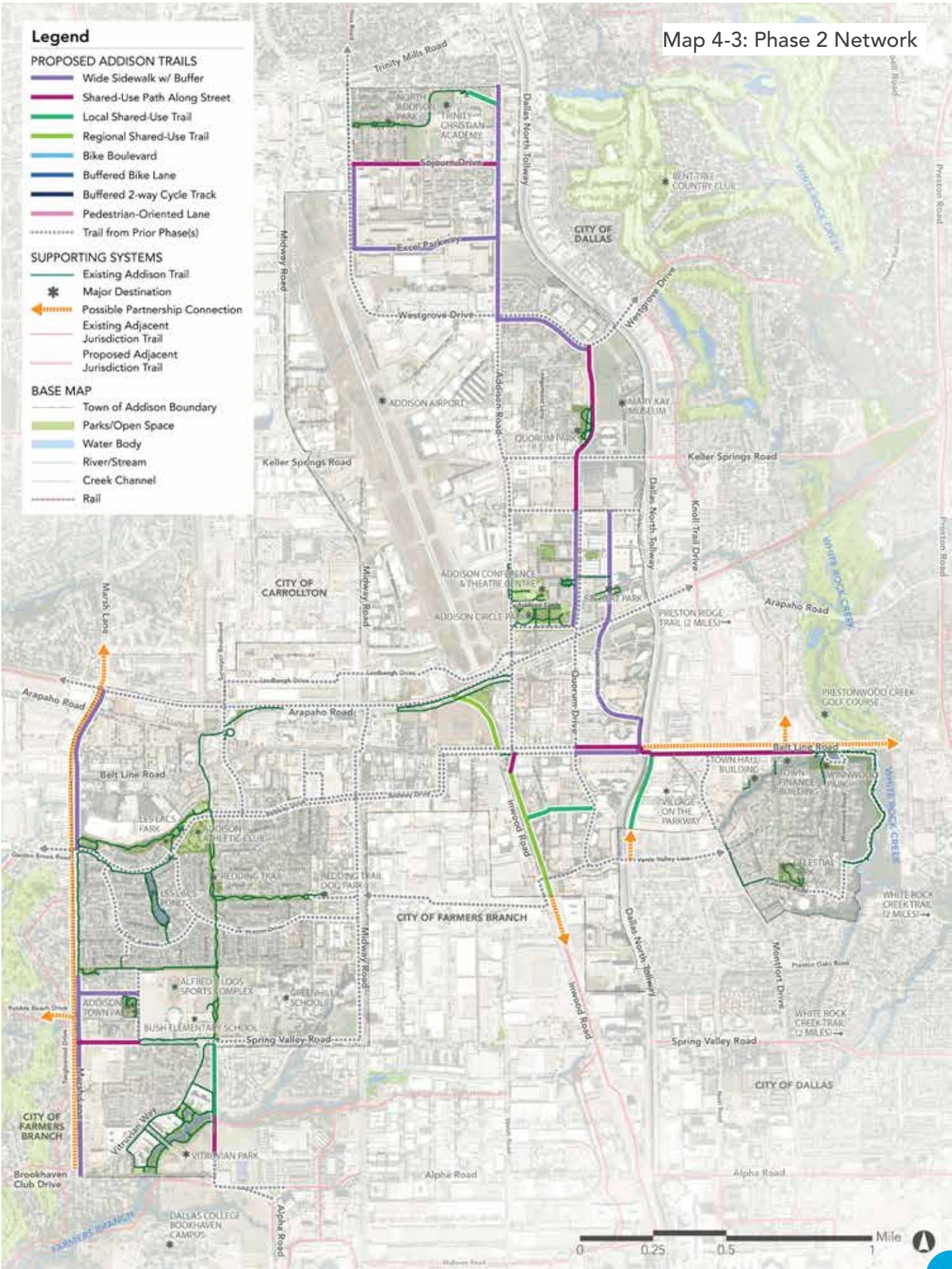
## PHASE 2: MEDIUM-TERM (6-10 YEARS)

The second phase of the Future Trail Network includes a number of improvements that largely fall into two categories. The first are projects along major roads that will require an additional level of coordination with Public Works and neighboring jurisdictions. The second are projects that create additional connections and loops within the various areas of Addison.

### Key aspects of Phase 2 of the Future Trail Network include:

- **Improvements along several principal and minor arterials**, including:
  - Widened sidewalks with buffers along Marsh Lane, as well as an improved crossing at Pebble Beach Drive.
  - Widened sidewalks with buffers and shared-use paths along Belt Line Road extending from Quorum Drive east to Winnwood Park, as well as an improved connection across Belt Line Drive at Prestonwood Boulevard.
  - Shared-use path extending north along Quorum Drive from Airport Parkway to Westgrove Drive.
  - Widened sidewalks with buffers along Addison Road from Westgrove Drive north to Trinity Christian Academy.
- **Improvements to complete loops and create additional connections** within several parts of Addison, including:
  - Southwest Addison:**
    - Extension of shared-use paths along Spring Valley Road from Woodway Drive to Marsh Lane.
    - Wide sidewalks with buffers along Sidney Drive from Woodway Drive to Marsh Lane.
  - South Quorum:**
    - Regional shared-use trail connection along the railroad east of Inwood Road.
    - A local shared-use trail running east and west across South Quorum in partnership with landowners.
  - East Addison:**
    - A local shared-use trail along the Dallas North Tollway frontage road on the east side of the tollway.
  - Central Addison:**
    - Widened sidewalks with buffers along Spectrum Drive.
  - North Addison:**
    - Widened sidewalks with buffers along Excel Parkway from Westgrove Drive to Addison Road.
    - Shared-use path along Sojourn Drive extending from Westgrove Drive to Addison Road.
    - A local shared-use trail connecting Addison Road to existing trails west on the Trinity Christian Academy campus and in North Addison Park.

Map 4-3: Phase 2 Network



## PHASE 3: LONG-TERM (11+ YEARS)

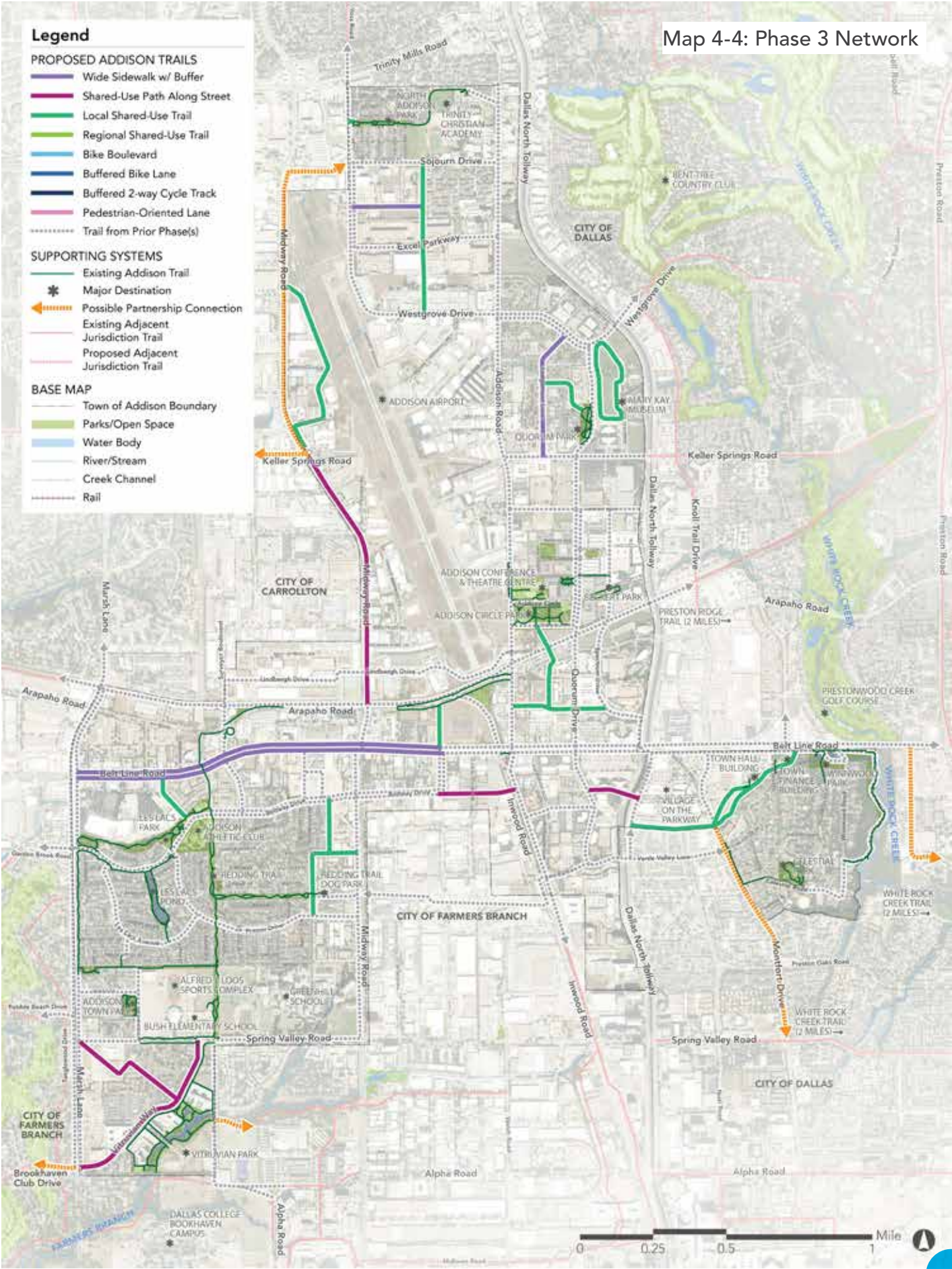
The last phase of the Future Trail Network primarily includes a collection of connections that will require longer term coordination and collaboration with neighboring jurisdictions and individual property owners as properties develop or redevelop.

### Key aspects of Phase 3 of the Future Trail Network include:

- A large collection of desired **connections that can enhance the trail network resulting from Phases 1 and 2 implementation**, but requiring coordination with individual redevelopment projects, including:
  - Shared-use paths along Vitruvian Way and new roadways included in future phases of the Vitruvian development.
  - Shared-use paths extending east and west connections south of Beltway Drive from and through South Quorum generally along the Beltway Drive alignment.
  - Local shared-use trails throughout portions of Southwest Addison connecting to Midway Road and Belt Line Road, East Addison through Village on the Parkway and running along the drainageway behind the Town Hall and Town Finance Buildings, Central Addison as part of the Addison Circle transit-oriented development, and in North Addison west of the airport, linking Sojourn Drive to Westgrove Drive and at and near the Mary Kay Campus.
  - Widened sidewalks with buffers along Belt Line Road from Beltway Drive west to Marsh Lane.
- Contribution to **a loop around the Addison Airport**:
  - Shared-use path along Midway Road from the Cotton Belt Trail north to Keller Springs Road, in conjunction with local shared-use trail connections identified above and partnership connections identified below.
- **Longer-term connections** working with neighboring jurisdictions:
  - Connections east and west from Vitruvian at Brookhaven Club Drive and along Farmers Branch Creek.
  - Improvements south along Montfort Drive linking to Spring Valley Road.
  - A possible connection of the Addison White Rock Creek Trail to White Rock Creek Trail in Dallas.
  - Roadway improvements west of the airport along Midway Road, Keller Springs Road and Sojourn Drive.
- **Completion or enhancement of local trail loops** in North Addison:
  - Widened sidewalks along Airborn Drive.
  - Widened sidewalks along Ledge-mont Lane.



Map 4-4: Phase 3 Network






# Trail Design Standards and Guidelines

The following core attributes are needed for quality Addison Trails.

## TRAIL TYPOLOGIES

### Wide Sidewalk with Buffer

Sidewalks provide great pedestrian facilities and can also accommodate joggers and bicyclists if they are wide enough. New sidewalks in Addison should be 8-10 feet wide wherever feasible and include a landscaped buffer between the back of curb and the sidewalk. The buffer should be a minimum of 3 feet, but a buffer width of 8 feet is preferred.

**Map Color Guide:**   
see Maps 4-1 through 4-4

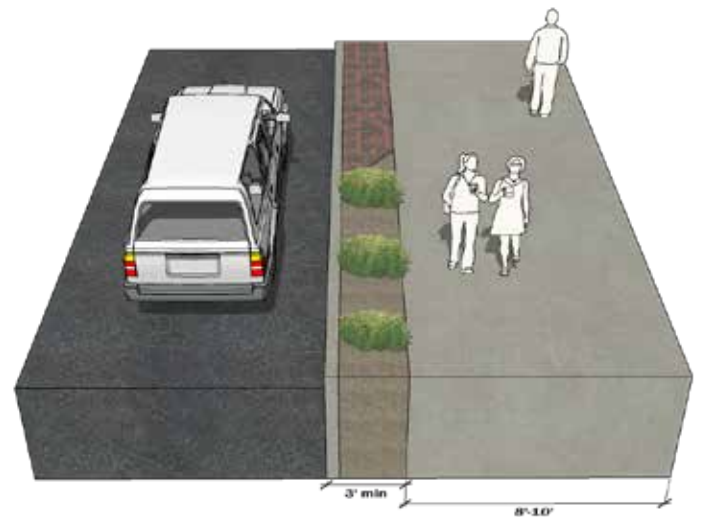


Figure 4-1: Wide Sidewalk with Buffer Typology

### Separated Shared-Use Path Along Street

Separated shared-use paths along streets are a key element of the Master Transportation Plan's Active Transportation Network. Shared-use paths are great for pedestrians, joggers and cyclists. Shared-use paths along streets should be 10-14 feet wide and include a landscaped buffer between the back of curb and the path. The buffer should be a minimum of 3 feet, but a buffer width of 8 feet is preferred.

**Map Color Guide:**   
see Maps 4-1 through 4-4

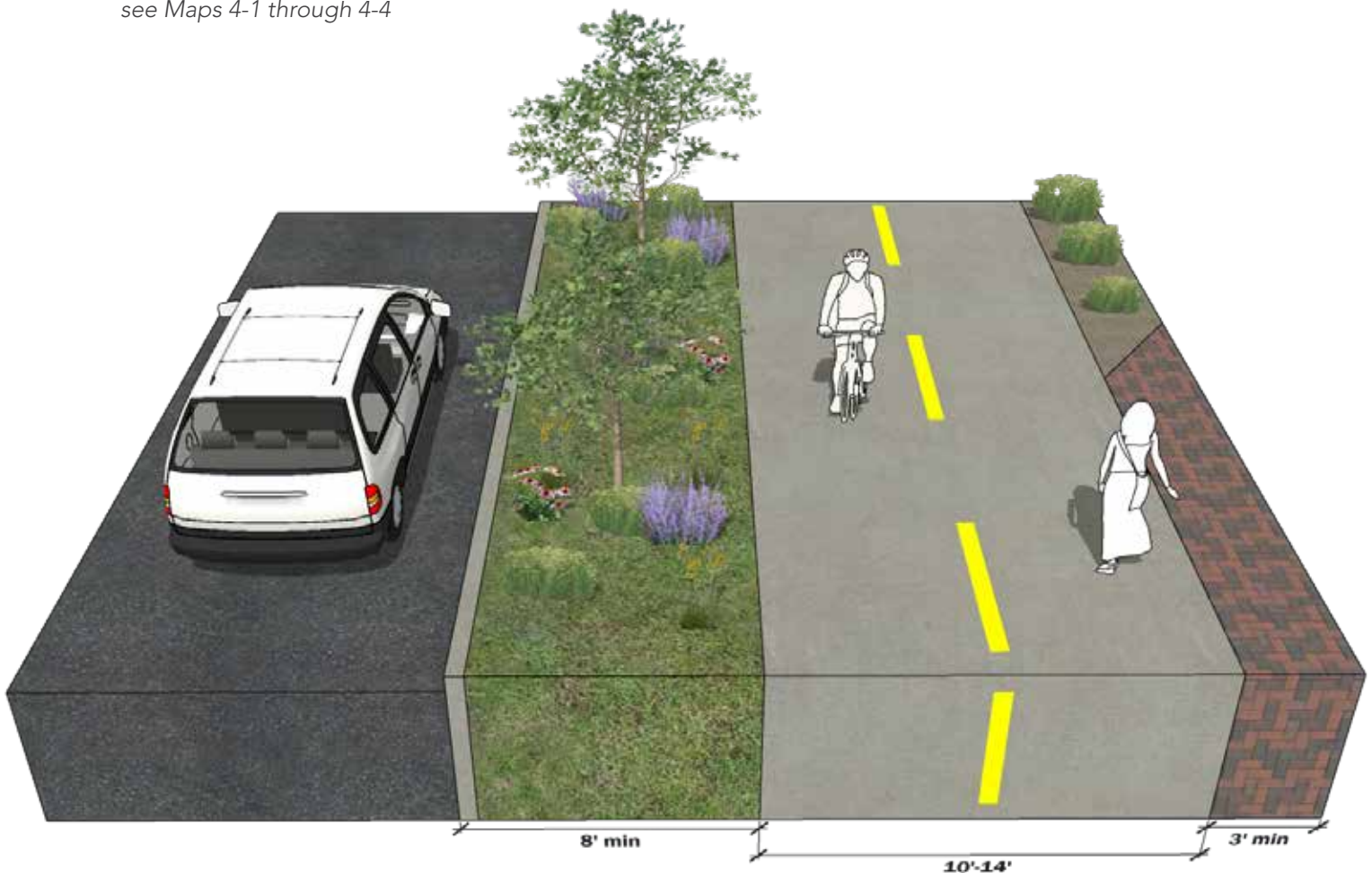
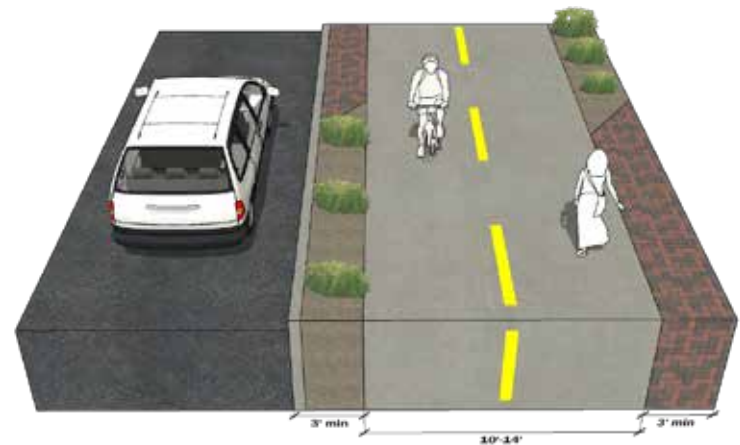



Figure 4-2: Separated Shared-Use Path Along the Street Typology

## Local Shared-Use Trail

Local shared-use trails are typically the safest and most comfortable facilities for pedestrian, joggers and bicyclists. They provide full separation from motor vehicles, except at street crossings. Local shared-use trails should be 10-12 feet wide and include buffers on both sides of the trail. Per AASHTO requirements the buffers should be a minimum of 2 feet, but wider buffers with landscaping and screening are highly encouraged. Landscaped buffers of 10-15 feet are highly desirable.

**Map Color Guide:**   
see Maps 4-1 through 4-4

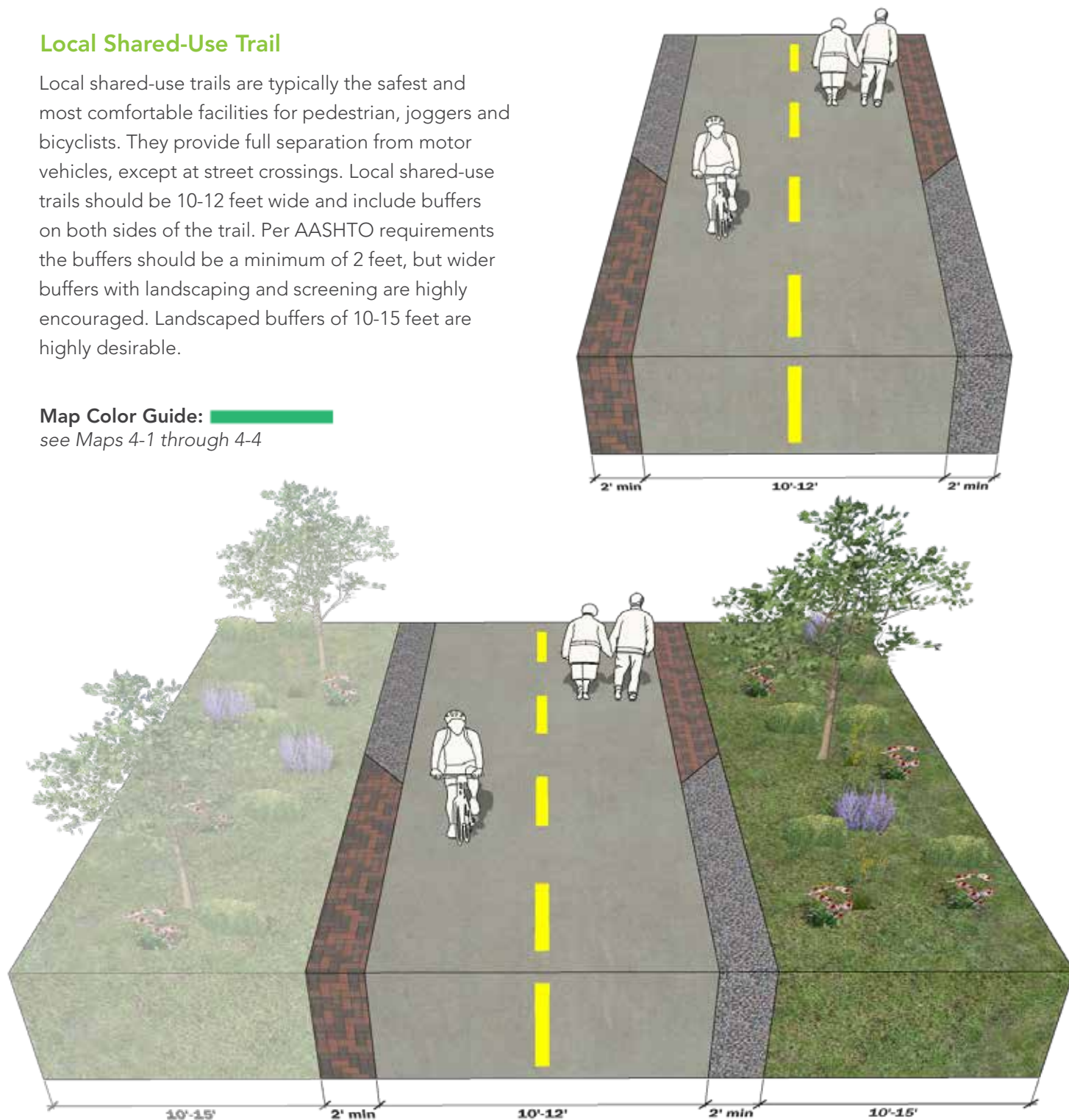


Figure 4-3: Local Shared Use Trail Typology



## Regional Shared-Use Trail

Regional shared-use paths are also very safe and comfortable for pedestrian, joggers and bicyclists. Like local shared-use trails, they provide full separation from motor vehicles, except at street crossings. Due to their regional nature, they tend to cross busier roadways and must navigate other natural and man-made obstacles. At a minimum, regional shared-use trails should be 10-12 feet wide and include at least 2 foot buffers on both sides of the trail, per AASHTO requirements. When possible, 6-10 feet of additional trail width to separate walkers from joggers and bicyclists is recommended. Landscaped buffers with screening of 10-15 feet are highly desirable.

**Map Color Guide:**   
see Maps 4-1 through 4-4

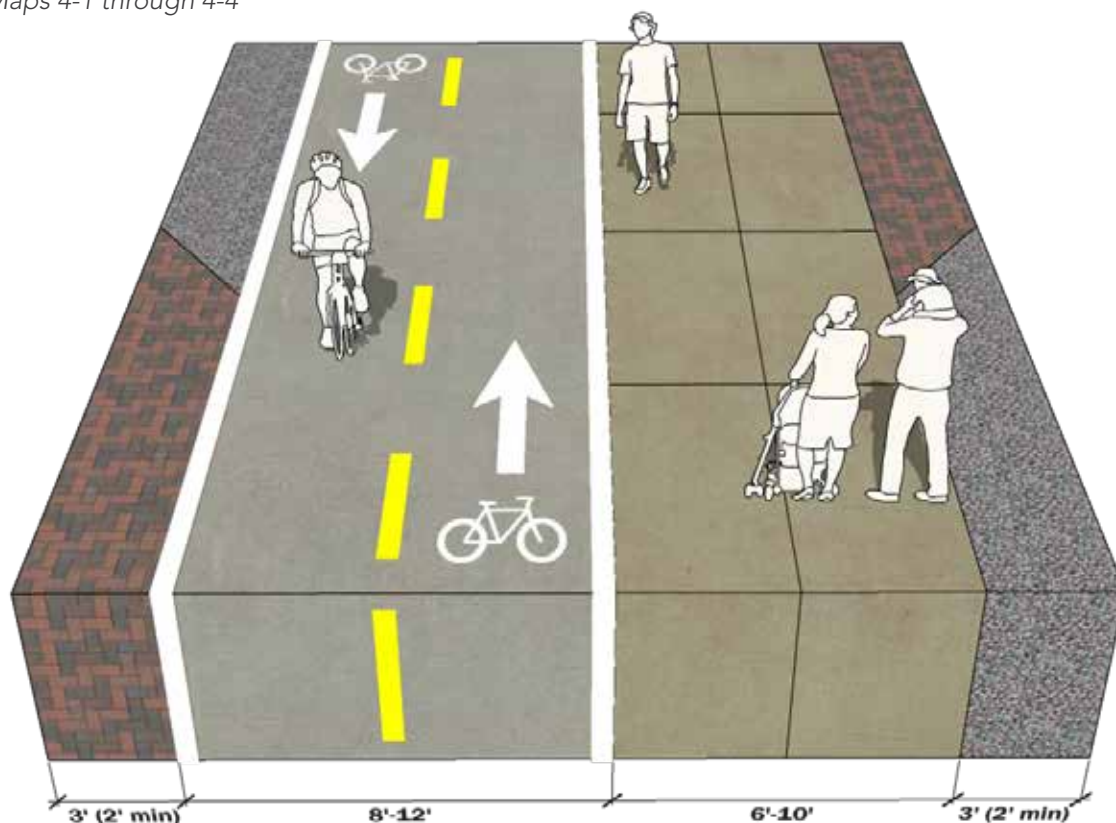
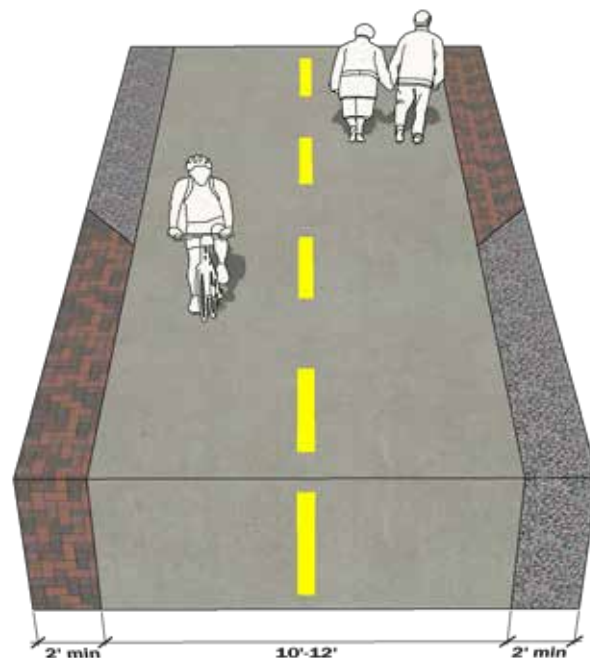


Figure 4-4: Regional Shared-Use Trail Street Typology



## Pedestrian-Oriented Lane

Pedestrian-oriented lanes are striped on-street lanes for pedestrian use only. These are typically used in rural areas or in neighborhoods with a low level of automobile traffic. Improvements often include lane markings and stenciling indicating pedestrian only activity and street intersection detractable warnings.

**Map Color Guide:**   
see Maps 4-1 through 4-4



## Bike Boulevard with Wayfinding

Bike boulevards are a unique treatment, typically reserved for lower traffic and often narrower streets. Improvements associated with a bike boulevard include sharrow markings on the roadway and signage. Sharrow markings should be in the flow of traffic when stenciled on streets with on-street parking. Additional traffic calming measures are also recommended on routes with faster moving traffic.

**Map Color Guide:**   
see Maps 4-1 through 4-4



Figure 4-5: Bike Boulevard with Wayfinding Typology

## Bike Lane

Bike lanes are one of the most traditional types of dedicated bike facility. The preferred application in Addison is a 6 foot width with bicycle stencils, a 6 inch stripe and bolted plastic reflectors at regular intervals on the stripe. Solid or hatched green paint or thermoplastic applications can be used to indicate potential conflict areas.

## Buffered Bike Lane

Buffered bike lanes are a preferred alternative to traditional bike lanes where space allows. They should include a bike lanes with a width of 5-7 feet, bicycle stencils in the bike lane and a minimum striped buffer of 3 feet. The striped buffer should include bolted plastic separators or another physical barrier. Solid or hatched green paint or thermoplastic applications can be used to indicate potential conflict areas.

**Map Color Guide:**   
see Maps 4-1 through 4-4

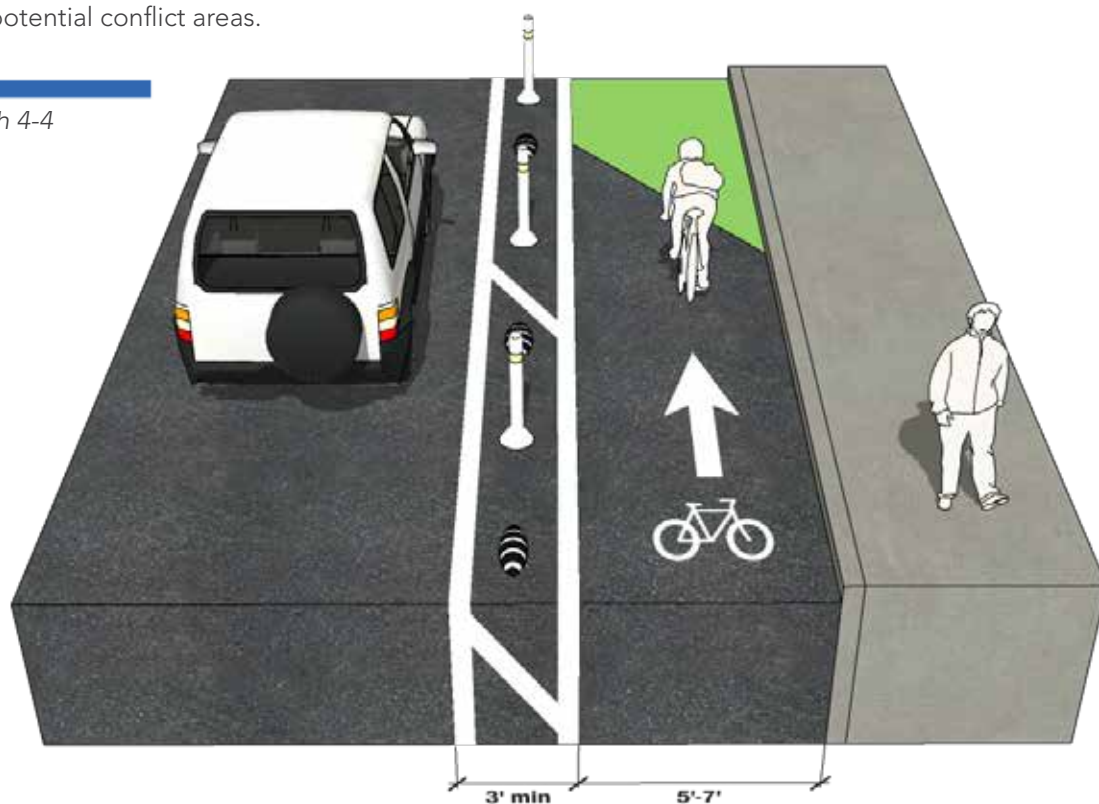
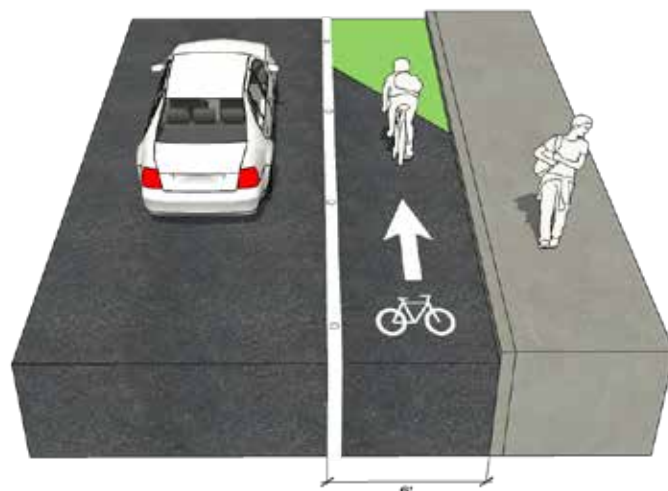



Figure 4-6: Bike Lane Typologies

## Two-Way Cycle Track

Cycle tracks have become a relatively popular bicycle facility type in certain circumstances, especially when a buffered separation of the bike facility is desired, but space is too constrained to provide buffered bike lanes on both sides of the street. The two-way cycle track should be at least 8-12 feet in width with stencils and striping delineating the two directions of travel. A striped buffer of at least 3 feet should include bolted plastic separators or another physical barrier such as a durable planter box, plastic lane dividers or breakaway bollards.

**Map Color Guide:**   
see Maps 4-1 through 4-4

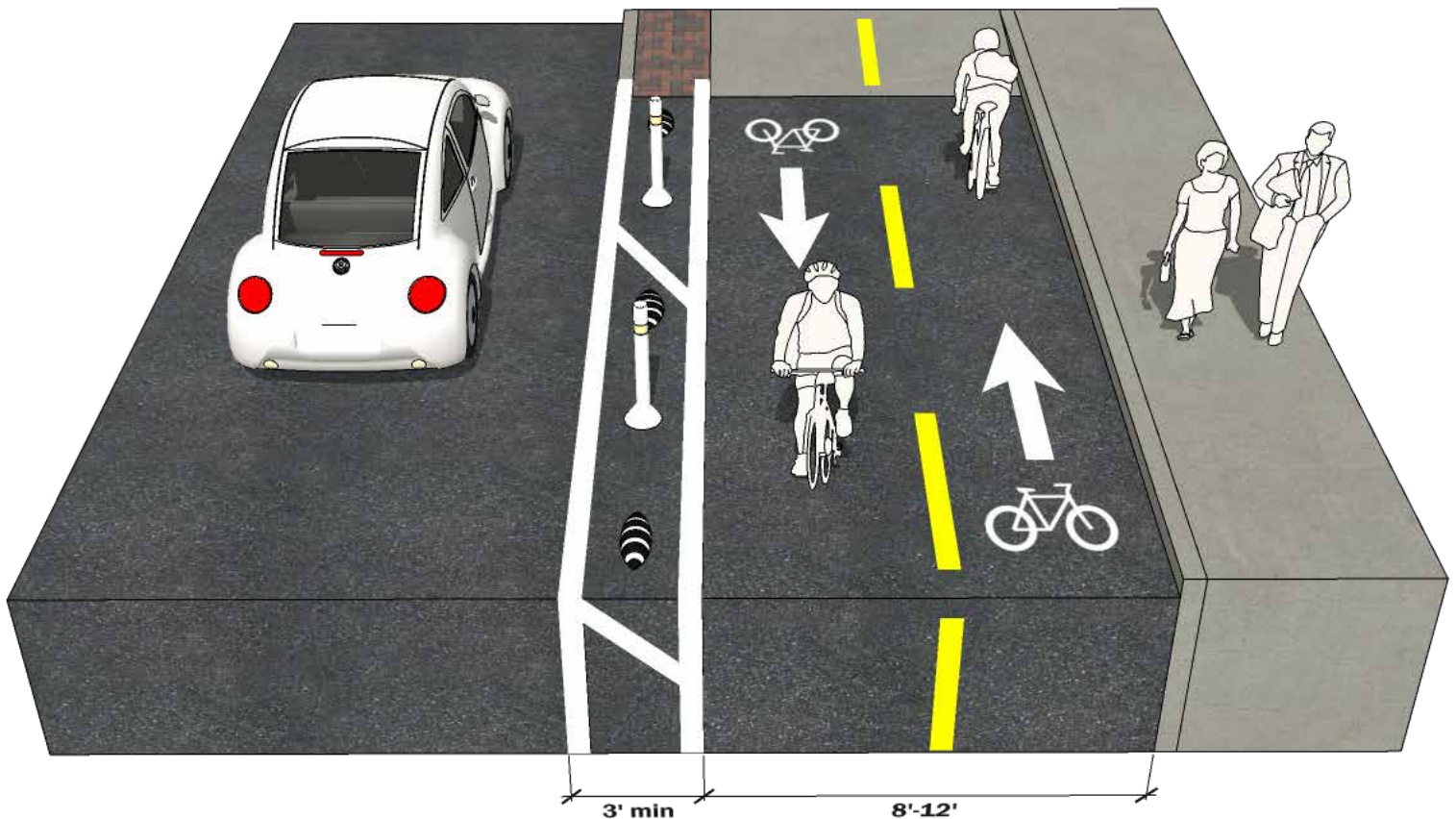


Figure 4-7: Two-Way Cycle Track Typology



### Soft Surface Park Trail

Soft surface park trails are a highly desirable surface for walking and jogging because it causes less strain on joints. The preferred treatment for soft surface park trails is a decomposed granite surface with a width of at least 4-6 feet.

### Paved Park Trail

Paved park trails should be concrete and at least 6-8 feet wide. A decomposed granite buffer or apron is desired and should be at least 1-2' on both sides of the trail when possible. A wider decomposed granite path of at least 4' on one side of the paved trail can provide a desirable option for slower moving trail users.

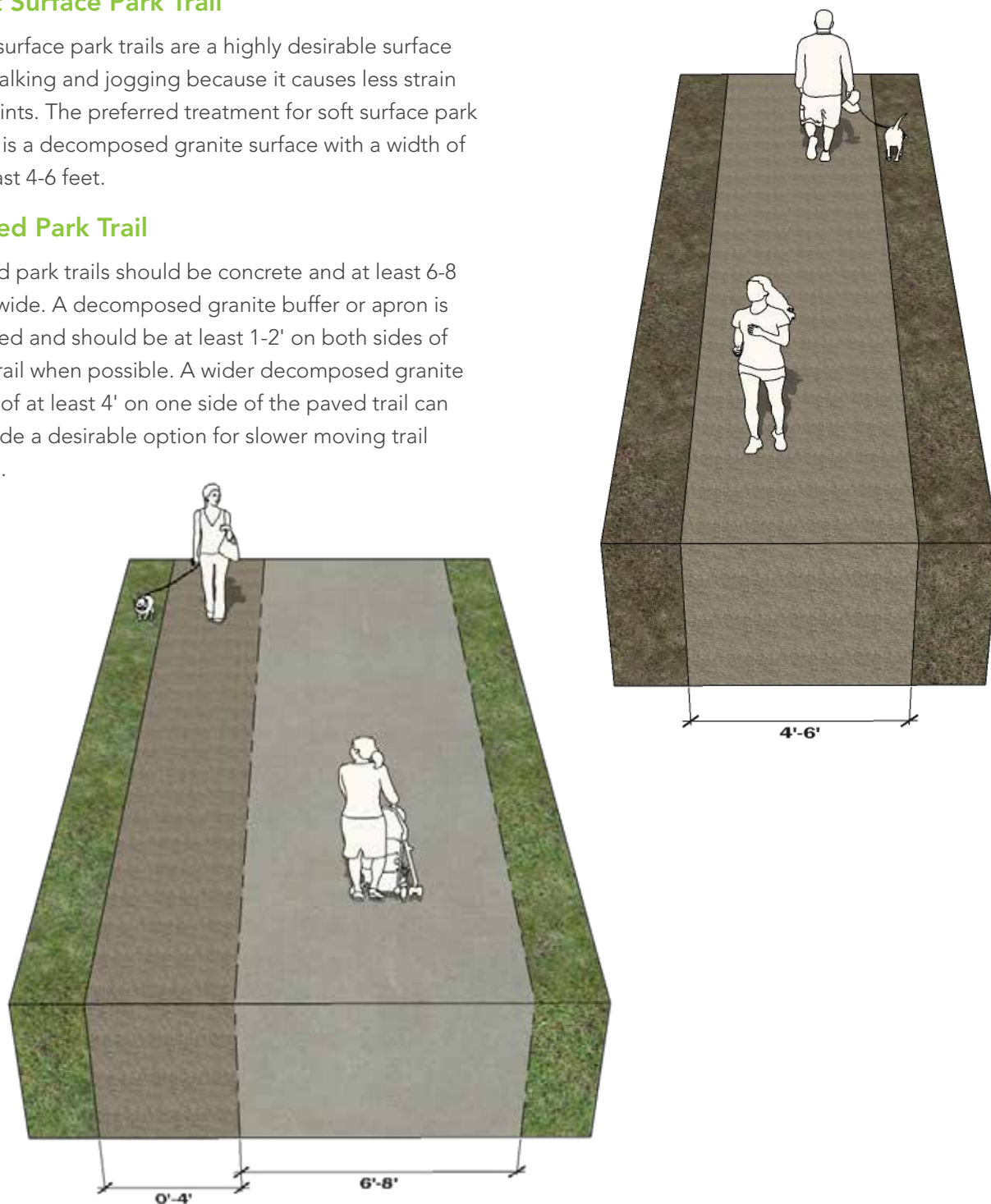


Figure 4-8: Park Trail Typologies

## Supporting Systems

**Trail Surfacing:** Concrete paving is preferred for most trail surfaces. Crusher fine granite surfacing may be suggested for use as trail buffers, soft-surface side trails or nature paths. Hard-surfaced pavers may also be used as trail buffers in areas that are more urban or desire a more finished look and feel. Hard-packed surfacing is common to interim trails.

**Site Grading and Layout:** When considering where to develop a trail path, effective stormwater management is essential. Either a modest cross slope along the trail or a gentle running slope in the direction of travel can prevent erosion, trail repairs or closure. Additional tips for site grading and layout include:

- Paths should be smooth and continuous, avoiding vertical disruption or changes in surfacing, and avoiding low points.
- Trails should strive to have running slopes of less than 5% and cross slopes less than 2% to provide positive drainage and accessibility. Trails should drain with the natural drainage pattern, if applicable, with runoff buffered with landscaping to avoid erosion.
- Sharp turns should be avoided. At turns, clear the approaches of trees and shrubs to maximize decision time for users.

- Trail alignment should strive to sustain 5' of clearance from fences, particularly if private gates onto Town-owned trail segments are possible or likely.
- Trails should end at a street or destination; they should not dead-end.

**Striping:** With most Addison's trails being paved and along streets, striping will be used heavily to identify trail direction, define an intersection and warn for areas of caution. All striping should follow the TxDOT Roadway Design Manual, the Manual on Uniform Traffic Control Devices (MUTCD) and other standards. Additional tips for striping include:

- **Yellow, centerline broken striping:** Are typically applied along segments of trail with good visibility to separate trail directions or modes of travel.
- **Yellow, centerline solid striping:** Are typically applied along segments of trail with limited visibility and at high traffic bicycle and pedestrian crossings.
- **White, solid shoulder striping:** Are typically applied along paved trail edges to indicate a potential risk.
- **Stop bar:** Are typically applied at street crossings or trailheads with "Stop" signage.

## TRAILHEADS AND ACCESS POINTS

### Access Points

Access points offer public access to off-street trails and are generally small in scale. Access points are designed to provide access to off-street trails from neighborhoods, an on-street trail or a park. They provide essential and simple trail amenities such as signage, seating, shade and trash receptacles, but may also include enhanced amenities (see Figure 4-11). The diagram depicted in Figure 4-9 shows a prototypical trail access point.

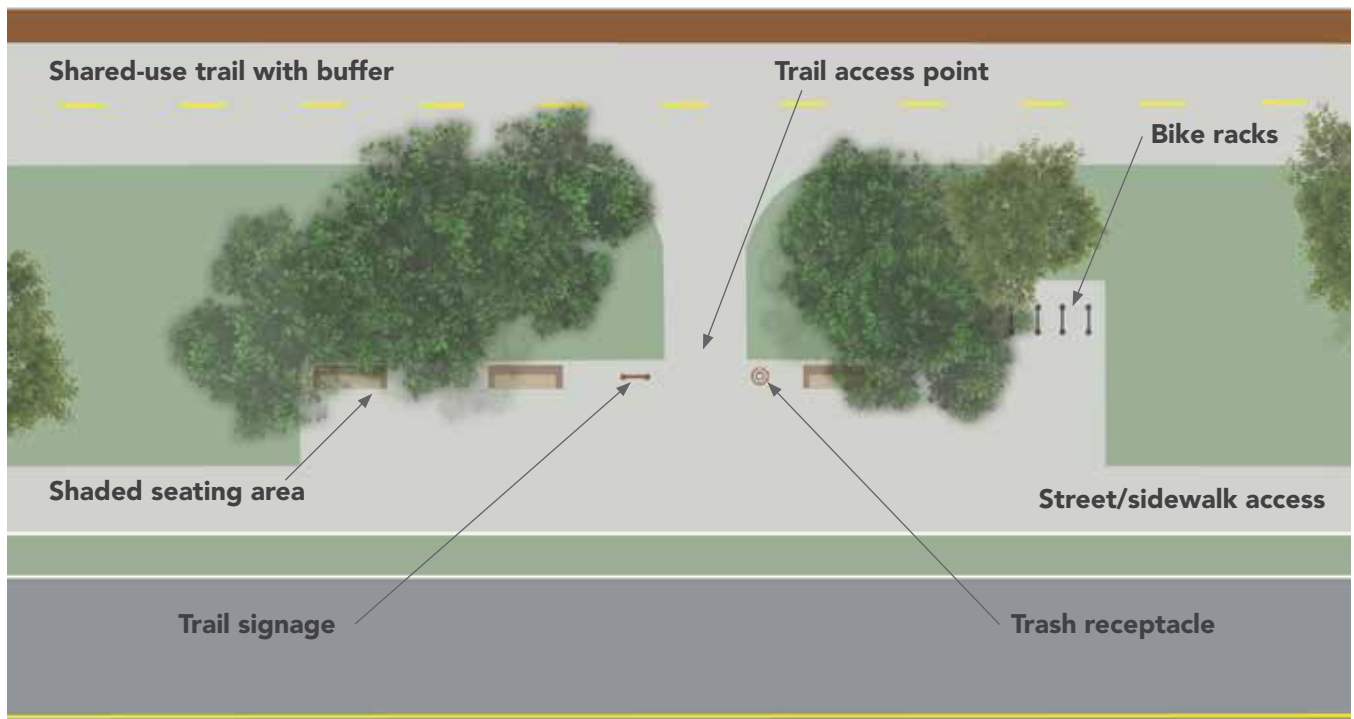


Figure 4-9: Prototypical Access Point with Basic Amenities

## Trailheads

Trailheads offer access to an off-street trail or trail system by providing parking and additional support amenities. These areas will vary in scale and shape depending on available land and the amount of trail activity. Trailheads may be constructed solely on public property such as the fringe of a park, on a civic building lot or on another property that the Town owns. Additionally, there may be opportunities to develop a trailhead on private property by establishing a shared parking lot. Figure 4-10 diagrams a

prototypical trailhead layout and Figure 4-11 indicates which amenities should or could be included.

*Note: Trailhead parking should be located where it will not impact the security of surrounding residential neighborhoods. The Parks Department shall conduct additional public input as part of the process for adding parking lots and trailhead access points to existing park / trail facilities that are surrounded by residential neighborhoods.*

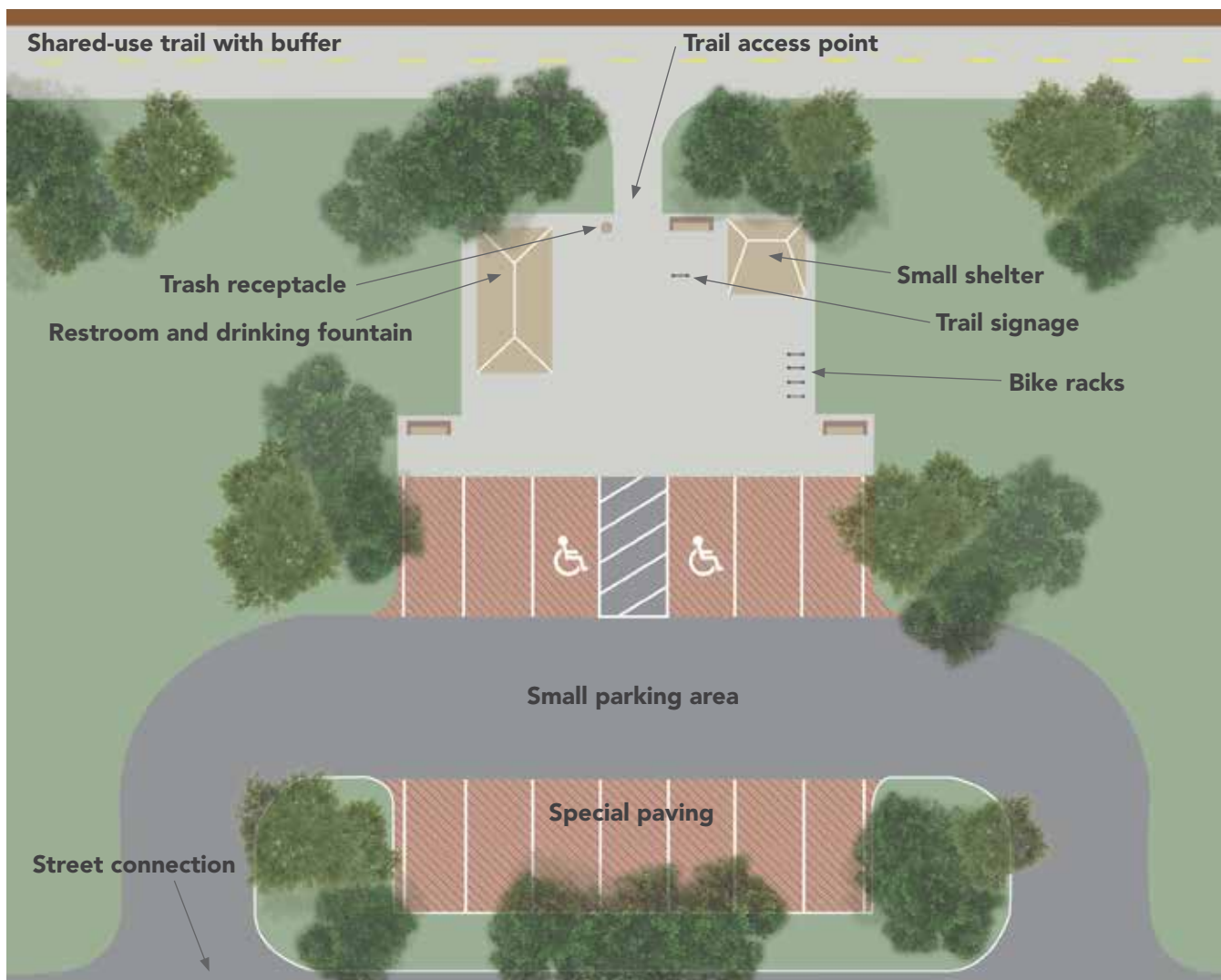


Figure 4-10: Prototypical Trailhead with Basic Amenities



## Figure 4-11: Access Amenities Toolkit

The graphics below identify essential trailhead and access point amenities. In addition, enhanced access amenities may be applied to trailheads or access points to enhance the placemaking experience.

### Access Point Essentials



Signage/Kiosks



Shade Trees and Landscaping



Bicycle Parking



Trash Receptacles

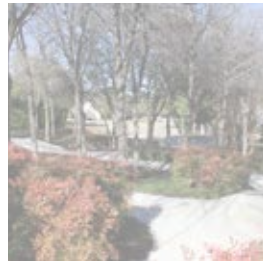


Lighting

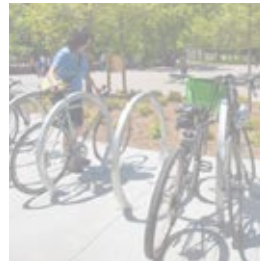
### Trailhead Essentials



Signage/Kiosks



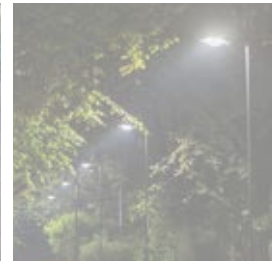
Shade Trees and Landscaping



Bicycle Parking



Trash Receptacles



Lighting



Parking Facilities



Restrooms



Drinking Fountain



Small Shelter

### Enhanced Access Amenities (Additional)



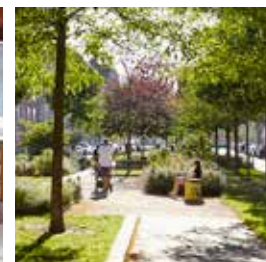
Trail Gateways



Art



Bicycle Repair Station



Gathering Area/Plaza

## STREET CROSSING TYPOLOGIES

Given most of the proposed trails in Addison are along streets, establishing safe crossings for pedestrian and bicycles are essential in developing a successful trail system. The following typologies represents best practices for street crossings.

### Pedestrian and Bike Intersection

- Crosswalks should be designed to offer as much comfort and protection for bicyclists and pedestrians as possible, especially at major intersections or high-traffic locations.
- High-visibility ladder, zebra, and continental crosswalk markings should be implemented to increase visibility and improve yielding behavior.
- Approaches to key intersections with extensive bicycle activity should be painted green to increase visibility and limit vehicular conflicts.
- Crosswalks should be as wide as or wider than the walkway it connects to.
- An advanced stop bar should be located in advance of the crosswalk to reinforce yielding to pedestrians/bicyclists.



Figure 4-12: Prototypical Belt Line Road Bike and Pedestrian Crossing

- Push button signal activation should be provided for pedestrians/bicyclists.
- Americans with Disabilities Act (ADA) accessible curb ramps are required for all approaches.
- Pedestrian safety islands should be at least 6-feet wide and are recommended where pedestrians must cross three lanes of traffic in one direction.
- OPTIONAL: Right-turn-on-red restrictions may be applied Town-wide or in areas where pedestrian/bicyclist conflicts are frequent.
- OPTIONAL: A separate bicycle signal head can provide a leading bicycle phase, which allows bicyclists to begin crossing the street in advance of other traffic.



Figure 4-13: Prototypical Bike and Pedestrian Crossing (Westgrove and Addison)



## Mid-Block Crossings

- Crosswalks should be designed to offer as much comfort and protection for bicyclists and pedestrians as possible, especially at major intersections or high-traffic locations.
- High-visibility ladder, zebra, and continental crosswalk markings should be implemented to increase visibility and improve yielding behavior.
- Crosswalks should be as wide as or wider than the walkway it connects to.
- Appropriate Manual on Uniform Traffic Control Devices (MUTCD) signage should be installed to make vehicles aware of crossing as well as bicyclists aware that cross traffic does not stop (if unsignalized).
- Americans with Disabilities Act (ADA) accessible curb ramps are required for all approaches.
- If installed within a signal system, signal engineers should evaluate the need for hybrid beacon to be coordinated with other signals.
- A Rectangular Rapid Flashing Beacon can be installed to alert drivers to yield where bicyclists have the right-of-way crossing the road.
- Active warning beacons should be installed on the side of the road and in center islands/medians for secondary locations.
- Pedestrian safety islands should be at least 6-feet wide and are recommended where pedestrians must cross three lanes of traffic in one direction.
- Bollards should be placed at entrance to deter motor vehicle access and adequately spaced to allow easy passage by bicyclists, pedestrians, and other users.



Figure 4-14: Prototypical Arterial Street Mid-Block Crossing (Belt Line Road)

## Supporting Systems

**Bridges** that accommodate pedestrians and bicyclists may be necessary for trail continuity or access. They are required to span roadways, rivers or to address a significant grade change. Bridges are expensive solutions but provide an opportunity to create a focal point that enhances the trail experience and supports cross-town connectivity. When constructing a bridge, best practices say to provide a minimum 12-foot width to meet Class I Bikeway standards.

**Undercrossings** provide trail continuity beneath roadways and other locations where trails meet or cross significant public infrastructure. They can help sustain an unobstructed Class I trail system. Furthermore, existing vehicle undercrossings can be adapted to provide a safe crossing option alongside vehicles. Appropriate lighting can illuminate the undercrossings for safety. Additionally, artistic/aesthetic elements can be installed along surfaces and vertical elements to enhance the trail experience.



**Ramps** of various sizes and types should be installed to provide access to trails for all user types.

- **Wheelchair Ramps** are commonly installed where an off-street trail reaches an on-street intersection to ensure crosswalk access. This ramp is intended to support access for persons in a wheelchair, but they also support bicyclists, persons with some physical limitations, and parents with strollers. ADA markings are required to convey a crossing.
- **Vehicle Access Ramps** should be used where there is planned access for maintenance or emergency vehicles.
- **Curb Ramps** are used in instances where trails intersect roadways or driveways. These will be commonly used in conditions where trails run along the street.
- **Bike Ramps** may be installed where access from on-street bike lanes to off-street trails is desired but doesn't align with an intersection or legal crossing of the roadway. These are similar to wheelchair ramps, but include "Bike" stenciling to convey its special function.



PLACEMAKING AMENITIES

Addison Trails are a defining element of the Town. As the system grows, Addison will be known for its quality trails and bike and pedestrian friendliness. Incorporating specific placemaking amenities will add to the Town’s image and quality system. The following amenities create visual interest and make the Addison trail experience more memorable.



Trail Design Themes

The Town is encouraged to choose a design theme for each of its major trails to support a sense of place and uniqueness. Chapter 5 identifies major trail alignments and local connections and applies nomenclature to distinct and important alignments. While the nomenclature in this plan is only a suggestion, the table below provides additional direction on how to establish unique features along specific stretches of trail.

Trail Gateways

The intent of a gateway is to increase the visibility of the trail from roadways and trails. Trail gateways are typically installed at a trail access point or trailhead, and/or at the transition from an on-street trail to an off-street trail system. A gateway should establish a unique design theme and character for the trail or trail system. Gateways can be comprised of a variety of design features including monumental signage, decorative pavement, seat walls, stone-clad columns, custom fencing, etc.

Table 4-1: Trail Systems and Design Themes Example

Trail Name	Icon	Theme	Forms & Materials	Gateway Feature
A unique trail name that brands an alignment to establish its identity	A graphic symbol that relates to the trail name and is depicted on trail signage	A broader theme that nods to Addison’s culture, history or nature	Unique placemaking elements and site furnishings specific to the trail theme	Small or large elements that assume the form of a decorative feature that attracts attention, public art pieces, or interpretive areas



## Interpretive Features and Signage

Interpretive features and signage provide visitors, commuters, and residents with a unique perspective or story that enriches their trail experience. Interpretation can cover a wide range of subjects including interesting facts about the site location, history, culture, or other topics. Typically, these features are signs, yet other forms of interpretation may include immersive sculptures demonstration areas. These areas may be highlighted by a change in trail surface to expand the experience into a larger interpretive area.

When providing interpretive signage, choose subject matter with an audience in mind. A trail that is likely to attract new users warrants a “Did you know?” sign installation. Whereas a short, neighborhood-serving trail might include a small sign to identify a unique tree or provide direction to a special view.

## Public Art

Addison is already known for its public art and its trails present a wonderful opportunity to showcase it. The planned Art Walk trails in South Quorum will incorporate art as a way establish a destination and encourage exploration. Ideally, the art or amenity is large scale and related to Addison’s identity. Successful trail art has longevity, is memorable and visually rewards trail users. In instances where public art already exists and is visibly accessible wayfinding signage should be provided or sight lines preserved.





## Play Elements

Instead of using trails as a means to get from one place to another, trails may be destinations in and of themselves. Buffers adjacent to trails provide opportunities to activate a trail edge with spaces for fitness and play. These elements may include nature play elements (e.g., climbing rocks, stepping stumps, spinner poles), fitness stations, interactive art and interpretive features. These elements may be interspersed along a corridor or clustered together near an access point or trailhead.



## Formalized Pause Points

Formalized pause points with seating may be considered where trail width is sufficient. These areas are recommended to be shaded, landscaped and marked with special paving to provide comfort and a natural appeal. While these areas are intended to provide a formal space for social interaction, they may also provide space for trail pull-offs to accommodate social distancing and a variety of movement patterns and fitness levels.



## SITE FURNISHINGS

Trails can be supported by numerous amenities to increase enjoyment and use.

### Signage

Addison desires signage and information that balances the display of information without overdoing it and creating sign clutter or obstructing views along trails. The following signage types may be strategically used along trails:

**Identification and wayfinding signage** identify the trail by name, provide wayfinding or directional information, and identify locations of destinations and amenities. These signs are typically posted at trail entry points and intersections and should identify the system by name and potentially an iconic trail symbol. These signs may be applied to trail systems that will regularly draw new users or people unfamiliar with the surrounding, such as regional trails or trails in Central Addison. Wayfinding is intended to guide trail users to useful or interesting resources such as, trailheads, public restrooms, food locations, or unique points of interest.

**Milestone markers** are special signs with location information that provide recreation benefits and enhance safety. Recreational users can utilize the sequentially numbered signs to track distances traveled on their run, walk, or bike ride. For safety, that same numbering system can be utilized by emergency response crews to locate trail users in need of assistance.







**Regulatory signs** are generally limited to “Trail Rules” that are posted at trailheads and access points. Rules and regulation signage may include postings such as, no motor vehicles, no trespassing, dismount bike zones, dog ordinance, stop and yield signs, pass left/keep right, and temporary trail closures.

**Warning signs** are very similar to traffic signs by alerting users to changes in the trail such as curves, narrowing, cross traffic, steep grades, and areas of potential high water.

**Sponsorship signage** Additionally, partnership agencies may be included as information beneath the identification signage to identify participating agency brands.



## Lighting

Lighting supports a safer user experience and is designed and installed to reduce impacts to adjacent land uses. Directional (LED) lights offer a precise direction of light that limits ambient spillover in unwanted areas such as private property and sensitive natural areas. When possible, lighting should be installed closer to the ground than streetlights, providing a pedestrian-scaled aesthetic and use.



## Seating

Addison encourages a variety of seating types throughout the network yet seeks consistent styles per individual trail or neighborhood. Durable, accessible custom seating, such as chairs, seat walls, artistic benches, or alternative seating options are encouraged, subject to the approval of the Town. Local materials such as excavated limestone may be reused to create unique seating alternatives. General tips for seating include:

- Locate where natural surveillance is maximized, such as near trail entry/exit points or within clearings in the landscape.
- Deploy at regular intervals (optimum: ½ mile) to provide opportunities to rest.
- Consider the user experience; locate beneath shade when possible and at a scenic location.
- Provide space adjacent to seating to meet ADA requirement for universal access.
- Design in a manner to prevent skateboarding and other damaging activities.
- Select to deter long-term occupancy and social distancing. Backless benches or mid-point armrests should be considered as well as armchair variations.







### Picnic Areas

Picnic areas may be considered along trail corridors with sufficient width, such as greenbelts. Although, parkland is a more appropriate space for these areas. Instead, consider installation of a shaded area with benches or chairs and a small table.

### Small Shelters

Small shelters are preferably located in adjacent park sites or at trailheads. They may be considered at trail nodes with sufficient width such as formalized pause point or in areas with high trail activity and a lack of tree shading. These shelters are small, but large enough to accommodate a seating area.



### Bike Racks

Bike racks are included where there are points of interest directly accessible at the trail edge. These may include parks, trailheads, public restrooms, interpretive/art areas. However, in most circumstances, the destination will be a private entity, such as a shop or restaurant. In these instances, the bike racks should be placed along the trail alignment, in the trail buffer. Additionally, it may be preferable to work with the destination's site manager or owner to consider a private installation adjacent to the trail alignment.



### Bike Repair Stations

Bike repair stations are a desirable amenity but are site-specific and do not serve all trails users. As such, these should be limited to regional trails and located at trailheads or at key trail intersections.

## Fitness Stations

Fitness stations may be considered along trail corridors with sufficient width such as greenbelts. Stations should be grouped to offer multiple exercises within a defined and highly visible space. Ideally, these fitness stations are shaded, easily accessible yet separated from the trail, and includes instructional signage.

## Trash Receptacles

Trash receptacles are to be installed at trail entry points and as-needed (or as-anticipated).

Engaging the Town's operations staff is highly encouraged to optimize placement and validate the likely need.

## Dog Waste Stations

Addison is considered a dog-friendly community. As such, accommodations should be made along all neighborhood-loop trails to ensure dog waste is properly disposed.

## Drinking Fountains

As a high-maintenance amenity, drinking fountains are encouraged only at trailheads and parks where management is optimized.



## Fencing

In general, fences should be used only when required by code or to address a hazard, establish rights-of-way, or protect privacy. This approach will help ensure safe access to trails whenever possible. Additionally, fences and railings should be designed in a way that is attractive, durable and consistent with exiting neighborhood-character aesthetics and styles.

## Bollards and Gates

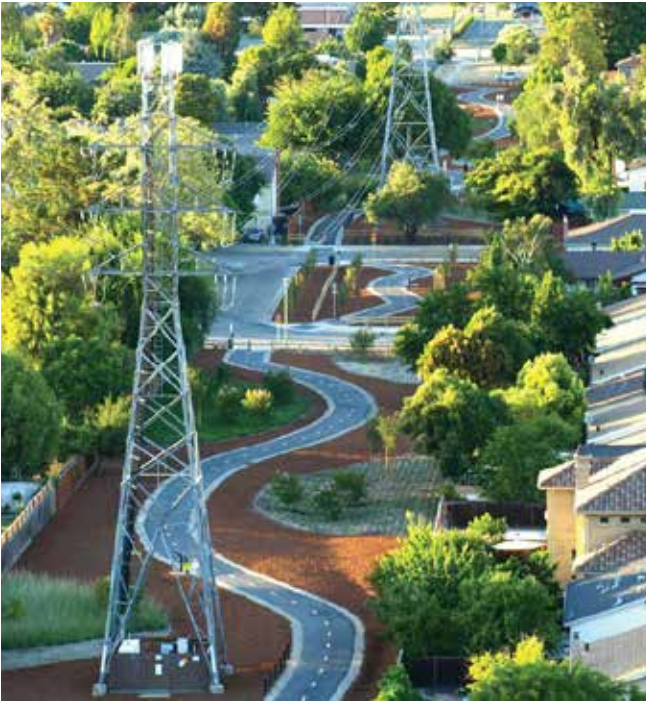
Bollards can be installed at trail entries from roadways and are intended to prevent or discourage vehicular trespassing upon a trail. A swing arm gate may also be used when sufficient width exists and there is a regular need for vehicular access to the trail while preventing illegal entry.

## Restrooms

Restrooms are preferably located in adjacent park sites or at trailheads to leverage existing maintenance.







## LANDSCAPING

Addison trails will be developed through a variety of urban and natural landscapes. Trail construction should always leverage the existing landscape, enhance when possible, and mitigate when required. Furthermore, all trail construction projects should protect the existing tree canopy for shade purposes and environmental benefits. While tree lined trails with enhanced landscaping is the image Addison seeks to achieve, certain trail corridors will require special landscaping treatments. These are summarized as follows.

### Utility Corridors

Plantings in utility corridors (underground and overhead) may have restrictions that impact species selection and locations where plantings are allowed. While limited, most locations should offer opportunities to restore or incorporate native, unornamental vegetation along the trail corridor to create a more natural trail experience and support the ecological function of the open space area.

### Street Corridors

Landscaping in street corridors should follow direction from the Master Transportation Plan and the Parks and Open Space Master Plan. In general, street trail corridors incorporate landscape buffers w/ street trees and a blend of plantings. When trail width is not available to establish a lush, landscaped environment, priority should be given to establishing a safe buffer that is easy to maintain.



### Park Corridors

Trails passing next to existing parks and in greenways should leverage irrigation availability. Landscaping on the trail should blend seamlessly with the design of the park. Grass turf may be provided immediately along the trail or in specific places to support recreation needs; however, the entire corridor should not be maintained that way and may include native plantings and trees.

### Riparian Corridors

If landscaping is allowed, vegetation should be native (local, ideally watershed specific), non-invasive, or non-hybridizing species. The plantings should contribute to the stabilization of these corridors by providing wildlife habitat, protecting water quality, filtering stormwater runoff, enhancing urban trees and connecting people to nature.

### Enhanced Landscape

An enhanced planting palette, including ornamental and nonnative plants, is most appropriate at points of entry, intersection or pause.

### Best Practices

- Use lower-maintenance plants;
- Select trees to provide shade and visual interest;
- Seek to landscape 50% of site area when extensive buffering is required;
- Favor native (local, ideally watershed specific in riparian corridors) or climate appropriate plants;
- Leverage existing landscapes and determine if supplemental landscape offers value;
- Place plants and trees based upon mature growth. Avoid roots uplifting trails and shrubs encroaching upon trail.

*Note: Landscaping shall adhere to the requirements described in the Addison Unified Development Code.*







**Town of Addison  
Perennial Trials Gardens  
October 2015**

Special thanks to Southwest Wholesale Nursery,  
Shades of Green, and Green Lake Nursery  
for their generous donation of plant materials.



A background image of a park with trees and a building. The image is slightly faded to allow text to be read. The building is a brick structure with a gabled roof and a small sign that says '2'. There are trees in the foreground and background, and a paved path in the lower right corner.

# 5

## Priority Projects

This chapter takes a deeper dive into several of the key projects included in the full Future Trail Network described in Chapter 4. While all alignments and segments included in the Future Trails Network are deemed important, this chapter focuses on projects that 1) require immediate or short-term action, 2) comprise multiple trail types and/or navigate more challenging contexts, and 3) include technically difficult design challenges.

The Priority Projects are organized into three categories, including:

- Major East to West Alignments
- Major North to South Alignments
- Local Connectivity

The chapter concludes with a section highlighting various reasons to and different types of partnerships. It highlights the importance of partnerships for realizing the community's trail vision and many aspects of plan implementation.



## Major East to West Alignments

### COTTON BELT TRAIL (ALONG THE DART SILVER LINE REGIONAL RAIL CORRIDOR)

The DART 2030 Transit System Plan (TSP) identified the Cotton Belt Corridor as a priority project. The project was accelerated to a 2022 completion target in DART's FY2017 Twenty-Year Financial Plan. In conjunction with the Regional Rail improvements, DART is working with local jurisdictions and the North Central Texas Council of Government (NCTCOG) to implement a corridor-wide hike and bike trail as an important component of the regional trail network referred to as the Velo Web. The DART owned right-of-way is approximately 100 feet wide, yet a large portion of the Cotton Belt Trail alignment will be in the Town's right-of-way. Although final design may modify this slightly, the hike and bike trail will typically be 12 feet wide. It can range between 10 to 14 feet wide depending on the location.

### Important Design Details and Considerations

- Access to the Cotton Belt Trail should be created at Marsh Lane, Surveyor Boulevard, Midway Road, Addison Road, Quorum Drive and Spectrum Drive.
- The trail width should be at least 12 feet through Addison to accommodate the large volume of users and variety of user types anticipated.
- The segment between Addison Road and Quorum Drive should be at least 14 feet wide or supplemented with an additional parallel walking path.
- A trailhead should be provided at or near the DART rail station between Addison Road and Quorum Drive.
- An additional layer of amenities should be provided along the trail through Addison, especially between Addison Road and Spectrum Drive; additional amenities should include benches, shade coverings, short-term and long-term bike parking, drinking fountains, trash and recycling receptacles, lighting, and a combination of wayfinding, identity, and interpretive signage.
- Public art of different types should be integrated into the trail design throughout Addison.



Figure 5-1: Cotton Belt Trail Connection to the "Rail Trail"

## BELTWAY DRIVE MOBILITY CORRIDOR

As described in Chapter 4, Beltway Drive can provide a critical east-west connection running parallel to Belt Line Road, as well as a connection north to Belt Line Road near the center of Addison. The Beltway Drive Mobility Corridor provides an important connection through Southwest Addison on a relatively low traffic roadway.

### Important Design Details and Considerations (from west to east)

- Create a safe crossing of Marsh Lane on the west end of Beltway Drive to Garden Brook Drive.
- Reduce Beltway Drive to a single lane in each direction through its entire length.
- Stripe bike lanes on both sides of the roadway from Marsh Lane to Midway Road.
- Add a continuous widened sidewalk that is buffered from traffic, extending from Les Lacs Park east and continuing north to Belt Line Road.
- Prioritize safe pedestrian and bicycle crossing of Midway Road.
- Add sharrow markings and other bike boulevard amenities east of Midway Road where the curb-to-curb width of Beltway Drive is especially constrained.



Figure 5-2: Beltway Drive Bike Lanes and Wide Sidewalk

## "POWER LINE" CONNECTOR (ONCOR EASEMENT THROUGH FARMERS BRANCH)

East-west connectivity is extremely limited through Addison south of Belt Line Road, especially between Midway Road and Inwood Road. The Redding Trail is one of the most popular trails in Addison and may provide the inspiration for a solution to this challenging gap in the larger transportation network. Working with Farmers Branch, the Town of Addison should partner with Oncor to develop an east-west trail connection along the power line easement extending between Midway Road and Inwood Road.

### Important Design Details and Considerations

- The Redding Trail should be extended along the Dog Park at its eastern terminus and extended
- further through the Oncor easement to Midway Road.
- A new mid-block crossing with signalization should be added to Midway Roadway beneath the power line corridor.
- A new multi-use trail of at least 10 feet in width should be constructed just south of the powerline corridor and just north of the rail line where it begins at Gillis Road.
- Low landscaping should be planted along the new trail alignment where space allows.
- Create a connection along the western side of Inwood Road connecting the east terminus of the "Power Line" Connector to Landmark Place.
- Amenities along the "Power Line" Connector should include seating and trash/recycling containers.

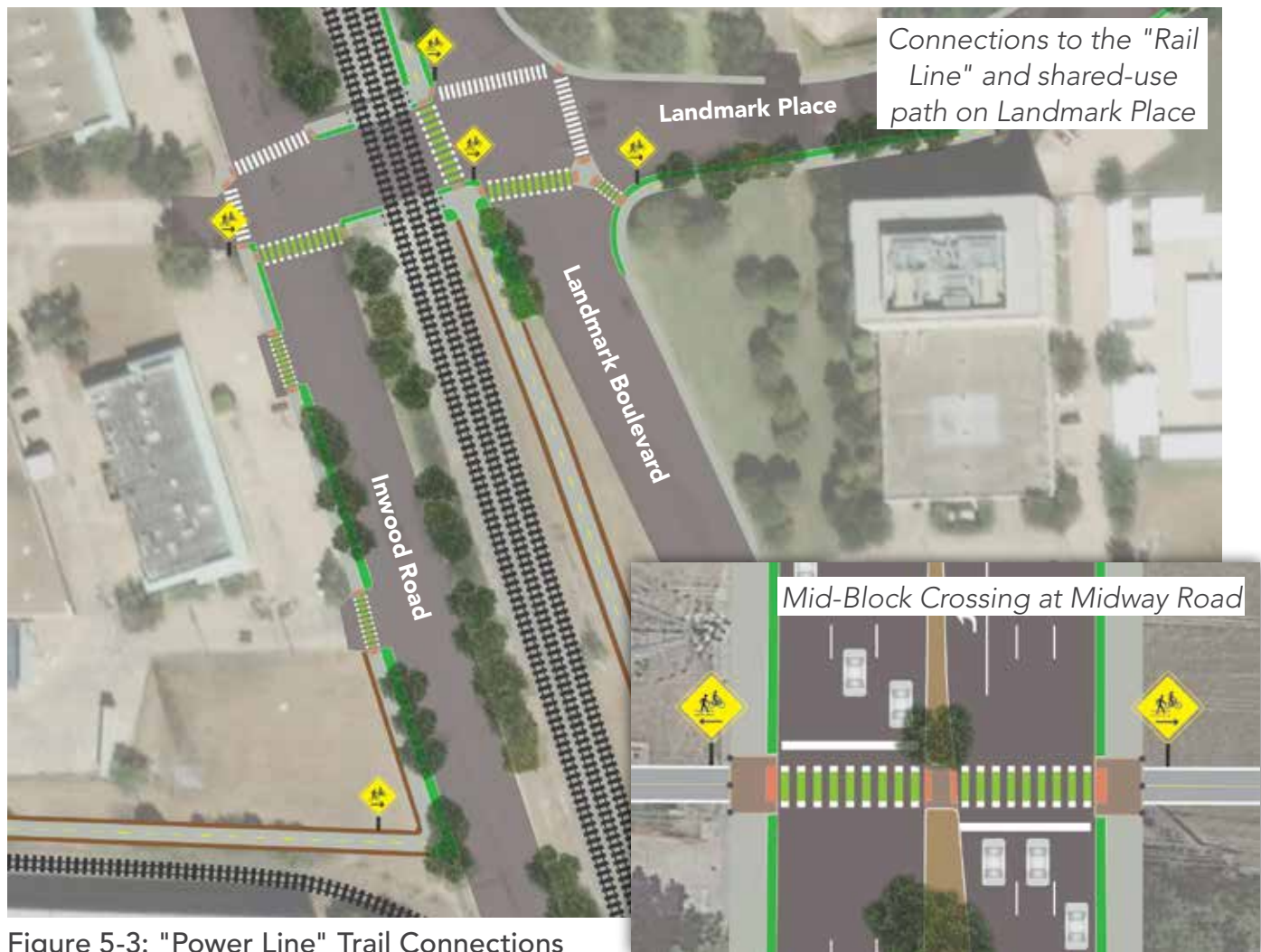


Figure 5-3: "Power Line" Trail Connections

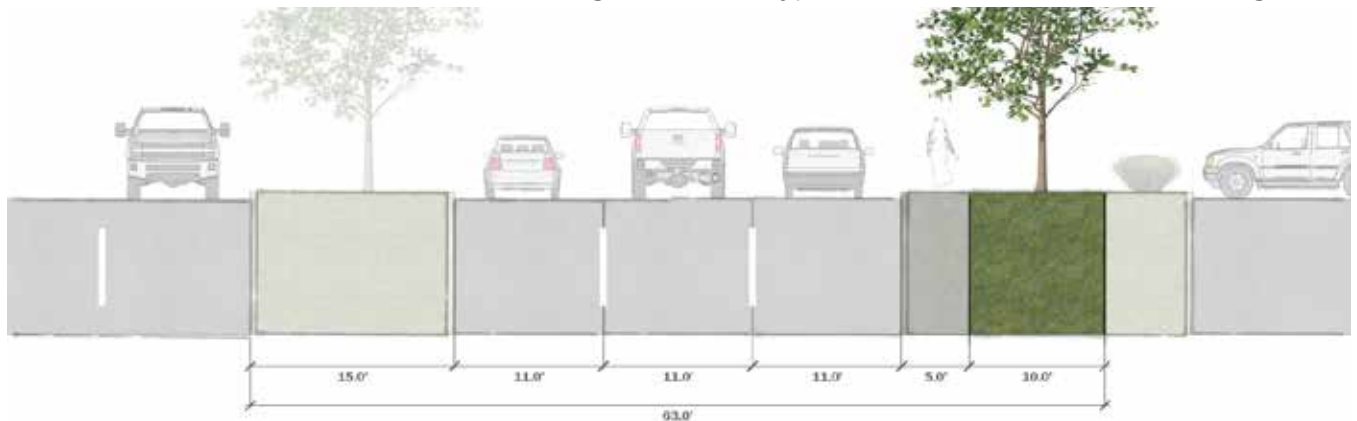
## BELT LINE MULTI-MODAL SEGMENTS

Belt Line Road is the major east-west connector through Addison. As such, it also has the highest traffic volumes of any roadway in the Town with the exception of the Dallas North Tollway. It also includes the greatest concentration of dining, hospitality and entertainment destination in Addison and perhaps the region. Movement along the corridor and across the corridor should be equally prioritized through implementation of the Trails Master Plan.

### Important Design Details and Considerations

- Wide sidewalks buffered from the travel lanes with landscaped planting strips should be added on the north side of Belt Line Road from Marsh Lane to Beltway Drive and on the south side of Belt Line Road from Marsh Lane to the Dallas North Tollway.
- In locations where it is not feasible to include a landscaped buffer between the curb and the sidewalk, planting areas should be included behind the sidewalk as part of the property frontage/setback.
- Enhanced pedestrian crossings should be constructed along Belt Line Road at Marsh Lane, Midway Road, Beltway Drive, Addison Road, Quorum Drive, and Dallas North Tollway.
- A shared-use path should be improved along the north side of Belt Line Road from Beltway Drive to the Dallas North Tollway.
- A shared-use path should be added along the south side of Belt Line Road from the Dallas North Tollway to Winnwood Park.
- Driveway access to businesses along Belt Line Road should be consolidated and shared to the extent possible.
- At busy and offset driveway access locations, pedestrian crossings with markings should be encouraged.

*Existing Condition Typ. (west of Quorum Drive, looking west)*



*Proposed Condition Typ. (west of Quorum Drive, looking west)*

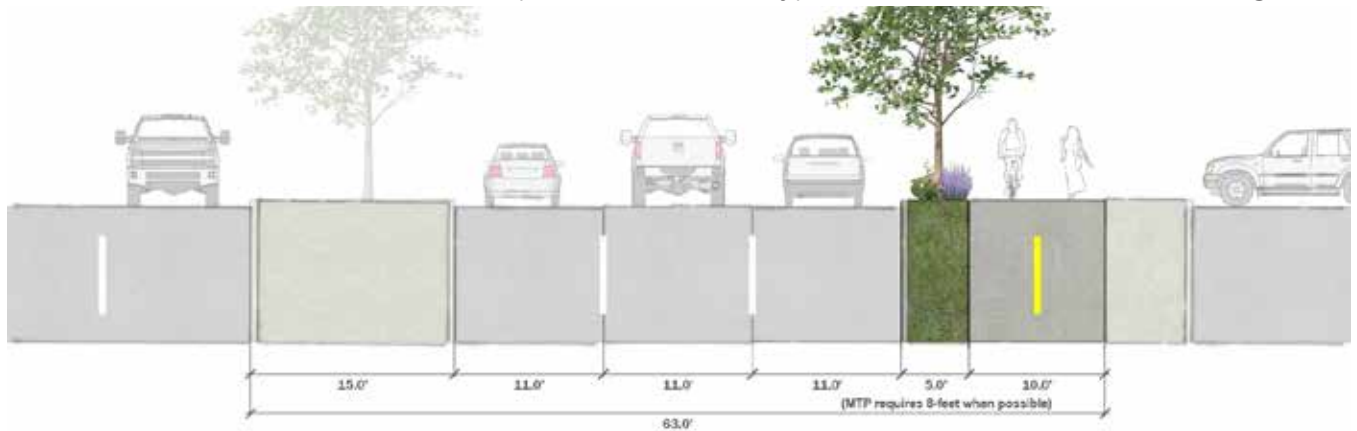


Figure 5-4: Belt Line Road Shared-Use Path



# Major North to South Alignments

## MIDWAY ROAD IMPROVEMENTS

One of the early implementation projects resulting from the Master Transportation Plan is Midway Road. It includes a shared-use path along the newly constructed roadway as part of the recommended Active Transportation network.

### Important Design Details and Considerations

- Midway Road is being improved from Spring Valley Road north to Arapaho Road.
- The shared-use trail will have a typical width of 10 feet and be separated from the travel lanes by the curb and a landscaped buffer in most locations.
- The shared-use trail runs along the west side of Midway Road south of Belt Line Road and switches to the east side of the roadway north of Belt Line Road.
- The trail along Arapaho Road will be connected to Midway Road as part of the current roadway improvement project.
- The shared-use trail should be extended north from Arapaho Road to Keller Springs Road in the future to provide a critical link in a loop around the Addison Airport.

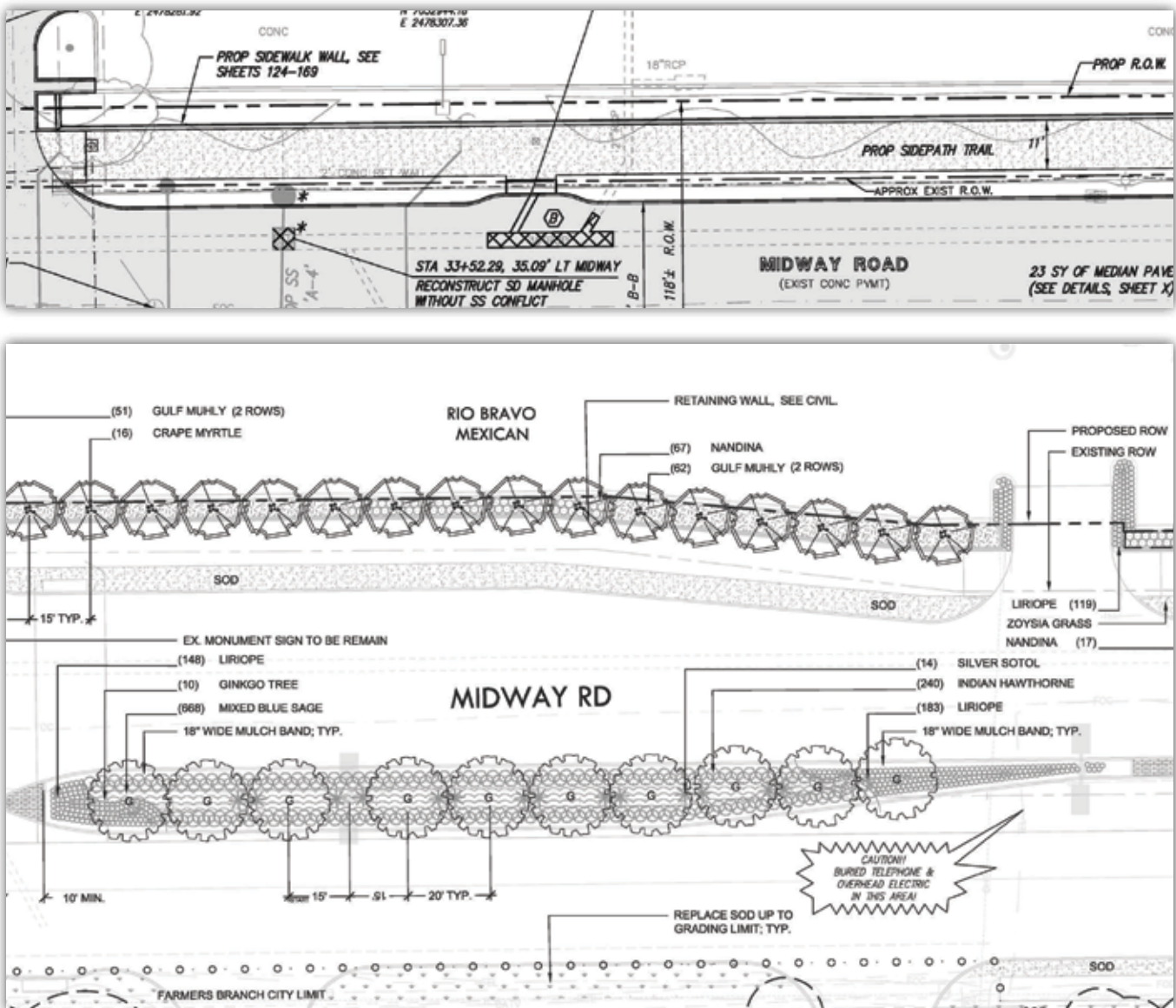


Figure 5-5: Midway Road Construction Drawings

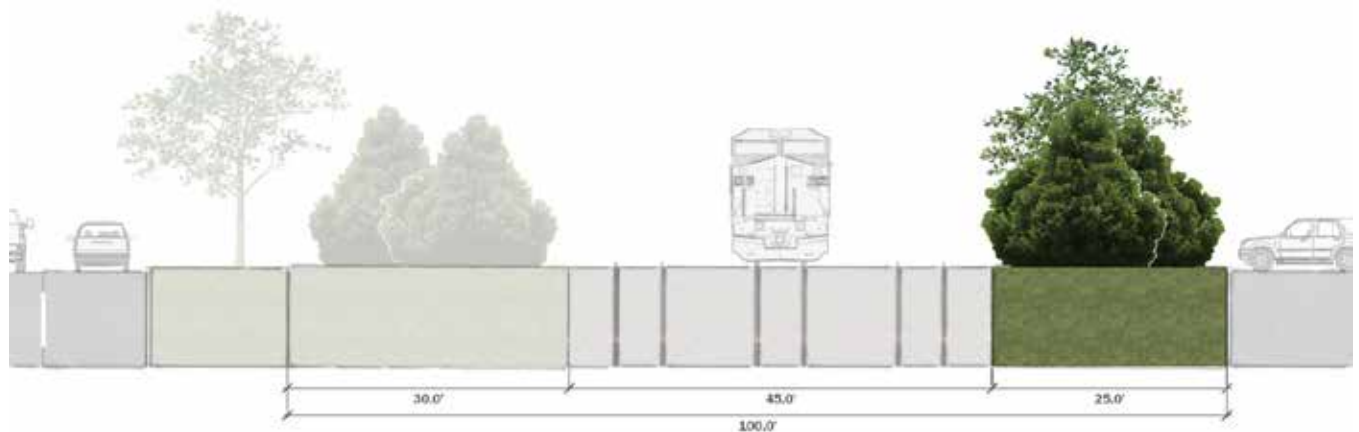
## INWOOD "RAIL TRAIL" TO ADDISON CENTRAL

The Inwood "Rail Trail" will provide a necessary connection from the "Power Line" Connection and a shared-use trail along Landmark Place north to Belt Line Road and the Cotton Belt Trail.

### Important Design Details and Considerations

- The connection to a rail trail alignment south of Addison in Farmers Branch should be carefully planned and coordinated to ensure a seamless trail experience and a consistent or compatible trail design.
- A regional shared-use trail should be constructed along the east side of the rail alignment north to Inwood Road where it crosses the railroad tracks.
- The regional shared-use trail should be at least 10 feet in width with public art and other amenities strategically located along the alignment.
- The regional shared-use trail should connect to a shared-use trail along the east edge of Inwood Road at the railroad crossing, providing trail users a safe connection north to the signalized intersection of Inwood Road and Belt Line Road.
- The intersection of Inwood Road and Belt Line Road should be improved to provide safe crossings for pedestrians and bicyclists.
- A shared-use trail along the north side of Belt Line Road should connect trail users to another regional shared-use trail connection running along the west side of the rail alignment north of Belt Line Road.

*Existing Condition Typ. (east of Inwood Road, looking north)*



*Proposed Condition Typ. (east of Inwood Road, looking north)*

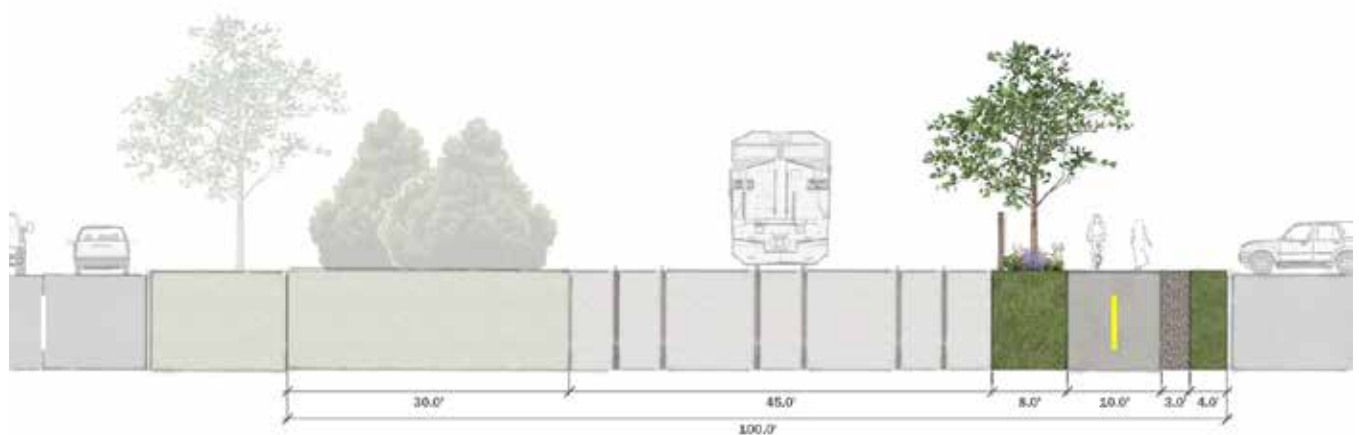


Figure 5-6: Inwood Road "Rail Trail"

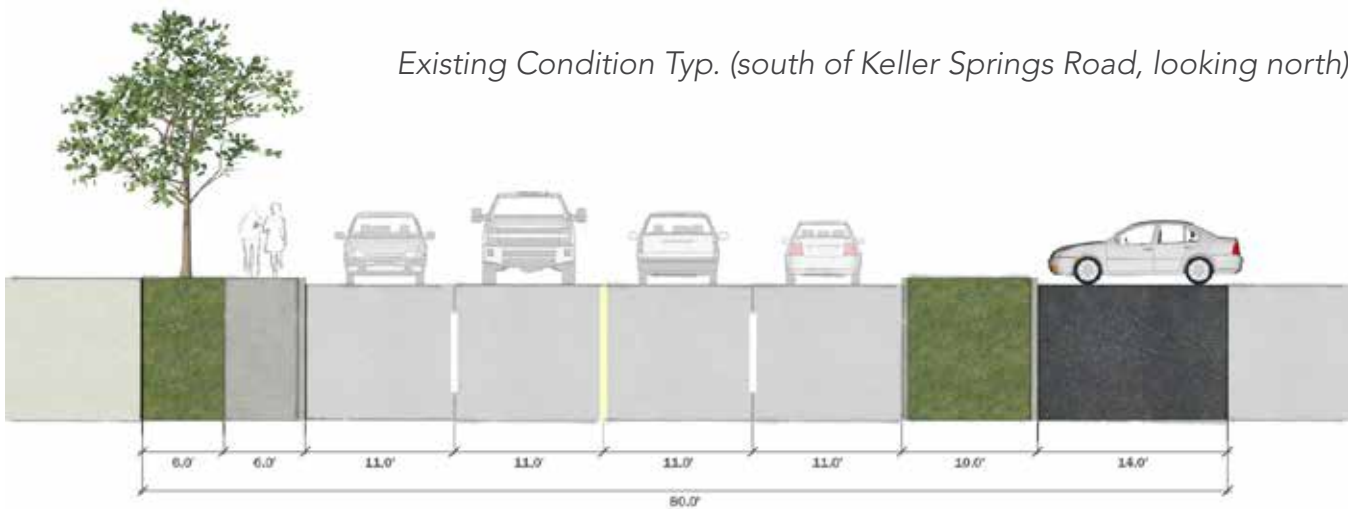
## ADDISON ROAD TRAIL

Addison Road provides the most continuous north-south connection through Addison east of Midway Road. It extends from Belt Line Road to the northern border of Addison. Trail improvements along this important corridor include a combination of wide sidewalks with buffers and shared-use paths along the street.

### Important Design Details and Considerations

- Wide sidewalks with buffers should be provided between Belt Line Road and just south of the Cotton Belt Trail, and from Airport Parkway to the Town's northern boundary.
- A shared-use path along the street should be added on the east side of Addison Road from just south of the Cotton Belt Trail to Airport Parkway.
- A wider shared-use pathway should be considered along the western edge of Addison Circle Park and the Addison Conference and Theatre Centre.
- Pedestrian crossing enhancements should be made at the intersection of Addison Road with the Cotton Belt Trail, Festival Way, Airport Parkway, and Westgrove Drive.

*Existing Condition Typ. (south of Keller Springs Road, looking north)*



*Proposed Condition Typ. (south of Keller Springs Road, looking north)*

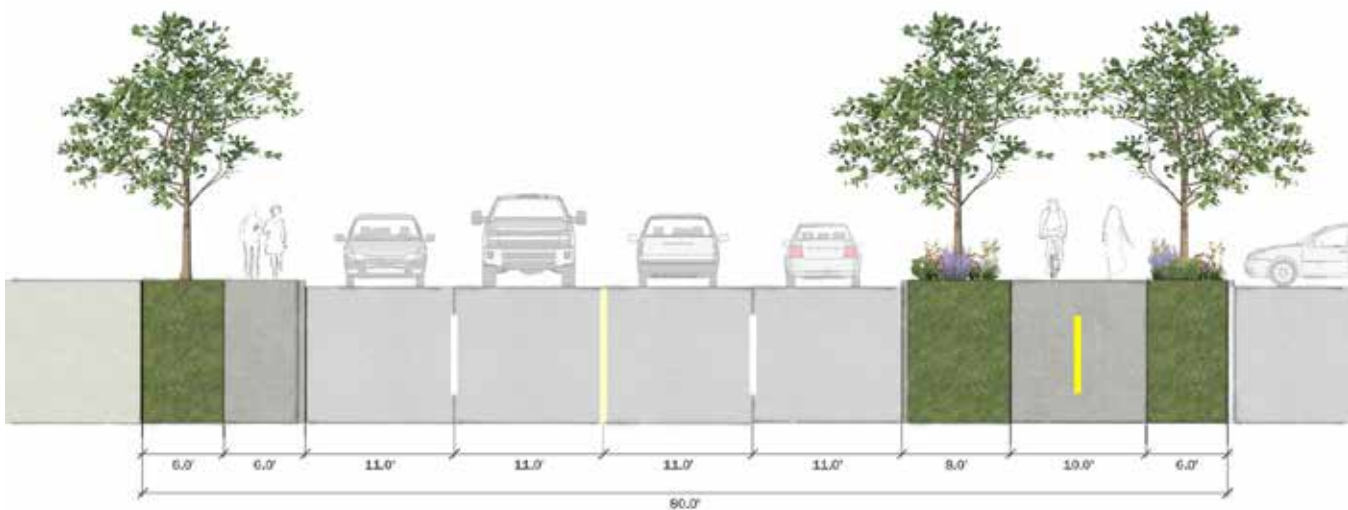


Figure 5-7: Addison Road Shared-Use Path

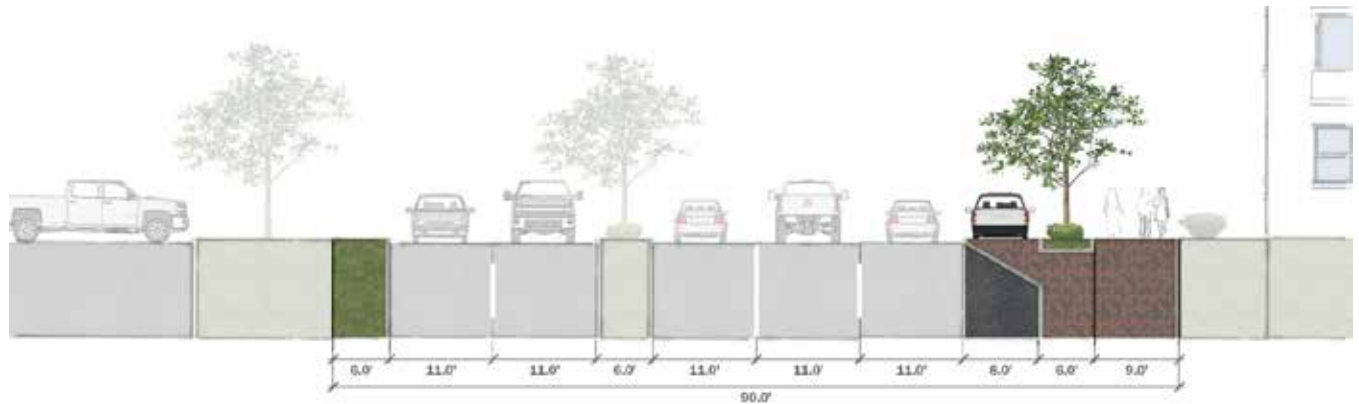
## QUORUM DRIVE TRAIL

Quorum Drive has tremendous potential as a high-quality north-south connector extending from South Quorum to North Addison. Quorum Drive through Central Addison is already one of the most desirable pedestrian environments in the Town and the Art Walk and roadway improvements planned for South Quorum further enhance this key corridor.

### Important Design Details and Considerations

- Shared-use paths should be added on both sides of Quorum Drive from Landmark Place to Festival Way.
- The existing wide sidewalks along Quorum Drive through Central Addison should be paired with bike boulevard enhancements to the roadway.
- Signage should be added at the north and south ends of the bike boulevard segment to help bicyclists navigate from the shared-use paths behind the curb to a shared travel lane configuration.
- Pedestrian crossing enhancements should be made at the intersection of Quorum Drive with the Cotton Belt Trail, Festival Way, Airport Parkway, Keller Springs Road, and Westgrove Drive.
- The Art Walk should be extended north along the entire length of Quorum Drive.

*Existing Condition Typ. (Addison Central, looking north)*



*Proposed Condition Typ. (Addison Central, looking north)*

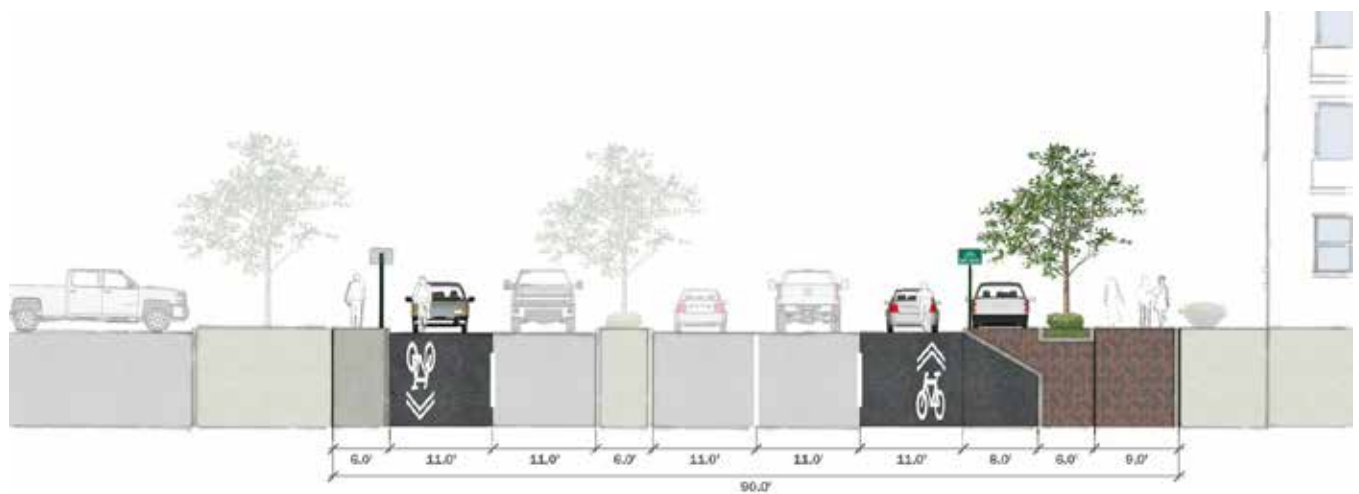


Figure 5-8: Quorum Drive Bike Boulevard



## WESTGROVE DRIVE CYCLE TRACK

Another exciting project that is an important priority for North Addison is the construction of a two-way cycle track on the north and east sides of Westgrove Drive. This trail alignment will provide a high-quality bicycle facility connecting North Addison to Carrollton and Dallas.

### Important Design Details and Considerations

- A two-way cycle track should be constructed in the roadway next to the curb on the east side and north side of Westgrove Drive from the northern boundary of Addison to the Dallas North Tollway.
- The on-street two-way cycle track treatment should transition to back of curb at intersections to improve bicyclist safety and minimize conflict points.
- Signals at the intersections of Westgrove Drive with Addison Road and Quorum Drive should be augmented to include cycle-specific signalization; signalization should explore giving pedestrians prioritization with advance timing over bicycles, as well as giving bicycles advance timing over motorists.
- Transitions to traditional bike lanes, sidewalks or a shared route configuration using both sides of the roadway should occur within Addison's boundaries to avoid the two-way cycle track ending abruptly and putting cyclists in an unsafe contraflow situation.



Figure 5-9: Westgrove Drive Cycle Track and Wide Sidewalk

## Local Connectivity

### “WOODED WALKWAY” IN EAST ADDISON

One of the few remaining opportunities to create a more traditional trail through a natural area exists in East Addison. A local shared-use trail is recommended between the Dallas North Tollway frontage road and the east side of the Tollway to the Town Finance Building and Winnwood Park. The portion between the frontage road and Montfort Drive would use an improved fire lane on the south edge of the Village on the Parkway property. From Montfort Drive to Belt Line Road, the desire is a combined boardwalk and trail alignment along the drainage that runs behind the commercial properties at Prestonwood Pond II, the Town Hall Building and the Town Finance Building.

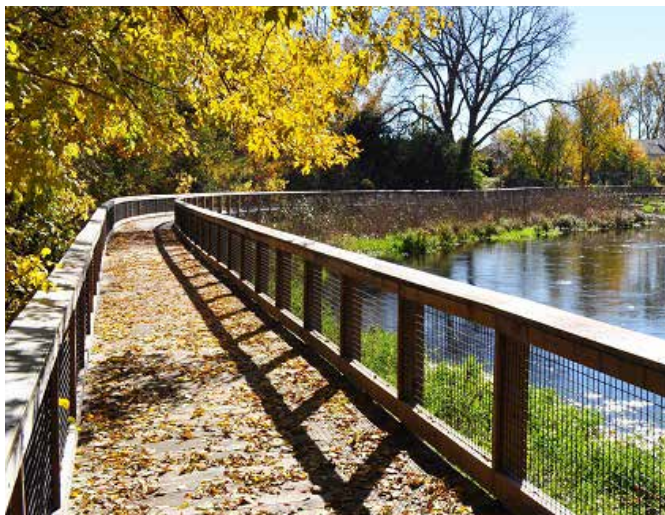
#### Important Design Details and Considerations (for the segment from Montfort Drive east)

- Construct a midblock crossing of Montfort Drive where the local shared-use trail crosses the roadway.
- Construct a boardwalk along or across the Prestonwood Pond.
- Construct a decomposed granite trail from the east side of Prestonwood Pond to the drainageway behind the commercial structure at Prestonwood Pond II.
- Construct a boardwalk above the drainage way or cantilever a trail off the parking structure of

Prestonwood Pond II to connect to the southwest corner of the Town Hall grounds.

- Widen and reinforce the existing paths south of the Town Hall Building and extend east and north to the Town Hall Square commercial development parking lot.
- Construct a trail connection or designated pedestrian connection along the south edge of the Town Hall Square commercial development parking lot.
- Utilize the median in Oaks North Drive to create an offset pedestrian crossing with a pedestrian refuge island.
- Construct a trail along the south edge of the Town Finance Building property.
- If the Town is able to purchase the property east of the Town Finance Building, then construct a trail connection to Winnwood Park and consider adding a trailhead at this location.
- If the Town does not purchase the property east of the Town Finance Building, then connect to the south side of Belt Line Road and construct a shared-use trail east to Winnwood Park.

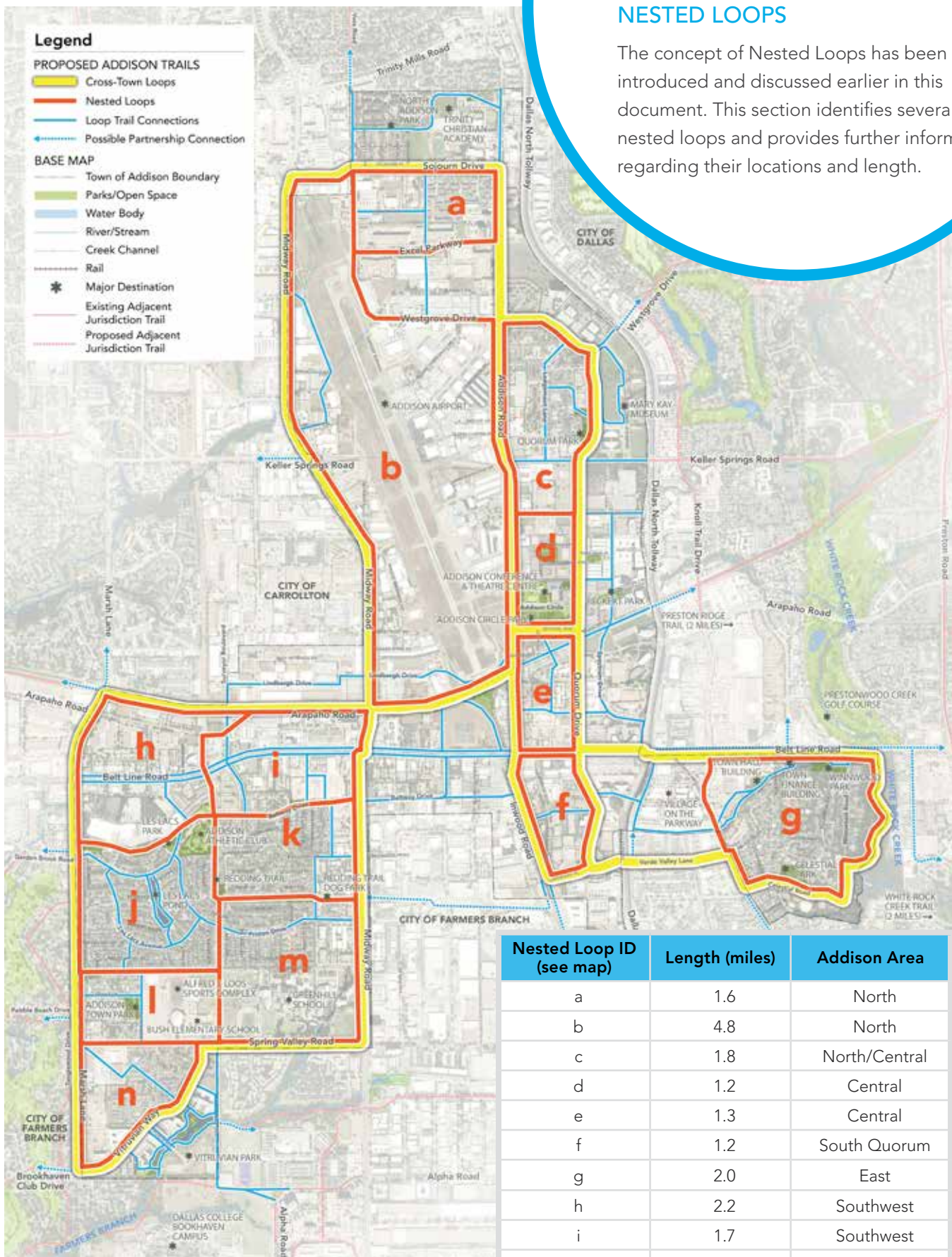
*Note: If the shared-use trail connection along the drainageway south of Prestonwood Pond II proves too difficult or infeasible, the Town should work with the property owners to route a marked pedestrian connection through the parking lot and linking to the fire lane on the east side of the property and just west of the Town Hall grounds.*





## NESTED LOOPS

The concept of Nested Loops has been introduced and discussed earlier in this document. This section identifies several of the nested loops and provides further information regarding their locations and length.



Map 5-1: Proposed Trails Loop Concept

Nested Loop ID (see map)	Length (miles)	Addison Area
a	1.6	North
b	4.8	North
c	1.8	North/Central
d	1.2	Central
e	1.3	Central
f	1.2	South Quorum
g	2.0	East
h	2.2	Southwest
i	1.7	Southwest
j	2.0	Southwest
k	1.6	Southwest
l	1.4	Southwest
m	2.0	Southwest
n	1.5	Southwest

Table 5-1: Nested Loops Identification



## TOLLWAY CROSSINGS

The Dallas North Tollway is the most challenging barrier to walking and biking in Addison. Existing crossings at Westgrove Drive and Keller Springs Road should be improved for pedestrians and bicyclists. The new multi-use Cotton Belt Trail will provide one of the safest crossing of the Tollway for pedestrian and bicyclists. The rest of this section highlights recommended crossing locations at Belt Line Road and south.

### Belt Line Overpass

- A shared-use path should be improved along the south side of the overpass of the Tollway along Belt Line Road.
- The shared-use path should be situated between the southernmost eastbound travel lane and the turnaround lane on the south side of the overpass.

- Improvements along the shared-use path should be explored, including:
  - Bollards on the north and south sides of the pathway.
  - Pedestrian lighting.
  - Covering protecting pedestrians from the sun and rain.
- Trim and/or adjust landscaping east and west of the overpass to ensure good sight lines and visibility for pedestrians and motorists.
- Conduct a traffic study to determine whether one or more slip lanes can be removed to ensure bicycle and pedestrian safety.

### Pedestrian Bridge

- The Future Trail Network includes a pedestrian bridge over the Tollway between Belt Line Road and Verde Valley Lane, connecting the South Quorum area to the Village on the Parkway.
- If possible, the pedestrian bridge should be designed to also serve as a gateway to Addison.



## Valley Verde Underpass

- The existing underpass extending east from Landmark Place in South Quorum east along Verde Valley Lane should be improved to create a safe and comfortable connection for pedestrians and bicyclists.
- Traffic counts suggest that a travel lane may be taken away to accommodate development of a wider shared-use path on one side of the underpass.
- Ideally, this path is situated on the south side of the underpass and ties into a shared-use path on Quorum Drive.
- Other improvements along the shared-use path under the underpass may include:
  - Bollards separating vehicular traffic from pedestrians and bicyclists.
  - Pedestrian lighting that is shielded from automobiles.
  - Art or mural installations.
- Bike boulevards or bike lanes may also be considered on either side of the underpass, so long as wide sidewalks connect to the underpass both west to Addison and east to Dallas.



Figure 5-10: Valley Verde Underpass

## Partnerships

As has been discussed throughout the Master Plan, implementing the full Future Trail Network envisioned by the community will require that Addison collaborate with neighboring jurisdictions, regional organizations and private property owners.

### REGIONAL CONNECTIVITY

There are five important ways in which Addison must collaborate and coordinate with local and regional agency partners. These are summarized below.

**Shared Jurisdiction of Important Roadways.** Marsh Lane, portions of Midway Road and portions of Belt Line Road are all examples of roadways with shared jurisdiction. In some cases, jurisdictional responsibility is split at the center line of the roadway and in other cases jurisdictional responsibility switches as you move along a roadway. In both instances, coordination with the other responsible jurisdictions will be critical to the implementation of the envisioned trail network.

**Key Crossings and Connections to Neighboring Pedestrian and Bicycle Routes.** Truly connecting across Addison and to the neighboring and regional trail network will require collaboration and partnerships with the Farmers Branch, Carrollton, Dallas, and the Dallas North Tollway.

### Critical Connections Outside of Addison.

Connections from Addison's Future Trail Network to other regional trails and destinations will require coordination with neighboring jurisdictions. The most important of these partnerships, based on the recommendations highlighted above and in Chapter 4 of the Master Plan, will be with Farmers Branch and the City of Dallas.

### Trail Improvements Along Utility and Rail

**Corridors.** Implementing these key trail connections will require coordination with utility and rail operators to establish use agreements, as well as mutually agreed upon designs, construction arrangements and maintenance agreements.

**Regional Trail Improvements.** The Cotton Belt Trail improvements will require continued coordination with DART to ensure that the segment of the trail extending through Addison meets the standards and expectations established within this Master Plan. Addison also has an opportunity to play a bigger role in the discussion of regional trail connectivity moving forward and should be proactive in participating in North Central Texas Council of Governments (NCTCOG) Bicycle and Pedestrian Advisory Committee and associated programs.





## COORDINATION WITH PRIVATE PROPERTY OWNERS

Partnerships with private developers will be critical in three primary ways throughout implementation. These are summarized below.

**Constrained Rights-of-Way (ROW).** In a few select cases, the envisioned trail improvements within or along roadways will require additional ROW to implement to the standards recommended in Chapter 4. The Town should work with private property owners to acquire necessary frontage to widen ROW to a sufficient width and to explore options for making trail improvements along the frontage of private parcels.

**Local Shared-Use Trail Connections.** Many of the local shared-use trail connections identified as part of Phase 3 of the Future Trail Network cross private property or run along the edge of private parcels. In nearly all cases, the recommended trail improvements are not possible given existing development and site improvements. The Town should work proactively with private property owners to educate them about the longer-term desire to add these connections and to integrate the local shared-use trail connections into redevelopment plans whenever those are developed.

**Potential Trailheads.** As outlined in Chapter 4, a variety of trailheads and trail access points are included in the recommendations for the Future Trail Network. In many cases, the best opportunities to create new trail access points or parking opportunities at trail access points will be through partnerships with private property owners. Using existing off-street parking when it is not in use (often evenings and weekends) is one such opportunity. Use agreements should be established and signage and enforcement related to any necessary restrictions should be considered. Additional public input is required prior to all trailhead development.

## Summary of Planning Level Costs

This plan will guide the Town for the next 10+ years. However, the majority of the priority projects in this chapter are recommended for construction within the next 10 years. These key projects will provide major cross town connectivity, establish neighborhood loops and link to regional destinations.

Tables 5-2 and 5-3 provide a summary of construction costs associated with the three high-level phases of Future Trail Network implementation.

Table 5-2 provides a summary of each phase with an indication of costs already accounted for in the 5-year Capital Improvements Program (CIP) and the percentage of project costs already planned for in the *Master Transportation Plan (MTP)*. At the highest level, the three phases generally break down to thirds. More specifically, Phase 1 accounts for 35.6% of the total estimated system cost, Phase 2 accounts for 26.3% of the total estimated system cost, and Phase 3 accounts for 38.1% of the total estimated system cost.

Table 5-3 provides a more detailed breakdown of each phase by trail type and includes a total quantity of linear feet per phase, overall linear feet for each trail type and the per linear foot and total cost for each trail type. The total miles of facilities included in the

Future Trail Network totals approximately 36.5 miles. Of that total, approximately 31% of the network will be sidewalks with buffers, 24.5% will be shared-use path along streets, and 16.5% will be local shared-use trail. The other significant portions of the system include approximately 10% as bike boulevards, 7% as regional shared-use trail, 4.5% as two-way cycle tracks, 3% as buffered bike lanes 3% represent priority shared-use paths with partners, and approximately 0.5% as a pedestrian-oriented lane.

The cost estimates for each trail type include allocations for site preparation and survey; removal of existing paving, landscaping, etc.; all hardscape and landscape materials; miscellaneous drainage improvements; and contractor mobilization, overhead and improvement, and contingency (at 35%). Cost estimates do not include provisions for property acquisition; trail maintenance; design costs; contingency for more complicated segments (where walls, curbs, drainage, and utilities need to be modified); signage for types other than the bike boulevard; trailheads or access points; intersection improvements; educational programming; or cost savings associated with overlapping MTP projects. All cost estimates are in 2021 dollars and do not include provisions for inflation or escalations.

**Table 5-2: Estimated Construction Cost by Phase**

Phase	Total Cost	Percent of Total Cost	MTP Project Overlap Percentage
Phase 1 (Funded)*	\$5,169,900	10.7%	86.8%
Phase 1 (Planned)**	\$12,043,700	25.0%	78.2%
Phase 2	\$12,687,700	26.3%	66.2%
Phase 3	\$18,364,600	38.0%	41.5%
<b>Grand Total</b>	<b>\$48,265,900</b>		

*Includes six FY 2020-21 Five-Year Capital Improvements Program projects identified in Chapter 2.

**Includes all other Phase 1 projects identified in this Master Plan

Table 5-3: Cost and Linear Feet by Trail Type

Typology	Description	Linear Feet					Cost per Linear Foot	Total Cost
		Phase 1 Funded*	Phase 1 Planned**	Phase 2	Phase 3	All Phases		
Wide Sidewalk w/ Buffer	8-10' sidewalks w/ 3' minimum buffer (preferred 8' landscaped buffer separated from traffic)	5,300	13,800	26,100	17,800	63,000	\$244	<b>\$15,369,100</b>
Separated Shared-Use Path Along Street	10-14' trail w/ minimum 3' buffers on both sides (preferred 8' landscaped buffer separated from traffic)	12,200	12,300	12,400	12,800	49,700	\$294	<b>\$14,589,100</b>
Regional Shared-Use Trail	10'-12' trail w/ 2' minimum buffers on both sides (when required, 10-15' buffer with landscape screening) or 6'-10' additional trail width (etched concrete) w/ 2' minimum buffer	-	10,300	3,800	-	14,100	\$183	<b>\$2,579,400</b>
Local Shared-Use Trail	10'-12' trail w/ 10-15' buffer with landscape screening (2' minimum buffers required on both sides)	700	5,900	4,700	24,300	34,200	\$422	<b>\$14,447,000</b>
Partner Shared-Use Path***	10'-12' trail w/ 2' minimum buffers on both sides	-	4,500	-	-	5,900	\$91	<b>\$539,600</b>
Bike Boulevard	Signage and stencil sharing a 14-16' travel lane	-	20,400	-	-	27,500	\$9	<b>\$192,800</b>
Pedestrian-Oriented Lane/ Bike Lane	6' lane stencil/striped w/ bolted plastic reflectors	-	1,400	-	-	-	\$25	<b>\$34,800</b>
Buffered Bike Lane	5-7' bike lane stencil/striped w/ minimum 3' buffer and bolted plastic separators or another physical barrier	-	5,800	-	-	5,800	\$31	<b>\$180,100</b>
Two-Way Cycle Track	8-12' cycle track stencil/striped w/ minimum 3' buffer and bolted plastic separators or another physical barrier	-	9,000	-	-	9,000	\$37	<b>\$334,100</b>
Paved Park Trail	6'-8' wide concrete off-street trail with optional 4' decomposed granite trail side trail (or 2' on both sides)	-	-	-	-	-	\$126	<b>\$0</b>
Soft-Surface Park Trail	4-6' wide decomposed granite trail	-	-	-	-	-	\$77	<b>\$0</b>
<b>TOTALS</b>		<b>18,200</b>	<b>83,400</b>	<b>47,000</b>	<b>54,900</b>	<b>203,500</b>		<b>\$48,265,900</b>

*Includes six FY 2020-21 Five-Year Capital Improvements Program projects identified in Chapter 2.

**Includes all other Phase 1 projects identified in this Master Plan

***Includes the "Power Line Trail" (Oncor Utility Easement through Farmers Branch) and the Alpha Road Connector (to Farmers Branch)



## Education, Encouragement and Enforcement

The build out of the Recommended Network for trails throughout Addison will be transformative and result in significant improvements to quality of life and sense of place throughout the community. To fully leverage that investment, the Town should also embark on a set of programs and smaller scale interventions to promote Education, Encouragement and Enforcement.

The Recommended Network of trails in Addison includes a variety of facility types and some corridors and alignments include multiple recommended design treatments. To retrofit the existing built environment in Addison, it is necessary to include more creative facility types, but that will also require a greater level of flexibility and familiarity from residents and other trail users. A set of education programs and campaigns should be implemented to familiarize residents and employees in Addison with the Citywide Trails Master Plan, new trail and crossing types as they are constructed, as well as proper trail etiquette and multi-modal traffic safety rules of the road. Education programming should consider inclusion of the following.

- Public information campaign/s, including billboards, flyers, yard signs, radio and tv advertisements, and targeted social media campaigns.
- Bicycle skills and maintenance classes.
- A trail system map for print and posting online.
- Organized walks, runs, and rides that emphasize proper etiquette and behavior and different trail and crossing types.
- Intercept events and organized events along or incorporating trails to increase awareness of the City-wide Trails Master Plan.







Trail use and active transportation are relatively common in small pockets of Addison today, but it will be important to encourage walking, jogging and biking on trails and other multi-modal facilities to ensure the Town's investment in trails is utilized to the fullest. In addition to the education programming suggested above, the Town should implement a set of programs and events to encourage trail use and walking, jogging and biking for recreation and transportation purposes. Encouragement programming should consider inclusion of the following.

- Organized walks, runs and bike rides with an emphasis on social connections and demonstrating key connections between neighborhoods and to desirable community destinations.
- Bike buddy or mentor program to pair more experienced cyclists with less experienced cyclists to learn about proper gear, route planning, safety considerations, end-of-trip facilities, etc.
- Active transportation commuter events in South Quorum to encourage employees to walk and bike to work (e.g., pancake breakfast, smoothies, etc.).
- Walking school buses and bike trains to encourage school children to walk and bike to school using trail facilities and safe behaviors.

Increased trail use and the introduction of new users to the trail network can also lead to less desirable behavior on trails. These types of behavior can include traveling too fast in congested areas, biking in designated dismount zones, trailblazing shortcuts through landscaped areas and private property, passing without notification, not allowing others to pass, not obeying traffic controls, etc. To support the education and encouragement efforts suggest above, the Town should also increase efforts to enforce proper trail etiquette and appropriate multi-modal traffic operations.











# CITY-WIDE TRAILS MASTERPLAN

DRAFT PLAN | MAY 2021



in association with:







# CITY-WIDE TRAILS APPENDICES

DRAFT PLAN | MAY 2021









# CITY-WIDE TRAILS APPENDICES

DRAFT PLAN | MAY 2021



in association with:



Table of Contents

APPENDIX A: EXISTING TRAIL INVENTORY..... A-1

APPENDIX B: COMMUNITY ENGAGEMENT SUMMARIES ..... B-1

APPENDIX C: TRAIL PRIORITIZATION CRITERIA ..... C-1

APPENDIX D: FUNDING STRATEGIES ..... D-1

APPENDIX E: MTP ACTIVE TRANSPORTATION MAP REVISIONS ..... E-1





# **Existing Trail Inventory**



## Addison Existing Trails Inventory

Name	Miles	Function	Surface	Addison Area
<b>Off-Street Trail Alignments</b>				
<b>Greenbelt Trails</b>				
Cotton Belt Trail	0.71	Multi-purpose	Hard	Southwest
Les Lacs Linear Park South Walking Paths	0.90	Multi-purpose	Hard	Southwest
Redding Trail	2.94	Multi-purpose	Hard	Southwest
White Rock Creek Trail	0.60	Multi-purpose	Hard	East
<b>Greenbelts Trails Subtotal</b>	<b>5.15</b>			
<b>Park Trails</b>				
Addison Circle Park Walking Paths	0.84	Multi-purpose	Hard	Central
Addison Town Park Walking Paths	0.43	Walking	Hard	Southwest
Beckert Park Walking Paths	0.20	Walking	Hard	Central
Bosque Park Walking Paths	0.22	Walking	Hard/Soft	Central
Celestial Park Walking Paths	0.49	Multi-purpose	Hard	East
Innwood Mini Park	0.03	Walking	Hard	South Quorum
Les Lacs Linear Park North Trails	0.99	Multi-purpose	Hard	Southwest
North Addison Park Walking Paths	0.67	Multi-purpose	Hard	North
Quorum Park Walking Path	0.56	Walking	Hard	North
Vitruvian Park Trails	1.21	Multi-purpose	Hard	Southwest
Winnwood Park Trails	0.18	Multi-purpose	Hard/Soft	East
<b>Park Trails Subtotal</b>	<b>5.82</b>			
<b>Public Space Trails</b>				
City Hall Walking Paths	0.03	Walking	Soft	East
Conference/Theater Trails	0.08	Walking	Hard	Central
Surveyor Water Tower	0.10	Walking	Hard	Southwest
<b>Public Space Trails Subtotal</b>	<b>0.21</b>			
<b>Off-Street Trail Alignments Total</b>	<b>11.18</b>			
<b>Trail Alignments in R.O.W.</b>				
<b>Enhanced Pedestrian Path</b>				
Celestial, Monfort and Oaks North	0.27	Multi-purpose	Hard	East
Conference/Theater Trails	0.20	Multi-purpose	Hard	Central
Fuel Farm Airport	0.12	Walking	Hard	North
Redding Trail South	0.24	Walking	Hard	Southwest
Morris Avenue	0.33	Walking	Hard	Central
Oaks North Drive	0.05	Walking	Hard	East
Spring Valley Road	0.24	Multi-purpose	Hard	Southwest
Vitruvian Streetscape	0.53	Multi-purpose	Hard	Southwest
<b>Enhanced Pedestrian Path Subtotal</b>	<b>1.98</b>			
<b>Trail Alignments in R.O.W. Total</b>	<b>1.98</b>			
<b>Grand Total</b>	<b>13.16</b>			



# Community Engagement Summaries

- Stakeholder Interviews
- Addison Trails Community Questionnaire
- Virtual Community Visioning Workshop
- Project Advisory Committee (PAC) Workshops
- Draft Future Trail Network Questionnaire





# Stakeholder Interviews

May, 2020

## Key Takeaways

### City Council

1. Cotton Belt Trail opportunities – first and last mile, TrOD
2. Trail design and amenities – shade, set as N Texas standard
3. Devise implementable/plausible solutions; articulate in various scenarios/phases
4. Connect the 4 residential areas - neighborhood loop trails
5. Stimulate the economy; promote new development with trails/walkability; recreation and business access

### Project Advisory Committee (PAC)

1. Off-street trails emphasis – nature trails, multi-use trails, recreation
2. Walkers/dog walkers are the primary users; walks within neighborhoods
3. Need more information about trails – how to go from one place to another, online info, establish groups, wayfinding signage
4. Connectivity to regional trails for cyclists to put in more miles
5. Provide amenities, establish pods of activity and meeting places

### Joint Council and PAC

1. Connect to existing trails, inside and outside the Town
2. Safety – lighting, street crossing, medians, not much concern about visitors
3. Use residential/local streets for on-street trails
4. Barriers – Midway, Tollway and Belt Line
5. Neighborhood connectivity, North to South and East to West

## Interview Notes

- Expand Addison pedestrian connectivity to surrounding desired pedestrian connections that are located outside of Addison
  - Future Bella Lane connection to Alpha Road in Farmers Branch
  - White Rock Lake connectivity
  - Northaven Trail connectivity
  - Trails in Plano connectivity
- Upcoming Projects that will add pedestrian connectivity
  - Midway Road



- Silver Line pedestrian path
  - Keller Springs Rd.
  - Airport Parkway
  - Montfort Rd.
  - Quorum Rd
- Safety
  - Future pedestrian paths off arterial streets needs to offer better protection from automobiles than what we provide now.
    - This can be accomplished with serpentine paths that meander between trees.
    - Streetlight fixtures help accomplish this.
    - Median like features at crosswalks help accomplish this
- Start Promoting Pedestrian Activities at the Addison Athletic Club
  - Biking groups can meet at the Addison Athletic Club parking lot before they venture out on a ride.
    - There can be various groups by how fast and how far the group will go.
  - Walking groups can be organized via the Addison Athletic Club, (AAC). Users can sign up for various groups at the AAC front desk, call in to the AAC or some digital form like Sign up Genius. These can also be organized by residents like we allow for those residents that organize the Racquetball Group.
    - Different groups can be assembled by age groups, days in which they want to walk, time of day, distance, etc.
- Art in Addison (i.e., more sculptures on the trails)
  - At present the only sculptures that we have on our trail system in Addison east of the Tollway are in residents front yards. We have ideal spots for one and or two sculptures at the entrance/exits points of White Rock Creek Park. Either one of these spots are ideal and both already have Town of Addison optical cameras to provide added security
  - We will need premier sculptures along the future Silver Line Pedestrian Trail
  - Artful bike racks
- East Addison
  - White Rock Creek Park is misidentified, actually a trail
  - Expensive homes built up on creek
  - Natural buffers for wealthy folks
  - Not a great location for a trailhead
- The Redding trail already connects to Vitruvian -more connectivity opportunities
- Belt Line, Midway and the Tollway are major barriers
  - Need to emphasize crossings
- 4 pedestrian hubs in Addison (north not substantial)
- Focus on first and last mile connections from the DART and Cotton Belt Trail
- Inwood Road Rail opportunity – utilize the ROW creatively, similar to the High Line
- Acquisitions are the biggest headache in Addison
- Plan priority – provide solutions that are implementable, plausible
- Primary connection need – Belt Line to the DART
- Deploy intercept opportunities in each neighborhood – publicize where and when (known pop-up events)
- 4 residential areas



- East Addison has great parks, but not great for extended walks; residents want a trail but are particular about where it comes through their neighborhood
  - North Addison is disconnected from the rest of the Town
  - Les Lacs – great access south, need better access west
  - Addison Circle – dog walking is popular; DART and Silver line will help adjacent connectivity
- Missing pedestrian links on Belt Line Rd
- Athletic Club is an ad hoc trailhead; people drive there, use restrooms
- Linkages
  - Other parks and trails
  - Dog parks
- Safety
- Short-term projects
  - 1 trail – path and cycle path
- Long-term projects
  - Benchmark standards – width, safety measures
  - Phasing is important
  - Enable Belt Line for barhopping, outings
  - Establish multiple scenarios
- Connect commercial areas
  - Village in the Parkway
  - Belt Line
- Beltway is a good street a trail
- Connect across Belt Line
- Addison’s trails have come a long way in 30 years
  - Linear parks from open space and easements
  - Aging trees and shrubs
- Cotton Belt Trail is a needed connection and will revolutionize the Circle
  - Transit Station is a game changer
- Most important to connect North to South
- Safety
  - Overgrown trees and shrubs
  - Lighting – security but also to limit tripping
  - Crossing streets (more improvements, bike safety, Midway project)
  - Existing Belt Line trail crossing E of Midway
  - Cameras at Winnwood and White Rock Creek – working
- Town Park and Bush Elementary will see more utilization with new development
- Addison Athletic Club trailhead, restroom use
- Les Lacs Linear Park North – good example of a residential loop trail
- Belt Line is the biggest challenge to cross
- Many residents exercise on trails in the morning
- Project Goals
  - Promote trails in Addison
  - Promote “trail-style” of living
  - Not only for exercise, but also entertainment
  - Better trail access
  - Promote parks and artwork

- Thematic loop trails
  - Utilize the asset management plan
- Values open space, walkability and biking
- Align funding with the outcome of the plan/planning process
  - Expedite process – have items in the 2020 budget
  - Short, mid and long-range solutions
- Promote more activity and movement in Addison
  - Shade-lined trails
- Amenities/design
  - Decomposed granite trails as an option
  - Native vegetation
  - Wayfinding signage
  - Benches
  - Trailheads
- Establish individual neighborhood loops
  - With neighborhood trail connectors
- Barriers
  - Major through streets, tollway
  - Texas heat – respond by establishing Addison as the standard of N Texas
- Addison Circle is the future of Addison
- Recommendations for development standards
  - Transit-oriented development
- Prioritize investment in the short-term
  - Connect East to West – PA 3, 5 and 6
  - Development standards in PA 2
  - PA 4 and 7 are already connected
  - PA 1 has limited residential
  - PA 2 – TOD development with higher density
- Addison Circle is a great place to walk, getting from place to place
- There are no bike trails in Addison – these are a need
- Arterial streets force people to walk on one side to the street, inconvenient
- Connectivity of destinations
  - Use trails to get from point A to point B
- Regional trail along the Silver Line is important to the Town
  - Bring people into Addison
- Overpass on the Tollway
  - Too expensive
  - May not get used, vandalized
  - Consider safe street crossings
- Primary goal – connectivity not only for recreation, but to have more walking choices
  - Enhance the economy
  - Establish a more convenient and safer environment
- TOD in Addison Circle
  - High-rise buildings
  - Mixed-use
  - Bring in more visitors

- Pearl Street example
- Trail connections already happening from Vitruvian outward
- Doesn't use trails but would like to when has more time
- Trails are a high priority for the community
- Prioritize key connections to improve quality of life
- Add trails in neighborhoods where the currently don't exist
- Connect Addison Circle to other neighborhoods
- Sacrificing a portion of the ROW for alternative modes of transportation is a good tradeoff
- Need better connections to regional trails – White Rock Trail, Preston Ridge Trail, Northaven Trail
- Residential streets fare relatively safe and suitable for bike improvements
- Health components of riding a bike outside (mental and physical)
- If you want to bike more than 15 miles, you need to connect to a regional trail system
- Most important components of the plan
  - Interconnectedness – trails should connect people the same way that the internet does; connecting ideas, people and places; trails are a resource that people should value more
  - Safety – more trail etiquette; some trails are too narrow; more education about trail rules for all users and modes
  - Resources available – provide more information about where to go and how to get around town; make it easier to access
- Get more people on trails and educate them how to use them
- Establish exercise groups on trails
  - Use various communications techniques to organize groups – apps, signup through the Town, etc.
- The Redding Trail is a good off-street trail for cycling
- The Dallas Area in general is not good for biking (road or off-street)
- There is limited trail infrastructure in Addison
- Trail connectivity
  - White Rock Lake is a preferred regional trail connection
  - Connect to existing trails
  - Connect to neighboring communities
- Recreational use of trails is primary focus
- Incorporate rest stations with drinking fountains
- Likes to run on a variety of trail types
- Trails in Addison are disjointed
- Adding signage and mile markers to explain where you are and where you are going
  - White Rock Creek Trail is a good example
- More lighting would improve safety and accessibility of trails
- Neighborhood/community access to trails is important
- Would like to see a larger, more comprehensive trail system
  - Explore different neighborhoods in Addison
  - Stimulate the economy – trail access to businesses

- Need more info about what is out there and where to go in Addison
- Addison is known for its trails
- Westgrove and Addison area
  - Missing sidewalks
  - Connect better to Addison Circle
  - Unsafe areas – traffic, tripping on uneven ground
- Athletic Center is Addison's primary trailhead
- More people are out exercising because of the pandemic
  - Promote community health and use of trails more afterwards
- Values the art in the community
- Walks to work – brainstorming sessions along on the trail
  - Trail along Les Lacs Pond
  - Chose Addison and neighborhood for walkability
  - Operates in there own little pocket of Addison
- Motivated to walk to events
- Not a hiker or a destination motivated trail user
- Dog walking for leisure and exercise is a top priority
  - Would like to see more dog parks and dog water stops along trails
- Primary focus in creating better connections in Addison
  - Connect to other parts of Addison from neighborhood
  - Vitruvian is an easy connection
  - Addison Circle is a hard connection
  - Farmers Branch connections
- Addison has great lighting
- Apprehensive to cross Belt Line and the Tollway
  - Would like trail access to Village in the Parkway
- Need more bike racks
- Improve crosswalks at trail intersections
  - Les Lacs, by the fire station needs improvements
  - Need better ways for how car and trail interface
  - Proton has a good crosswalk example
- On trails 5+ times per week
- Searches for safe residential streets to ride on
- Walks and runs in Addison Circle neighborhood
- Primary need for bike lanes in Addison is East to West and North to South
- Redding Trail is nice but inaccessible
- Arapaho road needs bike improvements, bridge too narrow
- Wayfinding signage implementation
  - Bike route numbers
- Prefers bike lanes but is open to sharrows on residential streets
- Wide-off street trails are the primary desire
- Needed connections
  - Primary connection is the SW to the N
  - Connect to agencies
  - Connect across the Tollway – no existing crosswalks
  - White Rock Creek Trail

- Connect existing trails together
  - Residents can experience the full range of what Addison has to offer
- With more connectivity issues, security on trails will be a huge issue
- Trails in Addison are the right size for walking
  - Wheelchair – trails in neighborhood accommodated well
  - Can get where they need to on neighborhood trails
  - 3-mile loop in neighborhood
- Crossing Belt Line is a challenge – need safety improvements
- Tollway is a barrier
  - Northaven trails do a good job of crossing the tollway
  - Designed overpass for bikes
  - Less traffic to worry about
- Walks or bikes to work
- Addison is full of people who exercise
- Dog walker
  - Trails should be more pet-friendly, more amenities
- Trails need more shade
- White Rock Creek Trail example of a good off-street trail
- Trails in Addison don't connect many places together
- Need for N/S and E/W thoroughfare trail connections
  - Connect bike paths to adjacent communities
- Trail near or around airport with viewing area
  - Soften the industrial look to the area
- Trails are the best form of exercise
- Nature trails
  - Supports mental health
  - Arbor Hills
  - Winnwood Park area
  - Develop another one in Addison – unpaved
- Off-street improvements are desired
- Uses the trails in neighborhood to the fullest extent
  - South to Vitruvian
  - North to Belt Line
- Need more shade on Arapahoe Road
- Micro-mobility safety concern
  - Embrace new technology, just plan for it
- Publicize trail security improvements to others
- Reroute bicyclists off of pedestrian trails – safety
- Trail maintenance is important
  - trash pickup - north side of Bush Elementary and connecting with Marsh
- Trail amenities
  - Working drinking fountains
  - Nameplates for plants on urban paths
- Beautification of the trail along Arapaho Road between Surveyor and Addison/Inwood Road

- Narrow focus on trails
    - Uses the White Rock Park trail
    - Trails at Winnwood
    - Uses the residential roads
  - Has an interest in trails across the community
  - Would train on other trails if they were better connected
    - Inside and outside of Addison
  - Opportunity for visitors coming through Addison for recreation and for attractions
  - Keep the streets the way they are in East Addison – they function well as local trails
  - Buy lot on Belt Line
    - Trailhead/parking
    - Civic use
    - Events
  - Residents in neighborhood don't want to see a medical center
  - Not enough collective will in the neighborhood to move the dial on certain topics
  - Add dog laws to trail signage
- 
- Creating bikeways in Addison is an interest
  - Having the Addison Trails connect to the greater trail system
    - Reach out to neighboring communities to connect to their trails
    - Priority regional connection to White Rock Creek Trail
    - Connect to mixed-use areas
  - Uses the Les Lacs and Redding Trails
  - A connection to Addison Circle is needed
  - Has worked on Trail Master Plans
  - Need more recreation in the neighborhoods
  - Hard to modify existing streets
  - Not interested in connecting to workplace
- 
- Walks a loop trail in the neighborhood
  - Strengthen to connection to Addison Circle to walk to events
  - Walks to restaurants on Belt Line
  - Priority is ADA compliancy and trail accessibility
    - Trails are ADA compliant, but sidewalks are not
  - There is not much of a need for biking in Addison
    - Not a good city for biking
    - You can use trails like the Katy Trail in Dallas
- 
- Trails in Vitruvian connections
    - Brookhaven College
    - Redding Trail
  - Addison Circle Park – central location with great walking access to events, retail, cafes
  - Vitruvian has commercial components – intended to be its own center
  - Trails can be planned in Vitruvian to retain and/or connect green space
  - Residents in Vitruvian
    - Desire more areas for children to play – possibly oversized games
    - Want amenities along trails, e.g. exercise equipment

- Dog friendly areas and amenities
- Bikes through neighborhoods in Addison to get to regional trails
- Walks to restaurants
- Identified barriers
  - Belt Line, Tollway
- Wide residential streets
  - Reclaim the width of the streets
  - Better bike access
  - Reduce speeds of vehicles
- Priority – make E/W connections in the Town
  - Cross the tollway
  - Belt Line – parallel or adjacent streets
- White Rock Creek Park trail
  - Easy neighborhood connections
  - Narrow
  - Used for walking and biking
- Connections to the west trails
  - Utilizes the trails
  - Better East to West connections
  - Difficult to move on Belt Line, consider Beltway for a trail
- Cotton Belt opportunities
  - Regional connections
  - Interconnection – transit, trail
  - Proximity to the Circle
  - Activate businesses – a conduit to bring people in
  - Neighborhood access, connections
- More parking/access to trails
- Signs along trails
  - How to use and wayfinding
- Les Lacs area has a good, extensive trail system
- Streets are the trails in Addison
- Addison is lacking bike infrastructure
- Connectivity
  - Connect pods of activities
  - Connect the different, unique residential areas
- Better education about the Cotton Belt
- Running in Addison
  - Not a great place to run
  - Trails populated by non-runners
  - Trails are not long enough
  - Find outlet elsewhere
- Walking in Addison
  - Great community for walking
  - Targeting the walking demographic with this plan



- Feels safe using the existing system
- Desire for a trail similar to the Katy Trail
  - Easy to use, well lit
  - Meeting points, spaces to socialize, nodes
  - Restrooms
  - Adjacent retail
- Biking is a priority if the conditions change to being safer
- Cotton Belt excitement
  - More greenery
  - Connect to West Addison
- Primary desire for an off-street trail
  - Addison is small
  - Connect different residential areas
- Cycling is not great in Addison; Plano is a better place to ride distance
- The main barriers are the Tollway and Midway
  - Bridges and overpasses
- Adopt bike route signage in Addison
- Trail access to Village on the Parkway is good from neighborhood
- Road that connects Belt Line to Monfort is a good trail route
- More foot and bike traffic in Addison/neighborhood is a good thing
- Establish a connected bike circuit
  - Limited crossings
  - Connect to other trails to make a 10 to 26-mile loops
  - Farmers branch connection opportunities



# Addison Trails Community Questionnaire

**May-June, 2020**

The Town of Addison is building upon previous community planning efforts to establish a City-Wide Trails Master Plan. As a part of the planning process, MIG, Inc. (MIG) conducted an online survey between May 5th and June 16, 2020. The purpose of the survey was to collect input on community member recreation needs, concerns, and preferences.

Total records in survey: 706

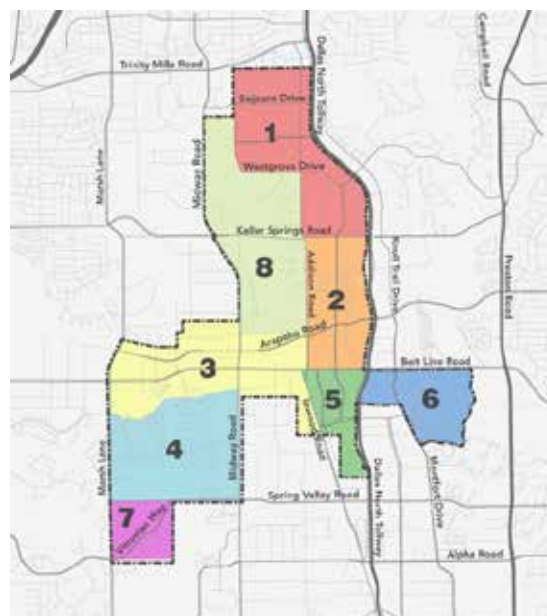
Full Responses: 526

Partial Responses: 180

## Reponses by Location (Planning Areas)

- 1. North Addison: 29
- 2. Addison Circle: 59
- 3. Belt Line: 33
- 4. Les Lacs/Midway Meadows: 162
- 5. South Quorum: 4*
- 6. East Addison: 69
- 7. Vitruvian Park: 190
- 8. Airport: 4*
- I Do not Live in the Town: 30
- No Answer: 13

*No residential uses in planning area



## Key Takeaways

- Addison is perceived as an “easy” place to walk around, however, biking is perceived as more difficult, and many survey participants do not currently bike.
- The majority of survey participants are on trails every day (primarily for exercise and to be surrounded by nature) and value them as being extremely important to the community’s quality of life.

- Trail types that support walking outweigh biking trail types, however, off-street multi-use paths are the most sought-after trail type for questionnaire participants.
- The Belt Line Planning Area was identified by questionnaire participants as having the most need for new paved trails.
- The Vitruvian and Les Lacs/Midway Meadows Planning areas were identified as having the most need for new unpaved or park trails.
- Of the 8 Planning Areas, Belt Line is the most desired trail destination from where participants live.
- Better trail connectivity within each Planning Area was prioritized above other town destinations by participants from most Planning Areas.
- Of the 8 Planning Areas, Belt Line is the most desired trail destination from where participants work, although the majority of participants do not work in Addison.
- The least need for new trails is the Airport Planning Area, whereas, Vitruvian and North Addison were also identified as having low needs.
- Top priority projects identified by participants are to improve existing trails and paths, connect neighborhoods to regional trails, and provide new sidewalk connections along streets.
- All trail amenity options were popular to participants, yet directional signage and gathering areas were the top 2 choices.
- Building new trails and paths narrowly outpaced updating existing infrastructure across the Town.



1. "Mark your level of agreement with the following statement about Addison: It is easy to WALK around Addison"

Answer	Count	Percentage
Agree	264	37.39%
Strongly Agree	168	23.80%
Disagree	92	13.03%
Neither Agree or Disagree	77	10.91%
Strongly Disagree	21	2.97%
Don't know	4	0.57%
<i>Not completed or Not displayed</i>	67	9.49%
<i>No answer</i>	13	1.84%

2. "Mark your level of agreement with the following statement about Addison: It is easy to BIKE around Addison"

Answer	Count	Percentage
Agree	138	19.55%
Disagree	136	19.26%
Neither Agree or Disagree	114	16.15%
Don't know	99	14.02%
Strongly Agree	50	7.08%
Strongly Disagree	40	5.67%
<i>Not completed or Not displayed</i>	67	9.49%
<i>No answer</i>	62	8.78%

3. "How important are trails to Addison's quality of life? (Choose one.)"

Answer	Count	Percentage
Very important	490	69.41%
Important	119	16.86%
Neutral	14	1.98%
Not especially important	5	0.71%
Not at all important	0	0.00%
<i>Not completed or Not displayed</i>	67	9.49%
<i>No answer</i>	11	1.56%

4. How frequently have you used Addison trails in the past year? (Choose the best response.)

Answer	Count	Percentage
Daily or Almost Daily	388	54.96%
About once per week	114	16.15%
A few times per month	55	7.79%
A few times per year	28	3.97%
Every two to three months	20	2.83%
I don't use Addison trails	17	2.41%
<i>Not completed or Not displayed</i>	67	9.49%
<i>No answer</i>	17	2.41%

5. What are the most compelling reasons to be on a trail? (Choose two.)

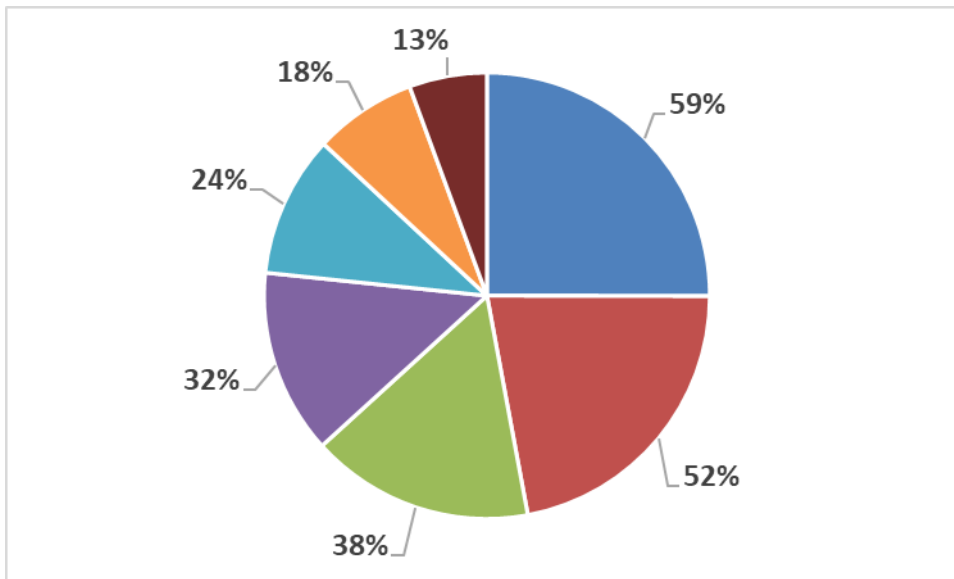
Answer	Count	Percentage
Getting exercise	416	58.92%
Being surrounded by trees, plants, and wildlife	361	51.13%
Walking or exercising with my dog (or another pet)	208	29.46%
Accessing shopping, restaurants or entertainment	68	9.63%
Exercising with others	48	6.80%
Getting together with friends, family, neighbors, etc.	40	5.67%
Commuting to work	14	1.98%
Other	12	1.70%
<i>Not completed or Not displayed</i>	67	9.49%

**Note:** “Other” responses can be reviewed in appendix

## Trail Types

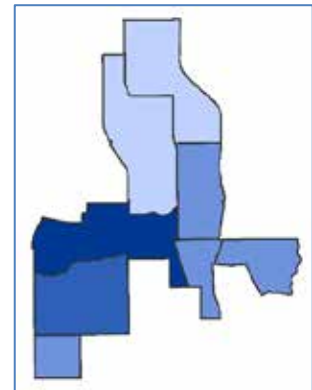
6. What types of trail connections do you want to see more of around Town?  
(Check all that apply.)

Answer	Count	Percentage
Off-street multi-use paths	417	59.07%
Wide walking paths and sidewalks	367	51.98%
Unpaved or park trails	270	38.24%
Multi-use paths in the public right-of-way	223	31.59%
Separated bike lanes	171	24.22%
Bike lanes	124	17.56%
Two-way cycle tracks	94	13.31%
Not completed or Not displayed	102	14.45%



7. Looking at the map, tell us where wide walking paths or sidewalks are most needed. (Check all that apply.)

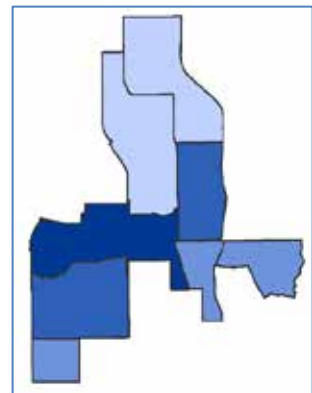
Answer	Count	Percentage
3. Belt Line	222	31.44%
4. Les Lacs/Midway Meadows	144	20.40%
7. Vitruvian Park	107	15.16%
5. South Quorum	104	14.73%
6. East Addison	104	14.73%
2. Addison Circle	103	14.59%
1. North Addison	84	11.90%
8. Airport	83	11.76%
<i>Not completed or Not displayed</i>	339	48.02%



Darker blue = trail type most needed

8. Looking at the map, tell us where bike lanes are most needed. (Check all that apply.)

Answer	Count	Percentage
3. Belt Line	84	11.90%
4. Les Lacs/Midway Meadows	56	7.93%
2. Addison Circle	55	7.79%
5. South Quorum	49	6.94%
6. East Addison	44	6.23%
7. Vitruvian Park	42	5.95%
1. North Addison	37	5.24%
8. Airport	34	4.82%
<i>Not completed or Not displayed</i>	582	82.44%

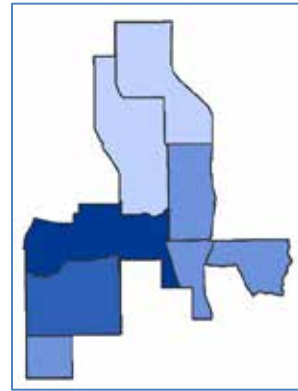


Darker blue = trail type most needed



9. Looking at the map, tell us where separated bike lanes are most needed. (Check all that apply.)

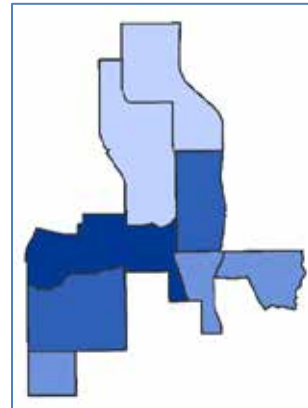
Answer	Count	Percentage
3. Belt Line	114	16.15%
4. Les Lacs/Midway Meadows	70	9.92%
2. Addison Circle	63	8.92%
7. Vitruvian Park	59	8.36%
5. South Quorum	58	8.22%
6. East Addison	56	7.93%
1. North Addison	43	6.09%
8. Airport	35	4.96%
<i>Not completed or Not displayed</i>	<i>535</i>	<i>75.78%</i>



*Darker blue = trail type most needed*

10. Looking at the map, tell us where two-way cycle tracks are most needed. (Check all that apply.)

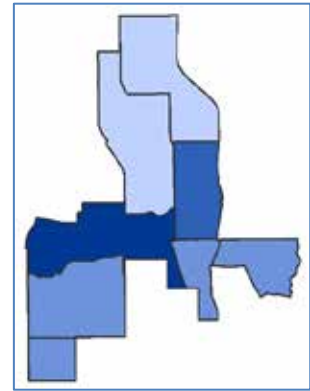
Answer	Count	Percentage
3. Belt Line	58	8.22%
4. Les Lacs/Midway Meadows	41	5.81%
2. Addison Circle	36	5.10%
7. Vitruvian Park	32	4.53%
6. East Addison	30	4.25%
5. South Quorum	28	3.97%
1. North Addison	22	3.12%
8. Airport	21	2.97%
<i>Not completed or Not displayed</i>	<i>612</i>	<i>86.69%</i>



*Darker blue = trail type most needed*

11. Looking at the map, tell us where multi-use paths in the public right-of-way are most needed. (Check all that apply.)

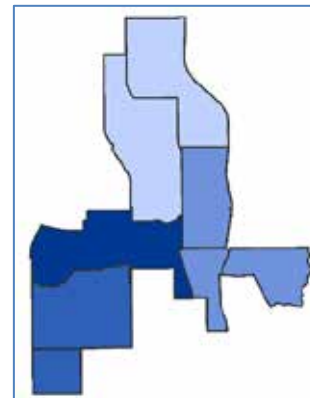
Answer	Count	Percentage
3. Belt Line	138	19.55%
2. Addison Circle	99	14.02%
4. Les Lacs/Midway Meadows	83	11.76%
6. East Addison	81	11.47%
7. Vitruvian Park	77	10.91%
5. South Quorum	74	10.48%
8. Airport	52	7.37%
1. North Addison	46	6.52%
<i>Not completed or Not displayed</i>	<i>483</i>	<i>68.41%</i>



*Darker blue = trail type most needed*

12. Looking at the map, tell us where off-street multi-use paths are most needed. (Check all that apply.)

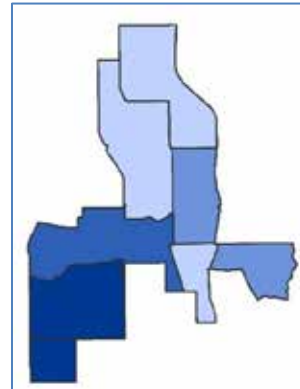
Answer	Count	Percentage
3. Belt Line	199	28.19%
4. Les Lacs/Midway Meadows	172	24.36%
7. Vitruvian Park	157	22.24%
2. Addison Circle	122	17.28%
6. East Addison	113	16.01%
5. South Quorum	103	14.59%
1. North Addison	89	12.61%
8. Airport	75	10.62%
<i>Not completed or Not displayed</i>	<i>289</i>	<i>40.93%</i>



*Darker blue = trail type most needed*

13. Looking at the map, tell us where unpaved or park trails are most needed. (Check all that apply.)

Answer	Count	Percentage
4. Les Lacs/Midway Meadows	113	16.01%
7. Vitruvian Park	111	15.72%
3. Belt Line	102	14.45%
2. Addison Circle	76	10.76%
6. East Addison	75	10.62%
1. North Addison	66	9.35%
5. South Quorum	62	8.78%
8. Airport	52	7.37%
<i>Not completed or Not displayed</i>	436	61.76%



*Darker blue = trail type most needed*

## Trail Connections

14. Looking at the map, where do you LIVE in Addison?

Answer	Count	Percentage
7. Vitruvian Park	190	26.91%
4. Les Lacs/Midway Meadows	162	22.95%
6. East Addison	69	9.77%
2. Addison Circle	59	8.36%
3. Belt Line	33	4.67%
I do not live in the town	30	4.25%
1. North Addison	29	4.11%
5. South Quorum	4	0.57%
8. Airport	4	0.57%
<i>Not completed or Not displayed</i>	113	16.01%
<i>No answer</i>	13	1.84%

15. From where you live, where are trail connections most needed in Addison?  
(Choose 1.)

Answer	Count	Percentage
3. Belt Line	187	26.49%
4. Les Lacs/Midway Meadows	79	11.19%
7. Vitruvian Park	70	9.92%
2. Addison Circle	63	8.92%
5. South Quorum	45	6.37%
6. East Addison	45	6.37%
1. North Addison	42	5.95%
<i>Not completed or Not displayed</i>	<i>160</i>	<i>22.66%</i>
<i>No answer</i>	<i>15</i>	<i>2.12%</i>

		From where you live, where are trail connections most needed in Addison? (TO)							
		1. North Addison	2. Addison Circle	3. Belt Line	4. Les Lacs/Midway Meadows	5. South Quorum	6. East Addison	7. Vitruvian Park	8. Airport
Where do you LIVE in Addison? (FROM)	1. North Addison	15	4	5	1	1	0	0	0
	2. Addison Circle	9	8	21	5	6	8	2	0
	3. Belt Line	1	8	12	3	3	2	2	0
	4. Les Lacs/Midway Meadows	5	13	81	21	8	12	17	0
	5. South Quorum	0	1	1	0	1	1	0	0
	6. East Addison	3	10	20	1	17	15	1	0
	7. Vitruvian Park	9	19	47	48	9	7	48	0
	8. Airport	0	0	0	0	0	0	0	0

16. Looking at the map, where do you WORK in Addison?

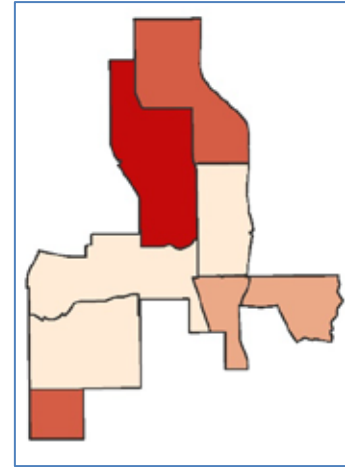
Answer	Count	Percentage
I do not work in town	367	51.98%
4. Les Lacs/Midway Meadows	35	4.96%
3. Belt Line	29	4.11%
6. East Addison	28	3.97%
7. Vitruvian Park	27	3.82%
1. North Addison	24	3.40%
2. Addison Circle	23	3.26%
5. South Quorum	22	3.12%
8. Airport	14	1.98%
<i>Not completed or Not displayed</i>	<i>119</i>	<i>16.86%</i>
<i>No answer</i>	<i>18</i>	<i>1.98%</i>

17. From where you work, where are trail connections most needed in Addison?  
(Choose 1.)

Answer	Count	Percentage
3. Belt Line	53	7.51%
2. Addison Circle	28	3.97%
7. Vitruvian Park	28	3.97%
5. South Quorum	25	3.54%
6. East Addison	20	2.83%
4. Les Lacs/Midway Meadows	16	2.27%
1. North Addison	13	1.84%
<i>Not completed or Not displayed</i>	<i>518</i>	<i>73.37%</i>
<i>No answer</i>	<i>5</i>	<i>0.71%</i>

18. Looking at the map, where are trails LEAST NEEDED in Addison?

Answer	Count	Percentage
8. Airport	130	18.41%
7. Vitruvian Park	94	13.31%
1. North Addison	75	10.62%
6. East Addison	57	8.07%
5. South Quorum	49	6.94%
2. Addison Circle	44	6.23%
4. Les Lacs/Midway Meadows	38	5.38%
3. Belt Line	37	5.24%
<i>Not completed or Not displayed</i>	<i>129</i>	<i>18.27%</i>
<i>No answer</i>	<i>53</i>	<i>7.51%</i>



*Darker red = trails least needed*

19. Why are trails least needed in the area you selected in question 17?

Answer	Count	Percentage
Answer	390	55.24%
No answer	187	26.49%
Not completed or Not displayed	129	18.27%

**Note:** Specific answers can be reviewed individually per answer to question 18 in the appendix.

## Trail Priorities

20. In your opinion, what are the highest priority projects from the following list?  
[Ranking #1, highest priority]

Answer	Count	Percentage
Improve existing trails and paths	93	13.17%
Connect neighborhoods to regional trails	93	13.17%
Provide new sidewalk connections along streets	90	12.75%
Provide new trails in natural areas and/or utility corridors	85	12.04%
Provide new multi-use trails along streets	56	7.93%
Provide new bike lanes in the street	42	5.95%
Other, please specify below	8	1.13%
<i>Not completed or Not displayed</i>	239	33.85%

**Note:** “Other” responses can be reviewed in appendix





21. In your opinion, what are the highest priority projects from the following list?  
[Ranking #2, mid-level priority]

Answer	Count	Percentage
Connect neighborhoods to regional trails	100	14.16%
Provide new trails in natural areas and/or utility corridors	92	13.03%
Provide new sidewalk connections along streets	80	11.33%
Provide new multi-use trails along streets (	72	10.20%
Improve existing trails and paths	62	8.78%
Provide new bike lanes in the street	47	6.66%
Other, please specify below	5	0.71%
<i>Not completed or Not displayed</i>	248	35.13%

**Note:** “Other” responses can be reviewed in appendix

22. In your opinion, what are the highest priority projects from the following list?  
[Ranking #3, lowest priority]

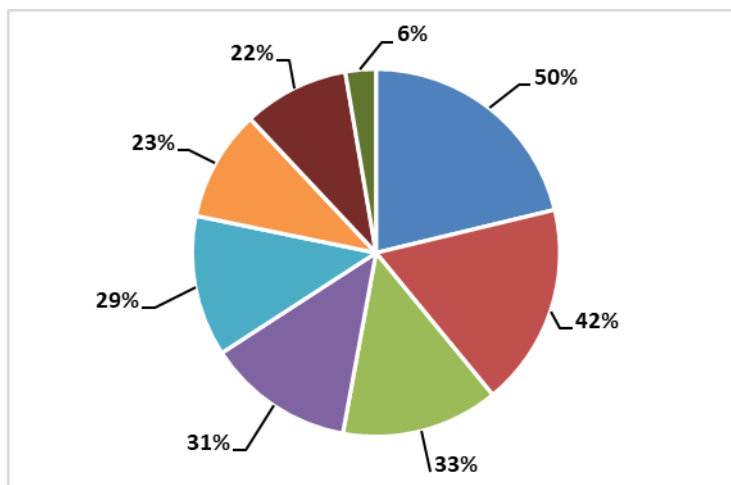
Answer	Count	Percentage
Connect neighborhoods to regional trails	97	13.74%
Provide new trails in natural areas and/or utility corridors	86	12.18%
Provide new sidewalk connections along streets	71	10.06%
Provide new multi-use trails along streets	71	10.06%
Improve existing trails and paths	53	7.51%
Provide new bike lanes in the street	46	6.52%
Other, please specify below	15	2.12%
<i>Not completed or Not displayed</i>	267	37.82%

**Note:** Rankings for #4-7 also available but question asked specifically for top 3. “Other” responses can be reviewed in the appendix.

### 23. What type of amenities would you like to see on trails? (Select all that apply)

Answer	Count	Percentage
Directional or wayfinding signage (to nearest places or trail connections)	356	50.42%
Small gathering areas (e.g., benches, viewpoints, pull-off areas)	299	42.35%
Art (sculptures, wall art, whimsical features)	232	32.86%
Attractive trail entryways or gateways	217	30.74%
Fitness areas or stations	208	29.46%
Nature play features for kids (e.g., climbing rocks, stepping stumps, spinner poles)	164	23.23%
Interpretive signage (history of the site, natural history)	156	22.10%
Other	45	6.37%
Not completed or Not displayed	159	22.52%

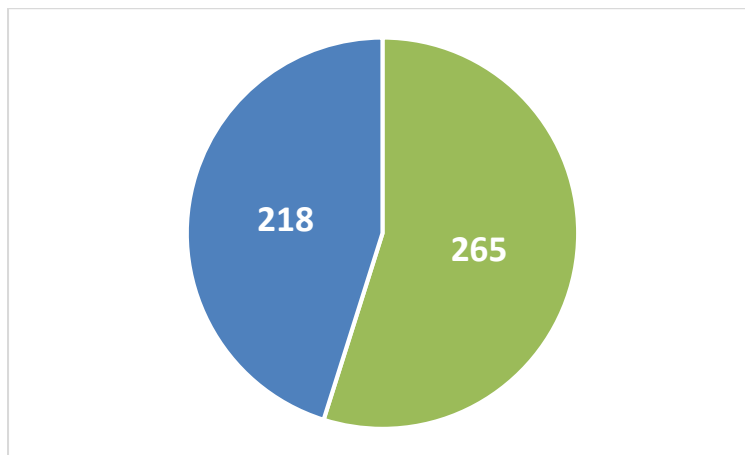
**Note:** “Other” responses can be reviewed in appendix



24. Which of the following should be our top funding priority? (Choose one.)

Answer	Count	Percentage
Build more trails and paths	265	37.54%
Maintain and repair existing infrastructure	218	30.88%
Other	33	4.67%
None of the above	6	0.85%
Not completed or Not displayed	159	22.52%
No answer	25	3.54%

**Note:** “Other” responses can be reviewed in appendix



## Please tell us about yourself

### 25. What is your age?

Answer	Count	Percentage
25-34	164	23.23%
55-64	91	12.89%
45-54	83	11.76%
35-44	79	11.19%
65+	76	10.76%
18-24	29	4.11%
Under 18	1	0.14%
<i>Not completed or Not displayed</i>	<i>166</i>	<i>23.51%</i>
<i>No answer</i>	<i>17</i>	<i>2.41%</i>

### 26. Please indicate your gender.

Answer	Count	Percentage
Female	317	44.90%
Male	197	27.90%
Prefer not to answer	6	0.85%
Non-Binary	4	0.57%
Other	2	0.28%
Transgender	0	0.00%
<i>Not completed or Not displayed</i>	<i>166</i>	<i>23.51%</i>

### 27. Most people think of themselves as belonging to a particular ethnic or racial group. How do you identify yourself? (choose all that apply)

Answer	Count	Percentage
Caucasian/White	377	53.40%
Hispanic/Latino	71	10.06%
Asian or Asian American	34	4.82%
African American/Black	24	3.40%
Multi-racial	13	1.84%
Native American	6	0.85%
Other	4	0.57%
<i>Not completed or Not displayed</i>	<i>166</i>	<i>23.51%</i>

28. Do you have children living in your household?

Answer	Count	Percentage
No	381	53.97%
Yes	83	11.76%
No, but children are frequent visitors	49	6.94%
<i>Not completed or Not displayed</i>	166	23.51%
<i>No answer</i>	27	3.82%

29. How long have you lived or worked in the area?

Answer	Count	Percentage
1-5 years	216	30.59%
More than 10 years	166	23.51%
5-10 years	93	13.17%
Less than 1 year	50	7.08%
<i>Not completed or Not displayed</i>	166	23.51%
<i>No answer</i>	15	2.12%

## APPENDIX – OPEN ENDED/“OTHER” RESPONSES

### Q5: 5. What are the most compelling reasons to be on a trail?

- Getting Exercise
- Getting to other parks
- Safer than walking/biking the street sidewalks
- Trails allow walking without the noise or traffic of city sidewalks. They also allow small children to ride their bikes without the risk of being hit by a car. Our trails are very important to our community.
- Just walking
- Watching football, soccer, volleyball and baseball practice
- My issue with Addison on Vitruvian Way. Crosswalk is so dangerous. Lighted crosswalk is necessary. Cars speeding don't have enough time to slow down. I've almost been hit several times.
- Ir a la lavandería o al estacionamiento
- Taking my toddler on a walk to get out of the house and enjoy nature. We love being able to walk to the duck pond and playgrounds!
- On the southern side of town the restaurants are not easily accessible. The trails don't continue to my knowledge to a place that would allow me to go from proton drive to the restaurant area of town.
- biking
- Cycling, skateboarding

### Q18: Why are trails least needed in:

#### North Addison

- Less populated urban area
- There are no businesses of interest in that area.
- Less people
- Most disconnected and least residential
- Less foot traffic activities there
- Selfish answer- I'm usually not in North Addison
- Most of all restaurants, shopping, parks, events and businesses run along belt line and Addison circle. But you can only drive to do any of these things cause it's so anti pedestrian and cyclist. Incredibly dangerous
- Less residential
- Restaurants/Bars/Entertainment are mostly along Beltline Rd.
- I am looking for connecting trails to Dallas area biking/hiking/Inline skating trails, mostly around river/creek banks. No such trails available in North Addison, so no need to connect.
- Far from my house

- Too commercial
- Not many housing there
- No residents mostly commercial users.
- Na
- Business district
- Too far
- Unpaved trails. However a dedicated bike lane would be great on Wstgrove and Soujorn.
- I do not go there much
- Not as much walking.
- I don't see it as a path that people normally use.
- Too much traffic
- Too close to tollway
- Too much traffic because of location.
- Don't go there
- They have some and there are more homes
- No restaurants or stores
- I actually think they may be needed all over.
- Less housing, more commercial area
- Seems like a barren area. Maybe that could be improved.
- More apartment, condo area, lack of parks.
- Not the right surrounding for walking
- More isolated part of town and don't live up that way
- Not as many spaces that need connecting
- Lack of residents/connection
- Too many office buildings
- The area seems too residential and commercial. What shops or restaurants are there in that area?
- We don't live near.
- Business and commercial area with not much residential area located here.
- To keep The mass healthy
- Most of the population and commerce is in south Addison.
- Just businesses. No homes/apt
- Tollway and traffic
- Fewer restaurants, no need to access Health Club via bike/trail
- least used area
- It's the one I am least familiar with and there was no "no opinion" option!
- Further away from Addison retail & residences

### Addison Circle

- The area is not set up for bike. It's already a walking area.



- Addison Circle Park is fabulous and the whole circle area is easy to talk through.
- There are great sidewalks and parks in that area already.
- Not enough area
- Already easy to navigate by foot, or by bicycle.
- I don't know tbh
- They already have connectivity and great sidewalks.
- The circle is easy to get around in.
- the circle is too dangerous for trails. drivers are reckless and trails would be dangerous
- Trails already there not sure
- There's already a good amount in and around the area
- Trails could be added but the center is already pretty walkable. Would benefit from more landscape going north from the park.
- There are plenty
- Not many residential buildings there, mostly office buildings and too many cars crossing
- There are already paths and walkways in Addison Circle
- Already overdeveloped
- It's already easy to walk around Addison Circle, it's trails leading to Addison Circle or Beltline that are needed
- They already have a lot.
- Already have them, but need to connect with Vitruvian area not using a major street.
- No
- Because that's more restaurant area etc
- It's easy to walk around that area
- They are already perfect!
- We have many walking and riding options in place
- There are a lot of walking trails that exist
- The Addison Circle has great existing pathways to all parts of the circle.
- Already fairly well connected
- Because there are enough trails in that area.
- Not enough space and land in the area
- Lots of walking areas there already
- Existing Streetscape
- The area already has a great area to workout in, be with friends, or pets in the area.
- There seems to be adequate trails at this time in Addison Circle
- Plenty of sidewalks, parks with trail, and removed from traffic

### Belt Line

- Too much traffic
- Too commercial
- Too much traffic and congestion.

- It's a busy place with too much of traffic at most times. So people hardly use that area to walk around
- there is no one directly to belt line
- Area is already developed
- This is heavily a business and restaurant area
- Belt line is congested as it is. No need to remove car lanes for trails.
- No use
- I dont live in that area
- Nort
- Too many cars and traffic
- To much traffic
- No los utilizo
- Very congested with vehicles
- Streets
- This question is weird and I have no answer
- all Belt Line.
- It sees like teh sidewalks are adequate
- To be more safe when we walking
- There are some there already
- Too busy of a road
- Heavy traffic
- More of a driving area
- Already plenty of sidewalks
- I thought it was pretty well connected there. In the circle there are only sidewalks.
- Commercial area

### Les Lacs/Midway Meadows

- There are already a lot!
- They have a very nice long trail
- We have several excellent trails around the gym and surrounding areas
- We have good coverage for getting around.
- The trail provided seems like enough for a walking and biking path.
- There is a great trail already
- Midway
- Already have
- We have a lot of trails around Les Lacs, going from the North connecting to Addison Circle , South to Vitruvian, West to Marsh Lane, East to Midway Road
- Plenty already
- Trails available now
- less traffic

- Already have a lot
- No shops there
- Already have
- Sufficient already
- No parking available near the parks, same at celestial so only people who live near there can use them.
- There are plenty
- Already lots of trails in back of that area
- Too much traffic
- Other areas have a more pressing need. That said, it would be nice to have an unsaved trail in area 4.
- The trails that already exist are adequate as they are.
- Seems to be the more industrial/warehouse district. Not much foot traffic.
- There are enough presently. Other areas need attention more.
- we already have wonderful trails
- Plenty of trails already exist in that area, more are needed elsewhere.
- Because the damn things are everywhere.
- Don't like the area no trees
- There are couple trails in that area.
- I don't go that side

### South Quorum

- Less people living there and no restaurants
- move not found any
- Has a large park already
- Most business are out of business there
- Mainly office space.
- I personally do not see much foot-traffic down that way.
- Not residential area
- Smaller area with not as much foot traffic due to the proximity to the tollway
- Less residents. More industrial
- Too many buildings
- Take care of our existing trails versus building more
- Less foot traffic
- Who goes there?
- It's too busy of an area
- Too close to highway
- Office buildings
- Less residents
- Mainly office buildings

- More homeless typically found in this area so feels like a less safe environment
- Easier connection to Dallas
- Too much traffic near the Tollway
- I don't go there
- Too many buildings in area and proximity to DNT
- Mostly Apartments
- From what I know of the use of the area, it is mostly commercial/office space so I don't think trails would be used to as great an extent as other locations.
- Good trails and signals already
- It's all office buildings. They would ve seldom used.
- Very heavy vehicle traffic there and it just seems impractical. Basic design is just not bike or pedestrian friendly.
- business/office area so not conducive to exercise
- Non residential area

### East Addison

- Because it is mostly store fronts
- Too close proximity to DNT
- Crossing the tollway intersections are dangerous
- There are trails that serves the needs. No additional needed or wanted
- There's a great one connected to the gazebo already
- Heavy traffic
- Have them now. Do NOT need more.
- Inconvenient location
- the area is suburban
- More car traffic than walkers or bikes
- Not connected well with the rest of addison
- High traffic
- Not heavily populated and busy streets.
- The area already has development to walk around.
- No preference
- safety
- Mostly streets there
- East Addison requires you to cross over the tollway and that is a very busy spot, unecceary to do that when he have all of Addison to walk/run. Also, Wast Addison does not have much nature scenery so not as fun to run by.
- Not to sure. The previous question required an answer of a location so I chose this one
- Nothing over there
- Largely commercial area, hard to park/access exisiting trails there (White Rock)
- Mostly Commercial

- Too much traffic and too many apartments
- It is a commercial restaurant/retail/entertainment area.
- Not as heavily populated
- 6. East Addison is a lovely and fairly well self-contained environment with wonderfully walkable neighborhood streets that seem to not be overly-trafficked.
- Don't really know, just guessing
- Hardly visit and it's the edge of Addison
- They already have the park and it is for a select few.
- Around the shopping areas
- Trails are needed everywhere. I didn't want to select an answer for this question.
- Separated by NTTA & heavy car traffic
- Less people & there is already a beautiful park there
- Around Beltline and tollway
- I don't know.
- Whiterock trail already exist
- All shopping and parking lots
- Not as heavily populated
- Tollway traffic and Shopping Center (Prestonwood)
- Lots of commercial buildings. More of a need for trails to get to and from that area safely/without having to use the road
- Because we already have trails by White rock Creek and celestial Park

### Vitruvian Park

- Good trails already
- There are already trails there
- Already has trails
- Already have them
- Already has trails, while there are none that I know of in north addison
- Because there is already a park
- They have a lot already.
- There are already plenty of trails in the area
- access is there
- Already have great ones
- Vitruvian already seems to have trails.
- Trail already exists and no where to connect with trail from Vitruvian
- There are a lot there already.
- It feels like there are already a lot there
- They already have them
- Already have nice trail there
- Existing trails

- Already seem to have a enough open areas
- Already planned and implemented within the developement.
- There are already walking trails
- They already have a huge walking/biking trail
- There are already plenty of trails.
- Existing sidewalks and paths already exists.
- Vitruvian Park already has trails and sidewalks.
- Bcz there are many trails there already & they are wonderful.
- They're already there
- Already there
- There is already a nice wide trail around the lake plus a connection to Brookhaven College.
- There are great walking paths already.
- The connection to Brookhaven is perfect
- There is trail already there
- Plenty of methods to travel. Low car traffic. I want the ability to walk or bike to restaurants
- All
- Because we already have great ones!
- There are already really great trails in this area.
- Mostly exists already.
- Plenty
- Plenty of current trails!
- They're already there!
- We have some
- They're all set already
- Because there is a park already
- It is full of trails and parks and connected to Brookhaven
- Already exist.
- Already has trails
- It already had trails but the trails need connection to Addison circle to be more effective and practical. Right now the trails are for mostly leisure use but connection to Addison circle and transit center could cause other types of uses
- There are a lot already
- There are already a lot. that may be bias
- Already there
- PATHs are already there
- Many trails already available
- There's a lot already! I use them often, and would love to see a comparable amount of trails other places in Addison. Additionally, I'd like to see well-kept and well-placed trails like those in Vitruvian leading from Vitruvian to other parts of Addison.

- It already has trails and is easy to connect to the les lacs trails. The ability to walk and bike becomes limited beyond that.
- The place already has tons of trails
- I feel like the current side walks in that are make it easy to walk and bike to/from the park. If anything, I think it could be expanded into the surrounding area more (like how it connects to Brookhaven, we love taking that route)
- There are a ton of trails already.
- Already built up
- They have some
- Already present.
- There is already a good representation of tree-lined trails in Vitruvian Park
- Already adequate connection and safe
- Because we have the Brookhaven College trails
- The park is wide enough for walkers and bikers
- I think it already has enough
- The park has great trails already! Would like to see some of the other areas be a little more accessible!
- Until there is some cooperation with Farmers Branch it would be a waste
- Plenty of trails here already.
- Already exist
- They already exist
- The trails are nice. Bike lanes are needed to keep bicycles off the trails.
- They already have an extensive walking area.
- There are already so many
- The trail is already great as it is.
- The Town has done a good job with connectivity here.
- There is a trail there around vitruvian park & Brookhaven college which seems adequate
- already sufficient
- Vitruvian already has a nice trail around the lake.
- It's already very well served by trails
- They already have them
- Already have them I
- The trails here are great and connect through to the trail around Brookhaven College so I don't think you need anymore trails but an outside basketball court would be awesome.
- It already has trails that are modern and do not need upgrades.
- There are great trails there already
- What's there is enough. But, it could always use improvement.
- Already there
- they already have them. beltline is a highway and not safe. need to be able to walk safely from Montford all the way to Addison circle



## Airport

- There isn't much around the airport.
- No residents, minimal public access.
- It seems like there is a lot of space there already, plus I don't bike or walk in that area
- There are less trees around airport.
- Idk don't have an opinion but you required an answer
- That is a hard one. Really I think trails are important everywhere in Addison. I love this place.
- Congested area due to vehicular traffic
- Safety Around the airport
- Too noisy
- Because there is less residential population
- Boring
- I don't think many people want to just stroll around the loud airport
- I don't spend time there personally a lot
- Who walks or bikes there, no one
- It should be a secure area
- I use the Airport area the least.
- Not a lot of trail users in this area
- don't feel this area is conducive to trail biking/walking
- The airport takes up most of the space. Biking lanes on Midway or Addison Rd would be nice.
- Because it's an airport
- Not as populated
- Seems it would be hard to put trails in/around an airport.
- security
- they are the least used
- Keeping the area congestion free
- No activity
- Too loud to enjoy a walk with planes taking off and landing
- Concrete jungle - not much nature, no consumer businesses to get to.
- Not a residential area
- Too noisy and congested.
- Not many live there. Not direct access
- It's the airport
- Airport too loud
- Just think we don't need them
- I don't think people will use it because it's an industrial area with limited shops/restaurants to walk to. It also doesn't connect to a densely populated area.
- I'm guessing less people walk in that area.

- Airport
- I do not believe unauthorized personnel are allowed/should be allowed on airport property.
- Not enough walk there
- They provide no benefit
- There is not a lot of retail and restaurants in the area. Belt line needs to be more pedestrian friendly with better walking trails connecting restaurants.
- Busy intersection
- It's a grungy industrial area anyway. Who would want to walk around there?
- people use public transportation near the airport
- 
- The airport is a busy and loud hub of Addison which would take away from the peaceful trails
- is more common move in car
- No one walks to the airport
- Who walks at an airport?
- Not scenic area
- It's near the airport, too much noise
- Foot traffic not needed there due to less places of business and residences
- Never found the area near the airport scenic enough
- More commercial buildings there. Less green space.
- Too commercial.
- I'm least likely to walk around in that neighborhood.
- take an uber or a lyft to the airport, who's biking to the airport?
- commercial area business aren't really suited for pedestrian traffic.
- NA
- They may be needed around the airport, but this area is largely not walkable
- Because it's the airport
- Very little foot or bike traffic.
- Not much need to walk around here in my opinion
- not many amenities in the area to access, least "pretty" area
- Could be interesting at some point with new development going on but for now would not be interested in walking over there.
- No retail/entertainment venues or scenery
- Cause it's the airport
- Too much traffic
- not as residential
- too many airplanes
- They would be underused.
- Very commercial area
- Air Traffic

- It seems more industrial
- No need
- Not needed
- Less need
- Fenced off
- Near air port there is not so much pedestrian walking, exercising, or using bikes.
- No foot traffic or reason for it. The area is too commercial and cars operate at very high speeds.
- It's already gated and relatively easy to ride on back streets near airport.
- Mostly airport
- Most of the airport land is restricted areas. It is a large area that could have long trails, and lead to the far north end destinations, but I'm not sure how that would work with the existing layout.
- Restricted areas
- I already feel like I'm compromising my health by living so close to an airport... especially after the approval for commercial jets. I don't intend to get any closer to the airport than I need to, especially when exercising.
- Lack of greenspace, high traffic, jet fuel exposure.
- I am assuming this is a restricted access area due to FAA.
- There's an airport there
- Busy
- Traffic and noise
- Not a pleasant place to walk because of noise and air pollution
- There are just businesses there so as long as there are feeders to Midway for safe travel there are no other needs.
- Only to connect to other trails. Otherwise, not needed at the airport

**Q19: In your opinion, what are the highest priority projects from the following list?**

- I would love to be able to safely bike from Midway Meadows to east addison in some kind of protected lane or corridor.
- I live extremely close to Addison. I live in Dallas, on Southern, between Noel and Montford. I hate walking along streets where side walks are missing. Love the trail near Celestial, near the White Rock church. It's scary to walk by the restaurants and Beltline. I do not feel safe with crosswalks and traffic on busy Beltline and the parking lots. With all our restaurants, wish it was easier to walk to and around them.
- Dedicated bike trails safe to access all the way off the streets or separate from traffic.
- Cleaning up the trash more often. The trash cans become full very easily and trash fly's around everywhere making the park very trashy and messy
- remove dangerous obstacles like speed bumps/humps and the speed bump grids at the intersections of trails and roads. These are not helpful, rather than annoying (for pedestrians and bikes) and dangerous (for Inline skates and such). Also avoid and

remove unnecessary stop signs on minor roads (e.g. Proton and Beltway with adjoining residential cul-de-sacs and no-outlet loops like Peabody, Canot, Park, ... ).

- it would be great if there was an easy way to get across Beltline Road (a bridge or wide walking area), connecting south and north Addison areas
- Create or enforce an ordinance for joggers/walkers to use sidewalks when available. Add sidewalks to areas where trails/paths terminate to connect to parking areas.
- Add adult exercise stations to existing trails
- Concrete streets & sidewalks are especially hard on legs & back. I move over to the grass when possible.
- Make running/walking/biking paths in North Addison longer trails than just a dog park.
- I love this area so much, renting inn the circle and I'm thinking of buying in the area. I am disappointed in how many disrespectful people there are that do not pick up after their dogs. You are kind enough to provide doggie bags and trash cans throughout the circle and it. really is getting bad. I have to make sure I don't step on dog feces. I personally will pick up after my dog and will always pick up that was left behind from someone else just to help out.
- Move mailboxes off of the sidewalk and make sidewalks ADA compliant.
- I would like to see a paved sidewalk created on Midway on the airport side, North end of Midway.
- was a choice
- I would like to see asphalt or rubberized asphalt used for the various trails. The concrete is nice, but it is hard on feet and bodies for prolonged and/or daily use like I have been during the pandemic.
- Take care of what we have versus building new
- Flowers and bushes have really fallen short the past 2 years from Previous years
- we need a dog park
- Need for safety. Car drivers are idiots and will run over bikers
- Just fix the Alpfa Rd connection trail !
- Lighted crosswalk on Vitruvian. Cars go to fast and not looking for pedestrian.
- Suggestions: On a smaller scale, it would be good to have an interesting garden new trail such as the Queen Mary's Garden (with hedges; stones; using imagination in walking); or the Kensington Gardens; or the movie gardens of Narnia. Additionally, perhaps something in a different area like Klyde Warren Park with cement fountains and rented board games.
- Pedestrian trails and dog areas
- There needs to be one restroom located somewhere along the trail
- Providing shade along paths
- disc golf course
- I think the paths that exist today are really quite nice, and Addison does a great job of keeping them up. I would love to see more!
- Sidewalks and bike path full length on Addison rd
- Better landscaping and trash pick up on existing trails.

- I'm not sure, I'm happy with the trails I access in Les Lacs. I don't walk to restaurants or anything outside of my neighborhood.
- Plant shade larger trees along sidewalks in North Addison, and along any newly constructed walkways. The vast amount of cement construction is hot, crowded, imposing, oppressive, ugly. Also lack of shade and greenery discourages walking for North Addison residents
- Please add a Frisbee golf course somewhere in Addison!
- Better street crossings
- Add sidewalk on street
- We need a local off road mountain bike trail. Could easily parallel the les lacs trail
- Connect the Sam's apartments to the dog parks without having to go through Midway Meadows
- connect neighborhood trails, create new ones
- Better cross walks to connect neighborhoods to Addison Retail & Restaurants.
- Can you immediately establish a walking trail directly to the post office so we don't have to cut across private land? Why can't a gate be made at the SE corner of the post office property?
- The click and drag didn't work. 1. Improve existing trails and paths; 2. new trails in NATURAL areas; 3. multi-use trails along streets.
- Not interested
- I would like to be able to bike from White Rock Creek trail utilizing the creek by the Gazebo, finance bldg, Town Hall, Village on the Parkway all the way to Vitruvian.
- Adequate lighting and safety measures- emergency call boxes etc
- The trails I walk on need more shade.
- Please let us not turn Addison into Portland, OR. Once bike lanes come in the extreme bikers soon follow. Not a sharing breed, they will hog up every accessible lane other than their own.
- Add sunshades to dog parks. Its hot out there!

**Q22: What type of amenities would you like to see on trails? (Select all that apply)**

- Public restrooms, water station, place for shade to cool off
- Dog water fountains and poop bag dispensers
- Dog parks
- None
- Trail markers to assist emergency response
- flowers, attractive bushes, trees, foliage
- Convenient stores or cafe
- police bike patrols, more trash cans, water fountains
- More trashcans along streets and at bus stops.
- Mileage markings

- flowers, instead of dirt on the sides of paths
- Bathrooms
- Dog Parks
- mileage indicators
- No new trails, just take care of existing
- Don't spend unnecessary money building. Fix what you have.
- Running pavement option on trails for those that do not like to run on the hard cement
- 110v outlets
- Enclosed dog areas /off leash
- Bikes, skateboards, razors at Vitruvian are dangerous coming up behind me walking. If I don't know they are coming and take the wrong step I've almost been hit and my dog too. Then you see bikers etc wearing head phones. Separate wide bike lane around Vitruvian or no bikes.
- Disc Golf Course
- see above suggestions
- More dog fountains that function and dog waste areas. The Katy Trail has a great layout of fountains and dog waste locations.
- Protecting native flora & fauna above selfish human interests & practices
- restrooms
- Path lighting
- signage to identify plants
- Dog areas
- Water fountains, shaded benches?
- swings for adults. I have seen a few using the ones for kids!
- Drinking fountain
- Restrooms
- Identify flowers
- Shade trees
- Nature. Long trails. Don't need expensive infrastructure.
- Disc Golf Course Please!
- Add exotic flowers with identifying nameplates
- Better parking availability by White Rock Trail on Winwood.
- I did not check many of these bc I find that when you have "gathering spaces", people litter, harass passers-by, hog the spaces for large parts of the day, etc. It's nice in concept, but not always in ultimate result. Also, I think the art that has been installed to date is unattractive and a waste of money.
- Safety features: emergency call buttons, lights, etc
- Water stations for people and pets
- Water fountains
- Mile markers, solar lighting where appropriate
- Enhanced Lighting

- More natural areas such as the White Rock trail. Not as much manicured areas and would be nice to have more of the 'pollinator gardens and wildflower/natural grass areas.

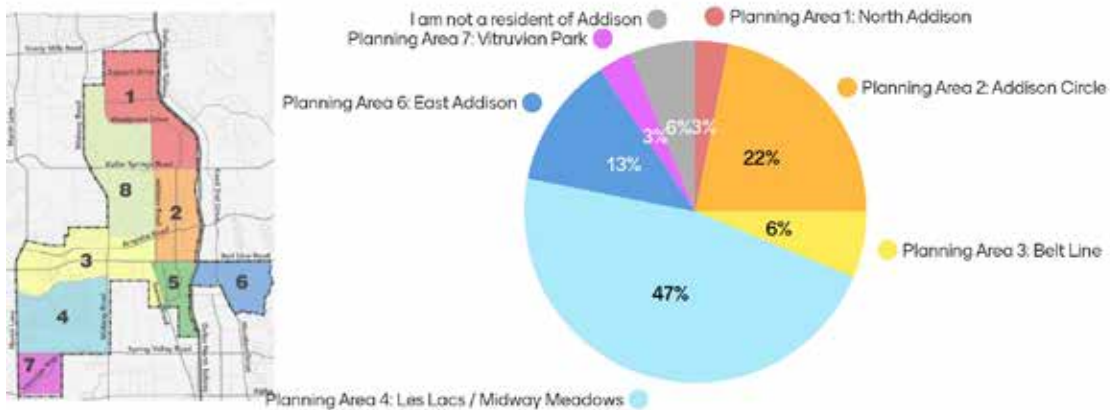
**Q23: Which of the following should be our top funding priority? (Choose one.)**

- Clean up trash at Vitruvian Park
- Cleaning up trash and cleaning out trash cans
- The Vitruvian park and the trails need cleaning as the water is very dirty and certain areas like waterfalls and such haven't been cleaned. Please fix the issues with cleaning
- Widen existing paths to 10'
- Connectivity within East Addison and east to west corridor
- Connecting Oaks North development to Winwood park
- Safe Bike trails
- build more trails and connect them all
- connecting sidewalks to parking areas.
- Connecting Addison trails to regional trails
- softer trails
- keep it clean
- Bathrooms
- bike lanes separated from traffic
- would like to see asphalt, rubberized asphalt or similar "soft" surface used on trails.
- Just pave the existing one!
- Lighted crosswalk between Fori and Cottonwood apts. Most dangerous. My biggest concern.
- Make a large loop including Brookhaven college
- Disc Golf Course
- Safe bike trails
- Reparar los danos internos de los apartamentos
- More drinking fountains and pet waste locations
- improve the width of trails to accommodate bikes and pedestrians more comfortably with social distancing in mind.
- restrooms
- Activities for children
- Shade trees around existing apartment buildings (Ledgemont Ln, Quorum east side, Keller Springs construction near Addison Rd, Westgrove airport area, along Addison Rd from Westgrove to Addison Circle Park) to cut down on heat, pollution, and ugliness
- Add a Disc Golf Course Please
- Add sidewalks where none exist that are appropriate for all citizens including the disabled
- Sidewalks on at least one side of every road.
- Maintain and improve what we have, while adding more trails and paths to include the addition of Bike paths (bike paths should be separate from Walking, but sharing the same path width)
- Connectivity and beautification
- Build sidewalks along mail roads like Arapaho, add sufficient lighting on existing trails
- See above





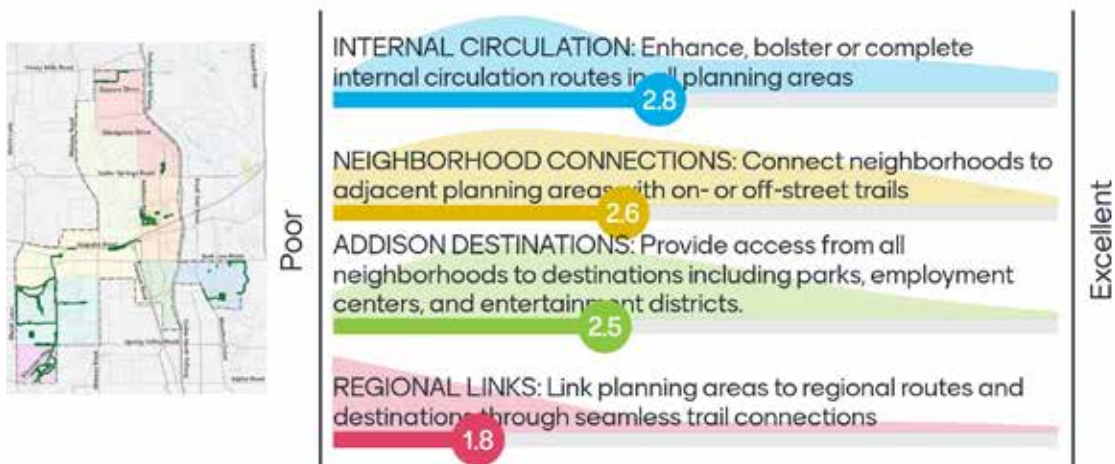
# Where do you live?



CITY-WIDE TRAILS MASTER PLAN



## Project Goals: Overall, how well does the existing trail system satisfy these goals?



CITY-WIDE TRAILS MASTER PLAN



# How important is it to implement each Project Goal in Planning Area 1?



# Which trail typologies should be prioritized in Planning Area 1?





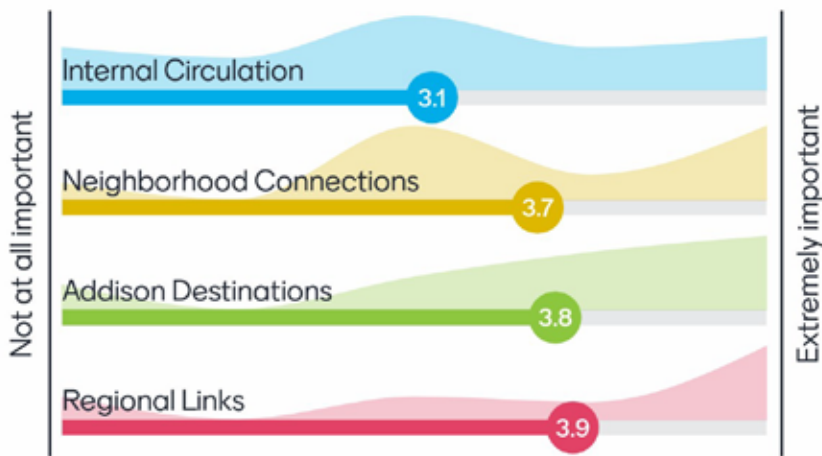
## How important is it to implement each Project Goal in Planning Area 2?



## Which trail typologies should be prioritized in Planning Area 2?



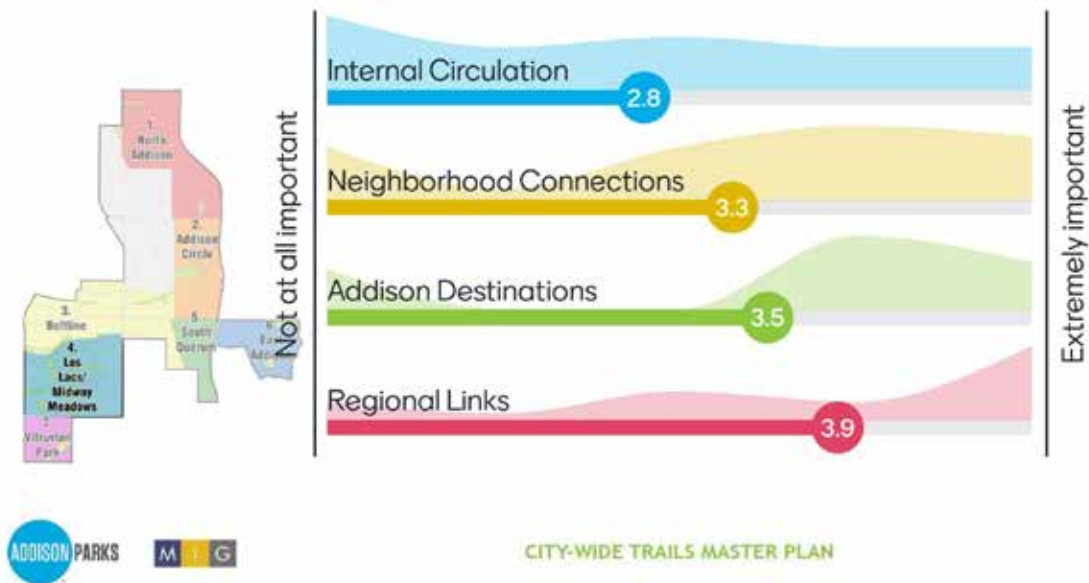
# How important is it to implement each Project Goal in Planning Area 3?



# Which trail typologies should be prioritized in Planning Area 3?



## How important is it to implement each Project Goal in Planning Area 4?



## Which trail typologies should be prioritized in Planning Area 4?



## How important is it to implement each Project Goal in Planning Area 5?

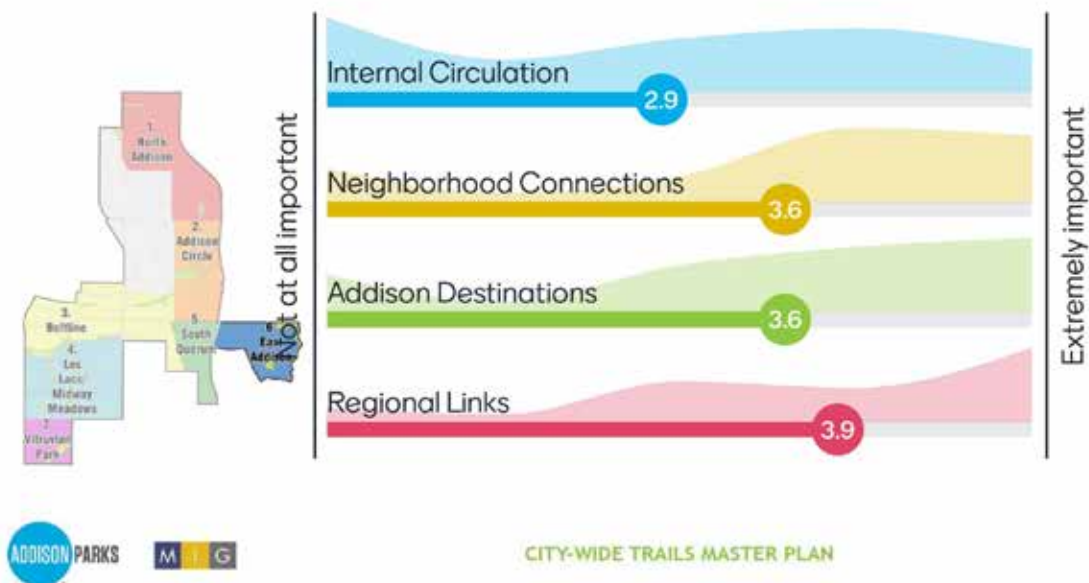


## Which trail typologies should be prioritized in Planning Area 5?





## How important is it to implement each Project Goal in Planning Area 6?



## Which trail typologies should be prioritized in Planning Area 6?



# How important is it to implement each Project Goal in Planning Area 7?

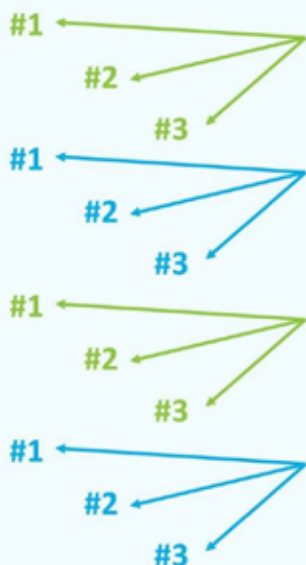


# Which trail typologies should be prioritized in Planning Area 7?



## Guiding Principles

### Evaluation Criteria



### Connectivity

Supports recreational and commuting needs through trail access, filling network gaps, and changing vehicular circulation when needed.

### Context-Sensitivity

Responds to the opportunities, constraints, and character of Addison by minimizing environmental impacts, reducing private property impacts, and accessing transit.

### Diversity

Attracts a range of users by providing multiple active transportation modes on various trail types around the town.

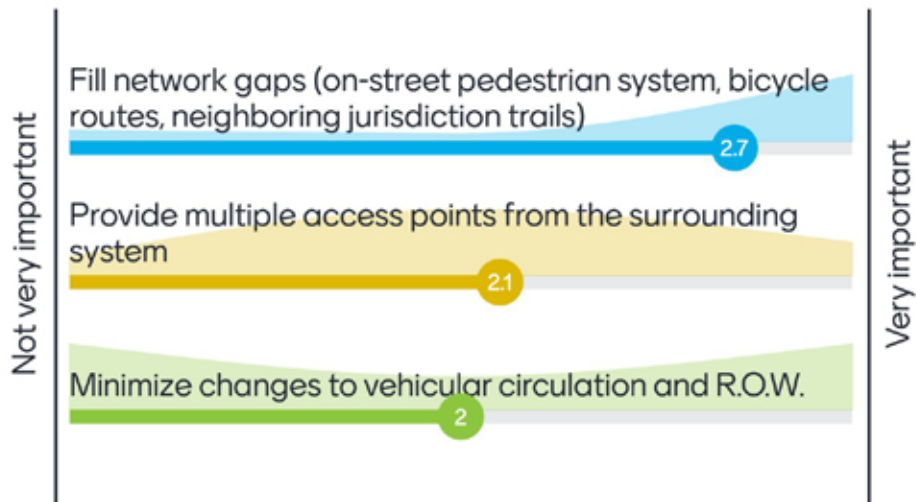
### Safety

Provides public safety by establishing low-stress facilities with minimal vehicle conflicts and visible corridors with crime prevention mechanisms.

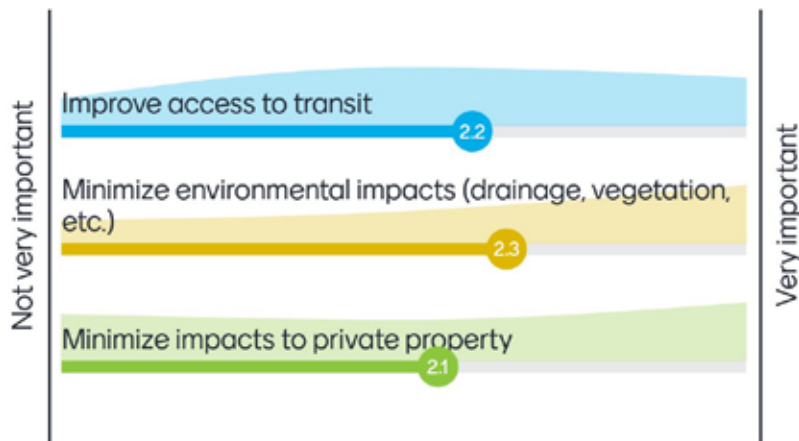
## SAFETY - Evaluation Criteria Ranking



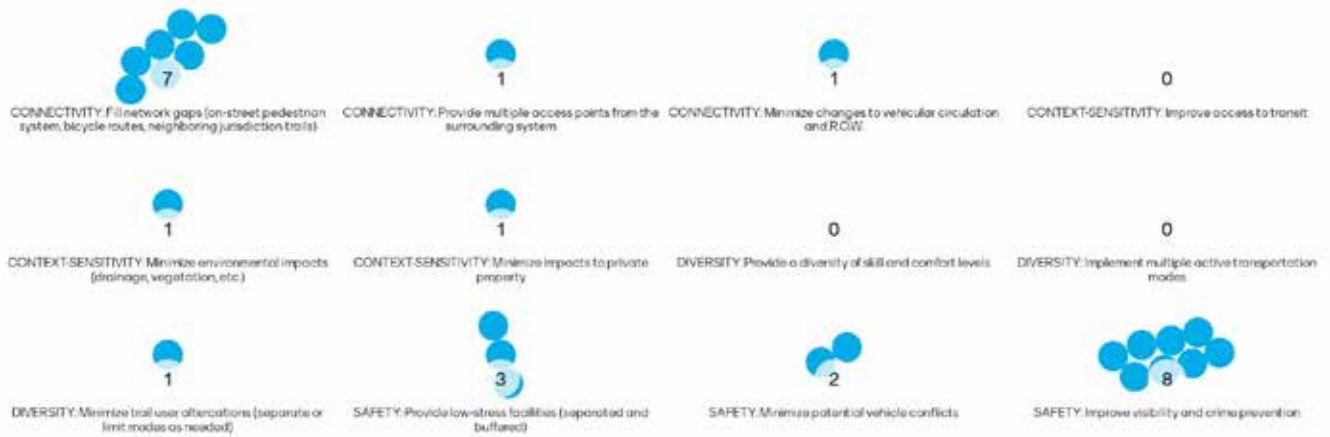
# CONNECTIVITY - Evaluation Criteria Ranking



# CONTEXT-SENSITIVITY - Evaluation Criteria Ranking



# What is the most important Evaluation Criterion to you?



## DIVERSITY - Evaluation Criteria Ranking





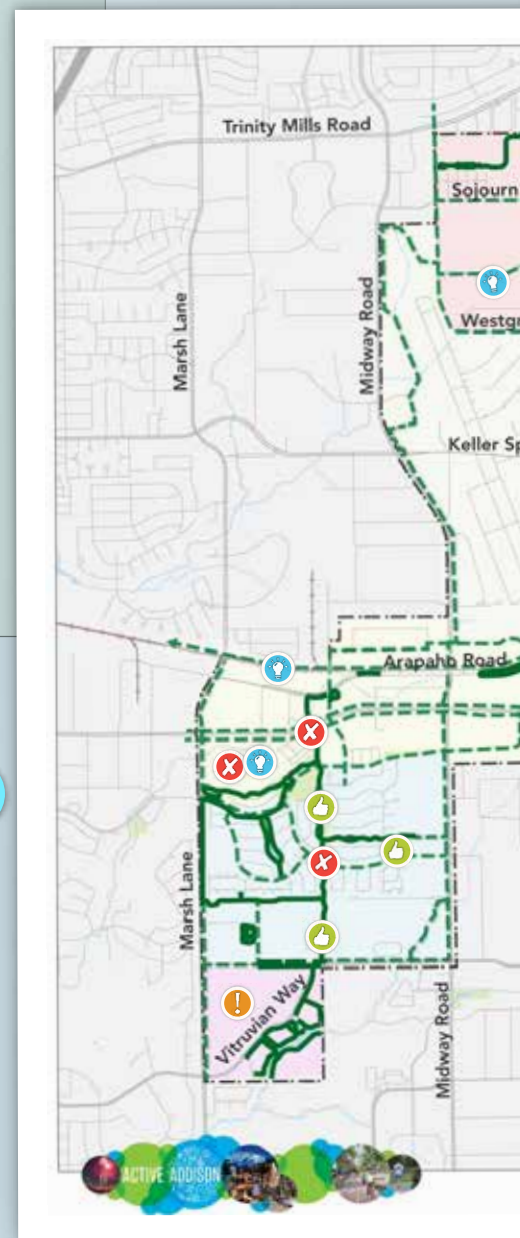


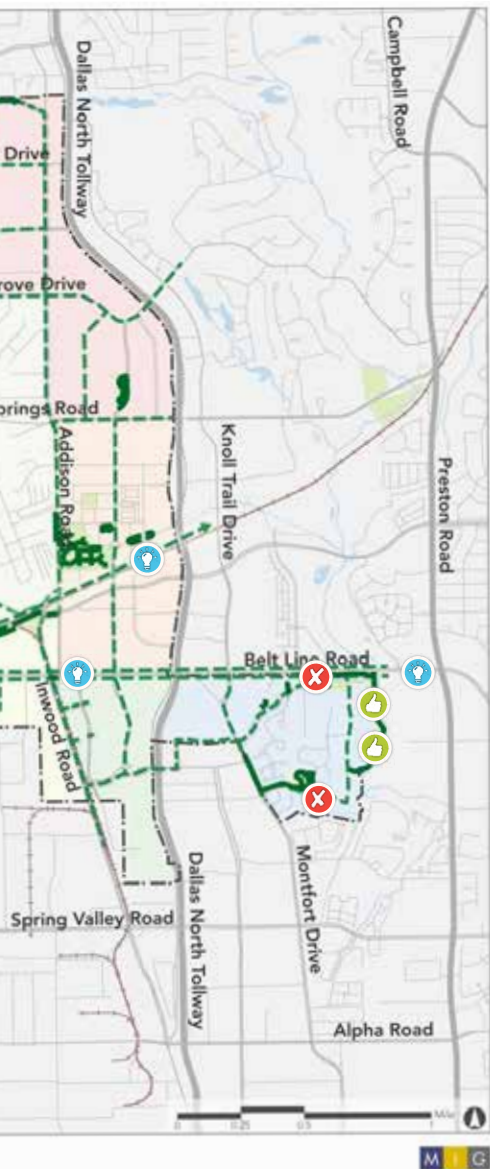
# Project Advisory Committee (PAC) Workshops

## SWOT Analysis, May 2020



### STRENGTHS

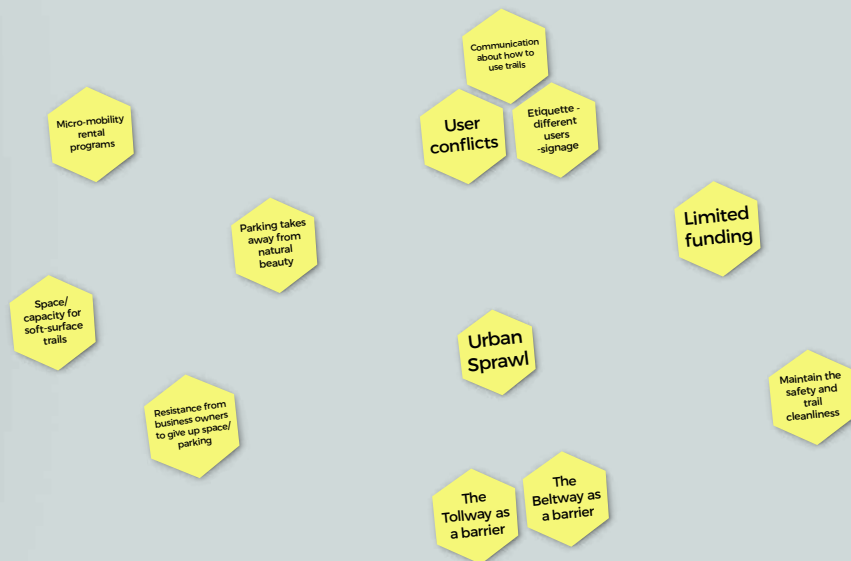




## WEAKNESSES



## THREATS







# Project Advisory Committee (PAC) Workshops

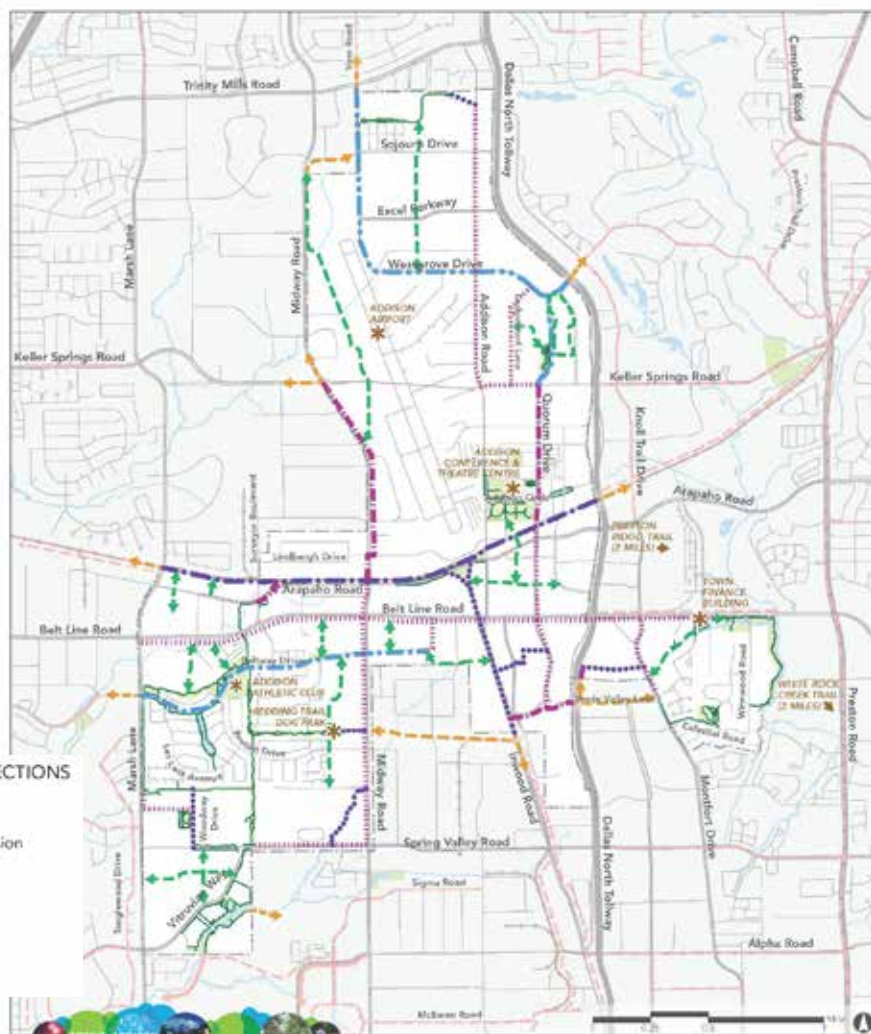
## Scenario Analysis and Survey Results, January 2021

- 17 survey participants
- 26 open-ended comments
- About 1/3 of group responded to map-based comments but those who did gave a lot of feedback
- Better response rate for big questions than for scenario questions

### SCENARIO 1: Low Stress Network

- Chooses the safest route possible
- Avoids conflicts with vehicles
- Incorporates buffered facilities
- Prioritizes routes that make it easy to access local destinations

ADDISON TRAILS		ADJACENT TRAIL CONNECTIONS	
Existing Trail	—	Existing Trail	—
Proposed		Proposed Trail	—
Regional Off-Street Shared-Use	—	Primary Trail Extension	—
Local Off-Street Shared-Use	—		
Buffered Bike Lanes w/ Sidewalks	—		
Cycle Track w/ Sidewalks	—		
Wide Sidewalks	—		
On-Street Shared-Use	—		
Long-Term Connection	—		



## SCENARIO 2: Neighborhood Loops

- Prioritizes developing or completing neighborhood trail loops
- Connect outwards:
  - To adjacent neighborhoods
  - To local destinations
  - Via on-street shared use trails

ADDISON TRAILS		ADJACENT TRAIL CONNECTIONS	
Existing Trail		Existing Trail	
Proposed:		Proposed Trail	
Regional Off-Street Shared-Use		Primary Trail Extension	
Local Off-Street Shared-Use			
Bike Lanes w/ Sidewalks			
Wide Sidewalks			
On-Street Shared-Use			
Long-Term Connection			



## SCENARIO 3: Direct Connections

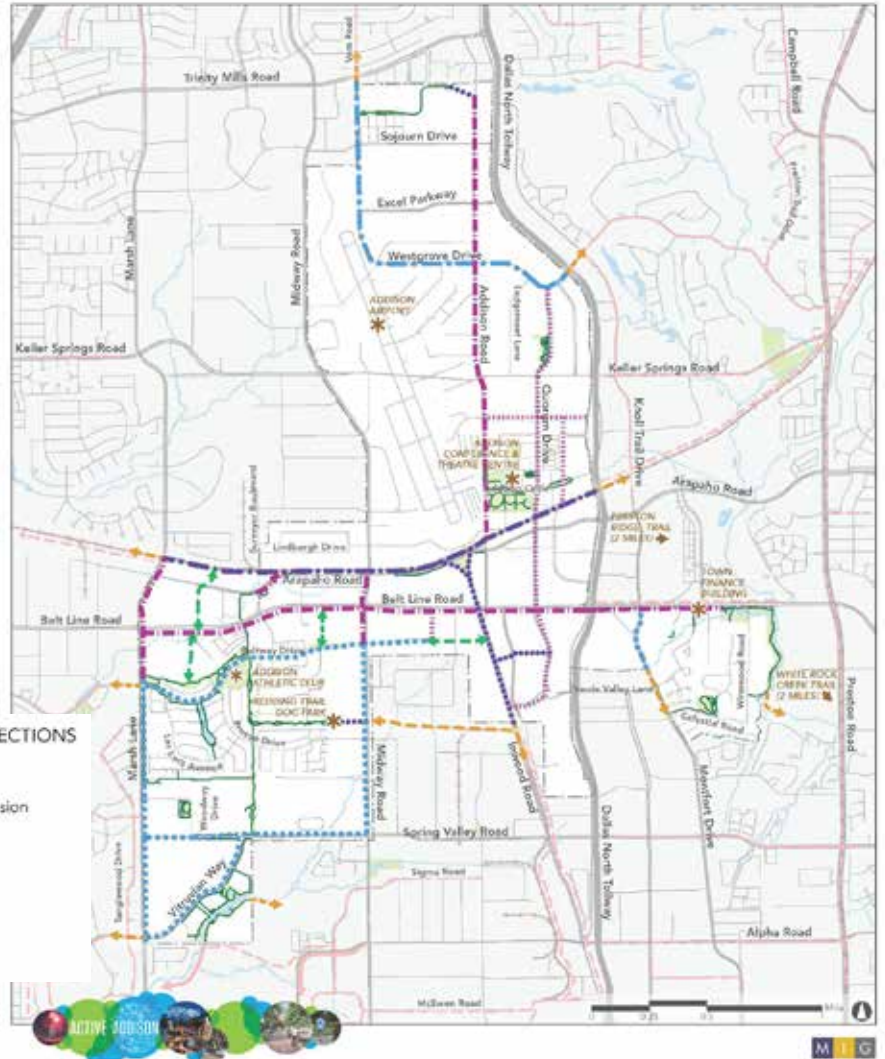
- Efficiently connects neighborhoods to local and regional destinations
- Primary alignments along Addison's primary arterial and collector streets

### ADDISON TRAILS

- Existing Trail
- Proposed
  - Regional Off-Street Shared-Use
  - Local Off-Street Shared-Use
  - Bike Lanes w/ Sidewalks
  - Buffered Bike Lanes w/ Sidewalks
  - Wide Sidewalks
  - On-Street Shared-Use
  - Long-Term Connection

### ADJACENT TRAIL CONNECTIONS

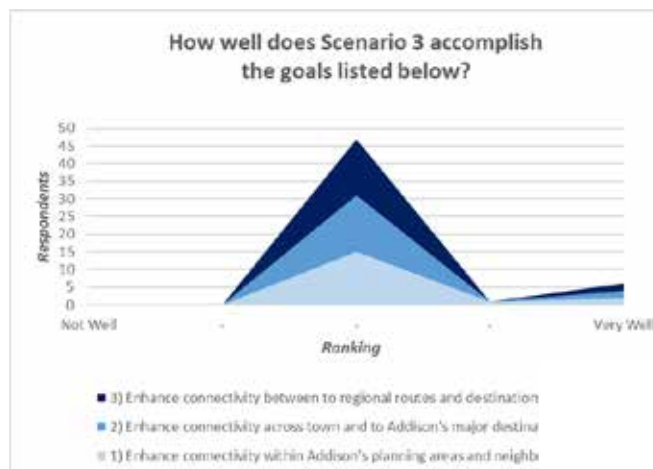
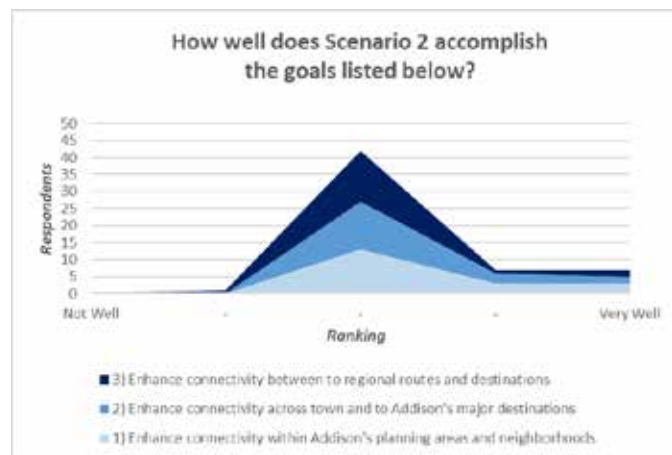
- Existing Trail
- Proposed Trail
- Primary Trail Extension





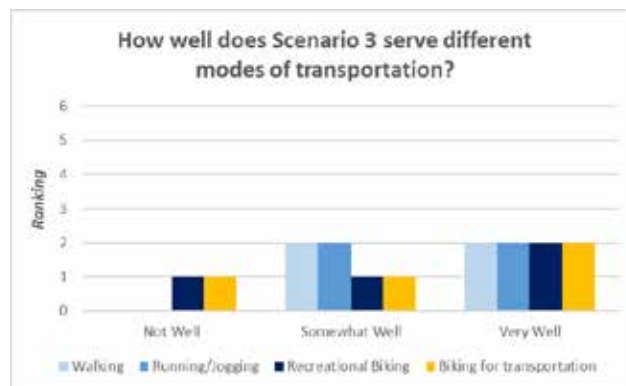
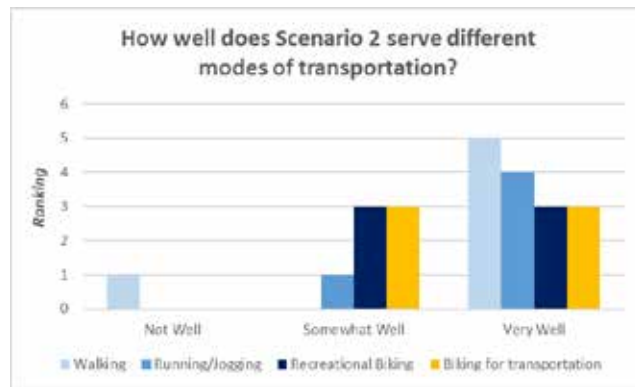
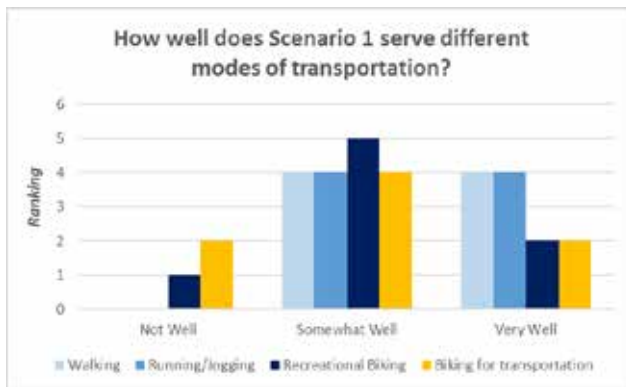
## How well does each scenario accomplish the goals listed below?

*Major Takeaway: All scenarios are similar in accomplishing goals*



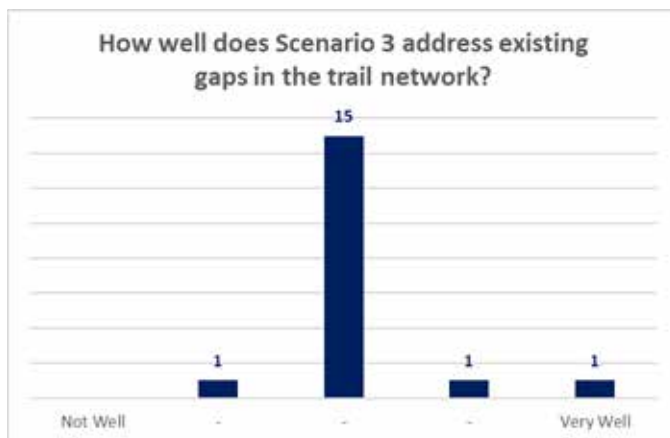
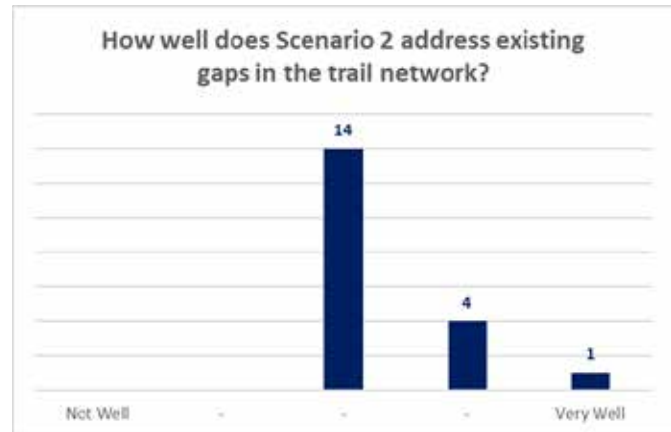
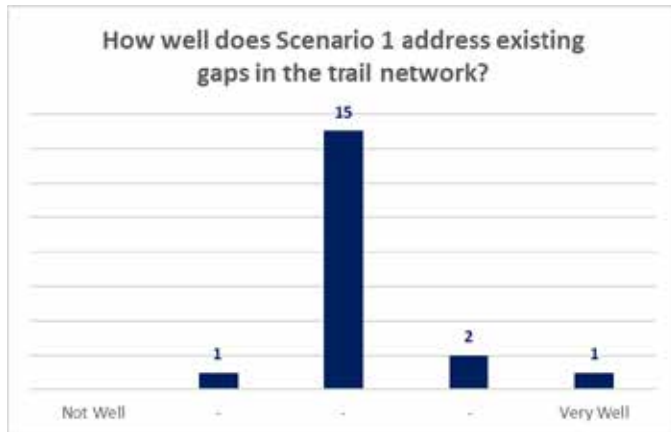
## How well does each scenario serve different modes of transportation?

**Major Takeaway:** Scenario 2 serves all modes best. Scenario 3 serves all modes least.

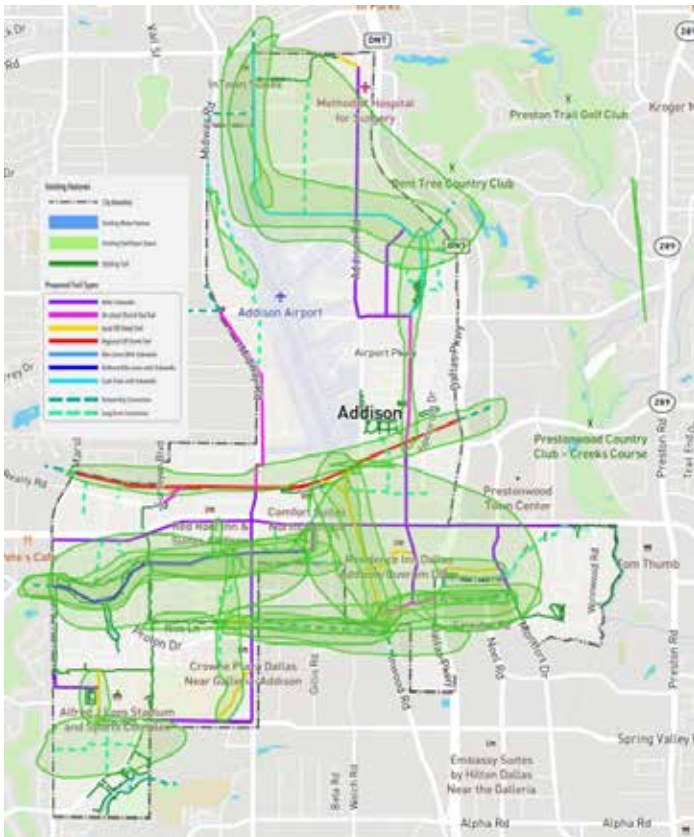


## How well does each scenario address existing gaps in the trail network?

*Major Takeaway: All scenarios are similar in addressing existing gaps*

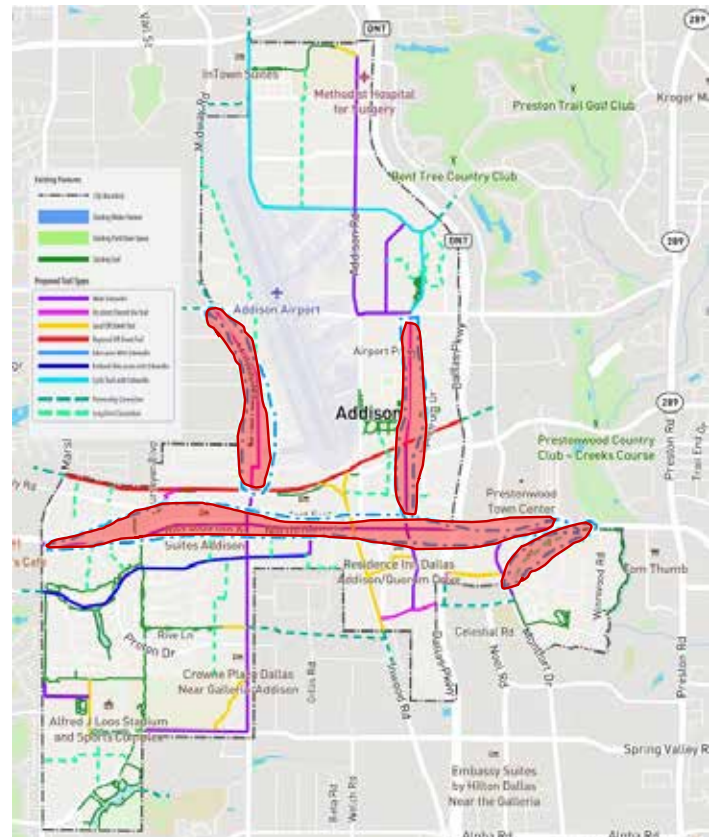


# Scenario 1 Likes/Dislikes



## Like the Location: 14, Like the Type: 10

- "I like this connection....just protect the dog park"
- "I'm hoping this is a safer and better-connected trail to get from one side of DNT to the other."
- "Need to get to Tom Thumb"

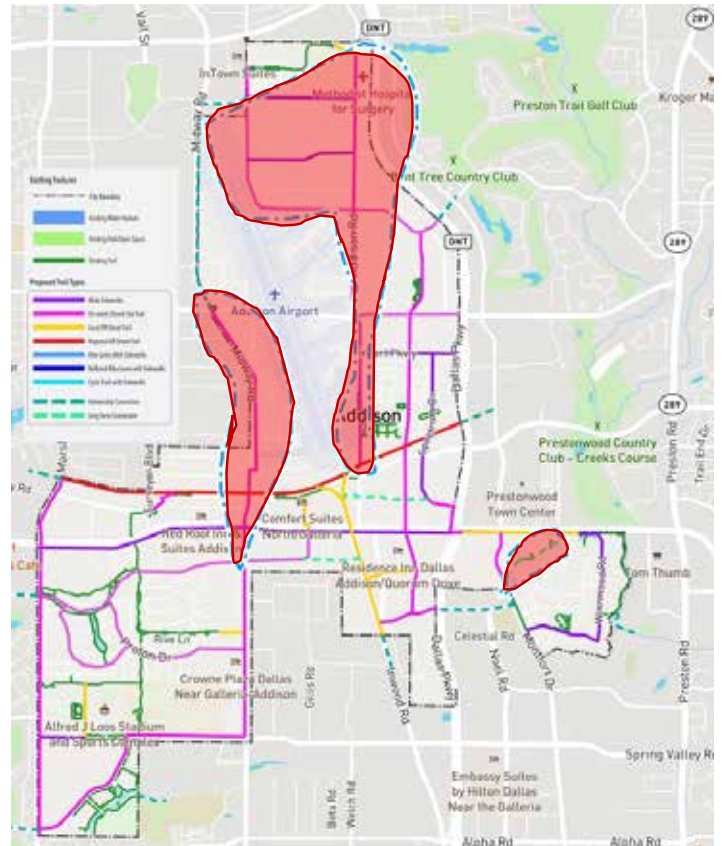
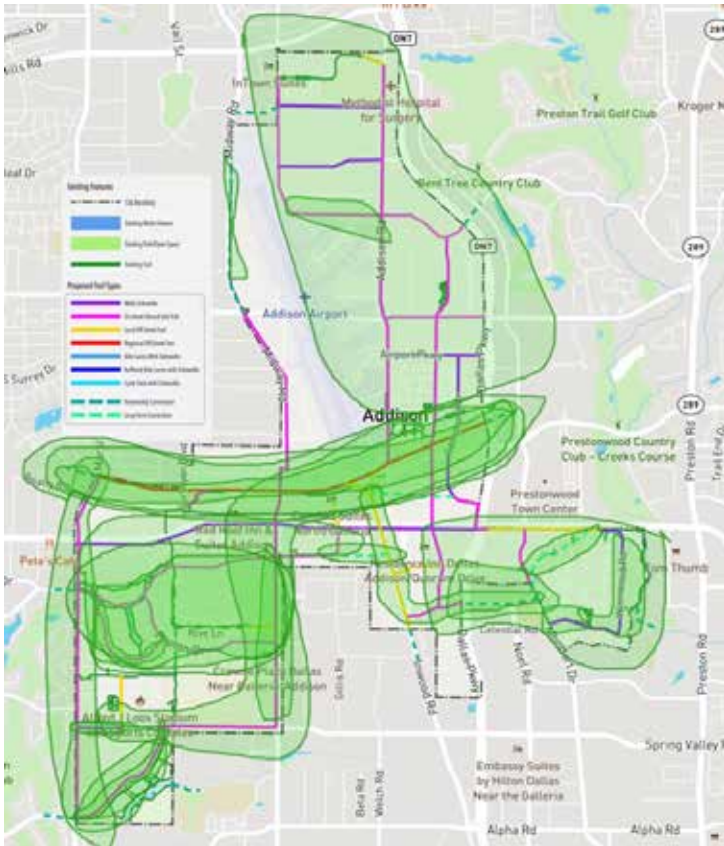


## Dislike the Location: 2, Dislike the Type: 5

- "Section behind Oaks North is too narrow and a small lake prevents passage"



# Scenario 2 Likes/Dislikes



## Like the Location: 16, Like the Type: 13

- "I like this connection a lot"
- "I like this multi-use as a continuation of existing trail north of Spring Valley. It's also heavily walked during events with parking at Loos Field House"
- "This will greatly improve mobility to/from Vitruvian"

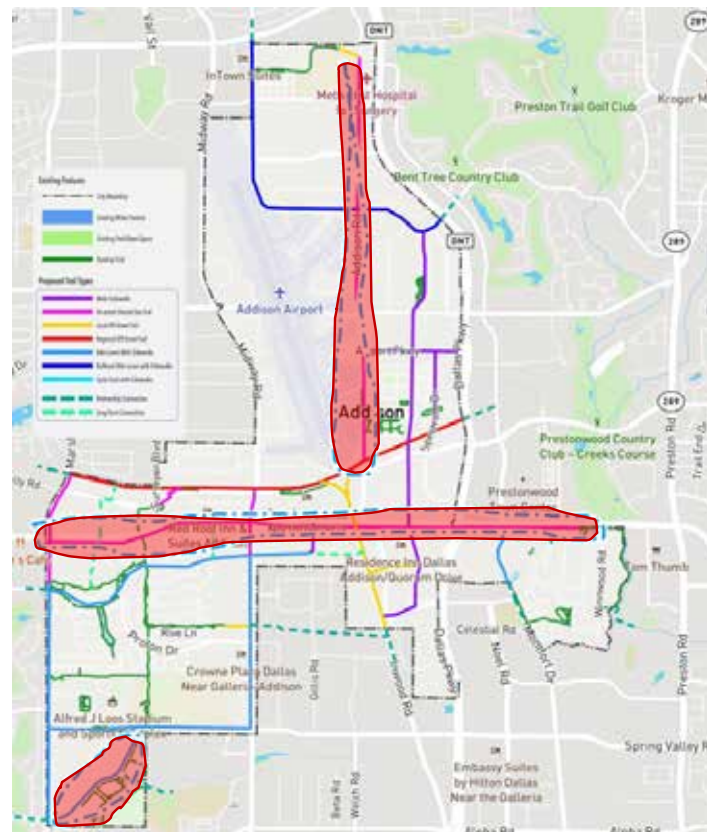
## Dislike the Location: 3, Dislike the Type: 4

# Scenario 3 Likes/Dislikes



Like the Location: 11, Like the Type: 9

- “I like the idea of a trail through this shopping center, doesn't matter where.”



Dislike the Location: 0, Dislike the Type: 3

- “I think shared path would be better than bike lane here, especially with event parking at Loos Field House.”

*Major Takeaways:*

Especially liked trails

- Inwood Road
- Beltway Dr
- Verde Valley Ln
- Westgrove Dr
- Spring Valley Rd
- Vitruvian Trails
- Midway south of Belt Line Rd
- Redding Trail across Farmer's Branch

Especially disliked trails

- Addison Rd
- Airport Loop
- Belt Line Rd

## Major Takeaways:

 Crossings

## Additional Low Stress Trails

- “Trail behind Oaks North is impractical. Small lake near Montfort precludes access; narrow ROW between private homes and parking garages precludes a trail. Prefer designating Oaks North Drive as a shared bike lane.”
- “Use overbuilt local roads and put cycle tracks or buffered bike lanes on them”



## Major Takeaways:

 Crossings

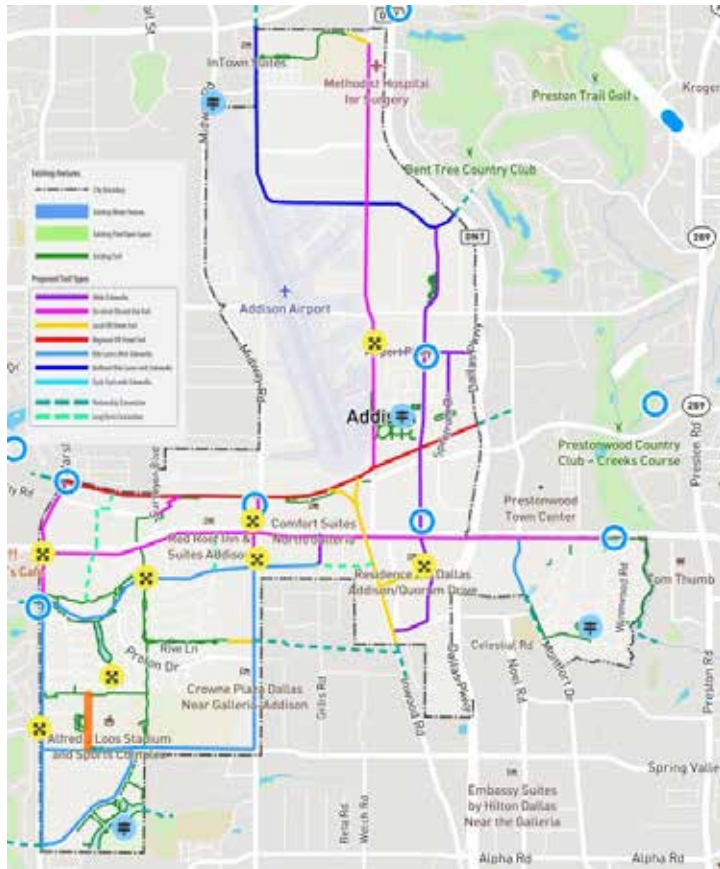
Additional Low Stress Trails

- “I love the outer loops for transportation. Makes biking more manageable, and I really appreciate this crosstown connectivity via Beltway extension.”
- “I see benefit from shared onstreet and/or wide sidewalk trails; low cost, low maintenance, and fairly immediate availability. However, onstreet and/or wide sidewalks should be reserved for residential streets and/or low traffic streets and not major arteries like Midway, Beltline, or Addison Road. These need off street, buffered trails.”
- “This is by far and away the best scenario”

ADDISON CITY-WIDE TRAILS MASTER PLAN |

# Trailheads/Crossings/Additional Trails: SCENARIO 3 Direct Connections

## Major Takeaways:

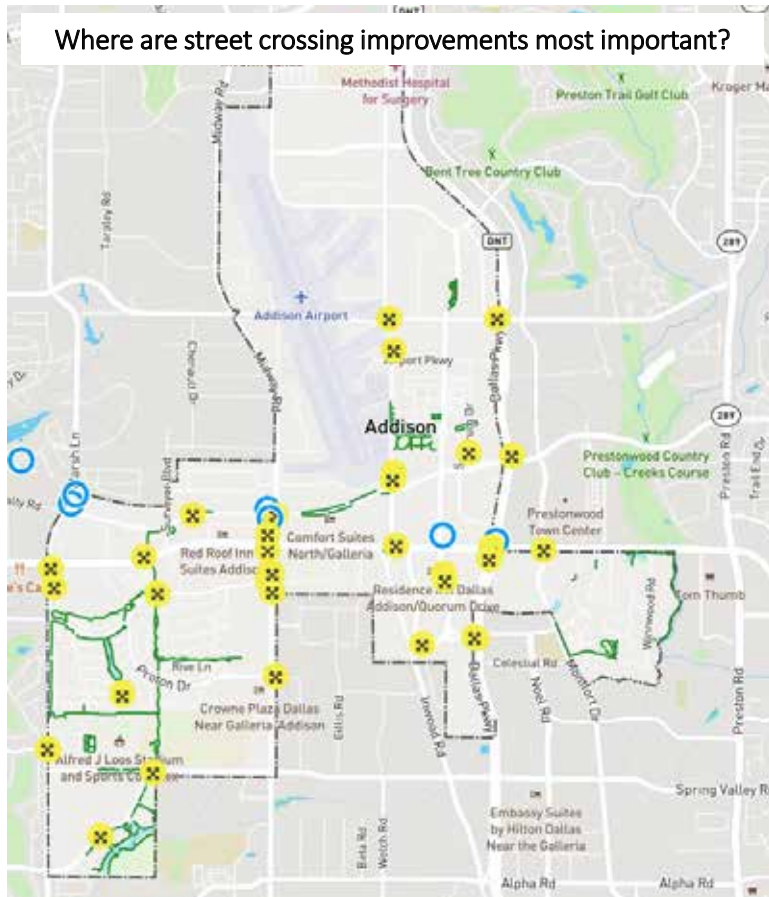


## Other Comments – Scenario 3

- “I don't have strong feelings about the types of trails looping the Vitruvian to Belt Line compared to Scenario 2, but I like the connectivity in both plans.”
- “On street bike lanes and/or wide sidewalks should not be on major roadways. Keep these for lower traffic roadways.”

ADDISON CITY-WIDE TRAILS MASTER PLAN |

## Crossing Improvements - Combined



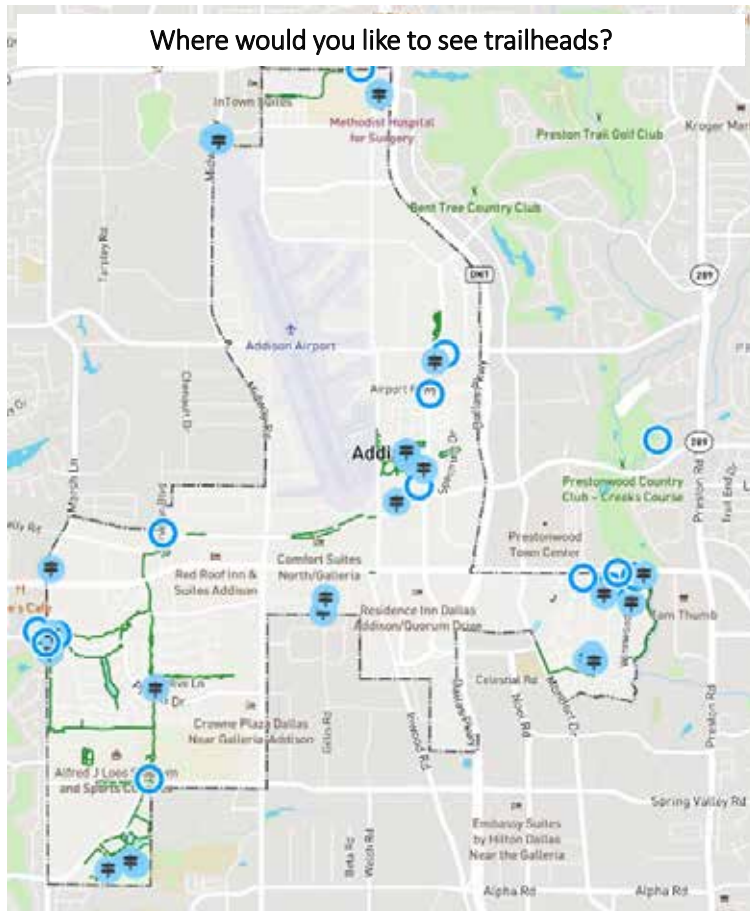
*Desired crossing improvements include:*

- *Midway Rd & Belt Line Rd*
- *Midway Rd & Beltway Dr*
- *Along Belt Line Rd*
- *Along Addison Rd*
- *Along the Dallas Tollway*
- *Along Arapaho Rd*

ADDISON CITY-WIDE TRAILS MASTER PLAN |



# Trailheads - Combined



Refer to  symbols only

*Desired trailheads include:*

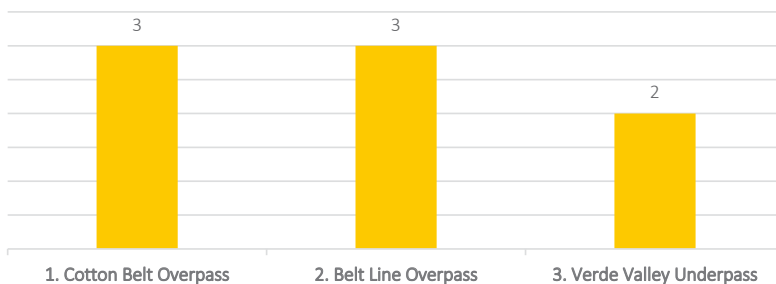
- *Vitruvian Park*
- *West end of Le Lacs Linear Park*
- *Celestial Park*
- *White Rock Creek Trail and Belt Line Road*
- *Beltway Drive north of Gillis Road*
- *Addison Transit Center*
- *Addison Circle Park*
- *Midway Rd and Sojourn Dr*
- *Methodist Hospital*

ADDISON CITY-WIDE TRAILS MASTER PLAN | 1

# Tollway Crossings

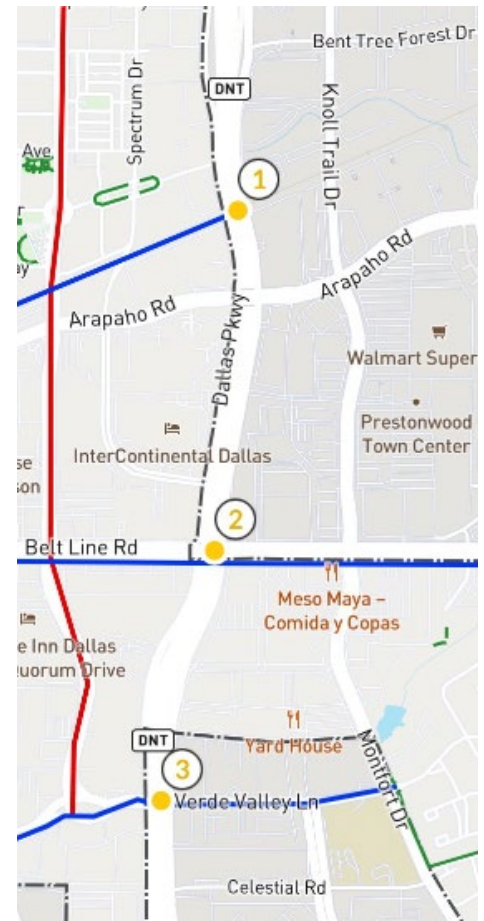
**Major Takeaway: All are important but no clear favorite**

Given safety improvements, which tollway crossing would provide the most ideal connection?



## Comments:

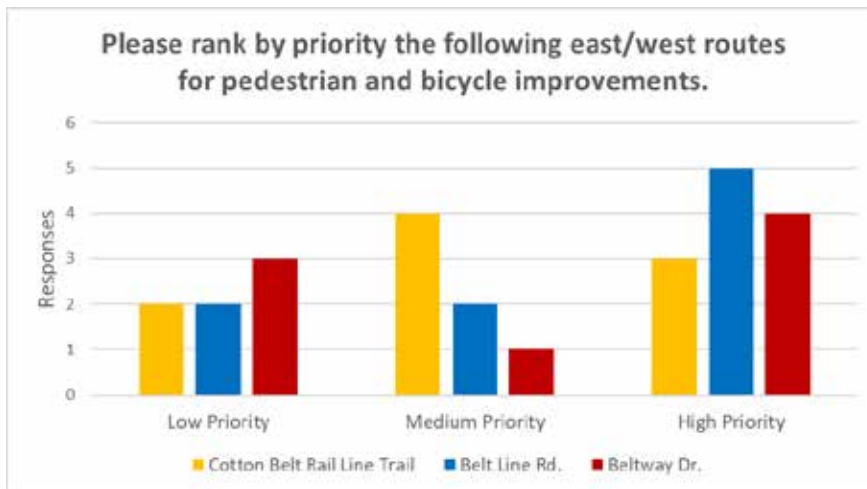
- “3 is acceptable as is. Which is good because getting DNT and City of Dallas to cooperate will take forever. 1 should be adequately addressed during construction. 2 is problematic, but the most urgent to focus resources.”
- “Belt Line would be the best if you did the work on either side of it to make it accessible”
- “I picked Beltline Overpass, but it feels like that would cause the most chaos in the city as that is a very popular crossing. See little interest in a Verde Valley crossing, 2nd would be number 1.”
- “I think Cotton Belt is probably ideal, but only if it connects back to Village on the Parkway.”
- “Verde Valley is equally important. If both Cottonbelt and Verde Valley are improved, then no need to address Belt Line crossing. Beltline crossing will be the least used ped/bike crossing even if improved.”



ADDISON CITY-WIDE TRAILS MASTER PLAN

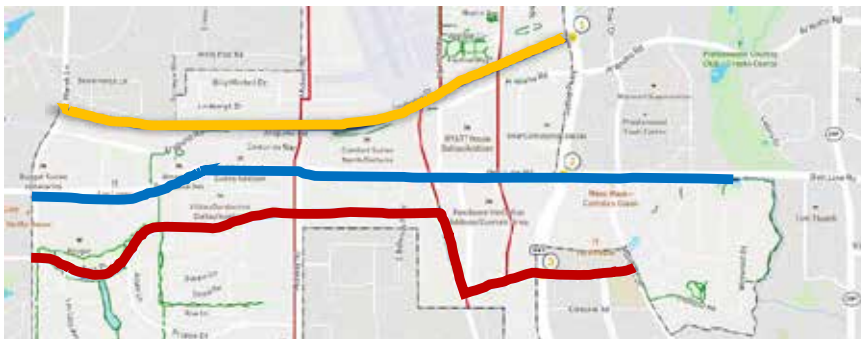
## East/West Routes

**Major Takeaway:** *Belt Line Rd. is highest priority east/west connections for pedestrian/bicycle improvements.*



### Comments:

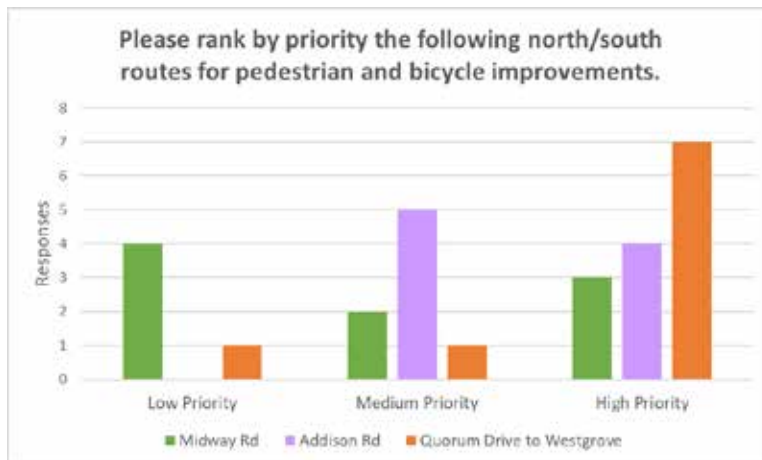
- "Again, Beltline will be the least likely used just because of the high traffic nature. Beltway E/W that runs behind the Beltline businesses would be much more popular."
- "Again, Cotton Belt should be addressed during construction. Beltline will take a lot of work and require cooperation of many businesses. Likelihood of anything in the next 10 years is slim. Beltway offers less issues, lower traffic, and could be done relatively quickly."
- "I really like the idea of extending Beltway"



ADDISON CITY-WIDE TRAILS MASTER PLAN |

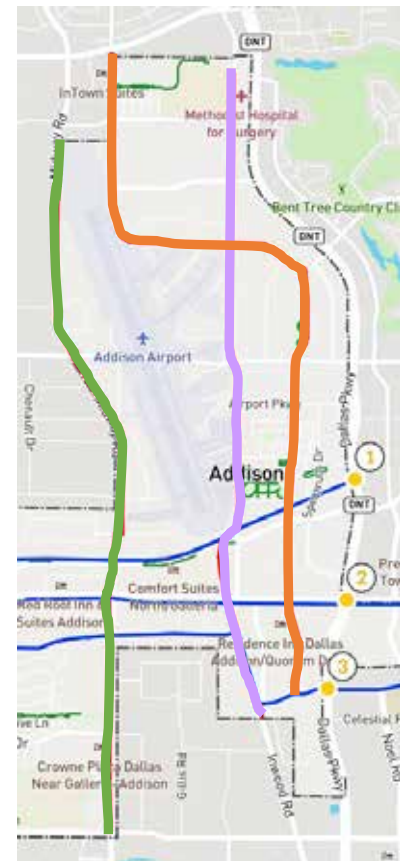
## North/South Routes

**Major Takeaway: Quorum Drive to Westgrove is highest priority for pedestrian/bicycle improvements. Midway Road is lowest priority.**



### Comments:

- "I love the connectivity to Addison Circle via Addison Rd or Quorum.
- "Midway Road: Very busy and many businesses. Plus City of Carrollton. All of this means long lead times assuming cooperation. Midway and Addison Roads have same issues as Beltline. But Quorum offers similar alternative to Midway/Addison Roads as Beltway does to Beltline. Addison Road is all within Town of Addison and with much of it along airport ROW, hopefully quicker results could be seen. Quorum Road: similar to Addison Road, but in my opinion a much more pleasant area with trees, residential, lower traffic."
- "They are all important to achieve N/S but also connectivity to other regional networks"

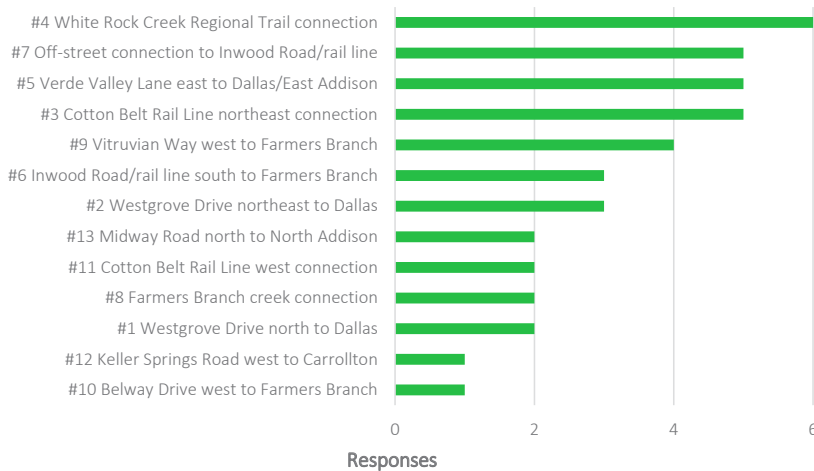


ADDISON CITY-WIDE TRAILS MASTER PLAN | 20

## Local and Regional Connections

**Major Takeaway:** Highest priorities for local/regional connections for pedestrians and bicycles are White Rock Creek, Inwood Road, Verde Valley, and Cotton Belt Rail Line.

Please rank by priority the following local and regional connections for pedestrians and bicycles.

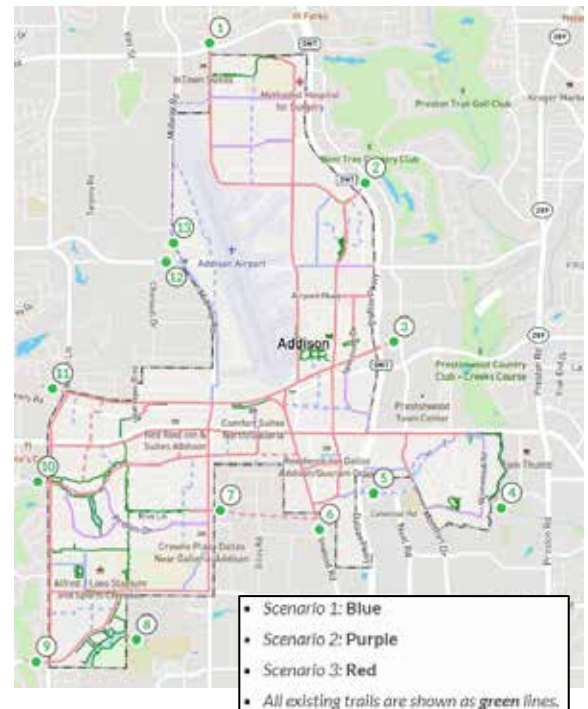


### Comments:

- “Cotton Belt is the 800lb gorilla in that it will connect to every N Dallas community. Verde Valley and extending Belt Way to Verde Valley are the most significant internal to Addison. The last two items will connect all of Addison to the athletic center.”

### Additional Connection Points

- Spring Valley Rd to west
- Monfort Dr to north



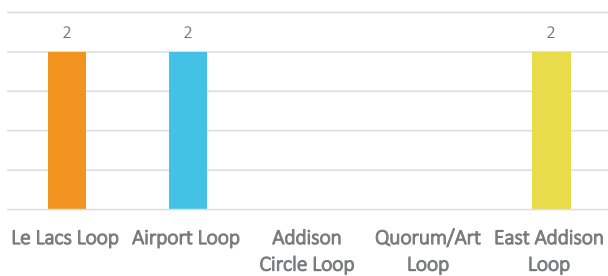
ADDISON CITY-WIDE TRAILS MASTER PLAN | 21



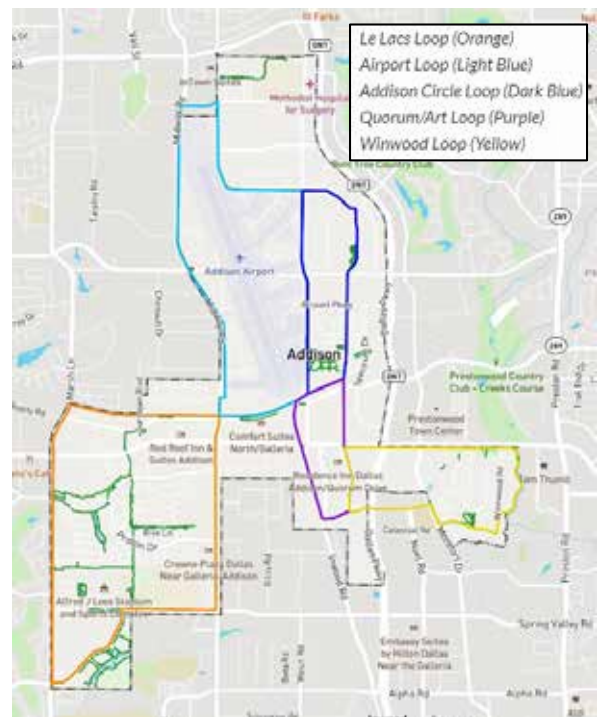
# Loop Trails

**Major Takeaway:** No clear favorite loop trail. Addison Circle Loop, East Addison Loop, and Quorum Art Loop are best for connecting neighborhoods to local/regional destinations, but all connect similarly well

Which potential Addison trail loop is your favorite?



How well do these loops connect neighborhoods to local and regional destinations?



ADDISON CITY-WIDE TRAILS MASTER PLAN | 22



# Draft Future Trail Network Questionnaire

November-December, 2020

Total Responses: 258

Dec-20

## 1. Do you live in Addison?

	Count	Percent of Total Responses	Percent of Responses to Question
Yes	249	97%	97%
No	9	3%	3%

## 2. Click here to place a pin near where you live (approximate location)

See Map-Based Responses

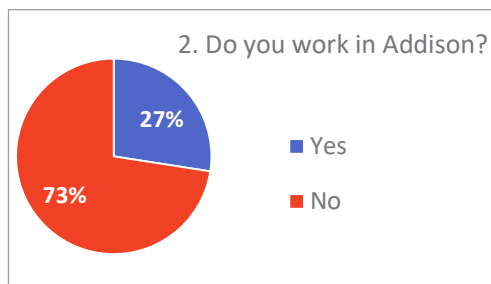
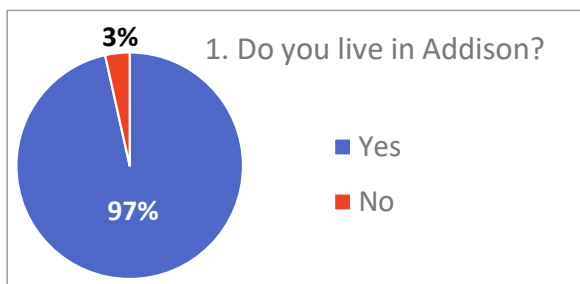
[geo-point-kgv5jx6f](#)

## 3. Do you work in Addison?

Yes	70	27%	27%
No	185	72%	73%

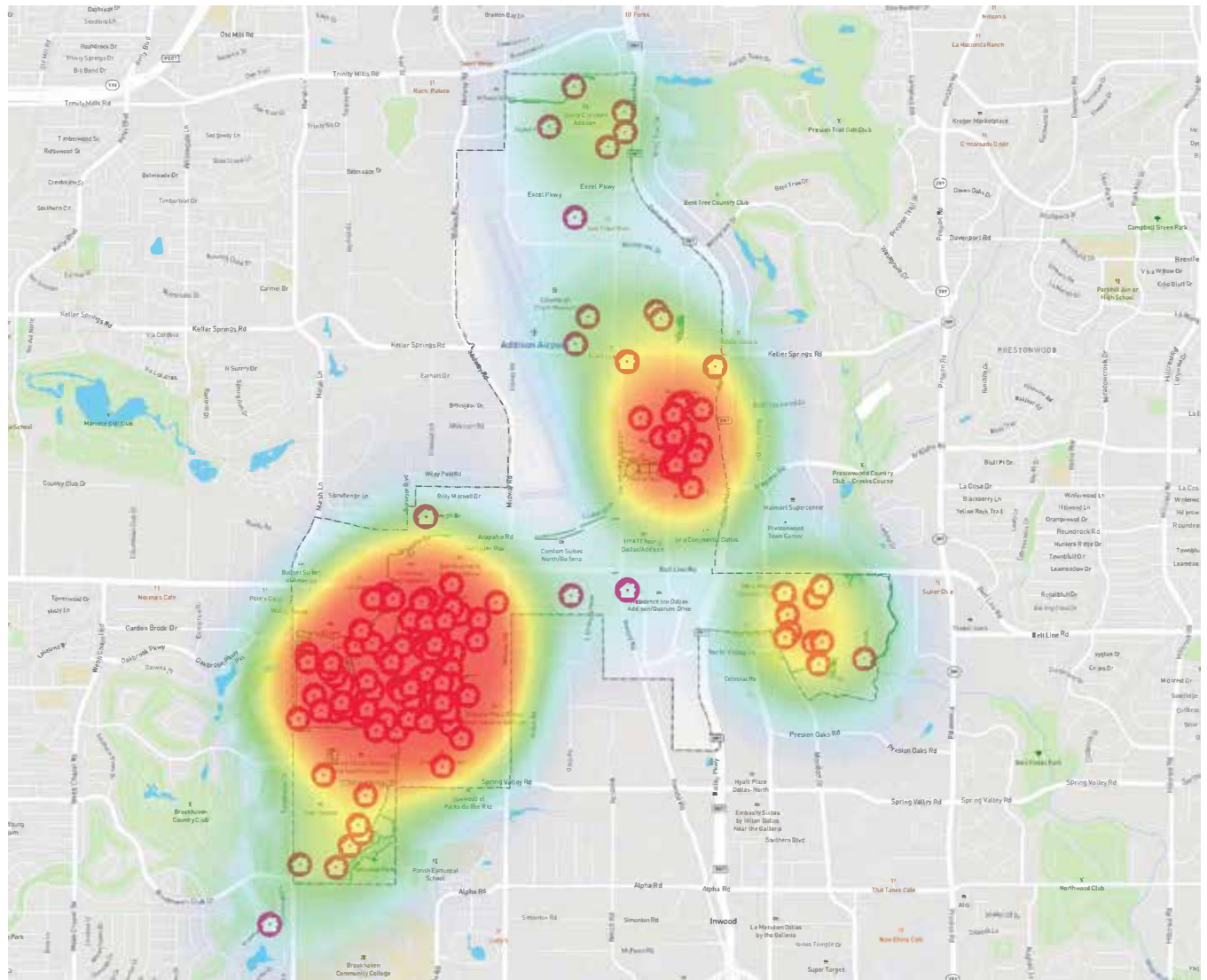
## 4. How do you like to use trails? (select all that apply)

Walking	224	87%	45%
Running/Jogging	108	42%	22%
Biking for Transportation	25	10%	5%
Biking for Recreation	102	40%	21%
I don't currently use trails	7	3%	1%
Other (please share what)	29	11%	6%

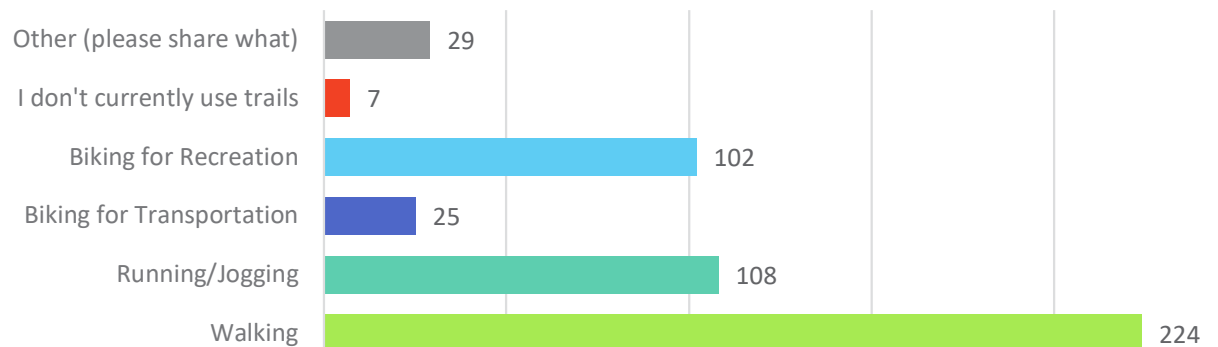




## 2. Where do you live?



## 4. How do you like to use trails?



## 5. Do you like the proposed future trail network?

Yes, I like it.	110	43%	62%
I somewhat like it.	39	15%	22%
Neutral	21	8%	12%
I somewhat dislike it.	3	1%	2%
No, I dislike it.	5	2%	3%
No Response	80	31%	

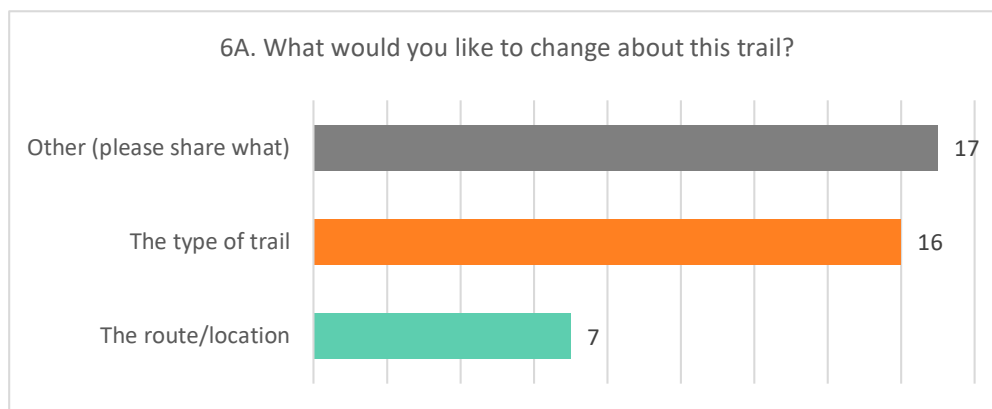
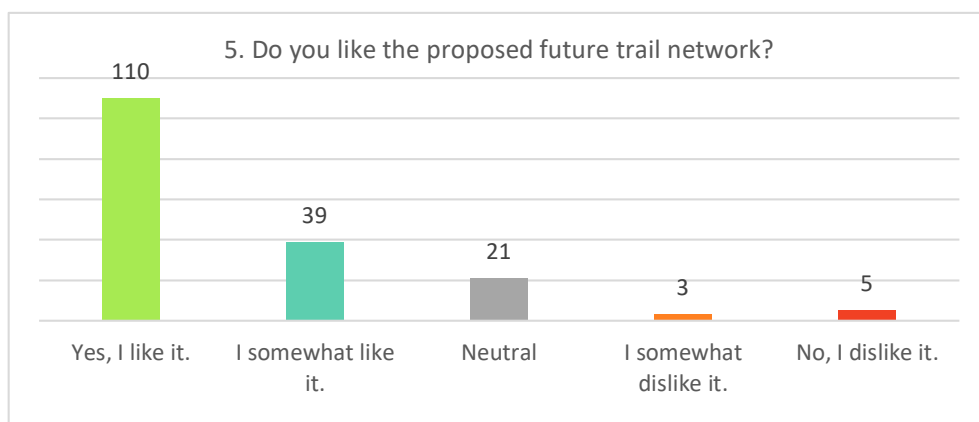
## 6. Click here to identify trails on the map you'd like to change.

See [Map-Based Responses](#)

[geo-point-kgv8nrgj](#)

### 6A. What would you like to change about this trail? (Select at least one)

The route/location	7	3%	18%
The type of trail	16	6%	40%
Other (please share what)	17	7%	43%



[illegible][illegible]

7. Click here to draw an additional future trail.

See Map-Based Responses

geo-line-kgv8ocsm

7B. How would you like to use this trail?

(select all that apply)

Walking	19	7%	31%
Running/Jogging	8	3%	13%
Biking	27	10%	44%
Other (please share what)	7	3%	11%
No Response	197	76%	

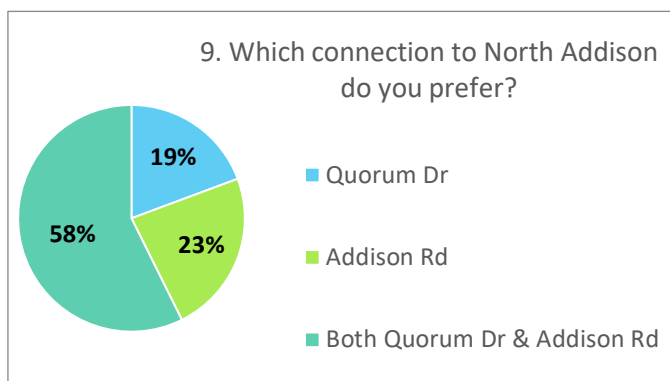
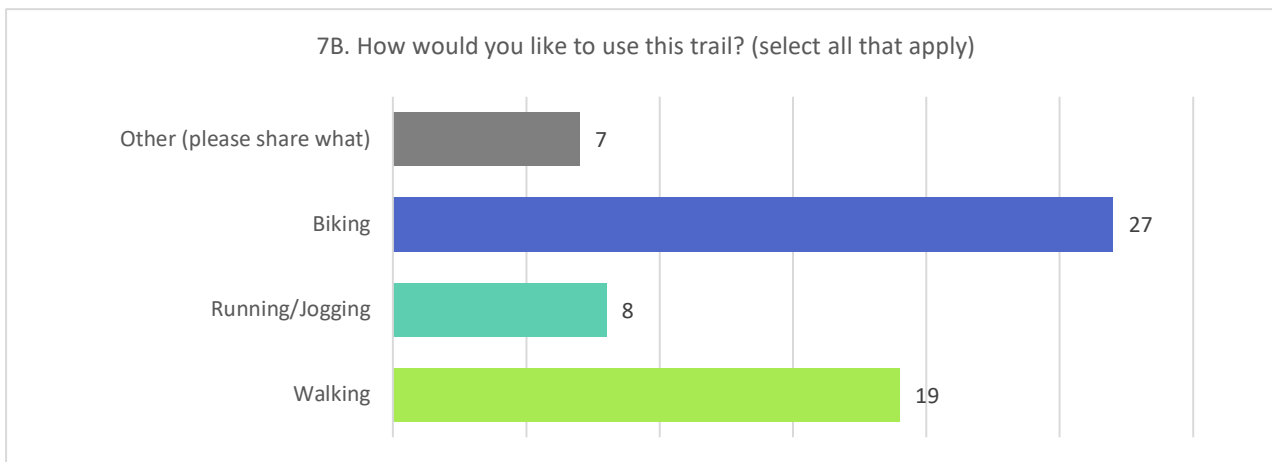
8. Click here to locate up to three additional crossing improvements.

See Map-Based Responses

geo-point-kgvaqq0e

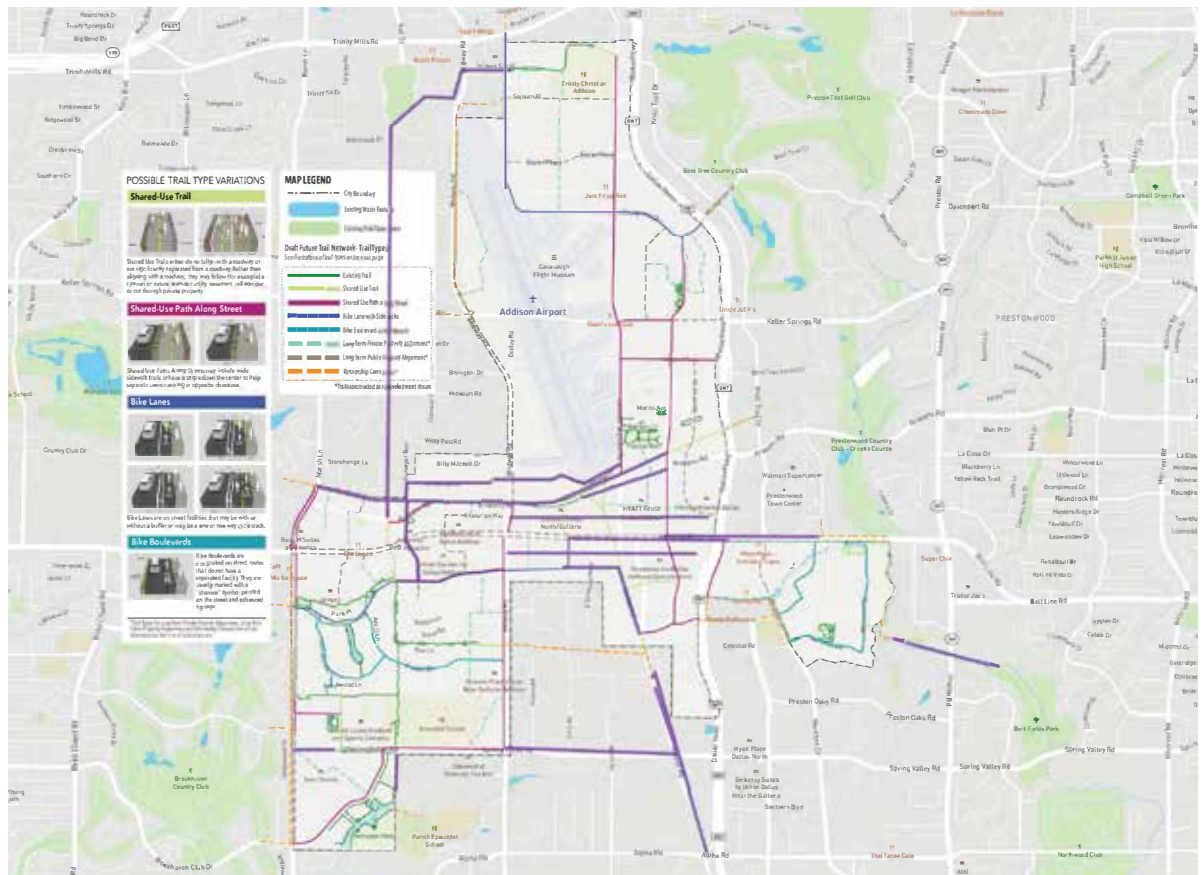
9. Which connection to North Addison do you prefer? (Choose Up to One)

Quorum Dr	29	11%	19%
Addison Rd	35	14%	23%
Both Quorum Dr & Addison Rd	86	33%	57%
No Response	108	42%	

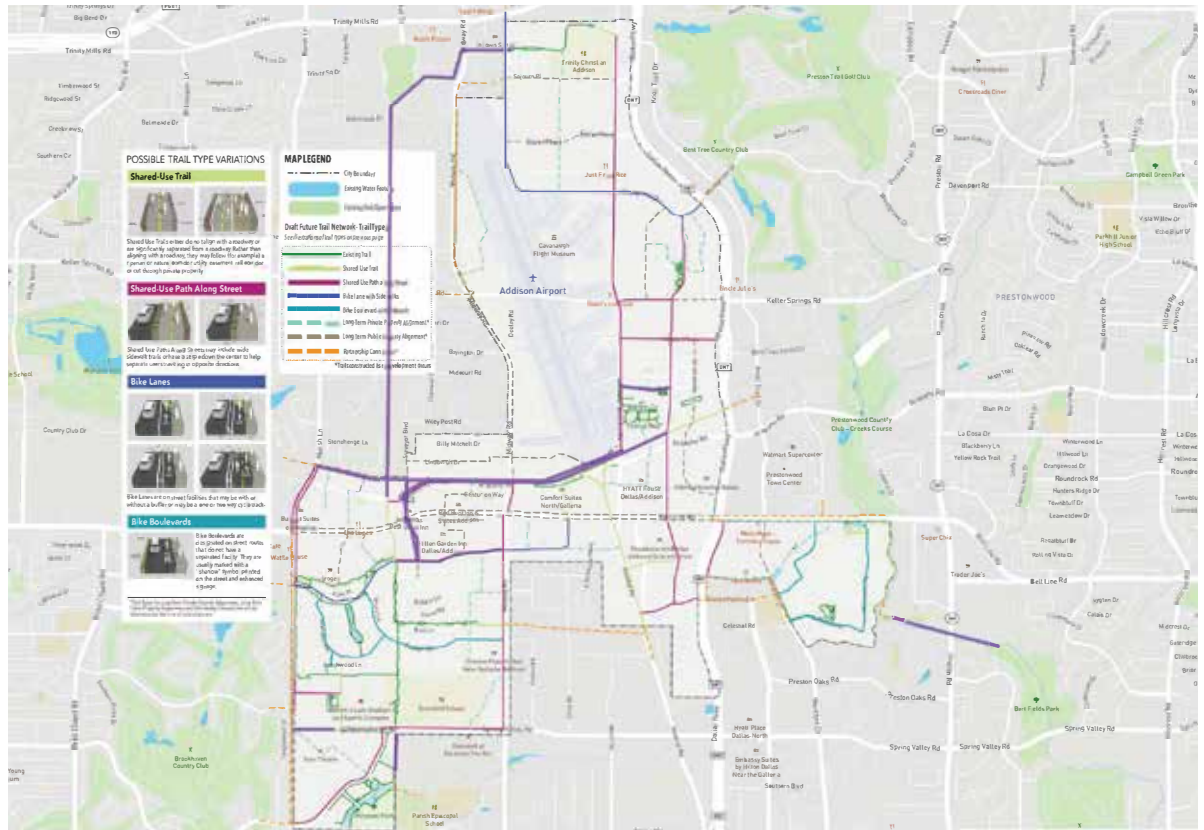




## 7. Additional Biking Trails



## 7. Additional Running/Jogging Trails



**POSSIBLE TRAIL TYPE VARIATIONS**

**Shared-Use Trail**

Shared-Use Trails are designed to be used by a variety of users, including pedestrians, joggers, and cyclists. They are typically located in parks, along waterways, and in other open spaces. Shared-Use Trails are designed to be safe and comfortable for all users, and they are typically located in areas with low traffic volume.

**Shared-Use Path Along Street**

Shared-Use Paths Along Streets are designed to be used by a variety of users, including pedestrians, joggers, and cyclists. They are typically located along streets, and they are designed to be safe and comfortable for all users. Shared-Use Paths Along Streets are designed to be safe and comfortable for all users, and they are typically located in areas with low traffic volume.

**Bike Lanes**

Bike Lanes are designed to be used by cyclists. They are typically located along streets, and they are designed to be safe and comfortable for cyclists. Bike Lanes are designed to be safe and comfortable for cyclists, and they are typically located in areas with low traffic volume.

**Bike Boulevards**

Bike Boulevards are designed to be used by cyclists. They are typically located along streets, and they are designed to be safe and comfortable for cyclists. Bike Boulevards are designed to be safe and comfortable for cyclists, and they are typically located in areas with low traffic volume.

**MAP LEGEND**

City Boundary  
Existing Water Features  
Proposed Multi-Use Trail Network  
Shared-Use Trail  
Shared-Use Path Along Street  
Bike Lane  
Bike Boulevard

**Map Legend**

City Boundary  
Existing Water Features  
Proposed Multi-Use Trail Network  
Shared-Use Trail  
Shared-Use Path Along Street  
Bike Lane  
Bike Boulevard

**MAP LEGEND**

- City Boundary
- Existing Waterfeature
- Existing Public Open Space

**Draft Future Trail Network**

- Existing
- Near Term Trail
- Long Term Trail
- Future Trail

*Trails constructed as redevelopment occurs

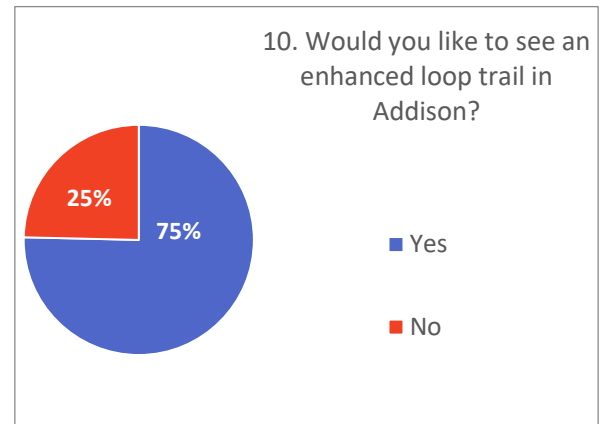


## 10. Would you like to see an enhanced loop trail in Addison?

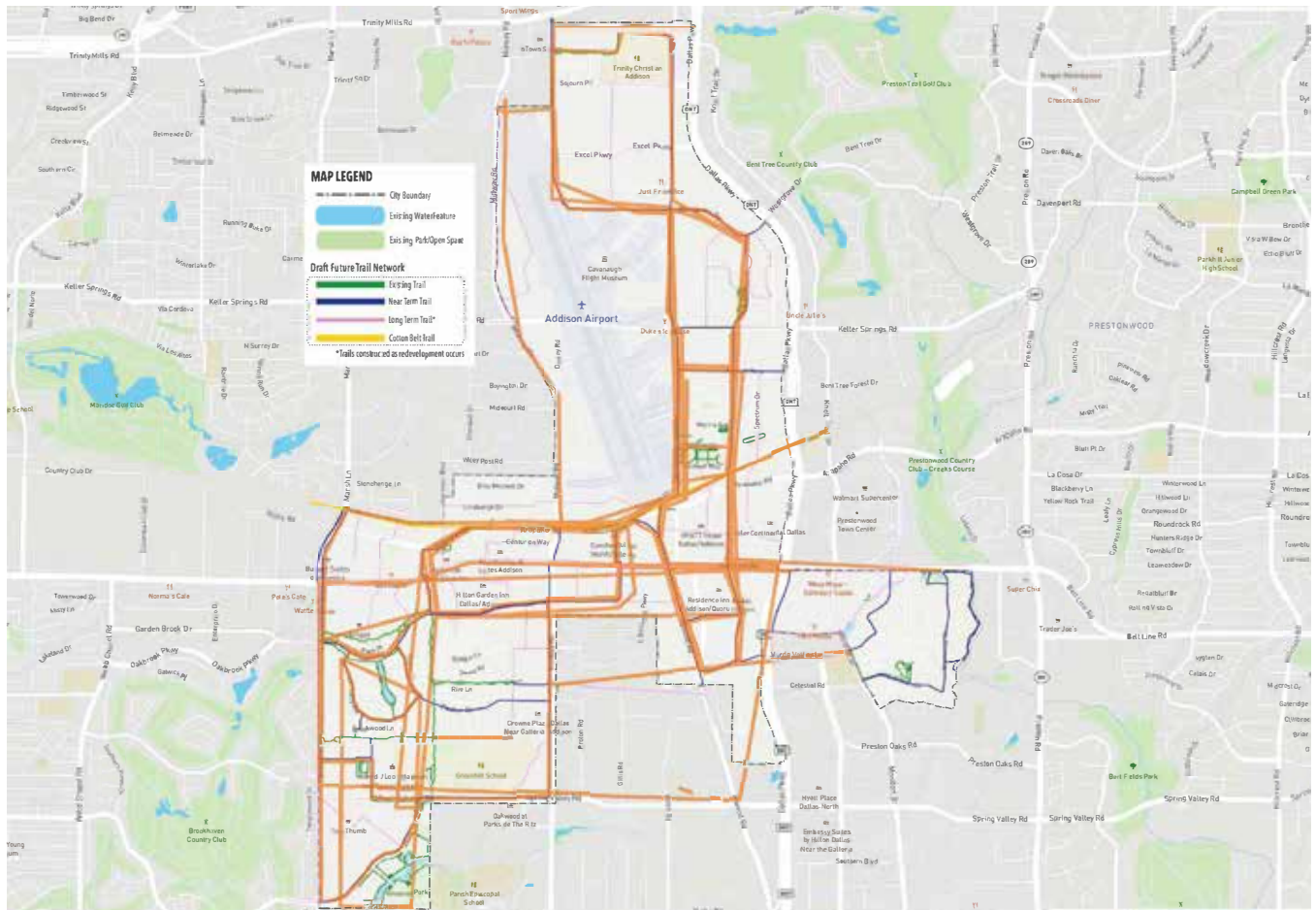
Yes	104	40%	75%
No	34	13%	25%
No Response	120	47%	

10A. If yes, click here to trace trails on the map that could form the enhanced loop you'd like.

See Map-Based Responses



## 10A. Loop Trail Alignments



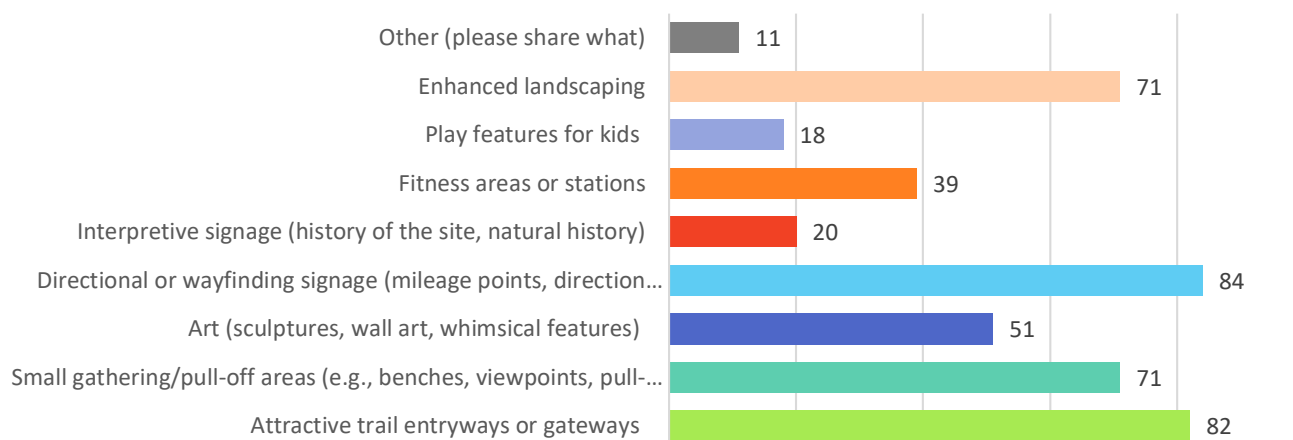


**11. Pick your top three choices for amenities that should be included along the Cotton Belt Trail in Addison. (Up to three)**

Attractive trail entryways or gateways  
 Small gathering/pull-off areas (e.g., benches, viewpoints, pull-off areas)  
 Art (sculptures, wall art, whimsical features)  
 Directional or wayfinding signage (mileage points, direction to nearest places or trail connections)  
 Interpretive signage (history of the site, natural history)  
 Fitness areas or stations  
 Play features for kids  
 Enhanced landscaping  
 Other (please share what)

82	32%	18%
71	28%	16%
51	20%	11%
84	33%	19%
20	8%	4%
39	15%	9%
18	7%	4%
71	28%	16%
11	4%	2%

11. Pick your top three choices for amenities that should be included along the Cotton Belt Trail in Addison.

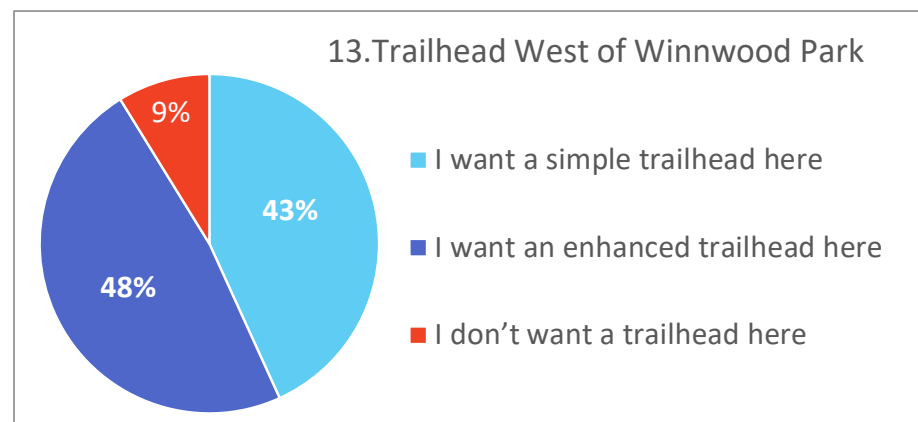
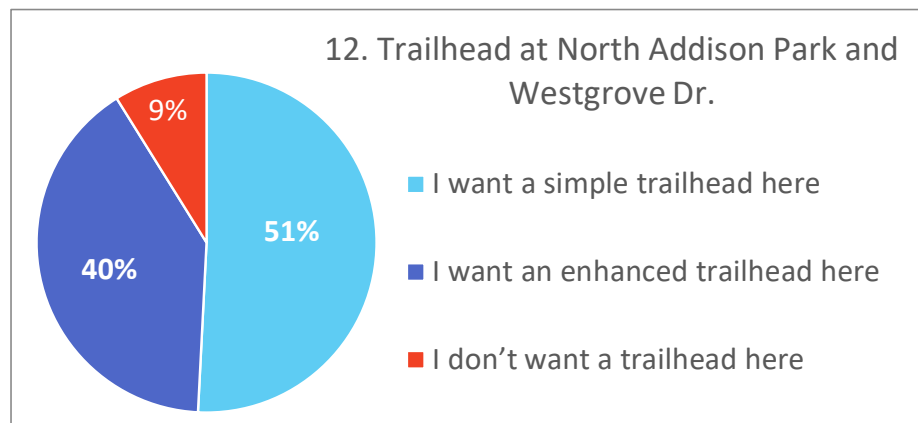


## 12. Trailhead at North Addison Park and Westgrove Dr.

I want a simple trailhead here	63	24%	51%
I want an enhanced trailhead here	50	19%	40%
I don't want a trailhead here	11	4%	9%
No Response	134	52%	

## 13. Trailhead West of Winnwood Park

I want a simple trailhead here	54	21%	43%
I want an enhanced trailhead here	60	23%	48%
I don't want a trailhead here	11	4%	9%
No Response	133	52%	



14. Click here to locate up to three additional new trailheads

See Map-Based Responses

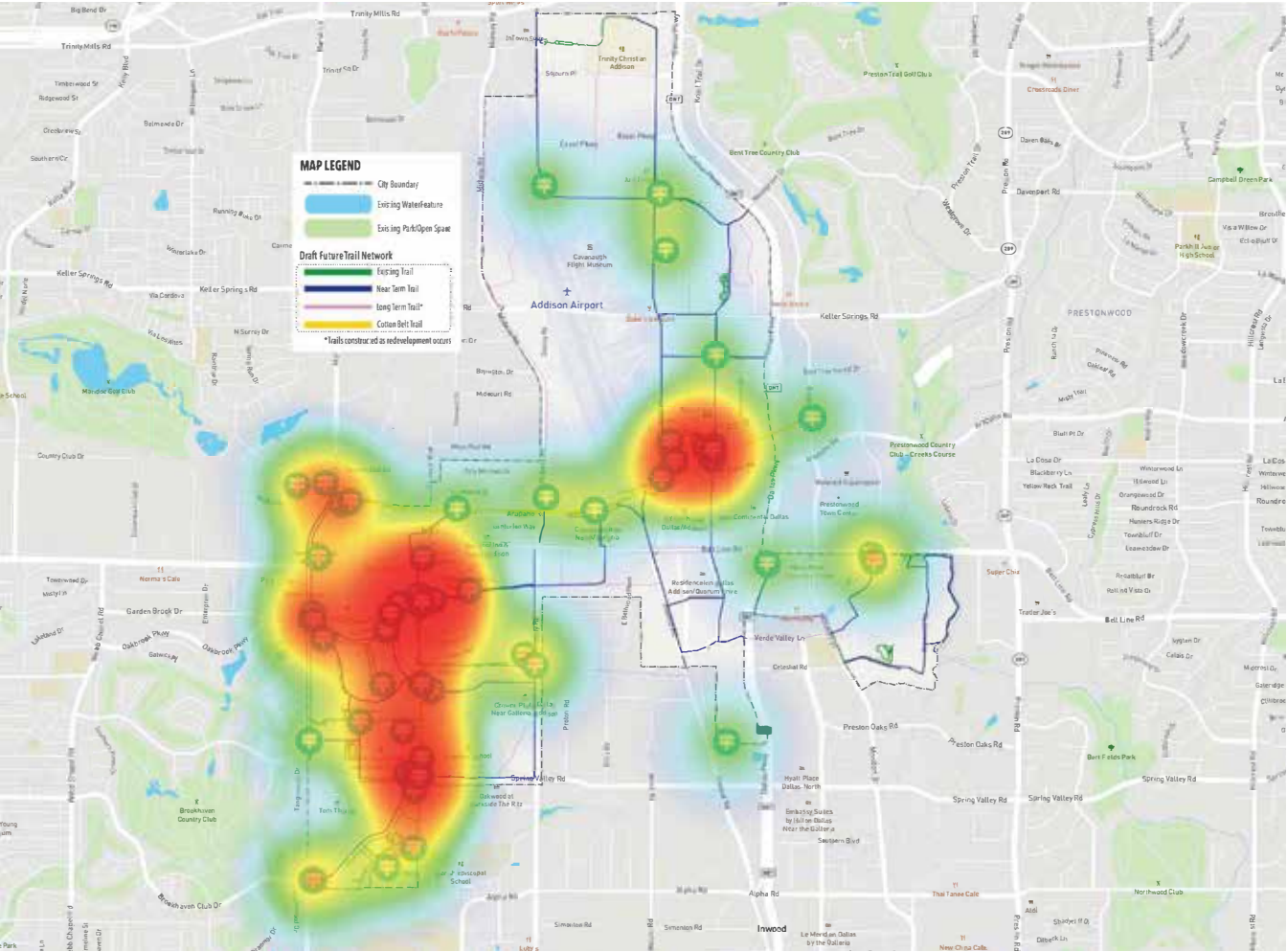
[geo-point-kgct0ksn](#)

14A. What type of trailhead should this be?

I want a simple trailhead here  
I want an enhanced trailhead here  
Other (please share what)

14	5%	24%
43	17%	73%
2	1%	3%

14. New Trailhead locations







# Trail Prioritization Criteria



## Trail Prioritization Criteria

Two types of trail prioritization criteria were established during the planning process. The following summarizes each and describes how it was used during the planning process and how it can be used moving forward.

The **Trail Typology Criteria** was used to determine which trail typologies could plausibly be applied to on-street and off-street alignments. During the planning process Table C-1 and Table C-2 were established to help to score possible trail alignments based on how well suited they were for each trail typology. This criteria was applied to all possible trails identified in the Master Transportation Plan; the Parks, Recreation and Open Space Master Plan; and the additional alignments identified in City-Wide Trails Master Plan process. This criteria may be used to vet alternative typologies for various alignments, should new information arise during the design phase.

The **Trail Evaluation Criteria** was used to evaluate various system-wide alternatives, prioritize projects and assign phasing. These criteria are based on the project's guiding principles and are represented in Table C-3. This criteria may be used to determine priorities for the complete trail system or for individual alignments.

Table C-1: Off-Street Trail Typology Criteria

	Locations	Use	Width required
<b>Off-street regional shared-use path</b>	Along long regional commuter routes with high volumes and/or varied types of users	Two-way traffic; pedestrians, cyclists, skaters, wheelchair users, and others	24' minimum for easement
<b>Off-street local shared-use path</b>	Along transportation and recreation routes through primary civic or commercial areas and residential neighborhoods	Two-way transportation routes with light to moderate volumes of primarily pedestrian and bicycle traffic	20' minimum for easement
<b>Paved park trails</b>	Within public parks and greenways	Specialized use for light volumes of traffic	12' minimum for improved area
<b>Unpaved park trails / nature paths</b>	Within public parks and greenways	Specialized use for light volumes of traffic	8' minimum for improved area

Table C-1: Off-Street Trail Typology Criteria (continued)

	Alignment	Views	Required maintenance	Topography	Soils, Water and Hydrology	Key operational elements
<b>Off-street regional shared-use path</b>	Efficient and direct routes; avoid creating tunnels or blind corridors; avoid maximum grades within 20 feet of intersections; avoid and preserve existing mature trees	Provide views of natural features and destinations; avoid direct views into private residences	Cut vegetation in clearance zones, repairs and upgrades to trail surface, crossings, and amenities	Accessible Trails: target grade less than 5%; target cross slope 2%	Avoid saturated soil; minimize water crossings; construct outside floodplains wherever possible	Additional width may be needed to accommodate bridges, cut / fill needs, curves, trail amenities, or maintenance
<b>Off-street local shared-use path</b>	Fairly direct connections between destinations; includes spurs and exits where possible; public access at all ends; connects to other trails; avoid and preserve existing mature trees	Provide views of natural features and destinations; avoid direct views into private residences	Cut vegetation in clearance zones, repairs and upgrades to trail surface, crossings, and amenities	Accessible Trails: target grade less than 5%; target cross slope 2%	Avoid saturated soil; minimize water crossings; construct outside floodplains wherever possible	Avoid using stairs, where possible
<b>Paved park trails</b>	Can meander as necessary to construct the trail with minimum disturbance to natural and built features	Align views with meandering trail alignment; avoid direct views into private residences	Cut vegetation in clearance zones, repairs and upgrades to trail surface, crossings, and amenities	Allow for an accessible trail without excessive cut / fill requirements	Avoid saturated soils and minimize water crossings	Create perimeter trails or loop routes to encourage exercise and activity
<b>Unpaved park trails / nature paths</b>	Take advantage of natural features; meandering trail to wrap around large features; generally follow the natural flow of the terrain	Align views with meandering trail alignment; avoid direct views into private residences	Cut vegetation in clearance zones, repairs and upgrades to trail surface, crossings, and amenities	Allow for an accessible trail without excessive cut / fill requirements	Trail follows natural dips in terrain, or create dips every 20-50 feet to prevent water from flowing along, and eroding, the trail	Prioritize trail development in areas with natural or cultural significance; trail grade should be no more than 1/2 the side slope grade



Table C-2: On-Street Trail Typology Criteria

	Functional street class	ROW width required for facility	Target max motor vehicle volume (ADT)	Motor vehicle lanes	Target motor vehicle speed	Required buffer minimum	Key operational elements
<b>Wide sidewalk trails</b>	Collector and minor arterial streets, but can be applied to principal arterials with proper buffering	8'-12' (includes buffer) on both sides of the street	Any	Any	40 mph or less	2' minimum buffer from roadway	The buffer can be included in the total width (8'-12') when physical barriers such as trees or landscaping are included
<b>Bike boulevards</b>	Local streets	14'-16' vehicle travel lanes	1,000 – 2,000	No centerline or single lane one-way travel	20 mph or less	N/A	Shared lane markings and signage are needed to guide bicyclists and to remind drivers to be aware.
<b>Bike lanes</b>	Local streets	6'	1,500 – 3,000	Single lane each direction	25 mph or less	N/A	5' lanes can be acceptable in some situations
<b>Buffered bike lanes</b>	Local and collector streets	4'-7'	3,000 – 6,000	Single lane each direction or multiple lanes per direction	30 mph or less	2' minimum	Bicycle travel lane can be narrower if buffer is wider (e.g. 4' bike lane with 3' buffer). Buffer should be striped or a different pavement type to visually distinguish.
<b>One-lane cycle tracks</b>	Collector and minor arterial streets	5' minimum, 7' minimum in higher volume areas	Greater than 6,000	Multiple lanes per direction	31 mph or higher	3' minimum	Buffer should be striped and contain physical barriers. The facility can be separated from street by curb or raised to level of sidewalks.
<b>Two-lane cycle tracks</b>	Collector and minor arterial streets	12' preferred width with a minimum of 8'	Greater than 6,000	Multiple lanes per direction	31 mph or higher	3' minimum	Buffer should be striped and contain physical barriers. The facility can be separated from street by curb or raised to level of sidewalks.
<b>Shared use paths in ROW</b>	Collector and minor arterial streets	10'-14'	Greater than 6,000	Multiple lanes per direction	31 mph or higher	2' on both sides of path	Centerline markings are good to use in higher volume areas.



Table C-3: Trail Evaluation Criteria

	Guiding Principles	Criteria
<b>Safety</b>	Provides public safety by establishing low-stress facilities with minimal vehicle conflicts and visible corridors with crime prevention mechanisms.	1. Prioritizes low-stress facilities (separated and buffered)
		2. Minimizes potential vehicle conflicts
		3. Routes are visible from adjacencies and avoid areas prone to crime and vandalism
<b>Connectivity</b>	Supports recreational and commuting needs through trail access, filling network gaps, and changing vehicular circulation when needed.	1. Low amount of network gaps (pedestrian system, bicycle routes, neighboring jurisdiction trails)
		2. Has multiple access points connecting to the surrounding neighborhoods
		3. Minimal vehicular circulation changes
<b>Context-Sensitivity</b>	Responds to the opportunities, constraints, and character of Addison by minimizing environmental impacts, reducing private property impacts, limiting facility costs, and providing access to transit routes.	1. Provides transit access
		2. System benefits outweigh cost of facility improvements
		3. Limited environmental impacts (drainage, vegetation, etc.)
		4. Limited private property impacts
<b>Diversity of Choices</b>	Attracts a range of users by providing multiple active transportation modes on various trail types around the town.	1. Provides a diversity of skill and comfort levels
		2. Supports multiple active transportation modes
		3. Avoids trail user altercations (separates or limits modes as needed)









# **Funding Strategies**

## Funding Strategies

Implementation of the Future Trail Network for the Town of Addison will likely require funding from a number of sources. The variety of trail types included in the Master Plan, the integration of recreation and transportation, and the identification of partnership opportunities results in a large variety of potential funding opportunities.

It is recommended that the Town of Addison dedicate a portion of the general fund to trail improvements throughout the community for construction and maintenance and continue to prioritize trail and other active transportation improvements as part of the roadway improvements and regular CIP planning. Town leadership may also want to explore the incorporation of trail improvements into a future bond measure as trail improvements have received substantial community support through many public processes, including the development of the Master Transportation Plan; the Parks, Recreation and Open Space Master Plan; and this City-Wide Trails Master Plan.

Some of the following sources should also be incorporated as part of the overall implementation plan. It is important to consider what funding sources might be available to help the Town supplement the cost of trail network expansion, especially for partnership connections identified as part of the Future Trail Network. It should be noted that several of the funding sources identified below require a local contribution or local match.

### COUNTY

- Dallas County Trail and Preserve Program
- Dallas County Bond Projects

### NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS (NCTCOG)

- Transportation Alternatives Program (TAP)
- Sustainable Development Calls for Projects
- Regional Tollway Revenue Funding Initiative

### STATE OF TEXAS

- Texas Parks and Wildlife Department (TPWD)
  - Outdoor Recreation Grants
  - Recreational Trails Grants
- Texas Department of Transportation (TXDOT)
  - Transportation Alternatives Program (TAP)
- State Energy Conservation Office
- Energy Efficiency and Conservation Block Grant

### OTHER FEDERAL TRANSPORTATION FUNDING SOURCES

- Highway Bridge Replacement and Rehabilitation Program
- Highway Safety Improvement Program
- National Highway System
- Surface Transportation Program
- Federal Transit Administration Programs
- Interstate Maintenance (through TxDOT)
- Transportation and Community and System Preservation

### OTHER FEDERALLY FUNDED PROGRAMS INCLUDING BICYCLE AND PEDESTRIAN OPPORTUNITIES

- U.S. Department of Housing and Urban Development
  - Community Development Block Grant
- U.S. Army Corps of Engineers (USACE)

### OTHER SOURCES OF FUNDING FOR TRAIL DEVELOPMENT

- The Trust for Public Land
- Land Trusts
- Communities Foundation of Texas
- Meadows Foundation
- Recreational Equipment, Inc.
- Foundation Directory On-Line
- Private Donations Partnerships with Volunteer Groups



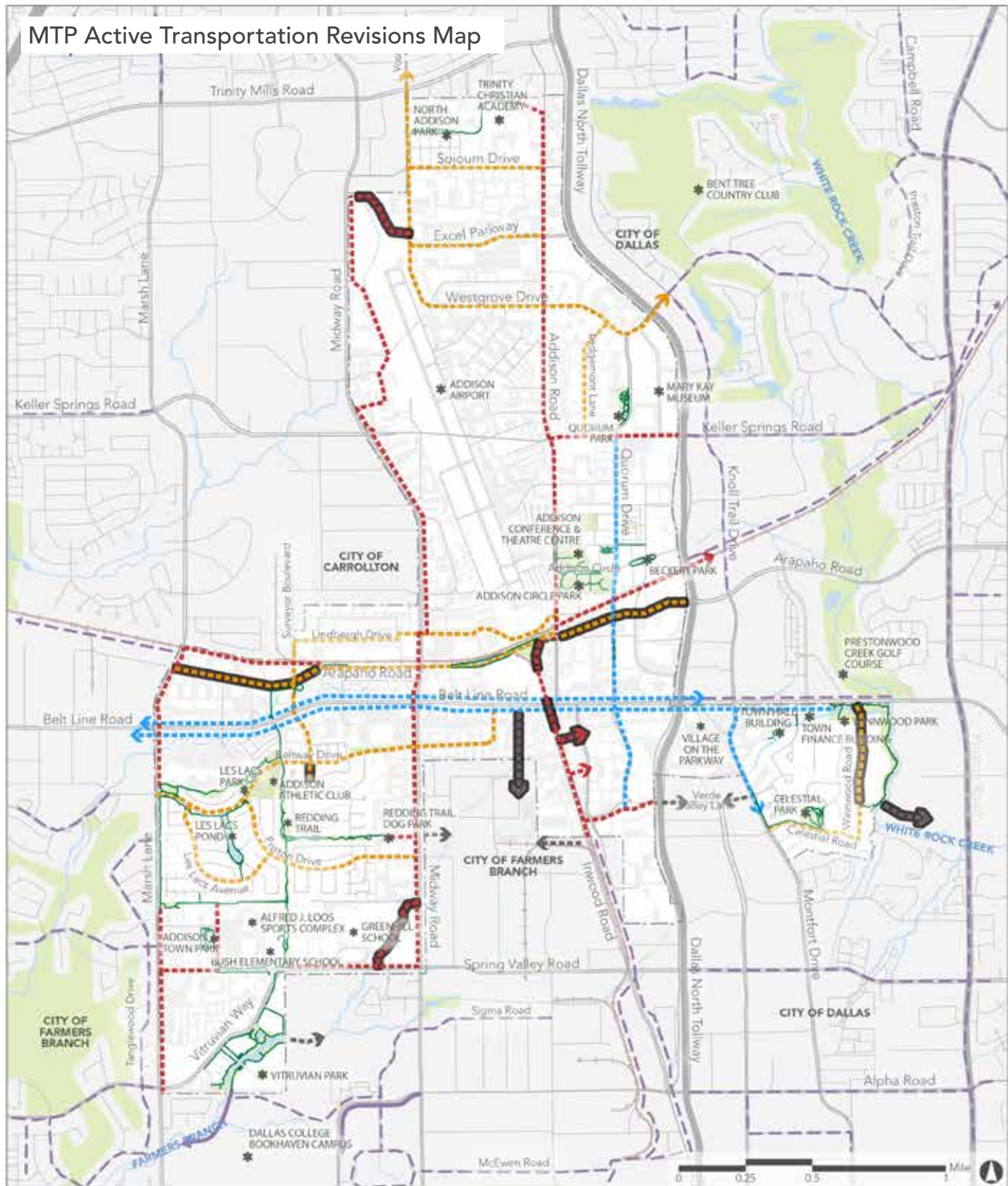


# **MTP Active Transportation Map Revisions**





# MTP Active Transportation Revisions Map



## LEGEND

- Addison Boundary
- Roadway
- Pavement
- Parks/Open Space/Golf
- Water Body
- River/Stream
- Creek Channel
- Rail
- * Major Destination

## EXISTING NETWORK

- Highway
- Major Road
- Local Road
- Addison Trail

## ADJACENT TRAIL CONNECTIONS

- Existing Trail
- Proposed Trail

## PROPOSED ACTIVE TRANSPORTATION*

- Off-Street Trail
- Enhanced Pedestrian Path
- Active Transportation Corridor
- Preferred Future Connectivity
- Deleted MTP Alignments

*Proposed Active Transportation Connectivity recommended in the 2016 Master Transportation Plan











# **CITY-WIDE TRAILS** **APPENDICES**

DRAFT PLAN | MAY 2021



in association with:





## Council Meeting

8.

Meeting Date: 05/25/2021

Department: Development Services

---

### AGENDA CAPTION:

Hold a Public Hearing, Present, Discuss, and Consider Action on an **Ordinance Changing the Zoning on Property Located at 5290 Belt Line Road, Suite 112B, Which Property is Currently Zoned PD, Planned Development, Through Ordinance O19-22, by Approving a Special Use Permit for a New Restaurant.** Case 1826-SUP/Jeni's Splendid Ice Creams.

### BACKGROUND:

#### COMMISSION FINDINGS:

The Addison Planning and Zoning Commission, meeting in regular session on April 20, 2021, voted to recommend approval of an ordinance changing the zoning on property located at 5290 Belt Line Road, Suite 112B, which property is currently zoned PD, Planned Development, through Ordinance O19-22, by approving a Special Use Permit for a new restaurant to permit a new ice cream shop with a patio, subject to no conditions.

Voting Aye: Catalani, Craig, DeFrancisco, Fansler, Meleky, Resnik, Souers

Voting Nay: none

Absent: none

SPEAKERS AT THE PUBLIC HEARING: none.

Please refer to the Staff Report for additional details.

### RECOMMENDATION:

Administration recommends approval.

---

### Attachments

1826-SUP Ordinance

Presentation - Case 1826-SUP

1826-SUP Staff Report

1826-SUP Plans

---

**ORDINANCE NO. _____**

**AN ORDINANCE OF THE TOWN OF ADDISON, TEXAS, AMENDING THE COMPREHENSIVE ZONING ORDINANCE TO GRANT A SPECIAL USE PERMIT FOR A RESTAURANT LOCATED AT 5290 BELT LINE ROAD, SUITE 112B; PROVIDING A PENALTY NOT TO EXCEED TWO THOUSAND AND NO/100 DOLLARS (\$2,000.00) FOR EACH OFFENSE AND A SEPARATE OFFENSE SHALL BE DEEMED COMMITTED EACH DAY DURING OR ON WHICH A VIOLATION OCCURS OR CONTINUES; SAVINGS, NO SEVERABILITY AND AN EFFECTIVE DATE.**

**WHEREAS**, the property located at 5290 Belt Line Road, Suite 112B, is zoned PD, Planned Development, through Ordinance Number O19-22; and

**WHEREAS**, at its regular meeting held on April 20, 2021 the Planning & Zoning Commission considered and made recommendations on a request for a Special Use Permit for a restaurant and a Special Use Permit for the sale of alcoholic beverages for on-premises consumption (Case No.1826-SUP); and

**WHEREAS**, this change of zoning is in accordance with the adopted Comprehensive Plan of the Town of Addison, as amended; and

**WHEREAS**, after due deliberations and consideration of the recommendation of the Planning and Zoning Commission, the information received at a public hearing, and other relevant information and materials, the City Council of the Town of Addison, Texas finds that this amendment promotes the general welfare and safety of this community.

**NOW THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE TOWN OF ADDISON, TEXAS:**

**SECTION 1.** That the recitals and findings set forth above are hereby found to be true and correct and incorporated as if fully set forth herein.

**SECTION 2.** That a Special Use Permit authorizing a restaurant, on the property located at 5290 Belt Line Road, Suite 112B, is hereby granted subject to the following conditions:

- (a) Prior to the issuance of a Certificate of Occupancy, said Property shall be improved in accordance with the site plan, floor plan, and building elevations, which are attached hereto as **Exhibit A** and made a part hereof for all purposes.
- (b) The Special Use Permit granted herein for a restaurant shall be limited to that particular area designated on the final site plan as encompassing a total area not to exceed 2,467 square feet.
- (c) If the property for which this Special Use Permit is granted is not used for the purposes for which said permits were granted within one (1) year after the adoption of this

ordinance, the City Council may authorize hearings to be held for the purpose of considering a change of zoning and repeal of the Special Use Permits granted herein.

**SECTION 3.** That any person, firm, or corporation violating any of the provisions or terms of this ordinance shall be subject to the same penalty as provided for in the Comprehensive Zoning Ordinance of the city, as heretofore amended, and upon conviction shall be punished by a fine set in accordance with Chapter 1, General Provisions, Section 1.10, General penalty for violations of Code; continuing violations, of the Code of Ordinances for the Town of Addison.

**SECTION 4.** That it is the intention of the City Council that this ordinance be considered in its entirety, as one ordinance, and should any portion of this ordinance be held to be void or unconstitutional, then said ordinance shall be void in its entirety, and the City Council would not have adopted said ordinance if any part or portion of said ordinance should be held to be unconstitutional or void.

**SECTION 5.** That all ordinances of the City in conflict with the provisions of this ordinance be, and the same are hereby repealed and all other ordinances of the City not in conflict with the provisions of this ordinance shall remain in full force and effect.

**SECTION 6.** That this Ordinance shall become effective from and after its passage and approval and after publication as may be required by law or by the City Charter or ordinance.

**DULY RESOLVED AND ADOPTED** by the City Council of the Town of Addison, Texas, on this the **25TH** day of **MAY** 2021.

**TOWN OF ADDISON, TEXAS**

_____  
Joe Chow, Mayor

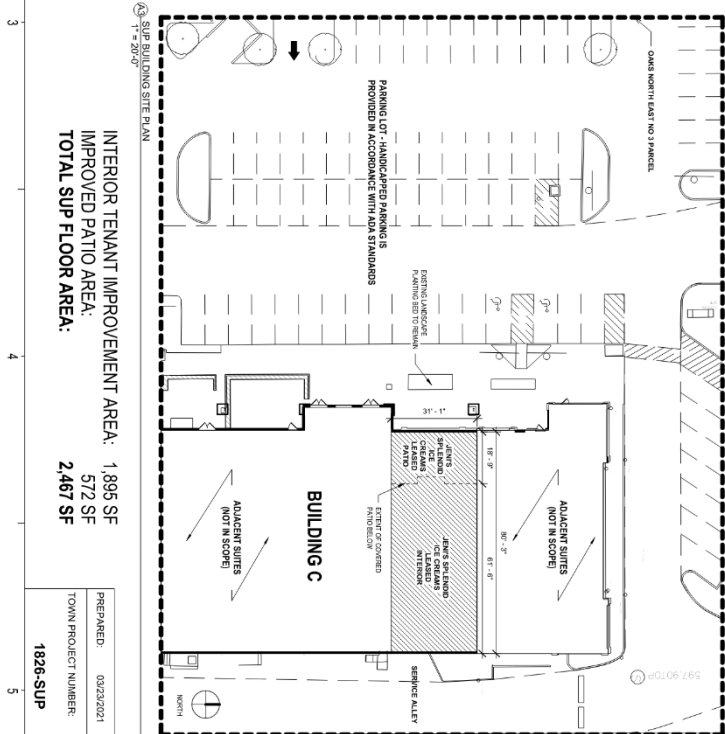
**ATTEST:**

**APPROVED AS TO FORM:**

_____  
Irma Parker, City Secretary

_____  
City Attorney

1



5290 Belt Line Road Suite 112B  
TOWN OF ADDISON, TEXAS  
SITE PLAN



[illegible]

**SEATING COUNT**  
DINING: 32  
PATIO: 23  
TOTAL: 55

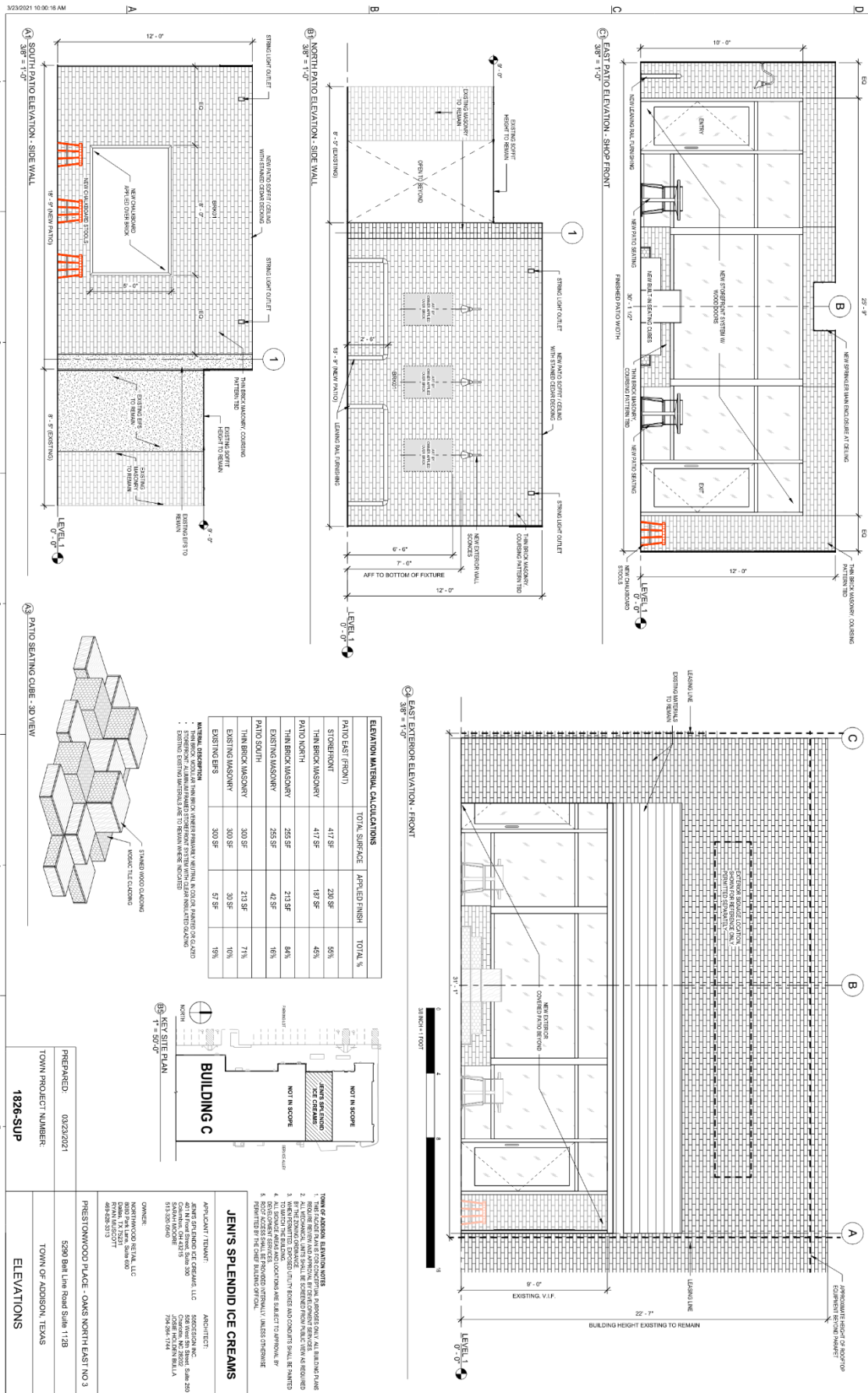
JENTS SPINNO ICE CREAMS, LLC  
407 N. Front Street, Suite 300  
Columbus, OH 43215  
SARAH MOORE  
613-320-0540

5605DESIGN, INC.  
508 West 5th Street, Suite  
Charlotte, NC 28202  
JOSE HOLTEN BULLA  
704-264-1744

PRESTONWOOD PLACE - OAKS NORTH EAST NO 3

PREPARED: 03/23/2021	5290 Bell Line Road Suite 112B
TOWN PROJECT NUMBER: 1826-SUP	TOWN OF ADDISON, TEXAS
	FLOOR PLAN

# EXHIBIT A



# **Jeni's Splendid Ice Creams Special Use Permit (1826-SUP)**

The logo for Addison, featuring the word "ADDISON" in a bold, blue, sans-serif font. The text is centered within a white circle, which is itself set against a blue background. The blue background is part of a larger graphic element on the right side of the slide, consisting of a blue triangle with a white circle and a grey triangle in the top-left corner.

**ADDISON**



# Case 1826-SUP Jeni's Splendid Ice Creams

ADDISON

## LOCATION:

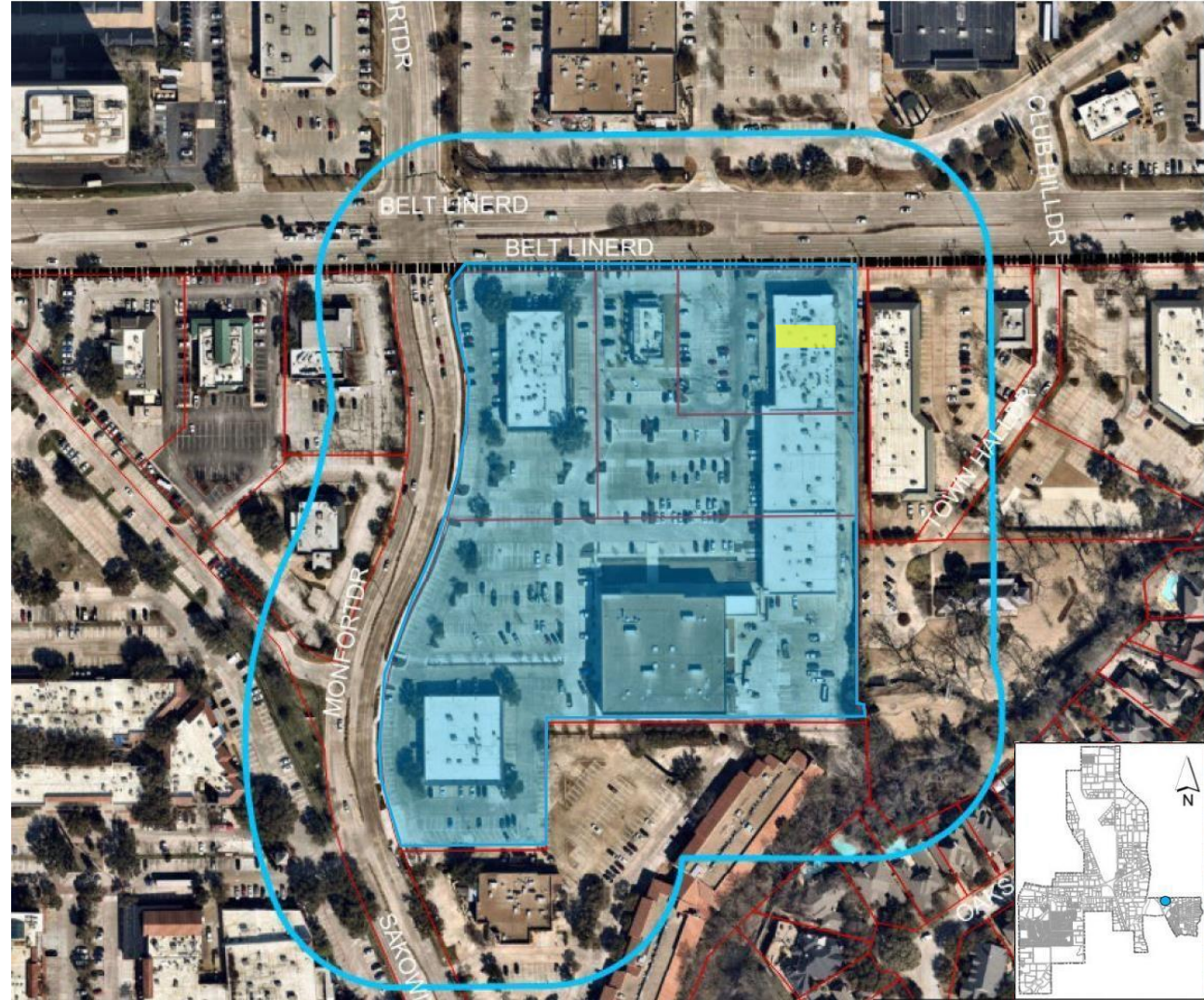
5290 Belt Line Road, Suite 112B.

## REQUEST:

Approval of a Special Use Permit for a restaurant to permit a new ice cream shop with a patio.

## ACTION REQUIRED:

Discuss, consider, and take action on the appropriateness of the proposed restaurant use and associated site conditions at the subject property.



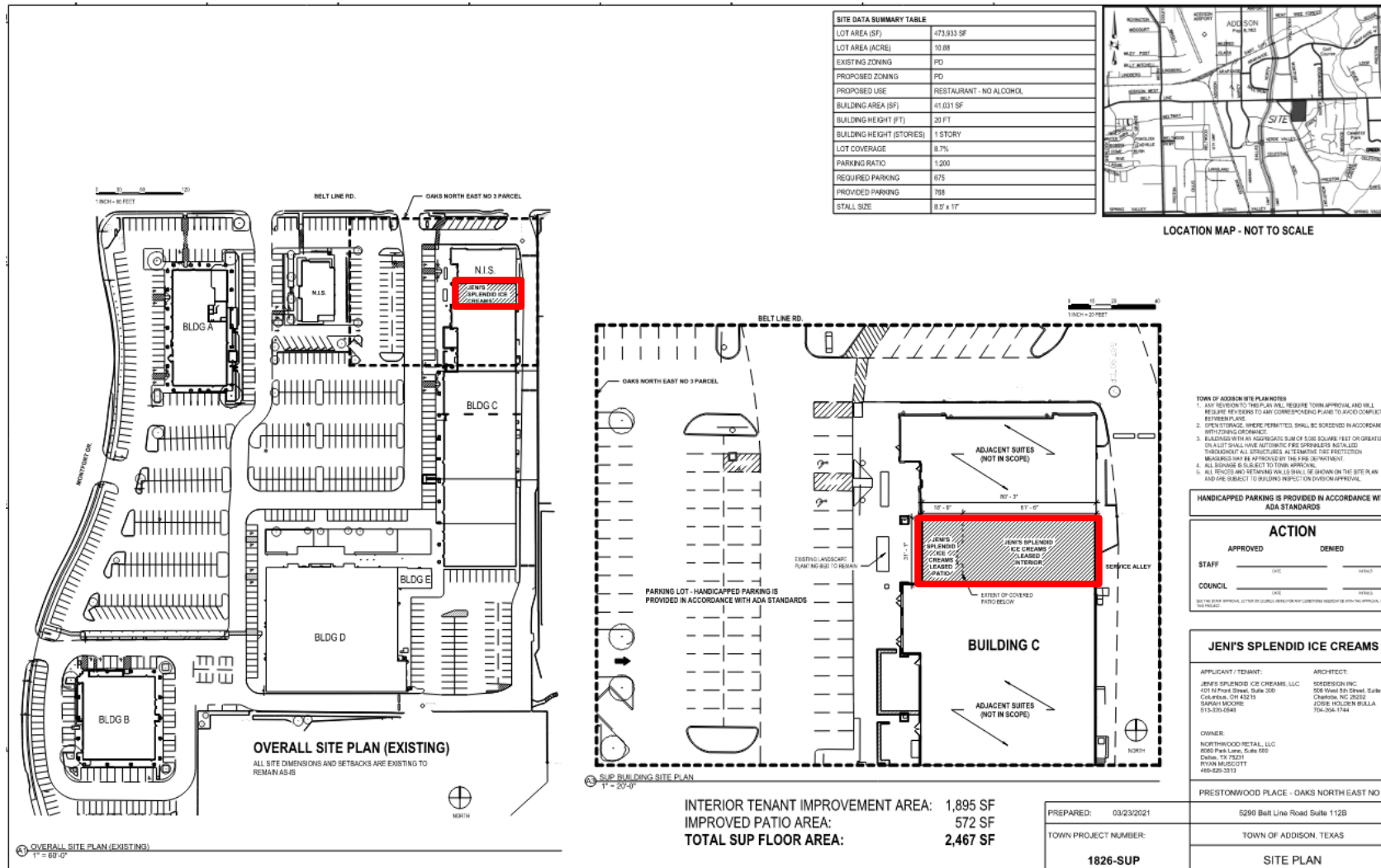
# Case 1826-SUP Jeni's Splendid Ice Creams

ADDISON

## PROJECT HISTORY:

June 2019 – Rezoned to PD to support reinvestment in Prestonwood Place

Present – Planned renovation of former la Madeleine space to accommodate Jeni's Splendid Ice Creams

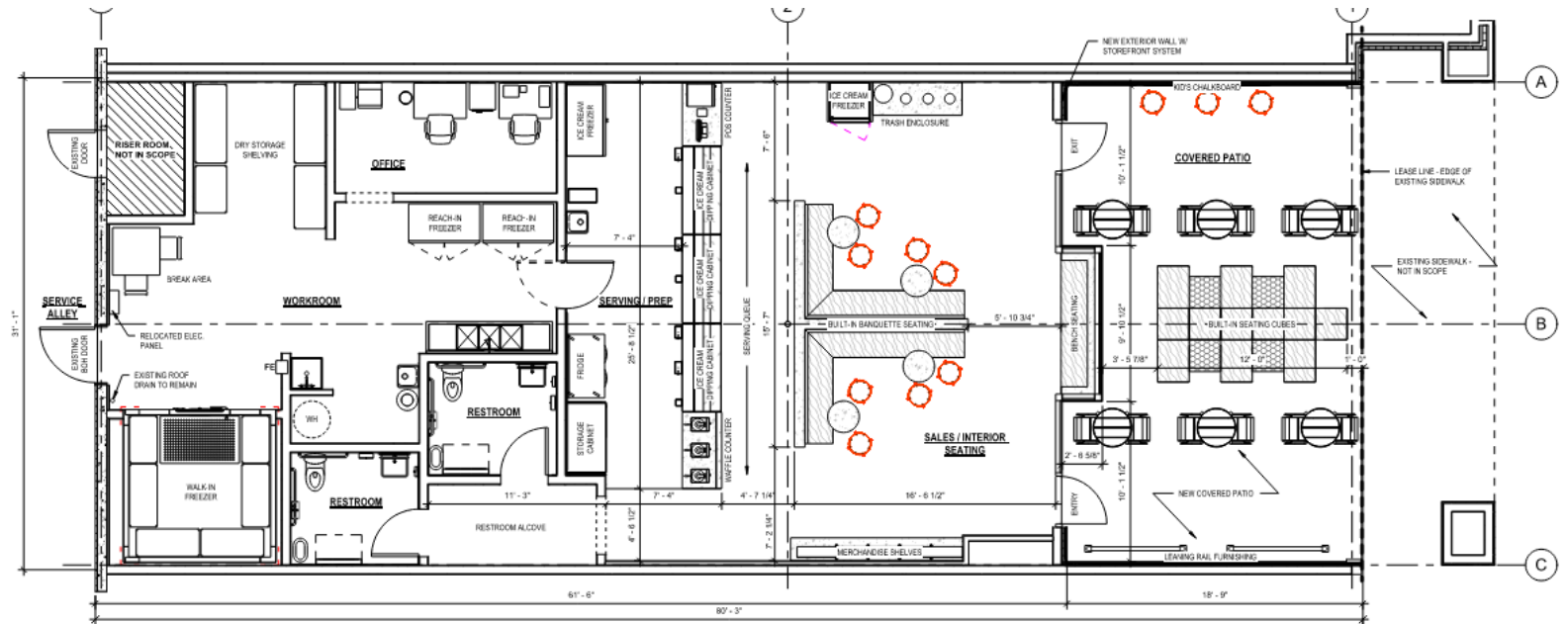


# Case 1826-SUP Jeni's Splendid Ice Creams

ADDISON

## Restaurant Use:

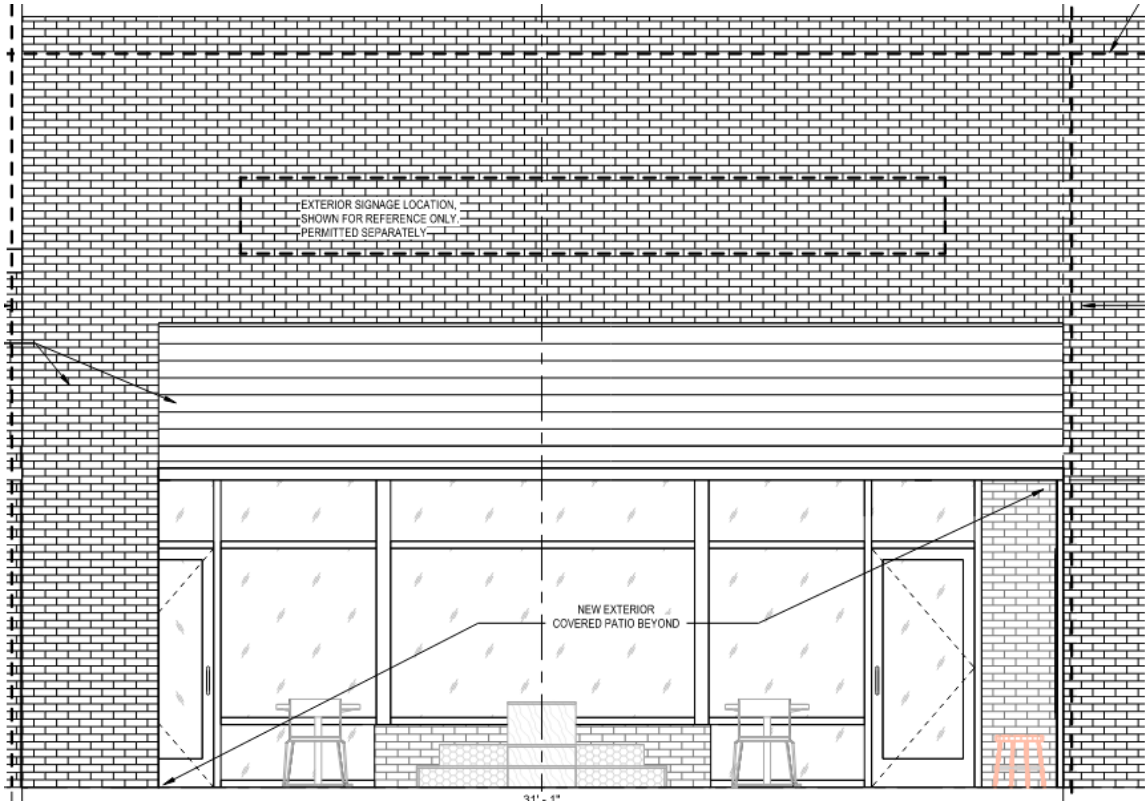
- 1,895 SF of interior floor area
- 572 SF of covered patio space
- Seating for 32 indoors,  
23 on the patio





# Case 1826-SUP Jeni's Splendid Ice Creams

ADDISON



## PARKING:

Overall site exceeds PD parking requirements by 93 spaces

## OPEN SPACE AND LANDSCAPE:

Plans comply with landscape requirements of the PD

## EXTERIOR APPEARANCE:

Façade improvements were largely completed with the overall building improvements; Applicant proposes to create a covered patio inset within the existing footprint of the building



# Case 1826-SUP Jeni's Splendid Ice Creams

ADDISON

## PUBLIC NOTICE:

Notice of public hearing was provided to property owners within 200 feet of the subject property in accordance with Town and State law

## NOTICE RECIPIENTS: 16.

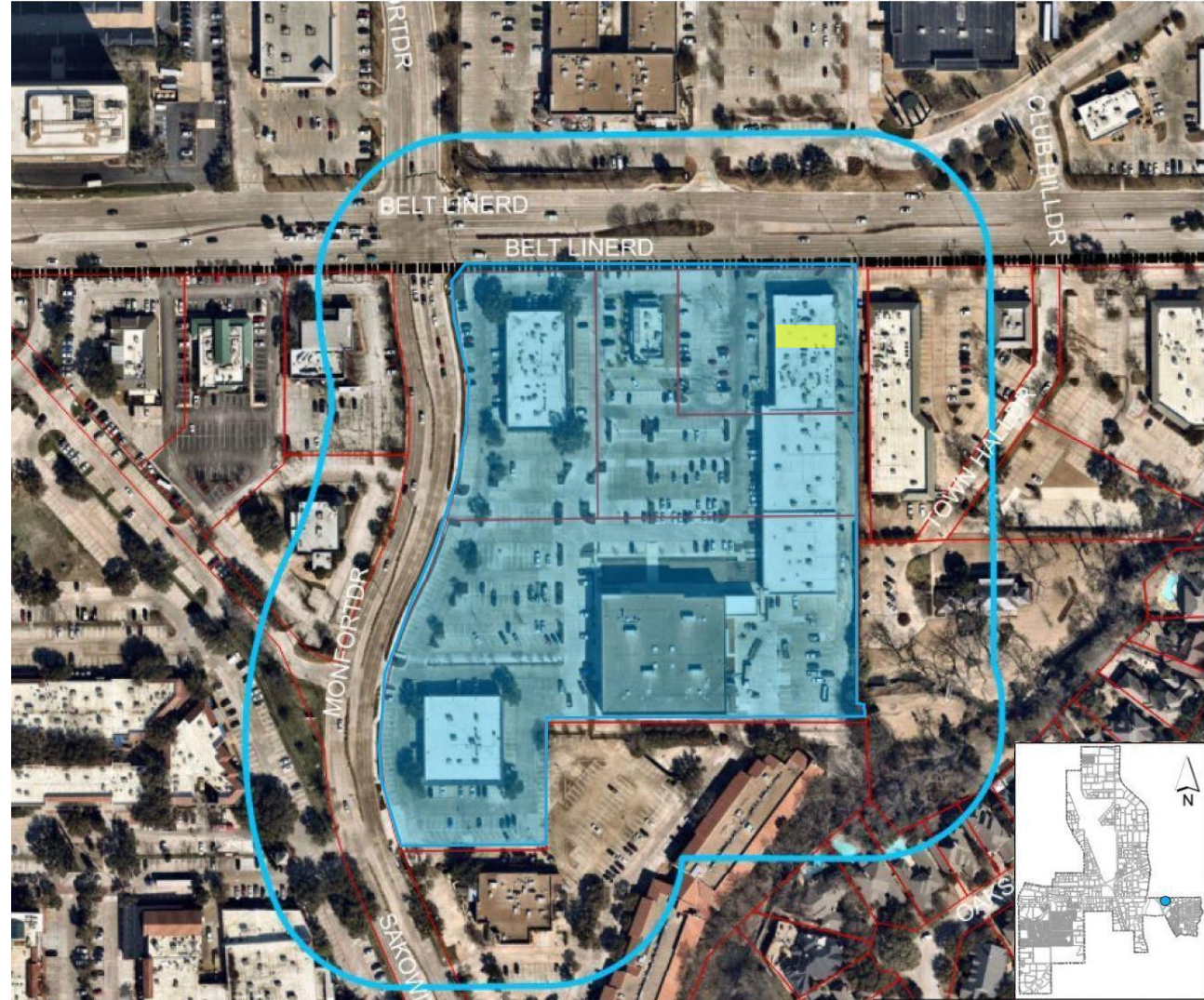
**FOR:** None.

**AGAINST:** None.

**NEUTRAL:** None.

## PLANNING & ZONING COMMISSION ACTION

Approval: 7 – 0, with no conditions.



# Case 1826-SUP Jeni's Splendid Ice Creams

ADDISON

## RECOMMENDATION:

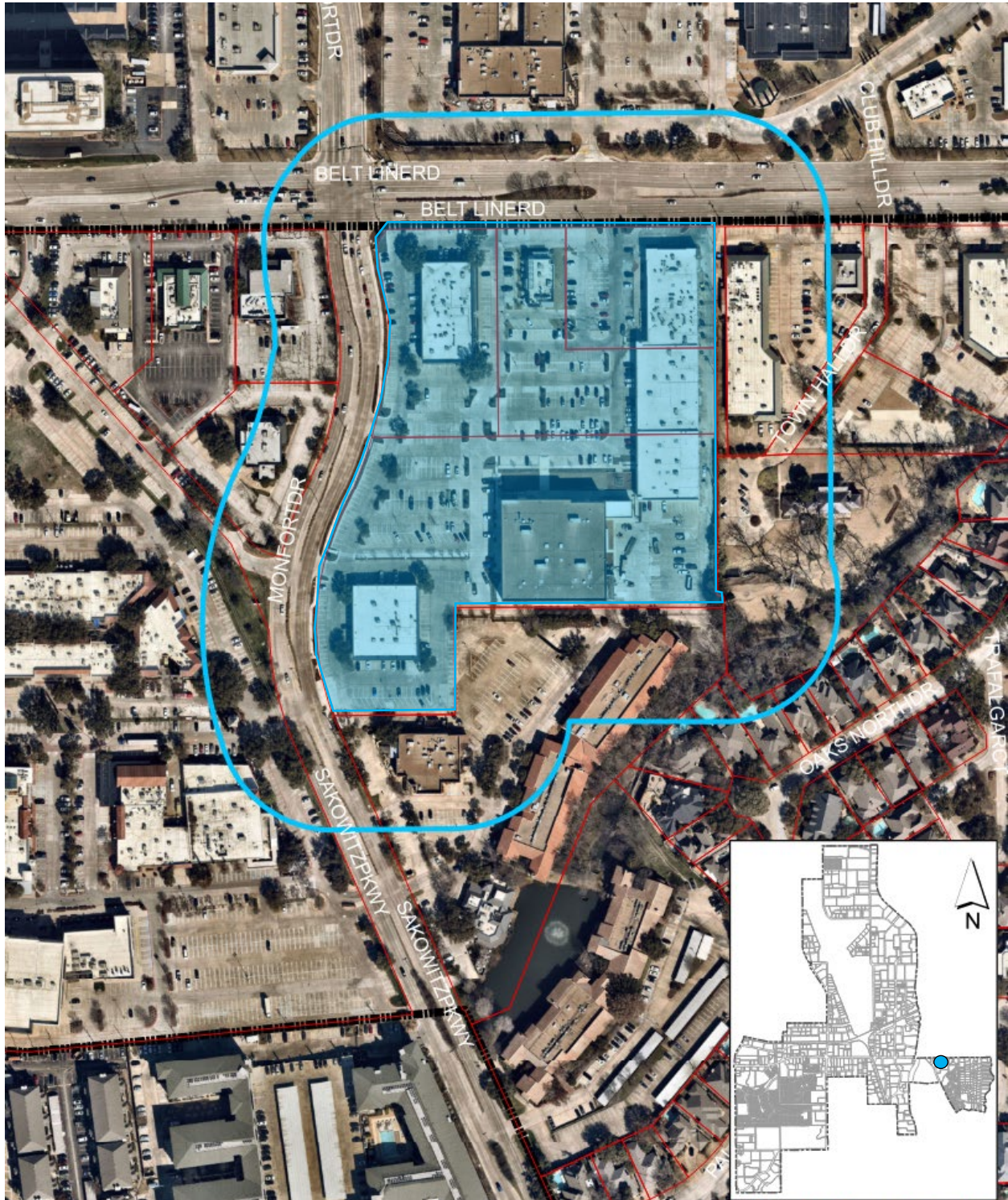
Staff recommends **approval of the request.**



# 1826-SUP

**PUBLIC HEARING** Case 1826-SUP/Jeni's Splendid Ice Creams. Public hearing, discussion, and take action on a recommendation regarding an ordinance changing the zoning on property located at 5290 Belt Line Road, Suite 112B, which property is currently zoned PD, Planned Development, through Ordinance O19-22, by approving a Special Use Permit for a new restaurant.

## LOCATION MAP





April 15, 2021

## STAFF REPORT

RE: 1826-SUP/Jeni's Splendid Ice Creams

LOCATION: 5290 Belt Line Road, Suite 112B

REQUEST: Approval of a Special Use Permit for a restaurant to permit a new ice cream shop with a patio.

APPLICANT: Sarah Moore, Jeni's Splendid Ice Creams

DISCUSSION:

Background: This proposed restaurant is situated within the Prestonwood Place shopping center, which is located at the southeast corner of Belt Line Road and Montfort Drive. This center was recently rezoned to PD, Planned Development, through Ordinance O19-22, to allow for renovation of the existing buildings in an effort to attract a broader mix of tenants.

A new tenant, Jeni's Splendid Ice Creams, is interested in a lease space in Building C, which is the remaining portion of the suite previously occupied by la Madeleine, adjacent to Shake Shack. This building has recently undergone exterior renovation in an effort to update and modernize the façades. Jeni's Splendid Ice Creams is proposing a small ice cream shop with a patio, which triggers the requirement for a new Special Use Permit (SUP).

Founded in Columbus, Ohio in 2002 by James Beard Award-winning ice cream maker Jeni Britton Bauer, Jeni's Splendid Ice Creams makes one-of-a-kind flavors in partnership with the growers, makers, and producers who supply them with ingredients, from family-run dairies to farmers who grow fields of berries just for their ice cream. Jeni's prides themselves on providing communities artisanal ice cream with local flair.

Proposed Plan: The applicant is requesting approval of a new SUP for a restaurant. The new restaurant space would total 2,467 square feet, inclusive of a 572 square-foot covered outdoor patio area. The floor plan shows a small interior dining area with a service counter, and an outdoor patio with café tables and a communal seating area. The interior dining room seats 32 and the outdoor patio seats 23.

Parking: This property is zoned PD, which requires a parking ratio of 1 space per 200 square feet across all uses. Based on the center's total square footage, inclusive of the new tenant space, it requires 675 parking spaces. There are currently 768 parking spaces provided on site, exceeding the minimum parking required by the PD district.

Exterior Facades: Improvements to the building façade were completed with the overall improvements to the building. The new tenant proposes to modify the front façade by creating a small covered outdoor patio within the confines of the adjacent tenant walls. The interior of the

patio area will include a new storefront system, exterior light sconces and string lighting, and masonry cladded walls that include art installations and a chalkboard.

Landscaping and Open Space: The landscape plans were recently reviewed through the rezoning process for the shopping center. As improvements have occurred, the development team has worked to maximize compliance with the Town's landscape requirements. The approved landscape plan does not require any additional landscaping or open space at this lease space.

**RECOMMENDATION: APPROVAL**

Jeni's Splendid Ice Creams and their artisanal, farm-sourced offerings will be a great addition to the evolving Prestonwood Place shopping center. This new restaurant adds diversity to the Addison restaurant landscape and reflects continued reinvestment momentum for Prestonwood Place.

Staff recommends approval of the request without conditions.





Case 1826-SUP/Jeni's Splendid Ice Creams

April 20, 2021

COMMISSION FINDINGS:

The Addison Planning and Zoning Commission, meeting in regular session on April 20, 2021, voted to recommend approval of an ordinance changing the zoning on property located at 5290 Belt Line Road, Suite 112B, which property is currently zoned PD, Planned Development, through Ordinance O19-22, by approving a Special Use Permit for a new restaurant to permit a new ice cream shop with a patio, subject to no conditions.

Voting Aye: Catalani, Craig, DeFrancisco, Fansler, Meleky, Resnik, Souers

Voting Nay: none

Absent: none

SPEAKERS AT THE PUBLIC HEARING:

For: none

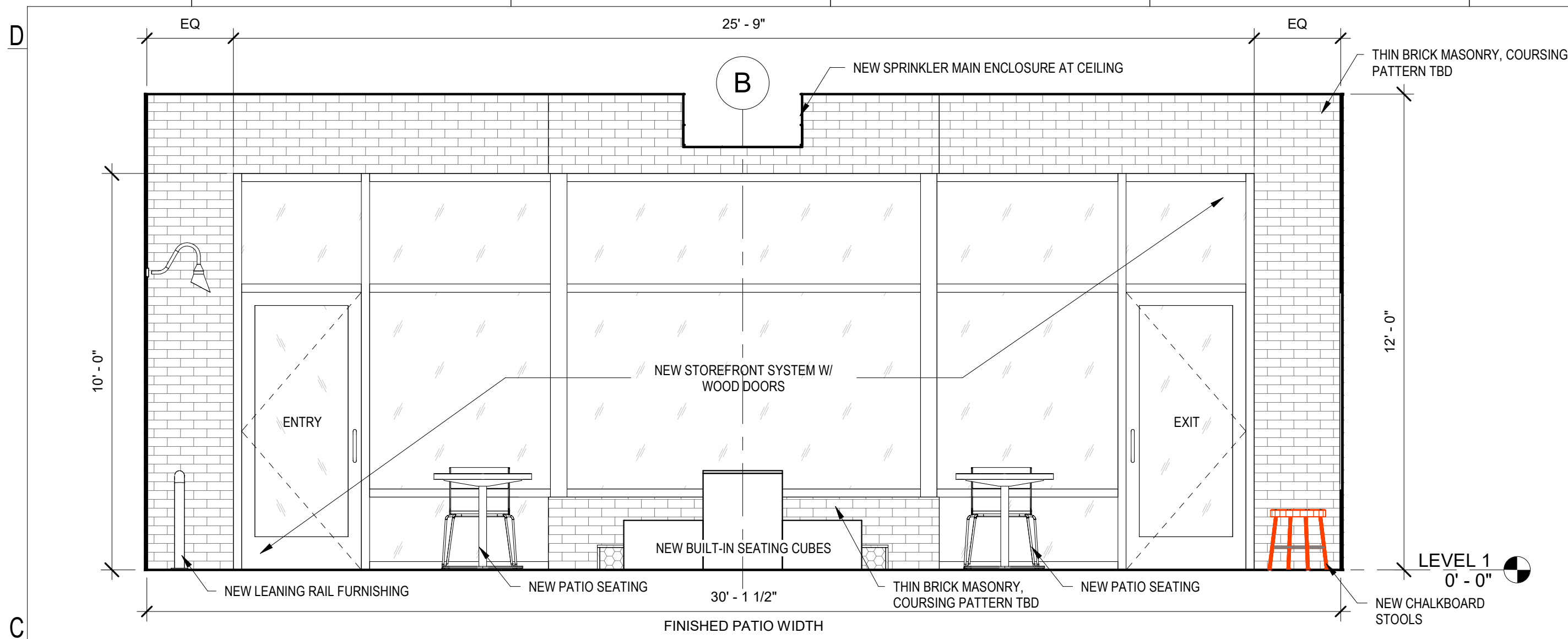
On: none

Against: none

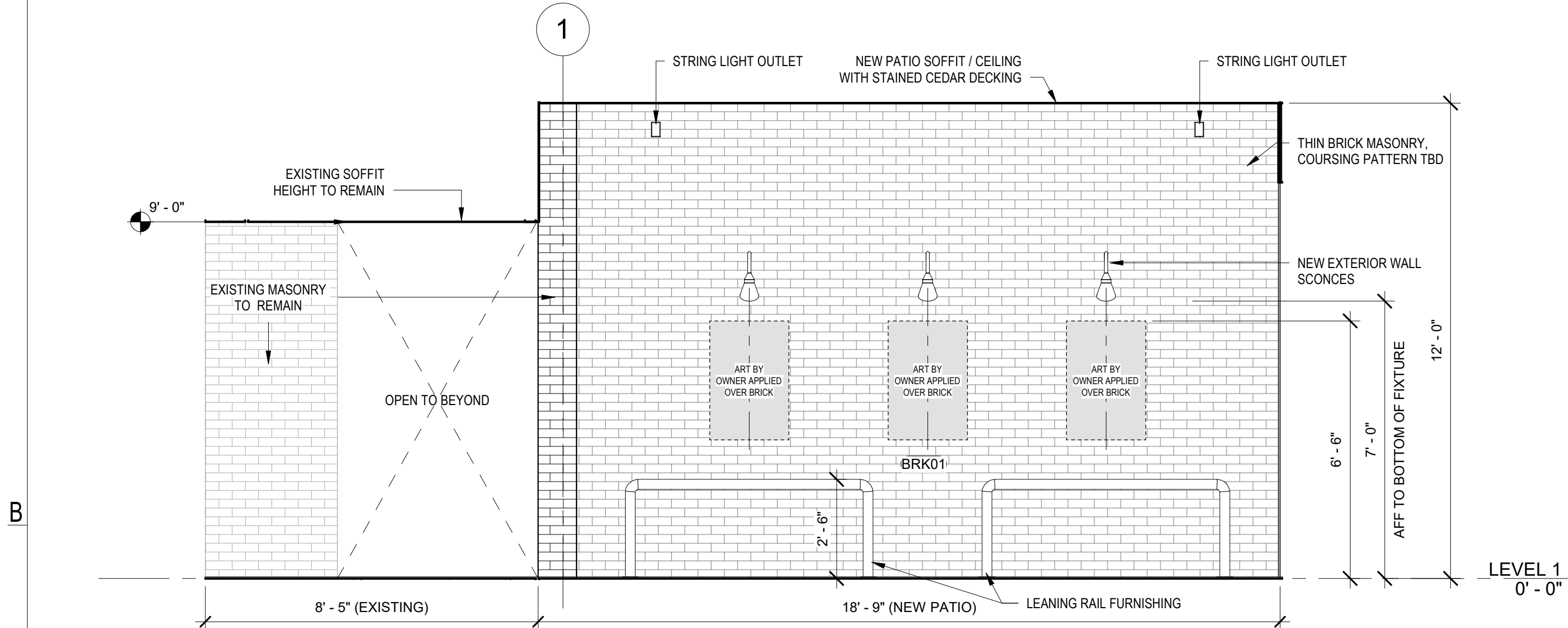




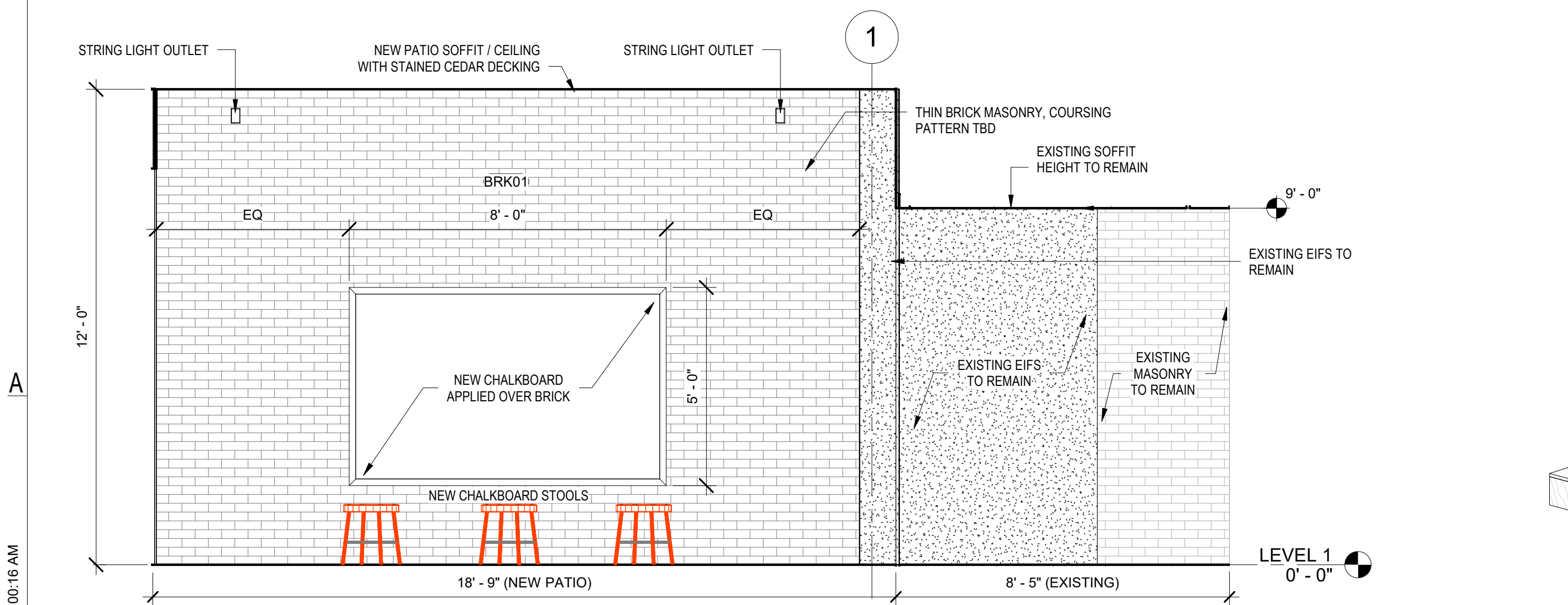




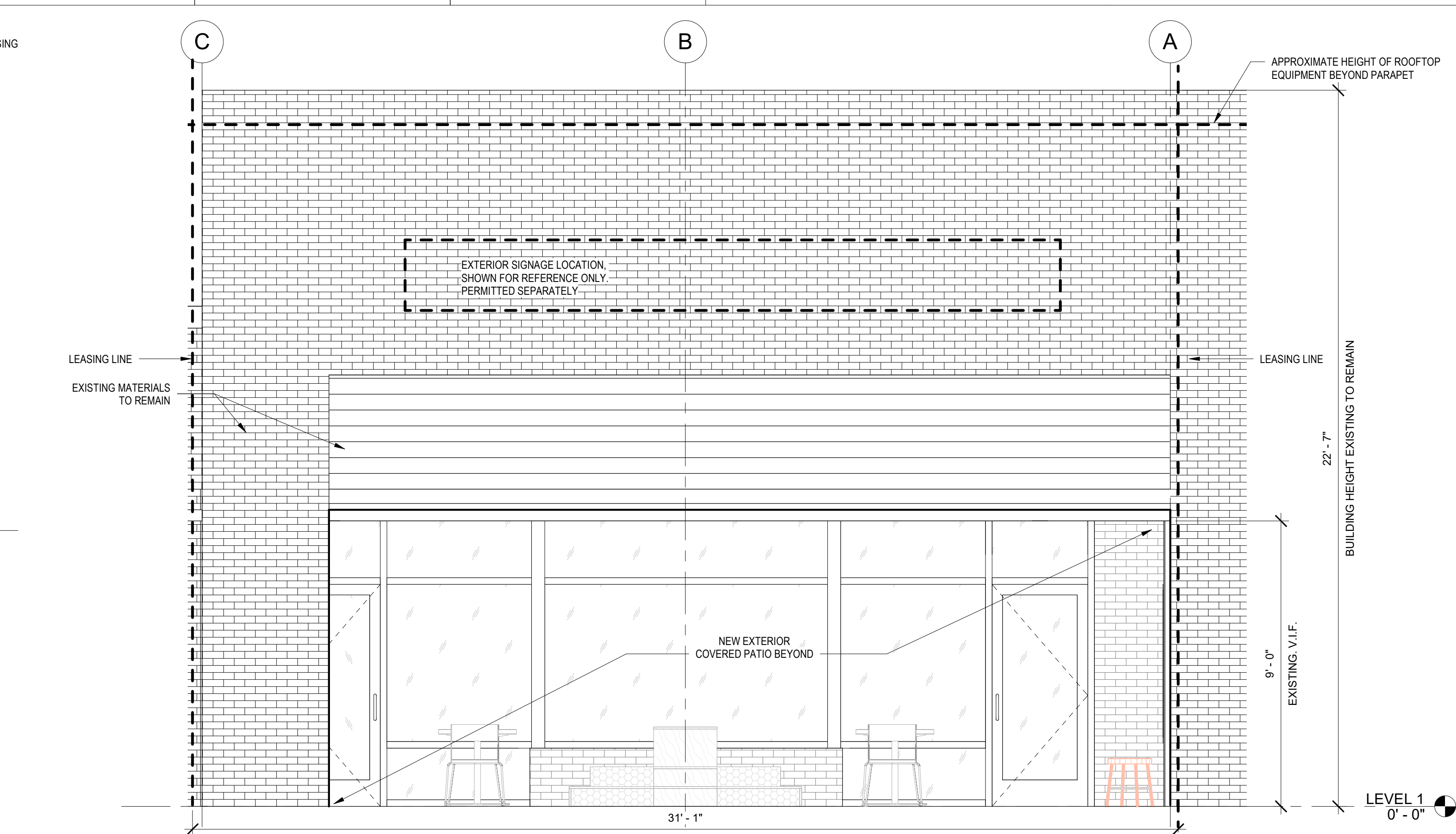
C1 EAST PATIO ELEVATION - SHOP FRONT  
3/8" = 1'-0"



B1 NORTH PATIO ELEVATION - SIDE WALL  
3/8" = 1'-0"



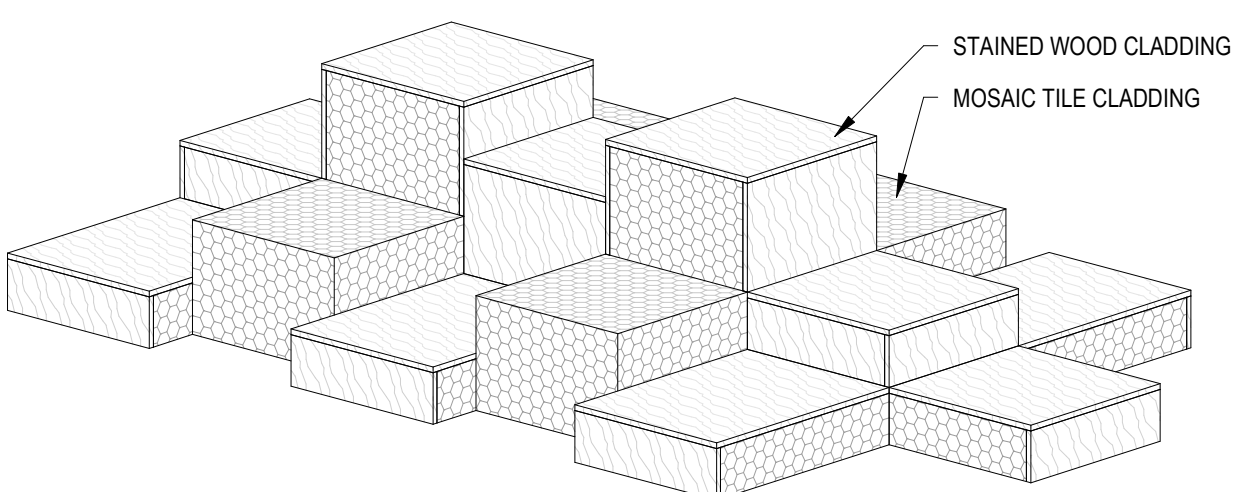
A1 SOUTH PATIO ELEVATION - SIDE WALL  
3/8" = 1'-0"



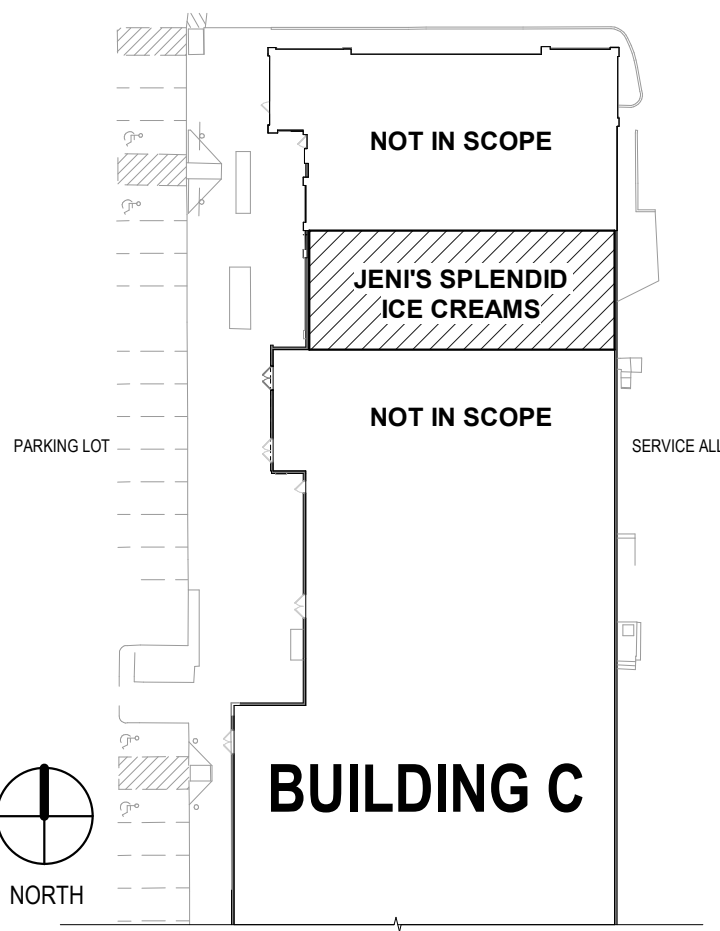
C4 EAST EXTERIOR ELEVATION - FRONT  
3/8" = 1'-0"

ELEVATION MATERIAL CALCULATIONS			
	TOTAL SURFACE	APPLIED FINISH	TOTAL %
PATIO EAST (FRONT)			
STOREFRONT	417 SF	230 SF	55%
THIN BRICK MASONRY	417 SF	187 SF	45%
PATIO NORTH			
THIN BRICK MASONRY	255 SF	213 SF	84%
EXISTING MASONRY	255 SF	42 SF	16%
PATIO SOUTH			
THIN BRICK MASONRY	300 SF	213 SF	71%
EXISTING MASONRY	300 SF	30 SF	10%
EXISTING EIFS	300 SF	57 SF	19%

- MATERIAL DESCRIPTION**
- THIN BRICK: MODULAR THIN BRICK VENEER PRIMARILY NEUTRAL IN COLOR, PAINTED OR GLAZED
  - STOREFRONT: ALUMINUM FRAMED STOREFRONT SYSTEM WITH CLEAR INSULATED GLAZING
  - EXISTING: EXISTING MATERIALS ARE TO REMAIN WHERE INDICATED



A3 PATIO SEATING CUBE - 3D VIEW



B5 KEY SITE PLAN  
1" = 50'-0"

- TOWN OF ADDISON ELEVATION NOTES**
1. THIS FACADE PLAN IS FOR CONCEPTUAL PURPOSES ONLY. ALL BUILDING PLANS REQUIRE REVIEW AND APPROVAL BY DEVELOPMENT SERVICES.
  2. ALL MECHANICAL UNITS SHALL BE SCREENED FROM PUBLIC VIEW AS REQUIRED BY THE ZONING ORDINANCE.
  3. WHEN PERMITTED, EXPOSED UTILITY BOXES AND CONDUITS SHALL BE PAINTED TO MATCH THE BUILDING.
  4. ALL SIGNAGE AREAS AND LOCATIONS ARE SUBJECT TO APPROVAL BY DEVELOPMENT SERVICES.
  5. ROOF ACCESS SHALL BE PROVIDED INTERNALLY, UNLESS OTHERWISE PERMITTED BY THE CHIEF BUILDING OFFICIAL.

## JENI'S SPLENDID ICE CREAMS

APPLICANT / TENANT: JENI'S SPLENDID ICE CREAMS, LLC  
401 N Front Street, Suite 300  
Columbus, OH 43215  
SARAH MOORE  
513-320-0540

ARCHITECT: 505DESIGN INC.  
508 West 5th Street, Suite 250  
Charlotte, NC 28202  
JOSIE HOLDEN BULLA  
704-264-1744

OWNER: NORTHWOOD RETAIL, LLC  
8080 Park Lane, Suite 600  
Dallas, TX 75231  
RYAN MUSCOTT  
469-828-3313

PRESTONWOOD PLACE - OAKS NORTH EAST NO 3

5290 Belt Line Road Suite 112B

TOWN OF ADDISON, TEXAS

ELEVATIONS

PREPARED: 03/23/2021

TOWN PROJECT NUMBER:

1826-SUP

## Council Meeting

9.

Meeting Date: 05/25/2021

Department: Development Services

---

### AGENDA CAPTION:

Hold a Public Hearing, Present, Discuss, and Consider Action on an **Ordinance Changing the Zoning on Property Addressed as 4141 Spring Valley Road and 14101 Midway Road, Currently Zoned Residential-1 (R-1) and Planned Development (PD), Through Ordinance 084-092, with a Special Use Permit for a Private School, by Approving a Special Use Permit for Seven Portable School Buildings**. Case 1827-SUP/Greenhill School Temporary Classrooms.

### BACKGROUND:

The most recent anticipated campus upgrade at Greenhill School is the reconstruction of an existing science building. In order to complete this project, the school will need to temporarily place seven portable buildings, six to serve as temporary classrooms and one to house the bathrooms for these classrooms. This triggers the requirement for a new Special Use Permit (SUP) to ensure that the quantity, location, appearance, and duration of use of the proposed temporary classrooms is compatible with surrounding site conditions.

### COMMISSION FINDINGS:

The Addison Planning and Zoning Commission, meeting in regular session on April 20, 2021, voted to recommend approval of an ordinance changing the zoning on property addressed as 4141 Spring Valley Road and 14101 Midway Road, currently zoned Residential-1 (R-1) and Planned Development (PD), through Ordinance 084-092, with a Special Use Permit for a private school, by approving a Special Use Permit for seven portable school buildings subject to the following condition:

- That the Special Use Permit shall be subject to review and reconsideration at least every 18 months following the date of authorization, and shall automatically expire - requiring removal of the buildings - by the earlier of:
  - Within thirty (30) days of issuance of a Certificate of Occupancy for the new science building, or;
  - January 1, 2024.

Voting Aye: Catalani, Craig, DeFrancisco, Fansler, Meleky, Resnik, Souers

Voting Nay: none

Absent: none

**SPEAKERS AT THE PUBLIC HEARING:**

For: Tim and Kate Wegener, 14609 Heritage Ln, Addison, TX 75001

On: none

Against: none

Please refer to the Staff Report for additional details.

**RECOMMENDATION:**

Administration recommends approval.

---

**Attachments**

1827-SUP Ordinance

Presentation - Case 1827-SUP

1827-SUP Staff Report

1827-SUP Plans

---



**TOWN OF ADDISON, TEXAS**

**ORDINANCE NO. _____**

**AN ORDINANCE OF THE TOWN OF ADDISON, TEXAS, AMENDING THE COMPREHENSIVE ZONING ORDINANCE TO GRANT A SPECIAL USE PERMIT TO ALLOW THE TEMPORARY PLACEMENT OF SEVEN PORTABLE SCHOOL BUILDINGS AT GREENHILL SCHOOL LOCATED AT 4141 SPRING VALLEY ROAD AND 14101 MIDWAY ROAD; PROVIDING A PENALTY NOT TO EXCEED TWO THOUSAND AND NO/100 DOLLARS (\$2,000.00) FOR EACH OFFENSE AND A SEPARATE OFFENSE SHALL BE DEEMED COMMITTED EACH DAY DURING OR ON WHICH A VIOLATION OCCURS OR CONTINUES; SAVINGS, NO SEVERABILITY AND AN EFFECTIVE DATE.**

**WHEREAS**, the property located at 4141 Spring Valley Road and 14101 Midway Road, is zoned R-1, Residential-1, and PD, Planned Development, through Ordinance No. 084-092, with a Special Use Permit for a school, through Ordinance No. 085-035, as amended by Ordinances No. 087-043, No. 091-064, No. 094-025, No. 004-010, No. 013-053, And No. 018-39; and

**WHEREAS**, at its regular meeting held on April 20, 2021, the Planning & Zoning Commission considered and made recommendations on a request to allow the temporary placement of portable school buildings (Case No.1827-SUP); and

**WHEREAS**, this change of zoning is in accordance with the adopted Comprehensive Plan of the Town of Addison, as amended; and

**WHEREAS**, after due deliberations and consideration of the recommendation of the Planning and Zoning Commission, the information received at a public hearing, and other relevant information and materials, the City Council of the Town of Addison, Texas finds that this amendment promotes the general welfare and safety of this community.

**NOW THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE TOWN OF ADDISON, TEXAS:**

**Section 1.** That the recitals and findings set forth above are hereby found to be true and correct and incorporated as if fully set forth herein.

**Section 2.** That a Special Use Permit, authorizing the temporary placement of seven portable school buildings, on the property located at 4141 Spring Valley Road and 14101 Midway Road, is hereby granted subject to the following conditions:

- (a) Prior to the issuance of a Certificate of Occupancy for the temporary portable school buildings, the Property shall be improved in accordance with the site plan, floor plan, and building elevations, which are attached hereto as **Exhibit A** and made a part hereof for all purposes.

(b) That the Special Use Permit shall be subject to review and reconsideration at least every 18 months following the date of authorization, and the City Council may initiate revocation of this SUP - requiring removal of the buildings - by the earlier of:

- a. Within thirty (30) days of issuance of a Certificate of Occupancy for the new science building, or;
- b. January 1, 2024.

**SECTION 3.** That any person, firm, or corporation violating any of the provisions or terms of this ordinance shall be subject to the same penalty as provided for in the Comprehensive Zoning Ordinance of the city, as heretofore amended, and upon conviction shall be punished by a fine set in accordance with Chapter 1, General Provisions, Section 1.10, General penalty for violations of Code; continuing violations, of the Code of Ordinances for the Town of Addison.

**SECTION 4.** That it is the intention of the City Council that this ordinance be considered in its entirety, as one ordinance, and should any portion of this ordinance be held to be void or unconstitutional, then said ordinance shall be void in its entirety, and the City Council would not have adopted said ordinance if any part or portion of said ordinance should be held to be unconstitutional or void.

**SECTION 5.** That all ordinances of the City in conflict with the provisions of this ordinance be, and the same are hereby repealed and all other ordinances of the City not in conflict with the provisions of this ordinance shall remain in full force and effect.

**SECTION 6.** That this Ordinance shall become effective from and after its passage and approval and after publication as may be required by law or by the City Charter or ordinance.

**DULY RESOLVED AND ADOPTED** by the City Council of the Town of Addison, Texas, on this the 25TH day of MAY 2021.

**TOWN OF ADDISON, TEXAS**

_____  
Joe Chow, Mayor

**ATTEST:**

**APPROVED AS TO FORM:**

_____  
Irma Parker, City Secretary

_____  
City Attorney

# EXHIBIT A

**ENGINEER/SURVEYOR:**  
ACHECO KOCH CONSULTING ENGINEERS, L.L.C.  
357 RAMBLER ROAD, SUITE 1400  
DALLAS, TX 75221  
PHONE: (972) 303-1031  
CONTACT: JUSTIN WALDRIP

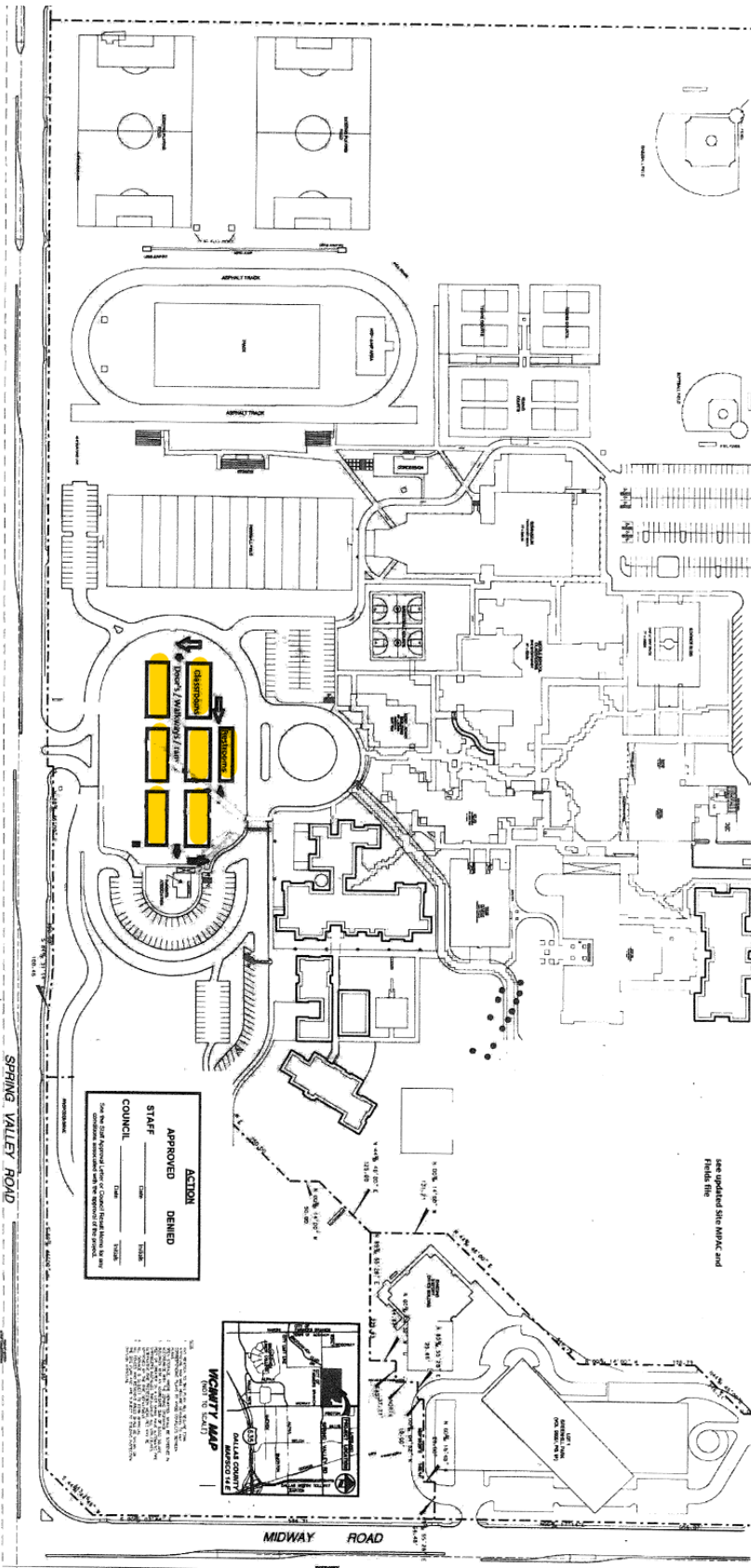
**OWNER:**  
GREENHILL SCHOOL  
4141 SPRING VALLEY ROAD  
ADDISON, TEXAS 75007-3615  
PHONE: (972) 628-9400  
CONTACT: MIKE WILLIS

**GREENHILL SCHOOL ADDITION**  
BEING A PORTION OF THE GREENHILL SCHOOL ADDITION  
AND THE REMAINDER OF THE LOT OF 1.00 ACRES, MORE OR  
LESS, BEING THE REPLAT OF GREENHILL PARK ADDITION  
AN ADDITION TO THE TOWN OF ADDISON, TEXAS  
AS BEING 12.02 ACRES OF LAND OUT OF THE  
THOMAS L. CHAMBERS TRACT NO. 273  
DALLAS COUNTY, TEXAS

**FACADE NOTES**  
1. THE FACADE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE  
2. ALL WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE  
3. THE FACADE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE  
4. THE FACADE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE  
5. THE FACADE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE

**GREENHILL SCHOOL**

- Request:**
- 6 Temporary Classroom Trailers (1,536 sq ft each)
  - 1 Temporary Bathroom Trailer (408 sq ft)

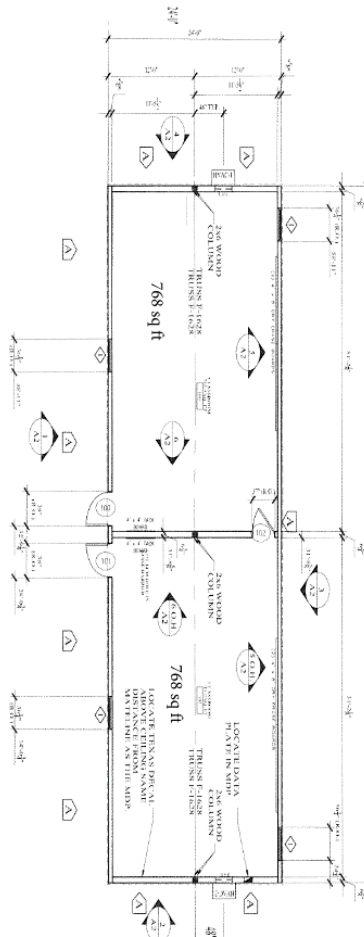
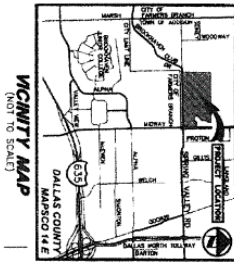




## **EXHIBIT A**

<b><u>ACTION</u></b>  <b>APPROVED</b> <b>DENIED</b>	<b>STAFF</b> _____ Date: _____ Initials: _____
	<b>COUNCIL</b> _____ Date: _____ Initials: _____

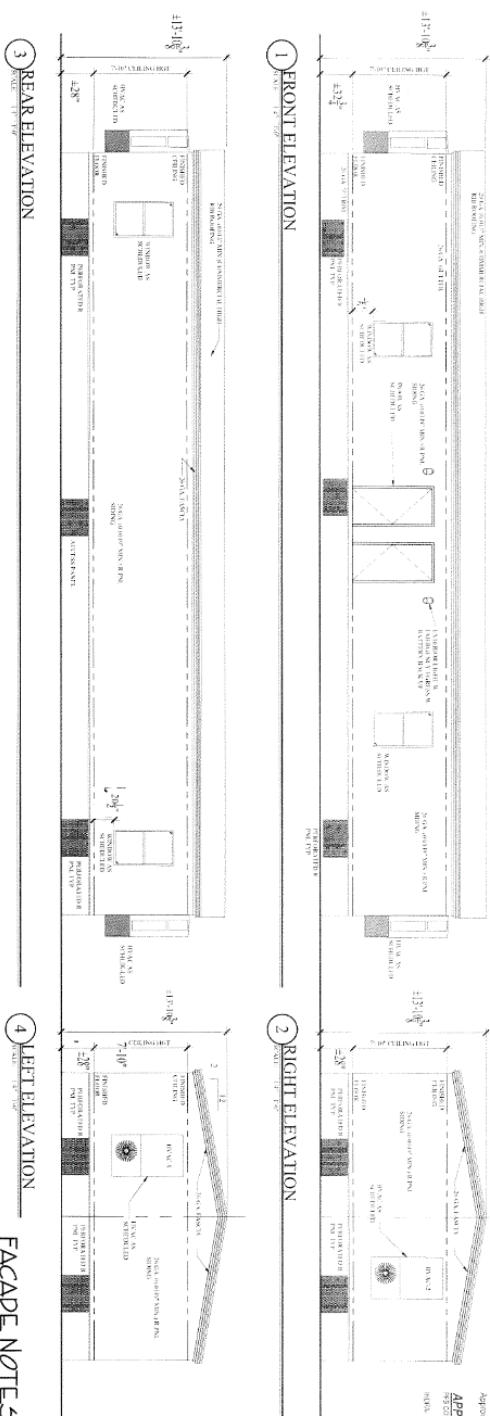
See the Social Approval Letter or Council Request Memo for any conditions associated with the approval of the project.



Total Area of Classroom Trailer: 1,536 sq ft  
Total Number of Classroom Trailers Proposed: 6

**OWNER:**  
GREENHILL SCHOOL  
4141 SPRING VALLEY ROAD  
ADDISON, TEXAS 75001-3615  
PHONE: (972) 628-5400  
CONTACT: Mike Willis

1. THIS FACILE PLAN IS FOR CONCEPTUAL PURPOSES ONLY.
2. ALL BUILDING PLANS REQUIRE REVIEW AND APPROVAL BY THE DEVELOPMENT SERVICES.
3. ALL MECHANICAL UNITS SHALL BE SCREENED PROBABLY VIEW AS REQUIRED BY THE JOINT COMPLIANCE
4. WHEN REPAIRED, EXPOSED UTILITY BOXES AND CONDUITS SHALL BE PAINTED TO MATCH THE BUILDING
5. ALL STORAGE AREAS AND LOCATIONS ARE SUBJECT TO APPROVAL BY DEVELOPMENT SERVICES.
6. ROOF ACCESS SHALL BE PROVIDED INTERNAL VERTICALS
7. ELEVATOR REPAIRED BY THE CHIEF BUILDING OFFICIAL



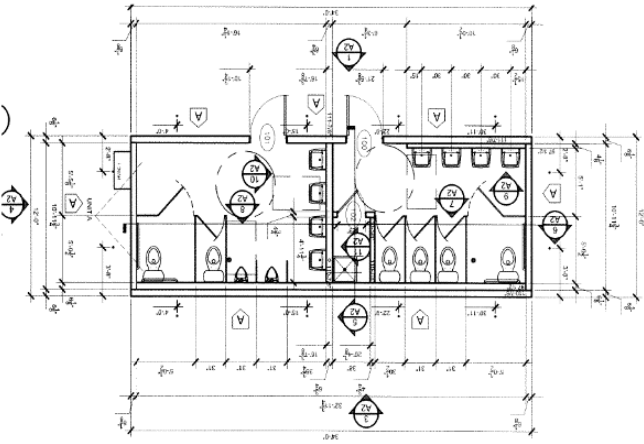
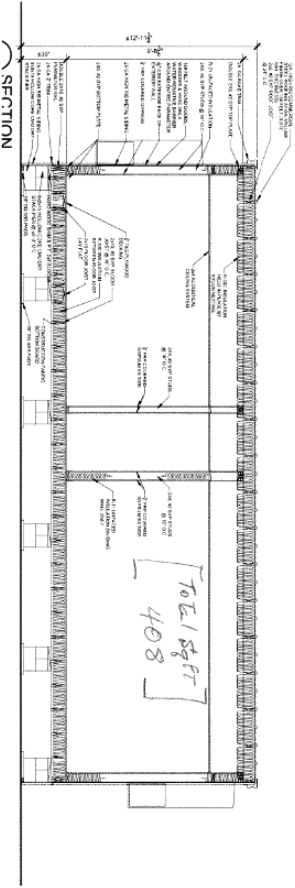
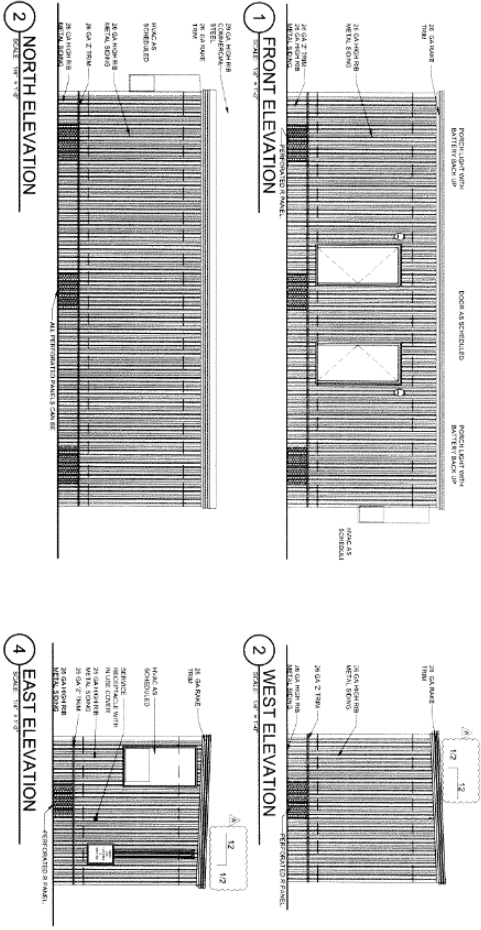
## FACADE NOTES

Texas Industrial  
 Building Code Council  
 IBC ☒ IRC ☐  
 Approval Date: _____  
 State: _____  
**APPROVED**  
 IBC CORPORATION  
 IBC-7



PROJECT <b>RAMTECH BUILDING SYSTEMS INC.</b>			COPYRIGHT NOTICE I AM THE SOLE AND EXCLUSIVE OWNER OF THE RIGHTS IN THE ABOVE WORK AND I HEREBY GRANT TO THE USER OF THIS WORK THE RIGHT TO REPRODUCE AND TRANSMIT THE WORK IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE NEED FOR PERMISSION FROM THE COPYRIGHT OWNER.	PLAN REVISIONS 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 7
-------------------------------------------------	--	--	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

EXHIBIT A



ACTION	
APPROVED	DENIED
STAFF Date _____ Initials _____	STAFF Date _____ Initials _____
COUNCIL Date _____ Initials _____	COUNCIL Date _____ Initials _____

See the Staff Approval Letter or Council Result Memo for any conditions associated with the approval of the project.

- NOTE:
1. ANY REQUEST TO THIS PLAN MUST BE SUBMITTED TO THE TOWN OF ADDISON, TEXAS, FOR REVIEW AND APPROVAL BY THE TOWN ENGINEER.
  2. ANY REQUEST TO THIS PLAN MUST BE SUBMITTED TO THE TOWN ENGINEER, 1000 WEST 10TH STREET, ADDISON, TEXAS 75001.
  3. ANY REQUEST TO THIS PLAN MUST BE SUBMITTED TO THE TOWN ENGINEER, 1000 WEST 10TH STREET, ADDISON, TEXAS 75001.
  4. ANY REQUEST TO THIS PLAN MUST BE SUBMITTED TO THE TOWN ENGINEER, 1000 WEST 10TH STREET, ADDISON, TEXAS 75001.
  5. ANY REQUEST TO THIS PLAN MUST BE SUBMITTED TO THE TOWN ENGINEER, 1000 WEST 10TH STREET, ADDISON, TEXAS 75001.

- FACADE NOTES**
1. THIS FACADE PLAN IS FOR CONCEPTUAL PURPOSES ONLY.
  2. ALL MECHANICAL UNITS SHALL BE SCREENED FROM PUBLIC VIEW AS REQUIRED BY THE ZONING ORDINANCE.
  3. WHEN PERMITTED, EXPOSED UTILITY BOXES AND/OR UTILITIES SHALL BE PAINTED TO MATCH THE BUILDING EXTERIOR.
  4. ALL SIGNAGE AREAS AND LOCATIONS ARE SUBJECT TO APPROVAL BY DEVELOPMENT SERVICES.
  5. ROOF ACCESS SHALL BE PROVIDED INTERNALLY UNLESS OTHERWISE PERMITTED BY THE CHIEF BUILDING OFFICIAL.



PROJECT		COPYRIGHT NOTICE		PLAN REVISIONS													
PROJECT: GREENHILL SCHOOL PORTABLE TOILET TRAILER 12'-0" X 34'-0" MODULAR ADDISON, TEXAS		A RAMTECH SYSTEMS, INC. HAS THE RIGHT TO REPRODUCE AND/OR DISSEMINATE THE CONTENTS OF THIS DOCUMENT IN WHOLE OR IN PART WITHOUT THE NEED FOR PERMISSION FROM THE CLIENT. THE CLIENT'S USE OF THIS DOCUMENT IS LIMITED TO THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREIN.		<table border="1"><thead><tr><th>NO.</th><th>DATE</th><th>DESCRIPTION</th></tr></thead><tbody><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr></tbody></table>		NO.	DATE	DESCRIPTION									
NO.	DATE	DESCRIPTION															
SHEET NO. A-2		DATE: 12-13-21		DRAWN BY: LHM													

# **Greenhill School Temporary Classrooms Special Use Permit (1827-SUP)**

The logo for Addison, featuring the word "ADDISON" in blue, uppercase, sans-serif font, centered within a white circle. The circle is set against a blue background that has a white diagonal line running from the top-left to the bottom-right, creating a triangular shape on the right side of the slide.

**ADDISON**



# Case 1827-SUP Greenhill Temporary Classrooms

ADDISON

## LOCATION:

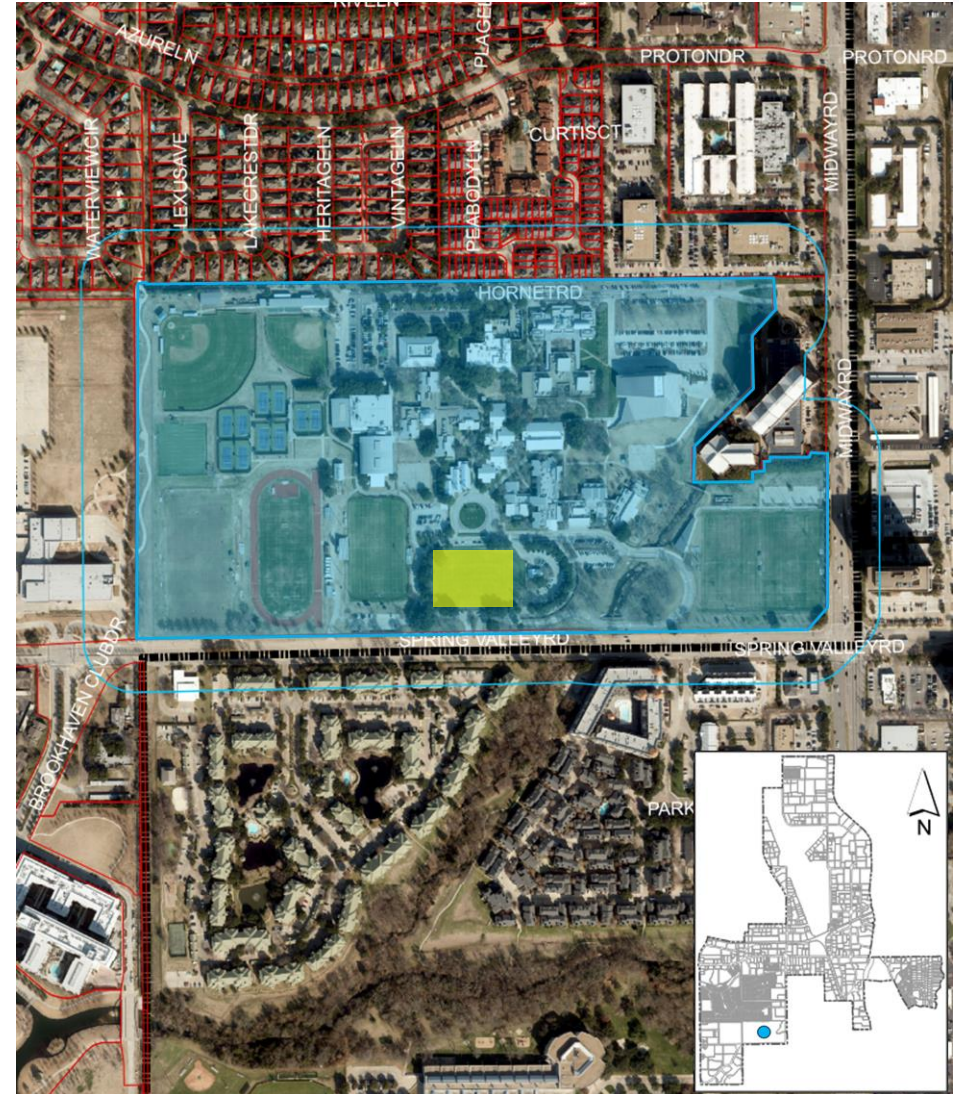
4141 Spring Valley Rd / 14101 Midway Rd.

## REQUEST:

Approval of a Special Use Permit for seven portable school buildings to provide for temporary classroom space while the new science building is under construction.

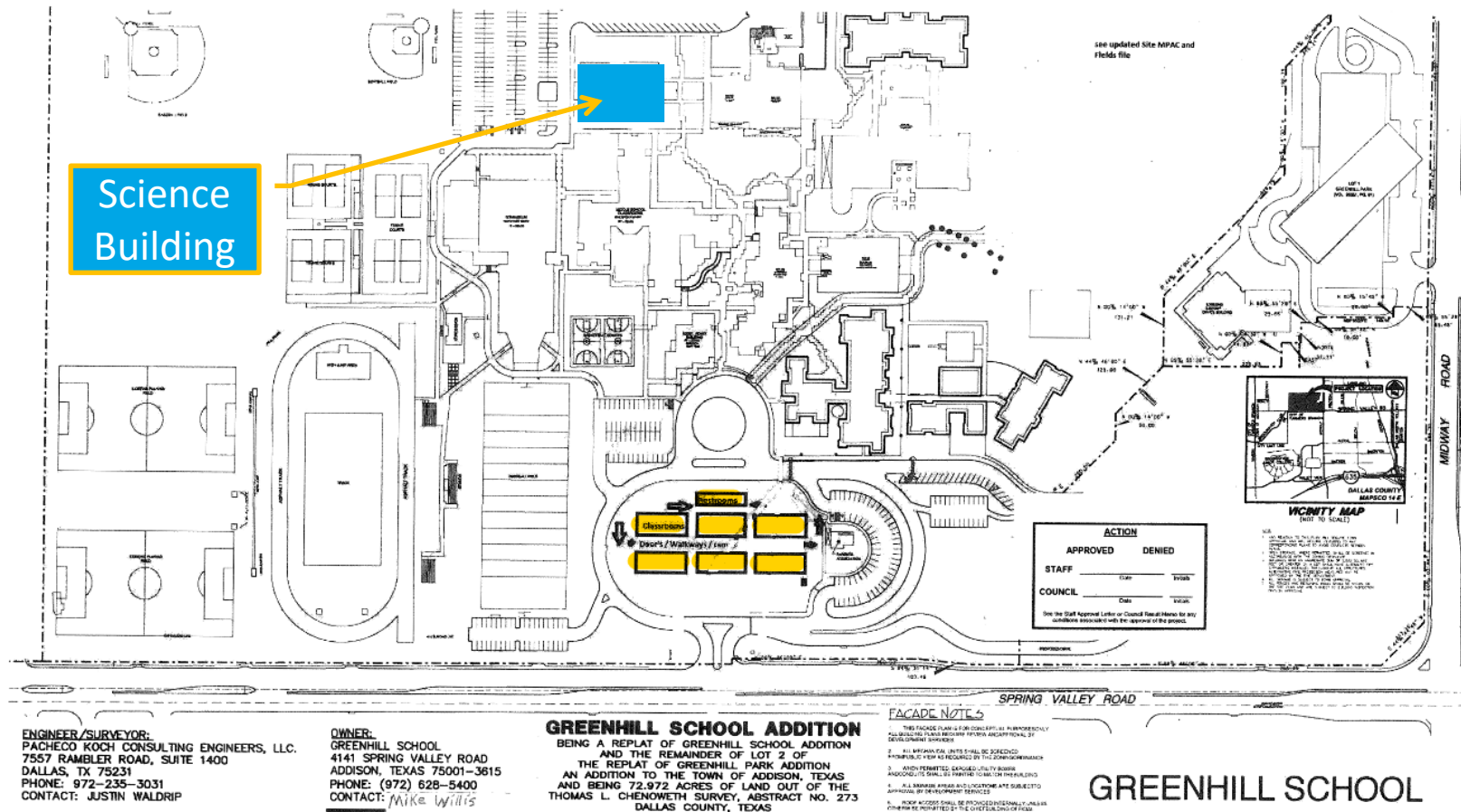
## ACTION REQUIRED:

Discuss, consider, and take action on the appropriateness of the proposed portable school buildings and associated site conditions at the subject property.



# Case 1827-SUP Greenhill Temporary Classrooms

ADDISON



SUP Request: 6 Temporary Classroom Trailers (1,536 sq ft each)  
1 Temporary Bathroom Trailer (408 sq ft)

## PROJECT HISTORY:

1960 – Greenhill School established in Addison

Present – Zoned R-1 and PD, with seven SUP ordinances approved since 1985 to accommodate the growth and evolution of the campus

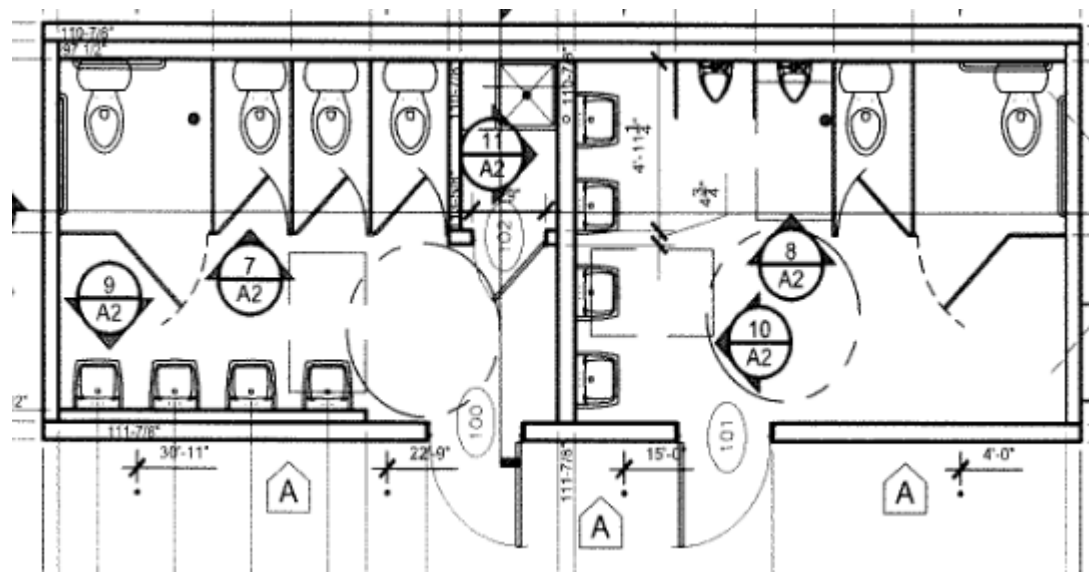
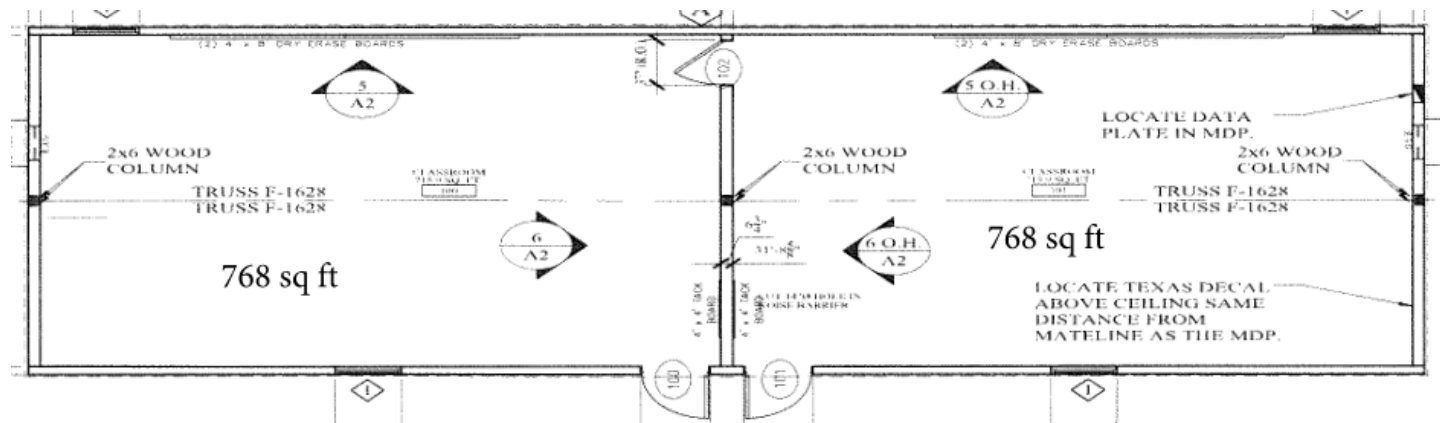
Temporary buildings are needed to support demolition of the existing science building (Summer 2021) and construction of a new STEM building (August 2023 completion)

# Case 1827-SUP Greenhill Temporary Classrooms

ADDISON

## Temporary Classroom Buildings:

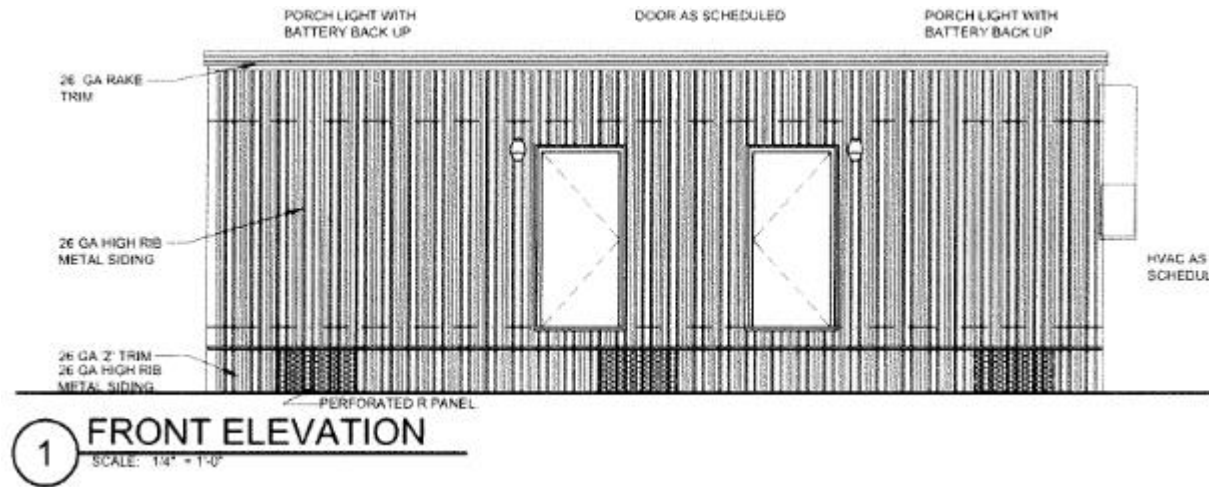
- Six instructional buildings with 1,536 SF of interior floor area
- One bathroom facility with 408 SF of interior floor area





# Case 1827-SUP Greenhill Temporary Classrooms

ADDISON

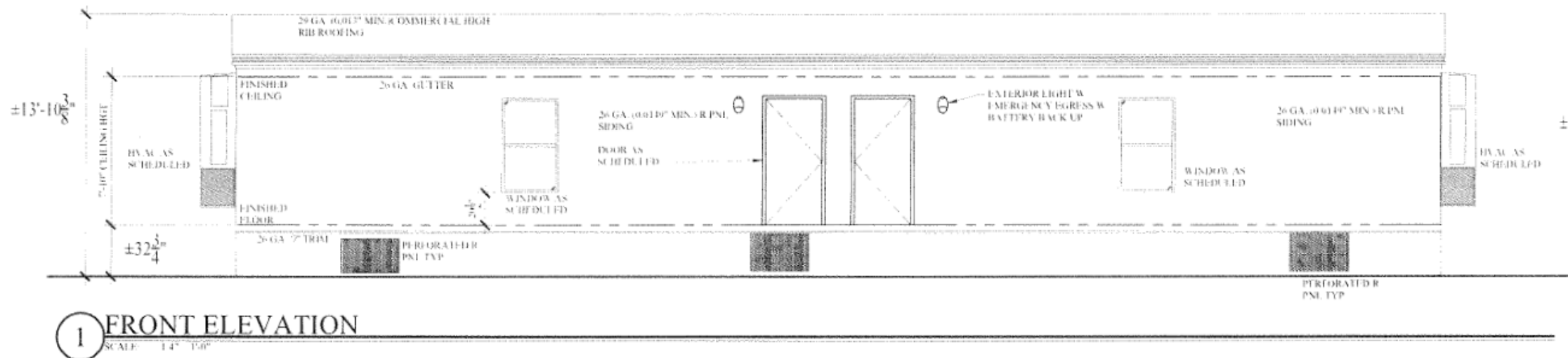


## DEVELOPMENT STANDARDS:

The proposed temporary buildings comply with height and building setback requirements, and will not result in additional traffic or parking demand.

## EXTERIOR APPEARANCE:

Due to these buildings being temporary in nature, metal façade materials are appropriate.



# Case 1827-SUP Greenhill Temporary Classrooms

ADDISON

## PUBLIC NOTICE:

Notice of public hearing was provided to property owners within 200 feet of the subject property in accordance with Town and State law.

NOTICE RECIPIENTS: 82.

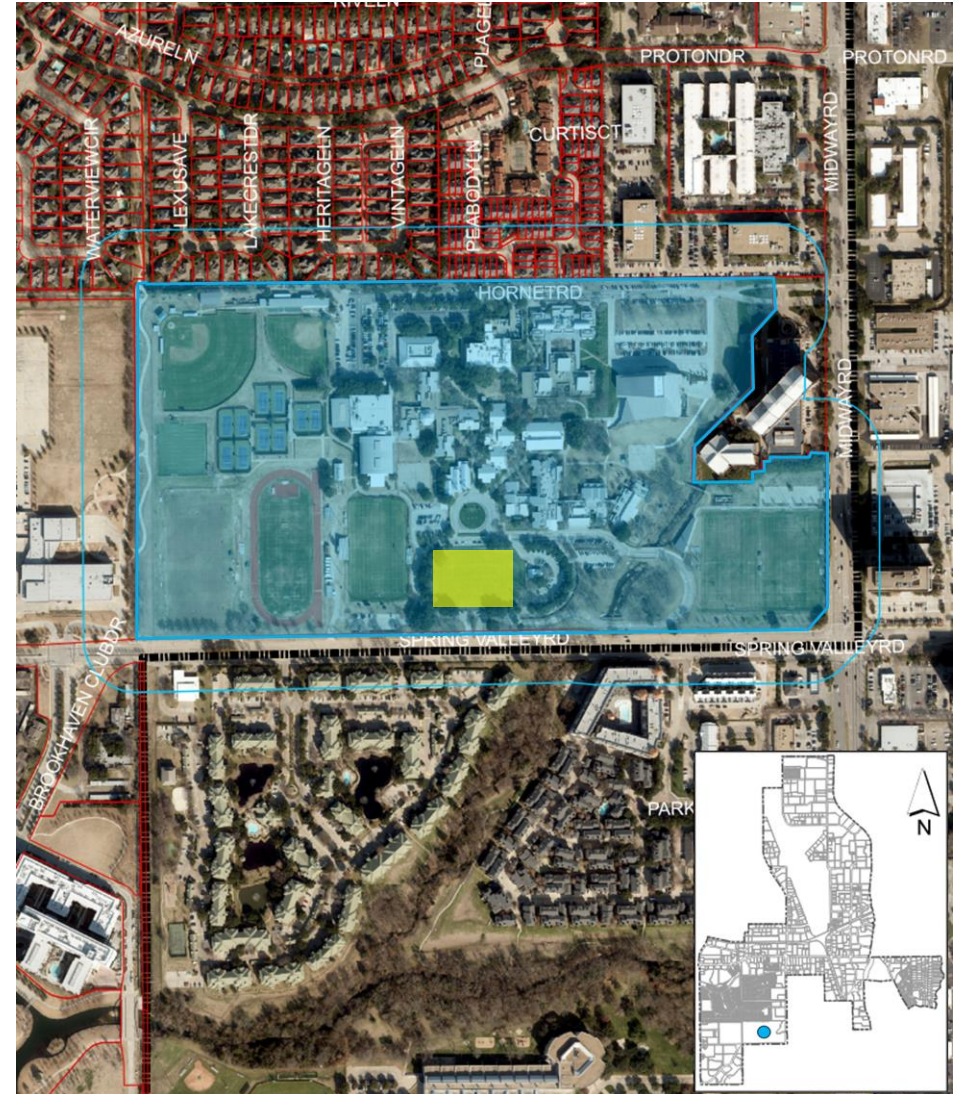
FOR: One.

AGAINST: None.

NEUTRAL: None.

## PLANNING & ZONING COMMISSION ACTION

Approval: 7 – 0, with conditions



## RECOMMENDATION:

Staff recommends **approval of the request, with the following conditions:**

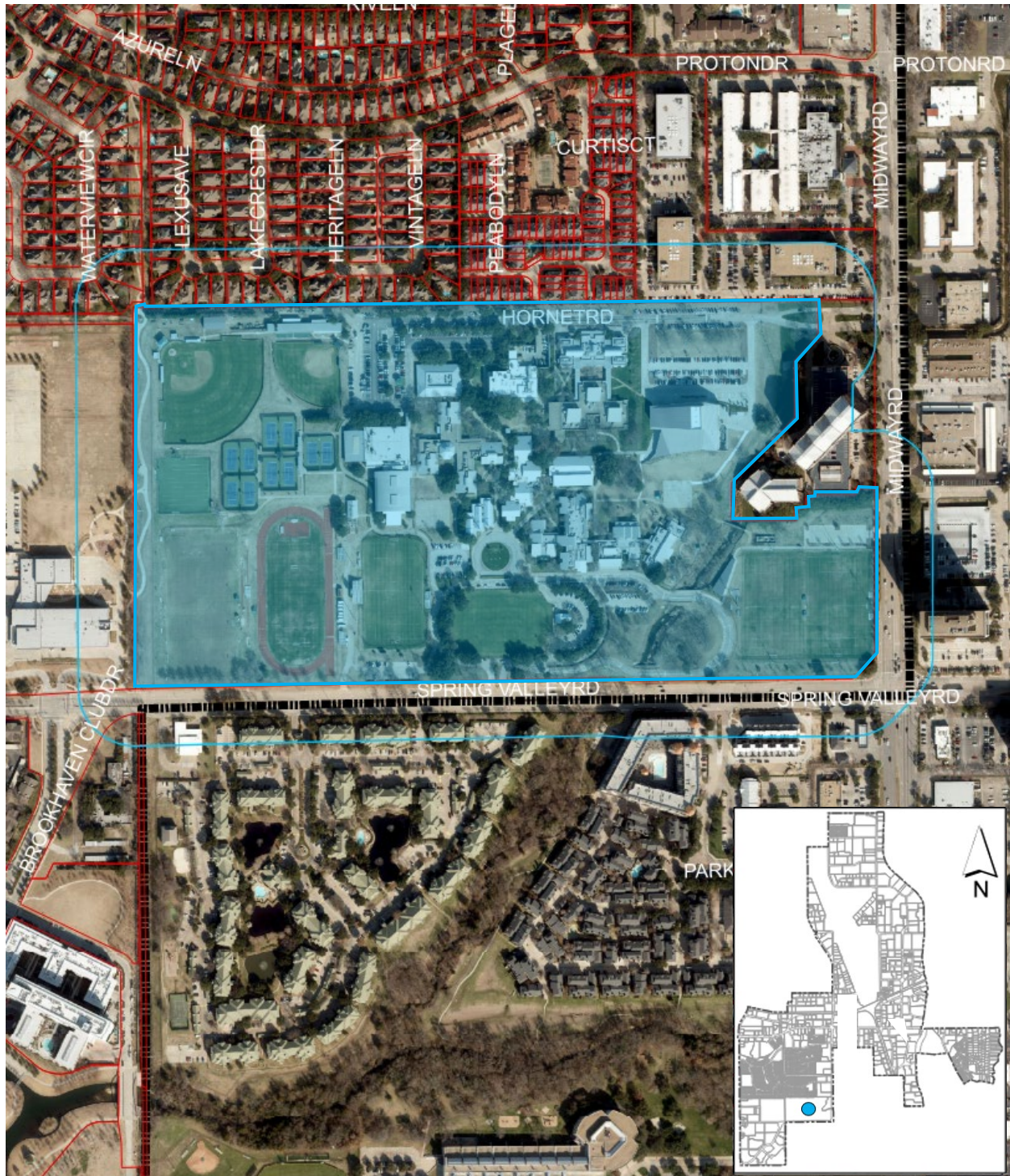
- The SUP shall be subject to review and reconsideration at least every 18 months and the City Council may initiate revocation of the SUP – requiring removal of the buildings – by the earlier of:
  - Within 30 days of issuance of a Certificate of Occupancy for the new science building, or;
  - January 1, 2024



# 1827-SUP

**PUBLIC HEARING** Case 1827-SUP/Greenhill School Temporary Classrooms. Public hearing, discussion, and take action on a recommendation regarding an ordinance changing the zoning on property addressed as 4141 Spring Valley Road and 14101 Midway Road, currently zoned Residential-1 (R-1) and Planned Development (PD), through Ordinance 084-092, with a Special Use Permit for a private school, by approving a Special Use Permit for seven portable school buildings.

## LOCATION MAP





April 15, 2021

## STAFF REPORT

RE: 1827-SUP/Greenhill School Temporary Classrooms

LOCATION: 4141 Spring Valley Road and 14101 Midway Road

REQUEST: Approval of a Special Use Permit for seven portable buildings, which comprise six temporary classroom trailers and one-bathroom trailer, to allow for uninterrupted school operation during reconstruction of the existing science building.

APPLICANT: Mike Willis, Greenhill School

## DISCUSSION:

Background: Greenhill School has been in Addison since 1960, located primarily within the Residential-1 (R-1) zoning district, with the southeastern corner of the property zoned as Planned Development District (PD), through Ordinance 084-092. The school has a Special Use Permit (SUP) that has been amended over the years in order to provide for revised development plans and additional uses, through ordinances 085-035, 087-043, 091-064, 094-025, 004-010, 013-053, and O18-39.

The campus is situated on 75 acres and consists of 15 buildings, including a full athletic complex, library, and performing arts center that totals over 303,000 square feet of floor area. As funding has been generated, the school's campus has evolved and buildings have been upgraded and reconstructed over time to serve the 1,300+ Greenhill School students.

The most recent anticipated campus upgrade is the reconstruction of an existing science building. In order to complete this project, the school will need to temporarily place seven portable buildings, six to serve as temporary classrooms and one to house the bathrooms for these classrooms. This triggers the requirement for a new Special Use Permit (SUP) to ensure that the quantity, location, appearance, and duration of use of the proposed temporary classrooms is compatible with surrounding site conditions.

Proposed Plan: The applicant has requested to install these portable buildings in the open green space area in front of the main campus, facing Spring Valley Road. Six of the portable buildings

will serve as temporary classrooms, each accommodating 1,536 square feet of floor area, and one will contain the bathrooms, which comprises 408 square feet of floor area. During past campus expansion and redevelopment activities, the proposed site has accommodated portable buildings and the applicant intends to utilize existing utility connections that were established with those past projects. The proposed portable buildings will be onsite for the duration of the construction of the new science building, with anticipated removal by the end of June 2023.

Uses: Portable school buildings are allowed through an SUP within the Residential-1 (R-1) district, if authorized, an SUP for a portable school building and any ordinance authorizing the same shall be subject to review and reconsideration at least every 18 months following the date of such authorization.

Development Standards: Development standards regulate the setbacks, building heights, and square footages of certain uses. The proposed plans meet the dimensional standards of the R-1 zoning district and previously approved SUPs.

Exterior Facades: The R-1 district requires at least 80 percent of the exterior walls of all structures to be of masonry construction. Given that the proposal is for temporary structures, masonry facades are not practical. Additionally, due to recent State legislation, the Town is pre-empted from enforcing exterior materials requirements that exceed the minimum requirements of the building code.

The applicant is not proposing to make any other changes to the site, therefore there is no impact on landscaping, open space, parking, or other paved areas.

#### RECOMMENDATION: **APPROVAL**

The school has made ongoing efforts to address past issues and prevent any new nuisances, and has maintained open lines of communication with the adjacent residential neighborhood. The proposed temporary classrooms are needed to allow the school operation to continue uninterrupted during the school year.

Staff recommends approval of the request, with the condition that the SUP shall be subject to review and reconsideration at least every 18 months following the date of authorization, and shall automatically expire - requiring removal of the buildings - by the earlier of:

1. Within thirty (30) days of issuance of a Certificate of Occupancy for the new science building, or;
2. January 1, 2024.





Case 1827-SUP/Greenhill Temporary Classrooms

April 20, 2021

COMMISSION FINDINGS:

The Addison Planning and Zoning Commission, meeting in regular session on April 20, 2021, voted to recommend approval of an ordinance changing the zoning on property addressed as 4141 Spring Valley Road and 14101 Midway Road, currently zoned Residential-1 (R-1) and Planned Development (PD), through Ordinance 084-092, with a Special Use Permit for a private school, by approving a Special Use Permit for seven portable school buildings subject to the following condition:

- That the Special Use Permit shall be subject to review and reconsideration at least every 18 months following the date of authorization, and shall automatically expire - requiring removal of the buildings - by the earlier of:
  - Within thirty (30) days of issuance of a Certificate of Occupancy for the new science building, or;
  - January 1, 2024.

Voting Aye: Catalani, Craig, DeFrancisco, Fansler, Meleky, Resnik, Souers

Voting Nay: none

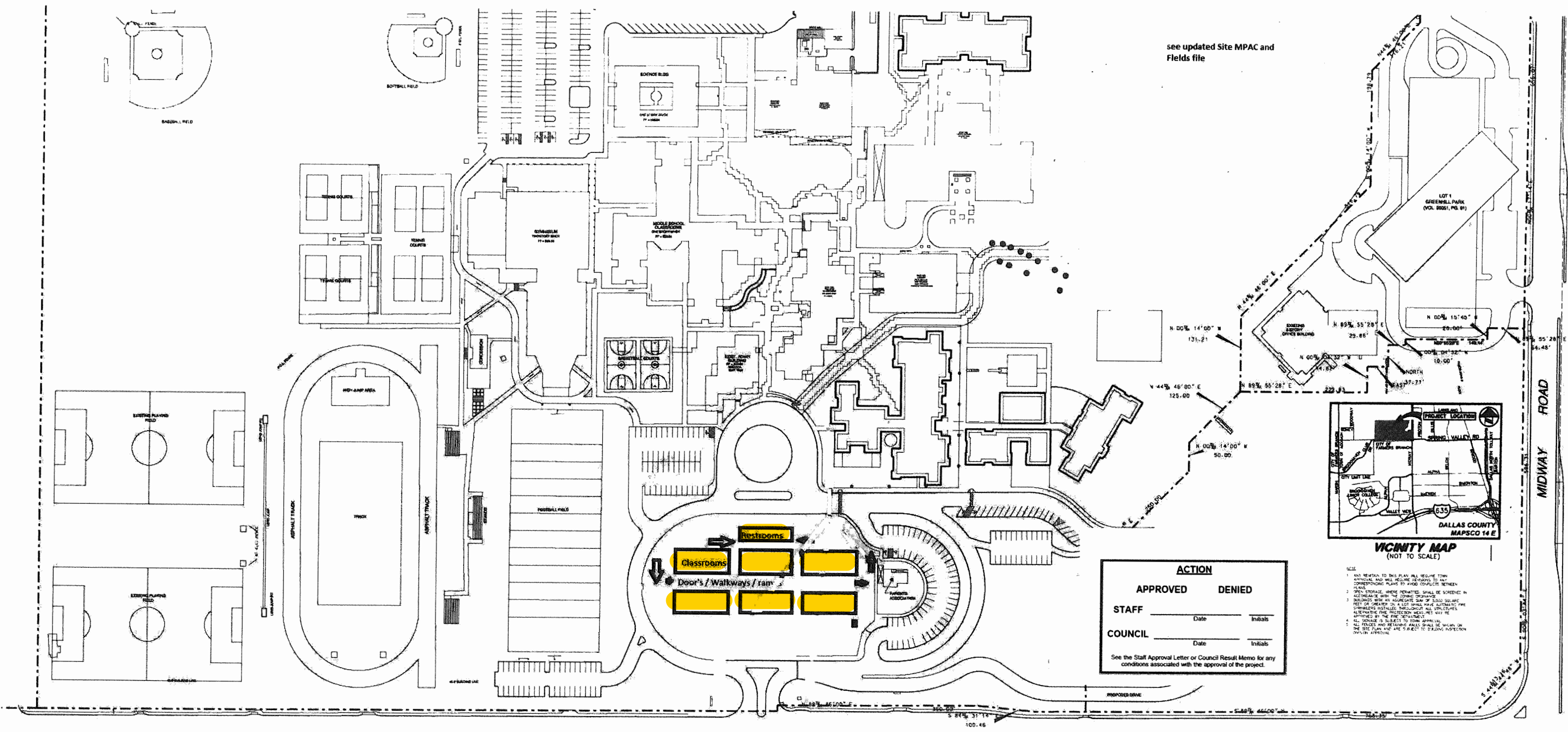
Absent: none

SPEAKERS AT THE PUBLIC HEARING:

For: Tim and Kate Wegener, 14609 Heritage Ln, Addison, TX 75001

On: none

Against: none



**ENGINEER/SURVEYOR:**  
 PACHECO KOCH CONSULTING ENGINEERS, LLC.  
 7557 RAMBLER ROAD, SUITE 1400  
 DALLAS, TX 75231  
 PHONE: 972-235-3031  
 CONTACT: JUSTIN WALDRIP

**OWNER:**  
 GREENHILL SCHOOL  
 4141 SPRING VALLEY ROAD  
 ADDISON, TEXAS 75001-3615  
 PHONE: (972) 628-5400  
 CONTACT: *Mike Willis*

**GREENHILL SCHOOL ADDITION**  
 BEING A REPLAT OF GREENHILL SCHOOL ADDITION  
 AND THE REMAINDER OF LOT 2 OF  
 THE REPLAT OF GREENHILL PARK ADDITION  
 AN ADDITION TO THE TOWN OF ADDISON, TEXAS  
 AND BEING 72.972 ACRES OF LAND OUT OF THE  
 THOMAS L. CHENOWETH SURVEY, ABSTRACT NO. 273  
 DALLAS COUNTY, TEXAS

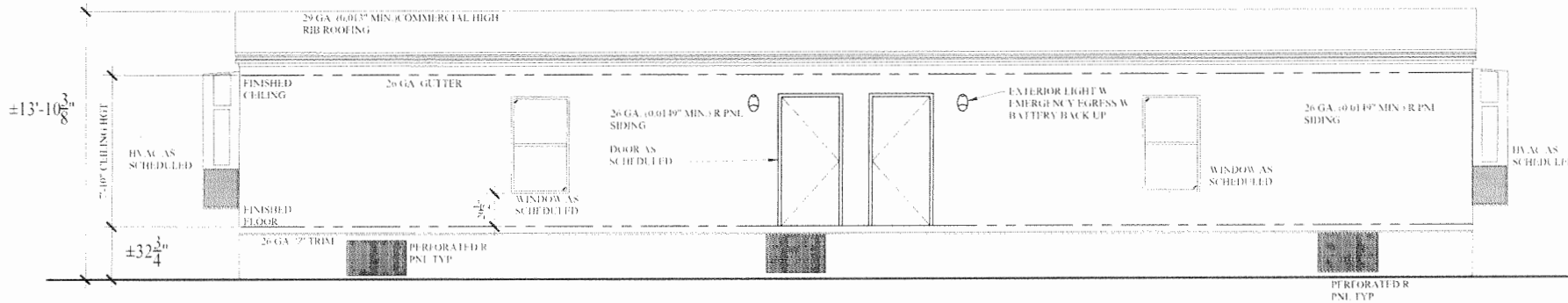
**FACADE NOTES**

1. THIS FACADE PLAN IS FOR CONCEPTUAL PURPOSES ONLY. ALL BUILDING PLANS REQUIRE REVIEW AND APPROVAL BY DEVELOPMENT SERVICES.
2. ALL MECHANICAL UNITS SHALL BE SCREENED FROM PUBLIC VIEW AS REQUIRED BY THE ZONING ORDINANCE.
3. WHEN PERMITTED, EXPOSED UTILITY BOXES AND CONDUITS SHALL BE PAINTED TO MATCH THE BUILDING.
4. ALL SIGNAGE AREAS AND LOCATIONS ARE SUBJECT TO APPROVAL BY DEVELOPMENT SERVICES.
5. ROOF ACCESS SHALL BE PROVIDED INTERNALLY UNLESS OTHERWISE PERMITTED BY THE CHIEF BUILDING OFFICIAL.

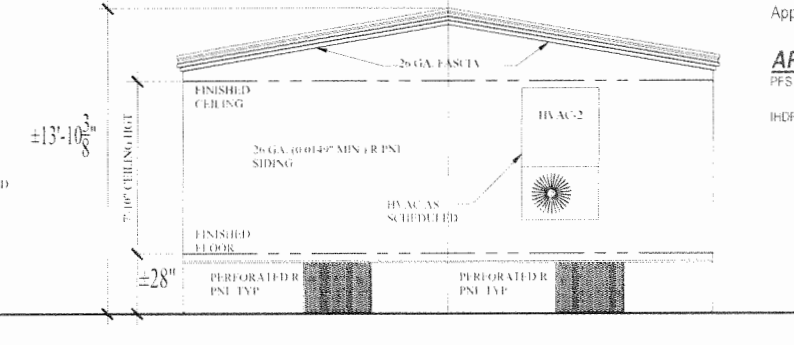
**GREENHILL SCHOOL**

**SUP Request:**

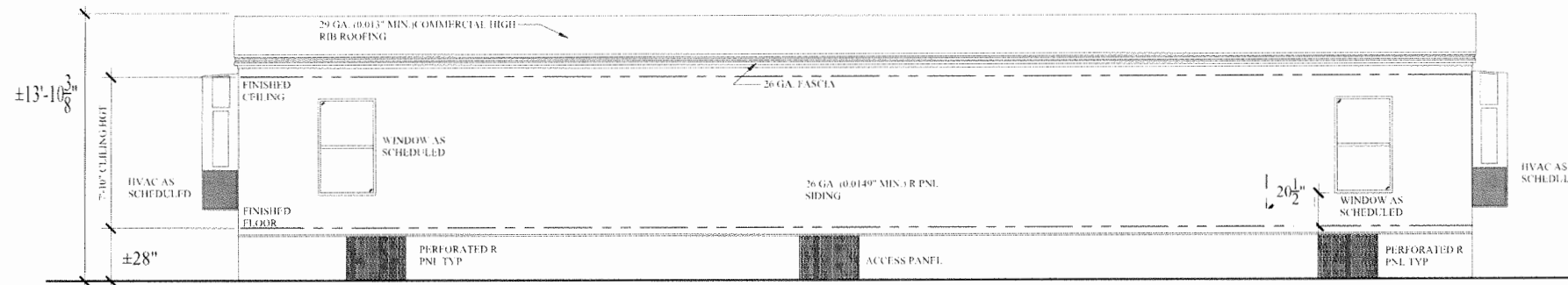
- 6 Temporary Classroom Trailers (1,536 sq ft each)
- 1 Temporary Bathroom Trailer (408 sq ft)



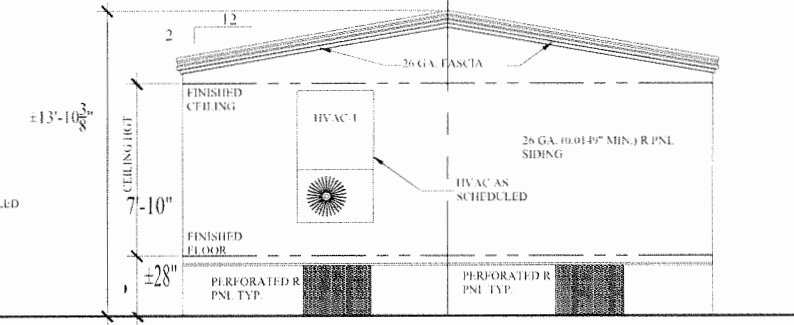
1 FRONT ELEVATION  
SCALE: 1/4" = 1'-0"



2 RIGHT ELEVATION  
SCALE: 1/4" = 1'-0"



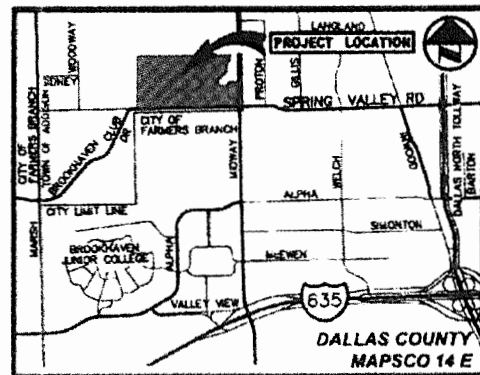
3 REAR ELEVATION  
SCALE: 1/4" = 1'-0"



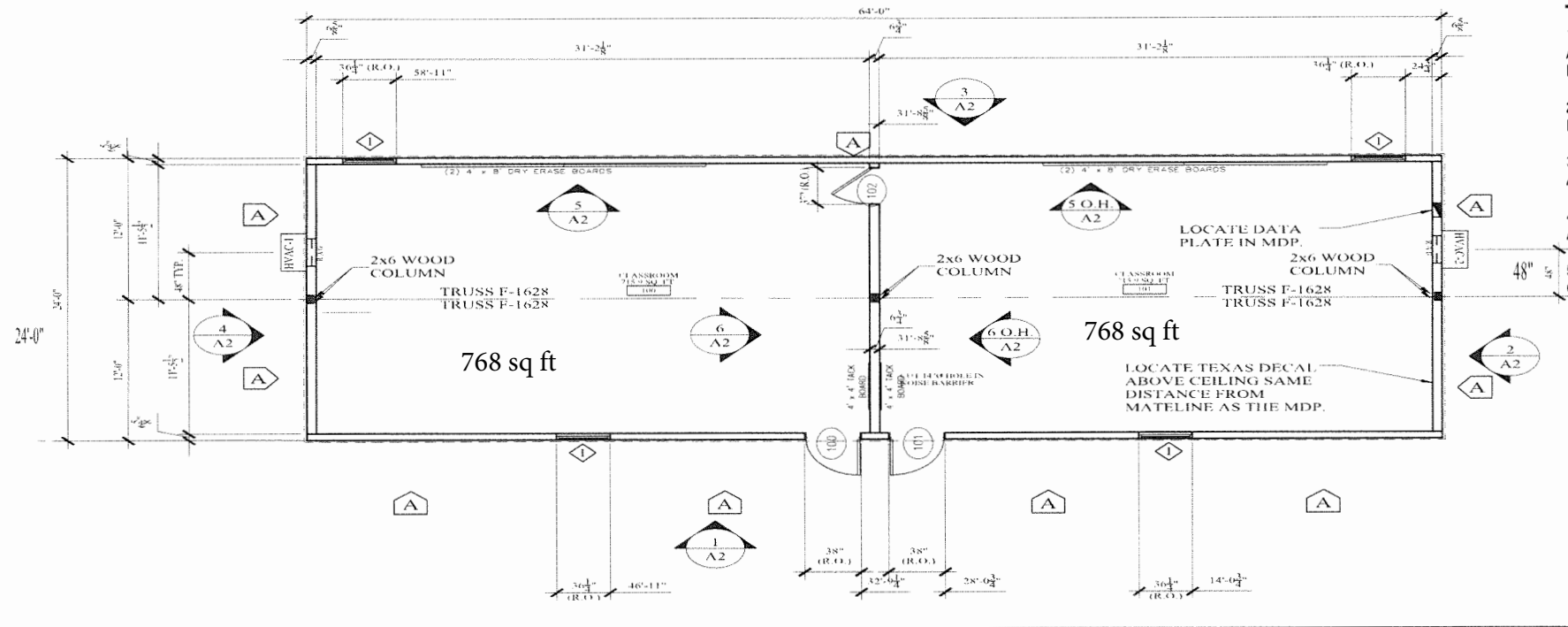
4 LEFT ELEVATION  
SCALE: 1/4" = 1'-0"

## FACADE NOTES

1. THIS FACADE PLAN IS FOR CONCEPTUAL PURPOSES ONLY. ALL BUILDING PLANS REQUIRE REVIEW AND APPROVAL BY DEVELOPMENT SERVICES.
2. ALL MECHANICAL UNITS SHALL BE SCREENED FROM PUBLIC VIEW AS REQUIRED BY THE ZONING ORDINANCE.
3. WHEN PERMITTED, EXPOSED UTILITY BOXES AND CONDUITS SHALL BE PAINTED TO MATCH THE BUILDING.
4. ALL SIGNAGE AREAS AND LOCATIONS ARE SUBJECT TO APPROVAL BY DEVELOPMENT SERVICES.
5. ROOF ACCESS SHALL BE PROVIDED INTERNALLY, UNLESS OTHERWISE PERMITTED BY THE CHIEF BUILDING OFFICIAL.



VICINITY MAP  
(NOT TO SCALE)



**OWNER:**  
**GREENHILL SCHOOL**  
**4141 SPRING VALLEY ROAD**  
**ADDISON, TEXAS 75001-3615**  
**PHONE: (972) 628-5400**  
**CONTACT: Mike Willis**

Total Area of Classroom Trailer: 1,536 sq ft  
Total Number of Classroom Trailers Proposed: 6

- NOTES
1. ANY REVISION TO THIS PLAN WILL REQUIRE TOWN APPROVAL AND WILL REQUIRE REVISIONS TO ANY CORRESPONDING PLANS TO AVOID CONFLICTS BETWEEN PLANS.
  2. OPEN STORAGE, WHERE PERMITTED, SHALL BE SCREENED IN ACCORDANCE WITH THE ZONING ORDINANCE.
  3. BUILDINGS WITH AN AGGREGATE GROSS AREA OF 5,000 SQUARE FEET OR GREATER ON A LOT SHALL HAVE AUTOMATIC FIRE SPRINKLERS INSTALLED THROUGHOUT ALL STRUCTURES. ALTERNATE FIRE PROTECTION MEASURES MAY BE APPROVED BY THE FIRE DEPARTMENT.
  4. ALL SIGNAGE IS SUBJECT TO TOWN APPROVAL.
  5. ALL FENCES AND RETAINING WALLS SHALL BE SHOWN ON THE SITE PLAN AND ARE SUBJECT TO BUILDING INSPECTION DIVISION APPROVAL.

ACTION	
APPROVED	DENIED
STAFF	Date _____ Initials _____
COUNCIL	Date _____ Initials _____

See the Staff Approval Letter or Council Result Memo for any conditions associated with the approval of the project.

Bowers Engineering Services, Inc.  
Texas  
Registration Number F-13468  
Expires: 06/30/2021



PLAN REVISIONS

MARK	DATE	DESCRIPTION
A		
B		
C		
D		
E		
F		
G		
H		
I		
J		
K		
L		
M		
N		
O		
P		
Q		
R		
S		
T		
U		
V		
W		
X		
Y		
Z		

COPYRIGHT NOTICE

A REVISION TO THIS PLAN WILL REQUIRE TOWN APPROVAL AND WILL REQUIRE REVISIONS TO ANY CORRESPONDING PLANS TO AVOID CONFLICTS BETWEEN PLANS.

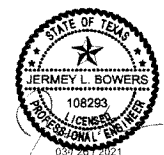
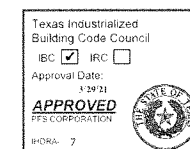
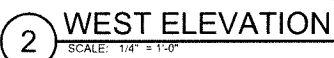
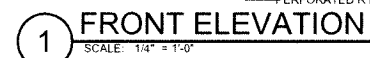
REGISTERED ARCHITECT  
STATE OF TEXAS  
05-04-18

**RAMTECH**  
Building Systems, Inc.  
1402 U.S. HWY. 387 SOUTH  
MANFELD, TEXAS 76063

PROJECT: RAMTECH BUILDING SYSTEMS INC.  
LT 2017 DRY DBL CLASSROOM  
24'-0" X 64'-0" MODULAR  
LOCATION: TEXAS

PROJECT NUMBER: _____  
DATE: 5-04-18  
DRAWN BY: LH  
SHEET NO. A2  
A-878.03





**Bowers Engineering Services, Inc.**  
Texas  
Registration Number: F-13498  
Expires: 06/30/2021



<u><b>ACTION</b></u>		
<b>APPROVED</b>	<b>DENIED</b>	
<b>STAFF</b>	<hr style="border: 0; border-top: 1px solid black;"/>	<hr style="border: 0; border-top: 1px solid black;"/>
	Date	Initials
<b>COUNCIL</b>	<hr style="border: 0; border-top: 1px solid black;"/>	<hr style="border: 0; border-top: 1px solid black;"/>
	Date	Initials

See the Staff Approval Letter or Council Result Memo for any conditions associated with the approval of the project.

1. THIS FACADE PLAN IS FOR CONCEPTUAL PURPOSES ONLY. ALL BUILDING PLANS REQUIRE REVIEW AND APPROVAL BY DEVELOPMENT SERVICES.

2. ALL MECHANICAL UNITS SHALL BE SCREENED FROM PUBLIC VIEW AS REQUIRED BY THE ZONING ORDINANCE
3. WHEN PERMITTED, EXPOSED UTILITY BOXES AND CONDUITS SHALL BE PAINTED TO MATCH THE BUILDING
4. ALL SIGNAGE AREAS AND LOCATIONS ARE SUBJECT TO APPROVAL BY DEVELOPMENT SERVICES
5. ROOF ACCESS SHALL BE PROVIDED INTERNALLY, UNLESS OTHERWISE PERMITTED BY THE CHIEF BUILDING OFFICIAL

NOTE

1. ANY REVISION TO THIS PLAN WILL REQUIRE TOWN APPROVAL AND WILL REQUIRE REVISIONS TO ANY CORRESPONDING PLANS TO AVOID CONFLICTS BETWEEN PLANS.
2. OPEN STORAGE, WHERE PERMITTED, SHALL BE SCREENED IN ACCORDANCE WITH THE ZONING ORDINANCE.
3. BUILDINGS WITH AN AGGREGATE SUM OF 5,000 SQUARE FEET OR GREATER ON A LOT SHALL HAVE AUTOMATIC FIRE SPRINKLERS INSTALLED THROUGHOUT ALL STRUCTURES. ALTERNATIVE FIRE PROTECTION MEASURES MAY BE APPROVED BY THE FIRE DEPARTMENT.
4. ALL SIGNAGE IS SUBJECT TO TOWN APPROVAL.
5. ALL FENCES AND RETAINING WALLS SHALL BE SHOWN ON THE SITE PLAN AND ARE SUBJECT TO BUILDING INSPECTION DIVISION APPROVAL.

## Council Meeting

10.

**Meeting Date:** 05/25/2021

**Department:** Finance

**Pillars:** Gold Standard for Financial Health

---

### **AGENDA CAPTION:**

Present and Discuss the **Finance Department Quarterly Financial Report of the Town of Addison for the Fiscal Year 2021 Second Quarter Ended March 31, 2021.**

### **BACKGROUND:**

The Town of Addison's financial policies require the publication of a financial report 60 days subsequent to the end of each fiscal quarter. This report covers the financial performance through the second quarter for Fiscal Year 2021 (January 1, 2020 - March 31, 2021). Enclosed in the report is an executive dashboard that provides a high-level look at some of the key financial indicators along with more detailed exhibits that demonstrate the current financial position for the various funds. The report includes information for the following funds: General, Hotel, Economic Development, Airport, Utility, and Stormwater funds.

Key highlights for the second quarter include:

- General Fund revenue totaled \$29.7 million, which is 76.5 percent of the fiscal year budget.
- General Fund expenditures totaled \$17.3 million, which is 43.8 percent of the fiscal year budget.
- Sales tax collections totaled \$6.9 million, which is 55.7 percent of the fiscal year budget.
- The Hotel Fund had revenue of \$797 thousand and expenditures of \$1.4 million, which is \$1.1 million less (revenue) than this time a year ago.
- Performing Arts expenditures are at 88.8 percent due to the full payment of the Water Tower Theatre grant.
- Special Events revenues totaled 4.0 percent, and expenses totaled 1.7 percent of the fiscal year budget due to the timing of events.
- Airport Fund operating revenue totaled \$2.8 million or 53.4 percent, and operating expenditures totaled \$2.2 million or 42.7 percent of the fiscal year budget.
- Utility Fund operating revenue totaled \$5.2 million or 37.1 percent, and expenditures totaled \$6.5 million or 45.8 percent of the fiscal year budget. This is in line with historical averages (seasonally low water usage).
- Stormwater Fund revenue and expenditures are in line with historical averages.

The Quarterly Investment Report for Quarter 2 of Fiscal Year 2021 is also being provided for informational purposes. This report has been prepared in accordance with state law and the Town's Financial Policies.

**RECOMMENDATION:**

Information only, no action required.

---

**Attachments**

Presentation - Quarterly Financial Report Fiscal Year 2021 Second Quarter

Quarterly Financial Report - Fiscal Year 2021 Second Quarter

Quarterly Investment Report - Fiscal Year 2021 Second Quarter

---



# Quarterly Financial Report Fiscal Year 2021 Second Quarter

May 25, 2021



**ADDISON**

# Executive Dashboard – Key Revenue Sources

ADDISON

## Executive Dashboard - 2nd Quarter, 2021 Fiscal Year

### Financial Indicators

Positive variance compared to historical trends

Positive

Negative variance of 3%-5% and more than \$50,000 compared to historical trends

Warning

Negative variance of >5% and more than \$50,000 compared to historical trends

Negative

Key Revenue Sources	FY2021 Budget	Actual through 3/31/21	% Annual Budget
Ad Valorem Taxes - General Fund	\$ 19,425,398	\$ 19,980,976	102.86%
Non-Property Taxes - General Fund	13,356,000	7,222,014	54.07%
Hotel Tax	4,155,000	680,291	16.37% ⁽¹⁾
Franchise Fees - General Fund	2,260,000	1,089,719	48.22%
Service/Permitting/License Fees - General Fund	3,113,326	1,165,338	37.43%
Rental Income - All Funds	4,337,770	2,226,659	51.33%
Fines and Penalties - All Funds	335,000	68,428	20.43% ⁽²⁾
Special Event Revenue - Hotel Fund	1,104,500	43,700	3.96% ⁽³⁾
Fuel Flowage Fees - Airport Fund	625,043	455,077	72.81%
Water and Sewer Charges - Utility Fund	13,772,976	5,169,555	37.53%

⁽¹⁾ Hotel tax revenue has not been collected from all hoteliers and reflects less hotel occupancy due to COVID-19

⁽²⁾ Municipal court has fewer court fines/fees issued due to COVID-19

⁽³⁾ Special Events are low due to the timing of events

# Executive Dashboard – Key Expenditures

ADDISON

## Executive Dashboard - 2nd Quarter, 2021 Fiscal Year

### Financial Indicators

Positive variance compared to historical trends

Positive

Negative variance of 3%-5% and more than \$50,000 compared to historical trends

Warning

Negative variance of >5% and more than \$50,000 compared to historical trends

Negative

Key Expenditures	FY2021 Budget	Actual through 3/31/21	% Annual Budget
General Fund	\$ 39,440,786	\$ 17,286,125	43.83%
Hotel Fund	5,838,564	1,405,981	24.08%
Economic Development	2,019,815	669,876	33.17%
Airport Operations	5,110,205	2,184,217	42.74%
Utility Operations	14,243,405	6,527,268	45.83%

# Personnel Information

ADDISON

Executive Dashboard - 2nd Quarter, 2021 Fiscal Year

Staffing Indicators

## Personnel Information:

Separations - Benefitted Positions				
	1/2021-3/2021			FY2021
Department	Part-Time Positions	Full-time positions	Total 2nd Qtr	YTD
Airport	0	0	0	0
City Manager	0	0	0	1
Conference Centre	0	0	0	0
Development Services	0	0	0	0
Finance	0	0	0	0
Fire	0	0	0	3
General Services	0	0	0	1
Human Resources	0	0	0	0
Public Works	0	0	0	2
Marketing & Communications	0	0	0	0
Municipal Court	0	0	0	0
Parks	0	1	1	2
Police	0	2	2	4
Recreation	0	0	0	0
Special Events	0	0	0	0
Streets	0	0	0	0
<b>Grand Total</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>13</b>

New Hires - Benefitted Positions				
	1/2021-3/2021			FY2021
Department	Part-Time Positions	Full-time positions	Total 2nd Qtr	YTD
Airport	0	1	1	14
City Manager	0	1	1	1
Conference Centre	0	0	0	0
Development Services	0	1	1	1
Finance	0	0	0	1
Fire	0	3	3	4
General Services	0	1	1	2
Human Resources	0	0	0	0
Public Works	0	1	1	2
Marketing & Communications	0	0	0	1
Municipal Court	0	0	0	0
Parks	0	1	1	2
Police	0	5	5	5
Recreation	0	0	0	0
Special Events	0	0	0	0
Streets	0	1	1	3
<b>Grand Total</b>	<b>0</b>	<b>15</b>	<b>15</b>	<b>36</b>

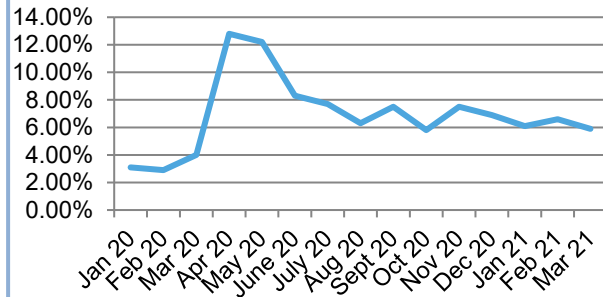
Public Safety Sworn Positions	Budgeted FY 2021	Filled Positions	Percent Filled
Police	66	62	94%
Fire ⁽¹⁾	56	58	104%

⁽¹⁾ FY2021 budget includes 56 budgeted sworn positions plus overfill of 1 Firefighter (F3) position. Fire received approval in Q2 to have an additional temporary overfill.

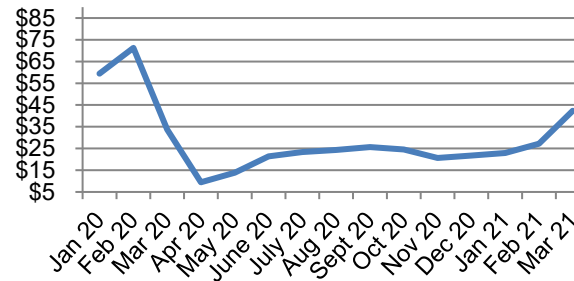
# Economic Indicators

ADDISON

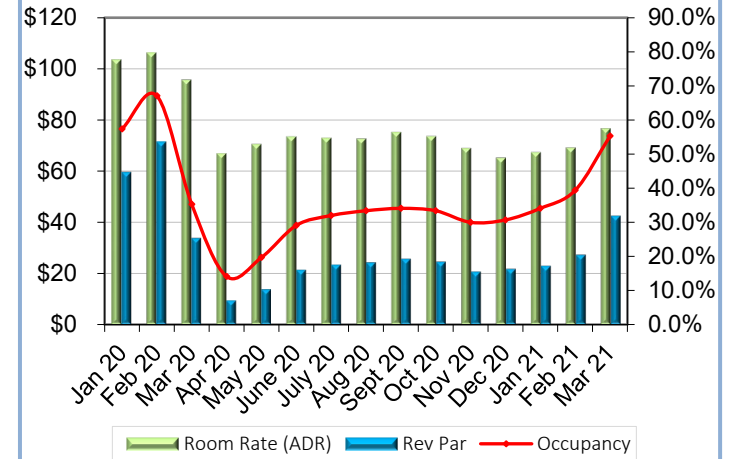
**DFW Unemployment Rate  
Last 12 months**



**Hotel Revenue Per Available  
Room**



**Addison Hotel Statistics**



**Occupancy Indicators:**

Office Occupancy =  
79.2%

Retail Occupancy =  
89.1%

0.6%

2.0%

**Hotel Indicators**

Hotel Occupancy =  
42.9%

RevPar =  
\$30.84

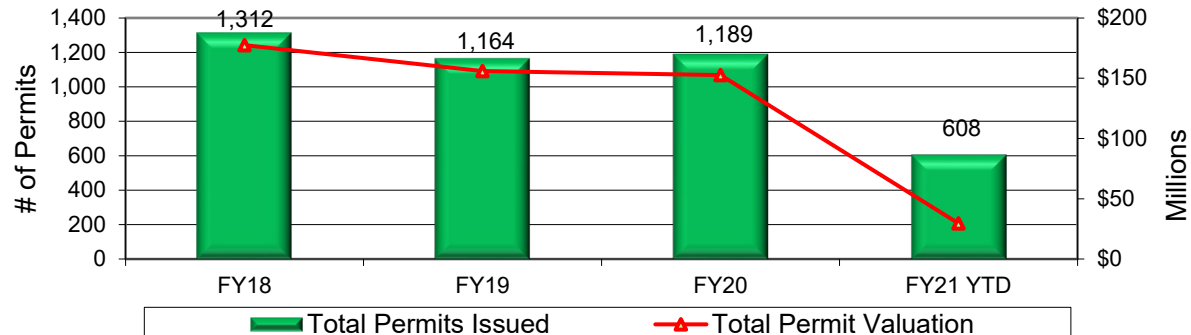
10.3%

43.7%

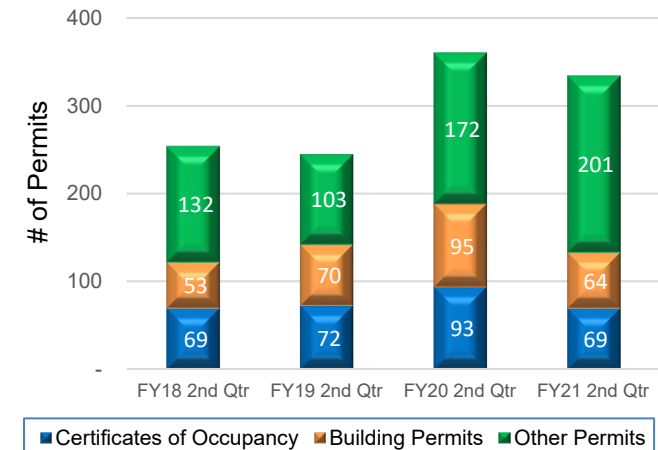
Source: CoStar (compares to prior year Q2)

Source: STR Report (compares to prior year Q2)

**Total Permits Issued and Valuation**

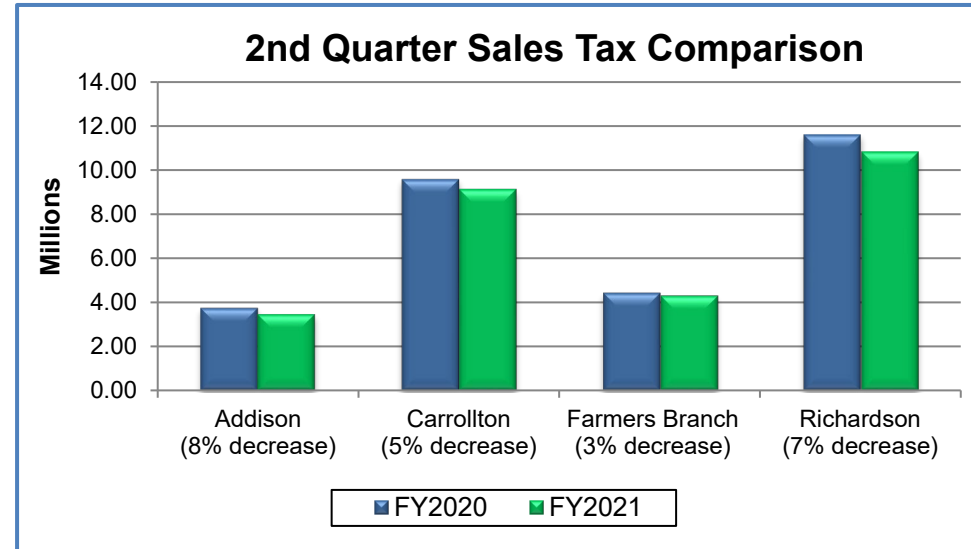


**Quarterly Permit Activity, Year over Year**



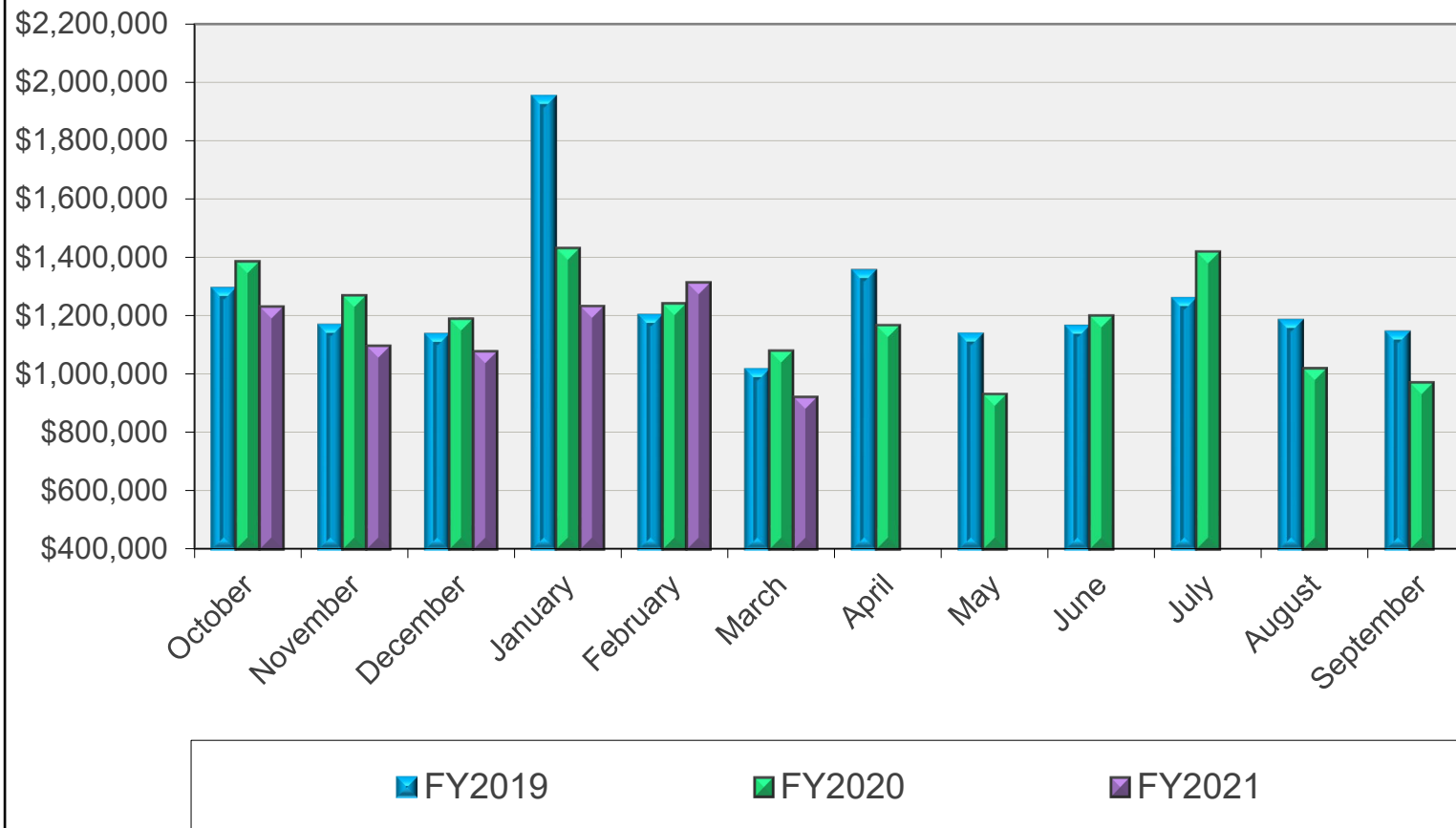
## Economic Development Incentives:

Executed Agreements	Amount Paid FY21	Total Incentives Committed
4	\$0	\$205,333





## Monthly Sales Tax Collections



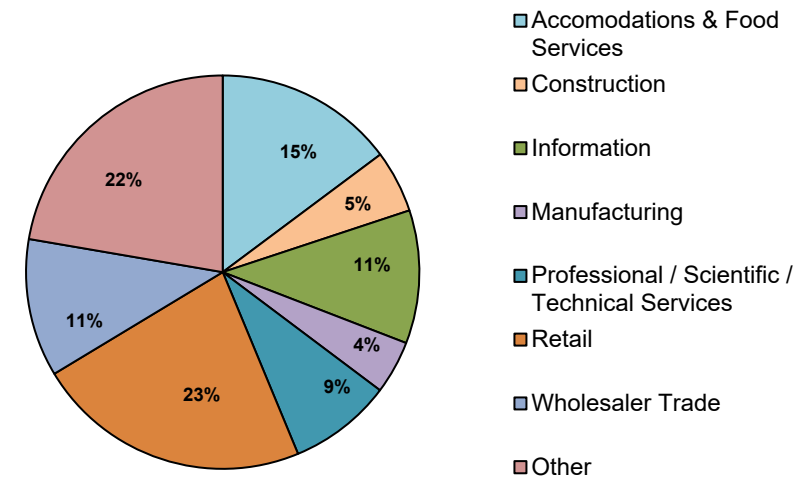
# Sales Tax Collections

ADDISON

## TOWN OF ADDISON Schedule of Sales Tax Collections For the quarter ending March 31, 2021

	FY2021 Monthly Collections	% Change from Prior Year	FY2020 Monthly Collections
October	\$ 1,229,815	-11.2%	\$ 1,384,839
November	1,095,667	-13.7%	1,269,353
December	1,076,775	-9.4%	1,188,777
January	1,231,161	-13.9%	1,430,683
February	1,312,153	5.7%	1,241,465
March	921,263	-14.7%	1,080,029
April		-100.0%	1,166,877
May		-100.0%	931,272
June		-100.0%	1,199,683
July		-100.0%	1,418,491
August		-100.0%	1,019,598
September		-100.0%	971,556
	<b>\$ 6,866,834</b>		<b>\$ 14,302,624</b>
Budget:	12,330,000	55.7%	13,700,000

### Breakdown of Sales Tax by Economic Category



# General Fund Revenue



CATEGORY	FY 2019-20 ACTUAL PRIOR YEAR	FY 2020-21 REVISED BUDGET	FY 2020-21 ACTUAL 2ND QTR	FY 2020-21 ACTUAL YTD	ACTUAL YTD as % of Budget
<b>Revenues:</b>					
Ad Valorem taxes:					
Current taxes	\$ 18,925,819	\$ 19,546,156	\$ 15,432,602	\$ 20,122,077	102.9%
Delinquent taxes	(356,413)	(165,758)	(63,398)	(166,544)	100.5% ⁽¹⁾
Penalty & interest	47,840	45,000	23,150	25,443	56.5%
Non-property taxes:					
Sales tax	14,302,624	12,330,000	3,464,577	6,866,834	55.7%
Alcoholic beverage tax	888,599	1,026,000	355,180	355,180	34.6%
Franchise / right-of-way use fees:					
Electric franchise	1,459,652	1,525,000	315,952	733,952	48.1%
Gas franchise	204,919	205,000	185,638	185,638	90.6% ⁽²⁾
Telecommunication access fees	316,471	400,000	50,598	105,114	26.3%
Cable franchise	196,520	130,000	34,702	65,015	50.0%
Street rental fees	(1,000)	-	-	-	0.0%
Licenses and permits:					
Business licenses and permits	110,964	211,650	17,785	38,880	18.4%
Building and construction permits	1,072,321	930,900	182,033	306,585	32.9%
Service fees:					
General government	-	-	-	-	0.0%
Public safety	873,871	984,945	219,676	378,258	38.4%
Urban development	17,727	71,900	6,291	13,584	18.9%
Streets and sanitation	396,436	445,700	128,897	215,824	48.4%
Recreation	34,914	57,800	3,668	6,993	12.1%
Interfund	516,490	410,431	102,926	205,216	50.0%
Court fines	227,998	260,000	38,087	68,428	26.3%
Interest earnings	402,873	200,000	(6,756)	11,852	5.9%
Rental income	9,252	8,000	1,650	3,850	48.1%
Other	171,542	128,000	29,410	109,535	85.6%
<b>Total Revenues</b>	<b>39,819,418</b>	<b>38,750,724</b>	<b>20,522,668</b>	<b>29,651,712</b>	<b>76.5%</b>

⁽¹⁾ Represents prior year tax payment refunds

⁽²⁾ Franchise fee payment due in the 3rd quarter

# General Fund Expenditures

ADDISON

CATEGORY	FY 2019-20 ACTUAL PRIOR YEAR	FY 2020-21 REVISED BUDGET	FY 2020-21 ACTUAL 2ND QTR	FY 2020-21 ACTUAL YTD	ACTUAL YTD as % of Budget
<b>Expenditures:</b>					
General Government:					
City Secretary	173,057	203,088	78,200	108,489	53.4%
City Manager	1,245,323	1,167,665	275,544	547,058	46.9%
Finance	1,826,483	1,775,555	470,963	871,349	49.1%
General Services	682,112	752,269	134,022	274,952	36.5%
Municipal Court	647,095	706,818	145,281	334,366	47.3%
Human Resources	641,387	711,040	157,433	318,557	44.8%
Information Technology	1,905,667	2,248,601	482,045	830,140	36.9%
Combined Services	1,323,634	1,187,951	150,275	439,140	37.0%
Council Projects	339,790	252,132	(11,646)	112,665	44.7%
Public Safety:					
Police	9,318,042	9,975,875	2,269,181	4,418,215	44.3%
Emergency Communications	1,360,463	1,391,519	329,830	1,023,701	73.6% ⁽¹⁾
Fire	8,492,455	8,481,549	1,970,318	4,050,390	47.8%
Development Services	1,501,596	1,637,553	356,394	672,405	41.1%
Streets	1,799,515	2,150,903	347,800	565,472	26.3%
Parks and Recreation:					
Parks	3,772,781	4,261,292	943,565	1,695,932	39.8%
Recreation	1,634,918	1,826,026	365,506	667,820	36.6%
Other financing uses:					
Transfers to other funds	3,608,900	710,950	177,738	355,475	50.0%
<b>Total Expenditures</b>	<b>40,273,218</b>	<b>39,440,786</b>	<b>8,642,446</b>	<b>17,286,125</b>	<b>43.8%</b>
Net Change in Fund Balance	(453,800)	(690,062)	11,880,221	12,365,587	
<b>Fund Balance at Beginning of Year</b>	<b>20,588,244</b>	<b>20,134,444</b>		<b>20,134,444</b>	
<b>Fund Balance at End of Year</b>	<b>\$ 20,134,444</b>	<b>\$ 19,444,382</b>		<b>\$ 32,500,031</b>	

⁽¹⁾ NTECC operations contribution for 3rd quarter posted in period 6

# Hotel Fund



CATEGORY	FY 2019-20 ACTUAL PRIOR YEAR	FY 2020-21 REVISED BUDGET	FY 2020-21 ACTUAL 2ND QTR	FY 2020-21 ACTUAL YTD	ACTUAL YTD as % of Budget
<b>Revenues:</b>					
Hotel/Motel occupancy taxes	\$ 3,240,946	\$ 4,155,000	\$ 429,463	\$ 680,291	16.4% ⁽¹⁾
Proceeds from special events	107,030	1,104,500	43,700	43,700	4.0% ⁽²⁾
Conference centre rental	233,182	-	650	650	0.0% ⁽³⁾
Theatre centre rental	68,781	23,810	8,361	13,901	58.4%
Interest and miscellaneous	57,203	50,100	56,020	58,896	117.6%
<b>Total Revenues</b>	<b>3,707,143</b>	<b>5,333,410</b>	<b>538,195</b>	<b>797,438</b>	<b>15.0%</b>
<b>Expenditures:</b>					
Addison theatre centre	246,578	318,877	47,229	92,101	28.9%
Conference centre	796,480	200,977	55,867	127,953	63.7%
General hotel operations	55,828	154,125	19,152	19,538	12.7%
Marketing	618,006	1,113,915	115,356	251,380	22.6%
Performing arts	505,000	329,089	64,263	292,102	88.8% ⁽⁴⁾
Special events	762,666	931,773	193,836	386,222	41.5% ⁽²⁾
Special events operations	606,660	2,405,808	40,563	40,594	1.7%
Attractions Capital Projects	31,761	-	1,490	4,090	0.0%
Other financing uses:					
Transfer to Economic Development Fund	384,000	384,000	96,000	192,000	50.0%
<b>Total Expenditures</b>	<b>4,006,980</b>	<b>5,838,564</b>	<b>633,756</b>	<b>1,405,981</b>	<b>24.1%</b>
Net Change in Fund Balance	(299,837)	(505,154)	(95,561)	(608,543)	
<b>Fund Balance at Beginning of Year</b>	<b>3,449,095</b>	<b>3,149,258</b>		<b>3,149,258</b>	
<b>Fund Balance at End of Year</b>	<b>\$ 3,149,258</b>	<b>\$ 2,644,104</b>		<b>\$ 2,540,715</b>	

⁽¹⁾ Hotel tax collections have not been received by all hoteliers

⁽²⁾ Special events revenues and expenses are low due to the timing of events

⁽³⁾ Conference Centre is closed for FY2021

⁽⁴⁾ Full NPO primary grant payment and matching funds of \$64,263.02 for non-profit grant funding to Water Tower Theatre

# Economic Development Fund



CATEGORY	FY 2019-20 ACTUAL PRIOR YEAR	FY 2020-21 REVISED BUDGET	FY 2020-21 ACTUAL 2ND QTR	FY 2020-21 ACTUAL YTD	ACTUAL YTD as % of Budget
<b>Revenues:</b>					
Ad Valorem taxes:	\$ 1,092,347	\$ 1,127,348	\$ 887,773	\$ 1,152,492	102.2%
Business license fee	36,360	50,000	14,150	22,350	44.7%
Interest income and other	44,843	58,000	388	2,881	5.0%
Transfers from General/Hotel Fund	384,000	384,000	96,000	192,000	50.0%
<b>Total Revenues</b>	<b>1,557,550</b>	<b>1,619,348</b>	<b>998,310</b>	<b>1,369,723</b>	<b>84.6%</b>
<b>Expenditures:</b>					
Personnel services	479,215	491,120	111,258	228,834	46.6%
Supplies	8,507	20,932	996	1,529	7.3%
Maintenance	19,393	29,450	1,529	10,442	35.5%
Contractual services	861,621	1,430,153	235,560	420,572	29.4%
Debt Service	16,997	48,160	4,249	8,499	17.6%
<b>Total Expenditures</b>	<b>1,385,734</b>	<b>2,019,815</b>	<b>353,592</b>	<b>669,876</b>	<b>33.2%</b>
Net Change in Fund Balance	171,817	(400,467)	644,718	699,848	
<b>Fund Balance at Beginning of Year</b>	<b>1,797,019</b>	<b>1,968,836</b>		<b>1,968,836</b>	
<b>Fund Balance at End of Year</b>	<b>\$ 1,968,836</b>	<b>\$ 1,568,369</b>		<b>\$ 2,668,683</b>	



# Airport Fund



CATEGORY	FY 2019-20 ACTUAL PRIOR YEAR	FY 2020-21 REVISED BUDGET	FY 2020-21 ACTUAL 2ND QTR	FY 2020-21 ACTUAL YTD	ACTUAL YTD as % of Budget
<b>Operating Revenues:</b>					
Operating grants	\$ 1,431,219	\$ 50,000	\$ -	\$ -	0.0%
Service fees	103,234	158,107	24,039	48,949	31.0% ⁽¹⁾
Fuel flowage fees	867,778	625,043	215,460	455,077	72.8%
Rental income	4,421,924	4,305,960	1,134,291	2,208,258	51.3%
Interest income and other	892,665	50,000	33,111	59,437	118.9%
<b>Total Operating Revenues:</b>	<b>7,716,819</b>	<b>5,189,110</b>	<b>1,406,901</b>	<b>2,771,720</b>	<b>53.4%</b>
<b>Operating Expenses:</b>					
Personnel services	356,381	2,157,056	432,000	862,316	40.0%
Supplies	40,793	61,900	9,878	20,278	32.8%
Maintenance	69,292	479,730	78,885	130,463	27.2%
Contractual services	185,511	1,325,914	222,402	475,818	35.9%
Capital Replacement/Lease	217,258	230,958	54,315	125,542	54.4%
Debt service	855,123	819,647	547,435	547,823	66.8%
Capital Outlay	-	35,000	10,989	21,978	62.8%
Operator - Operations and maintenance	3,060,383	-	-	-	0.0% ⁽²⁾
Operator - Service contract	396,815	-	-	-	0.0% ⁽²⁾
<b>Total Operating Expenses:</b>	<b>5,181,556</b>	<b>5,110,205</b>	<b>1,355,903</b>	<b>2,184,217</b>	<b>42.7%</b>
Capital Projects (Cash Funded)	3,633,777	2,043,911 [▲]	-	-	0.0%
<b>Total Expenses:</b>	<b>8,815,333</b>	<b>7,154,116</b>	<b>1,355,903</b>	<b>2,184,217</b>	<b>30.5%</b>
Net Change in Working Capital	(1,098,515)	(1,965,006)	50,998	587,504	
<b>Working Capital at Beginning of Year</b>	<b>6,710,399</b>	<b>5,611,884</b>		<b>5,611,884</b>	
<b>Working Capital at End of Year</b>	<b>\$ 5,611,884</b>	<b>\$ 3,646,878</b>		<b>\$ 6,199,388</b>	

⁽¹⁾ Percentage is below the quarterly threshold but actuals are in line with historical trends

⁽²⁾ The Town no longer has an operator contract as the Airport operations were insourced in FY2021

# Utility Fund



CATEGORY	FY 2019-20 ACTUAL PRIOR YEAR	FY 2020-21 REVISED BUDGET	FY 2020-21 ACTUAL 2ND QTR	FY 2020-21 ACTUAL YTD	ACTUAL YTD as % of Budget
<b>Operating revenues:</b>					
Water sales	\$ 7,460,287	\$ 7,502,499	\$ 1,444,803	\$ 2,788,552	37.2% ⁽¹⁾
Sewer charges	5,380,789	6,270,477	1,402,272	2,381,003	38.0% ⁽¹⁾
Tap fees	11,375	17,500	4,300	4,400	25.1%
Penalties	36,448	75,000	-	-	0.0%
Interest income and other	245,617	108,500	739	8,421	7.8%
<b>Total Operating Revenues:</b>	<b>13,134,515</b>	<b>13,973,976</b>	<b>2,852,115</b>	<b>5,182,376</b>	<b>37.1%</b>
<b>Operating expenses:</b>					
Personnel services	1,943,252	2,318,042	502,926	981,745	42.4%
Supplies	214,536	216,281	60,921	133,607	61.8%
Maintenance	524,182	650,623	96,483	159,677	24.5%
Contractual services					
Water purchases	3,506,330	3,652,672	989,627	1,355,052	37.1%
Wastewater treatment	3,427,714	3,746,596	1,380,440	1,943,471	51.9%
Other services	743,773	1,735,463	345,570	584,328	33.7%
Capital Replacement/Lease	280,401	340,797	82,964	165,929	48.7%
Debt service	1,414,426	1,517,931	1,203,098	1,203,460	79.3%
Capital outlay	84,269	65,000	-	-	0.0%
<b>Total Operating Expenses:</b>	<b>12,138,884</b>	<b>14,243,405</b>	<b>4,662,029</b>	<b>6,527,268</b>	<b>45.8%</b>
Capital Projects (Cash Funded)	860,351	163,000	13,865	146,627	90.0%
<b>Total Expenses:</b>	<b>12,999,234</b>	<b>14,406,405</b>	<b>4,675,894</b>	<b>6,673,895</b>	<b>46.3%</b>
Net Change in Working Capital	135,280	(432,429)	(1,823,779)	(1,491,520)	
<b>Working Capital at Beginning of Year</b>	<b>6,296,869</b>	<b>6,432,149</b>		<b>6,432,149</b>	
<b>Working Capital at End of Year</b>	<b>\$ 6,432,149</b>	<b>\$ 5,999,720</b>		<b>\$ 4,940,629</b>	

⁽¹⁾ Revenues represent a one-month lag in the collection of utility revenues and there is heavy seasonality with water revenue

# Stormwater Utility Fund



CATEGORY	FY 2019-20 ACTUAL PRIOR YEAR	FY 2020-21 REVISED BUDGET	FY 2020-21 ACTUAL 2ND QTR	FY 2020-21 ACTUAL YTD	ACTUAL YTD as % of Budget
<b>Operating revenues:</b>					
Drainage Fees	\$ 2,320,434	\$ 2,455,791	\$ 614,427	\$ 1,050,002	42.8% ⁽¹⁾
Interest income and other	136,976	40,000	(627)	7,386	18.5%
<b>Total Operating Revenues:</b>	<b>2,457,410</b>	<b>2,495,791</b>	<b>613,800</b>	<b>1,057,388</b>	<b>42.4%</b>
<b>Operating expenses</b>					
Personnel services	273,918	313,093	73,848	143,021	45.7%
Supplies	13,239	17,700	636	2,892	16.3%
Maintenance	32,637	102,620	13,680	29,426	28.7%
Contractual services	172,465	310,224	70,572	105,457	34.0%
Debt service	543,141	542,266	426,683	426,683	78.7%
Capital outlay	48,524	38,610	-	-	0.0%
<b>Total Operating Expenses:</b>	<b>1,083,926</b>	<b>1,324,513</b>	<b>585,420</b>	<b>707,479</b>	<b>53.4%</b>
Capital Projects (Cash Funded)	33,383	2,272,430	2,624	2,624	0.1%
<b>Total Expenses:</b>	<b>1,117,308</b>	<b>3,596,943</b>	<b>588,044</b>	<b>710,103</b>	<b>19.7%</b>
Net Change in Working Capital	1,340,102	(1,101,152)	25,756	347,285	
<b>Working Capital at Beginning of Year</b>	<b>6,431,737</b>	<b>7,771,839</b>		<b>7,771,839</b>	
<b>Working Capital at End of Year</b>	<b>\$ 7,771,839</b>	<b>\$ 6,670,687</b>		<b>\$ 8,119,124</b>	

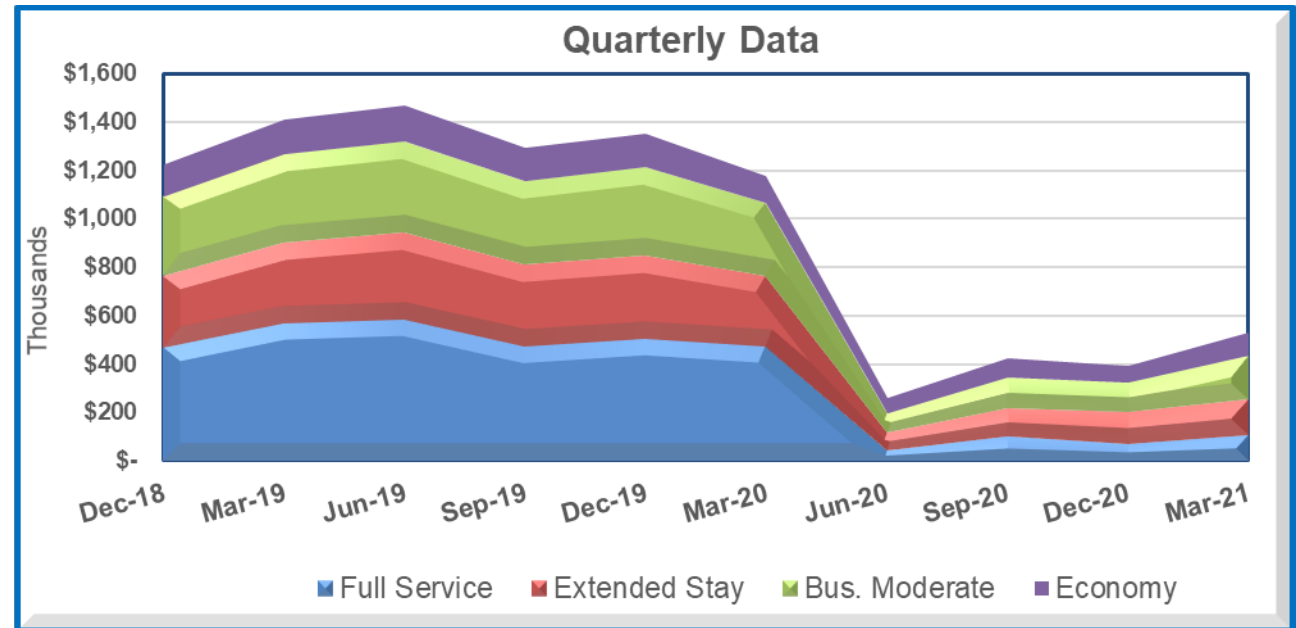
⁽¹⁾ Fees represent a one-month lag in the collection of stormwater revenue but actuals are in line with historical trends

# Hotel Occupancy Tax Collections

ADDISON

	Rooms		Jan. - Mar. 2021		21 to 20
	Number	%	Amount	%	% Diff.
<b>Full Service</b>					
Marriott Quorum	547	15%	\$ 76,475	14%	-66%
Renaissance	528	14%	30,361	6%	-82%
	1,075	29%	106,836	20%	-77%
<b>Extended Stay</b>					
Budget Suites	344	9%	6,825	1%	-31%
⁽¹⁾ Hawthorn Suites	70	2%	-	0%	-100%
⁽²⁾ Mainstay Suites	70	2%	8,841	2%	0%
Marriott Residence Inn	150	4%	33,239	6%	-31%
Hyatt House	132	4%	10,813	2%	-76%
⁽¹⁾ Homewood Suites	120	3%	-	0%	-100%
Home2Suites	132	4%	48,960	9%	-18%
Springhill Suites	159	4%	39,160	7%	-40%
	1,177	32%	147,838	28%	-49%
<b>Business Moderate</b>					
Marriott Courtyard Quorum	176	5%	24,100	5%	-70%
LaQuinta Inn	152	4%	37,492	7%	-19%
Marriott Courtyard Midway	145	4%	20,104	4%	-51%
Radisson - Addison	101	3%	18,465	3%	3%
Hilton Garden Inn	96	3%	28,163	5%	-32%
Holiday Inn Express	97	3%	29,328	6%	100%
⁽¹⁾ Holiday Inn Beltway	102	3%	-	0%	100%
Best Western Plus	84	2%	22,420	4%	-13%
	953	26%	180,072	34%	-41%
<b>Economy</b>					
Motel 6	127	3%	31,414	6%	5%
Hampton Inn	158	4%	19,827	4%	-49%
Red Roof Inn	105	3%	22,160	4%	12%
Quality Suites North/Galleria	78	2%	14,279	3%	-22%
America's Best Value Inn	60	2%	5,273	1%	-11%
	528	14%	92,954	18%	-18%
<b>TOTAL</b>	<b>3,733</b>	<b>100%</b>	<b>\$ 527,700</b>	<b>100%</b>	<b>-55%</b>

⁽¹⁾ Not yet received one or more payments for the quarter



# Investment Report Summary

A blue circular logo with the word "ADDISON" in white capital letters.

	Book Value	Market Value	Interest Revenue	Weighted Average Yield-to- Maturity
3/31/2021	107,279,066	107,285,397	104,590	0.27%
12/31/2020	103,100,078	103,228,942	141,276	0.48%
Change	4,178,988	4,056,455	(36,686)	-0.21%
% Change	4.05%	3.93%	-25.97%	-43.82%



Department of Finance

# *Quarterly Review*

*For the Period Ended March 31, 2021*

---

---

*Town of Addison*



## *Table of Contents - Quarter Ended 3/31/21*

---

Memorandum to the City Manager.....	1-2
Executive Dashboard .....	3-6
General Fund, Quarterly Statement of Revenues Compared to Budget .....	7
General Fund, Quarterly Statement of Expenditures Compared to Budget .....	8
Hotel Fund .....	9
Economic Development Fund.....	10
Airport Fund .....	11
Utility Fund.....	12
Stormwater Fund.....	13
Schedule of Sales Tax Collections and Related Analyses .....	14
Hotel Occupancy Tax Collection by Hotel Service Type.....	15



**To: Wes Pierson, City Manager**

**From: Steven Glickman, Chief Financial Officer**

**Re: Second Quarter Financial Review**

**Date: 5/25/2021**

This is the second quarter report for the 2020-2021 fiscal year. Revenues and expenditures reflect activity from October 1, 2020 through March 31, 2021 or 50 percent of the fiscal year.

### GENERAL FUND

- Fiscal year-to-date revenue totals \$29.7 million, which is 76.5 percent of the overall budget amount. Sales tax collections are at 55.7 percent of the fiscal year 2021 budget. Alcoholic beverage tax collections are at 34.6 percent of the fiscal year 2021 budget.
- Fiscal year-to-date expenditures and transfers total approximately \$17.3 million, which is 43.8 percent of budget. All departments are on pace with or below their respective budgets for fiscal year 2021.

### HOTEL FUND

- Revenues through the second quarter total approximately \$797 thousand, 15.0 percent of the fiscal year 2021 budget. Hotel occupancy tax collections are 16.4 percent of budget for five months of collections. Collections have not been received by all hoteliers for March. Proceeds from Special Events are below budget due to timing of events; all significant events occur between May and September.
- Hotel Fund expenditures of \$1.4 million are 24.1 percent of budget, and \$1.1 million less than this time a year ago. Performing Arts expenditures are at 88.8 percent due to the full payment of the Water Tower Theater primary grant. Special events expenditures are at 1.7 percent due to timing of events.

### AIRPORT FUND

- Operating revenue through the second quarter total approximately \$2.8 million or 53.4 percent of the fiscal year 2021 budget.
- Operating expenses total \$2.2 million, or 42.7 percent of fiscal year 2021 budget.
- Total year-to-date operating income for the Airport Fund is \$587 thousand.

## UTILITY FUND

- Operating revenue through the first quarter totals \$5.2 million, or 37.1 percent of the fiscal year 2021 budget. With a one-month lag in the collection of utility revenues, 41.7 of the fiscal year has expired. Water revenues are at 37.2 percent of the fiscal year 2021 budget. There is heavy seasonality with water revenue. The year-to-date revenue and percent of budget is in line with prior year.
- Operating expenses through the first quarter total approximately \$6.5 million, or 45.8 percent of the fiscal year 2021 budget. Water wholesale purchases and wastewater treatment expenses are less than this time a year ago.

## STORMWATER FUND

- Operating revenue through the first quarter total \$1.1 million or 42.4 percent of the fiscal year 2021 budget. With a one-month lag in the collection of stormwater revenues, 41.7 percent of the fiscal year has expired.
- Operating expenses through the first quarter total approximately \$707 thousand, or 53.4 percent of the fiscal year 2021 budget. The percentage to budget is driven by our debt service payment, which is made in Q2 of the fiscal year.

## Executive Dashboard - 2nd Quarter, 2021 Fiscal Year

### Financial Indicators

Positive variance compared to historical trends

Positive

Negative variance of 3%-5% and more than \$50,000 compared to historical trends

Warning

Negative variance of >5% and more than \$50,000 compared to historical trends

Negative

Key Revenue Sources	FY2021 Budget	Actual through 3/31/21	% Annual Budget
Ad Valorem Taxes - General Fund	\$ 19,425,398	\$ 19,980,976	102.86%
Non-Property Taxes - General Fund	13,356,000	7,222,014	54.07%
Hotel Tax	4,155,000	680,291	16.37% ⁽¹⁾
Franchise Fees - General Fund	2,260,000	1,089,719	48.22%
Service/Permitting/License Fees - General Fund	3,113,326	1,165,338	37.43%
Rental Income - All Funds	4,337,770	2,226,659	51.33%
Fines and Penalties - All Funds	335,000	68,428	20.43% ⁽²⁾
Special Event Revenue - Hotel Fund	1,104,500	43,700	3.96% ⁽³⁾
Fuel Flowage Fees - Airport Fund	625,043	455,077	72.81%
Water and Sewer Charges - Utility Fund	13,772,976	5,169,555	37.53%

Key Expenditures	FY2021 Budget	Actual through 3/31/21	% Annual Budget
General Fund	\$ 39,440,786	\$ 17,286,125	43.83%
Hotel Fund	5,838,564	1,405,981	24.08%
Economic Development	2,019,815	669,876	33.17%
Airport Operations	5,110,205	2,184,217	42.74%
Utility Operations	14,243,405	6,527,268	45.83%

⁽¹⁾ Hotel tax revenue has not been collected from all hoteliers and reflects less hotel occupancy due to COVID-19

⁽²⁾ Municipal court has fewer court fines/fees issued due to COVID-19

⁽³⁾ Special Events are low due to the timing of events

**Executive Dashboard - 2nd Quarter, 2021 Fiscal Year**

**Staffing Indicators**

**Personnel Information:**

Separations - Benefitted Positions				
	1/2021-3/2021			FY2021
Department	Part-Time Positions	Full-time positions	Total 2nd Qtr	YTD
Airport	0	0	0	0
City Manager	0	0	0	1
Conference Centre	0	0	0	0
Development Services	0	0	0	0
Finance	0	0	0	0
Fire	0	0	0	3
General Services	0	0	0	1
Human Resources	0	0	0	0
Public Works	0	0	0	2
Marketing & Communications	0	0	0	0
Municipal Court	0	0	0	0
Parks	0	1	1	2
Police	0	2	2	4
Recreation	0	0	0	0
Special Events	0	0	0	0
Streets	0	0	0	0
<b>Grand Total</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>13</b>

New Hires - Benefitted Positions				
	1/2021-3/2021			FY2021
Department	Part-Time Positions	Full-time positions	Total 2nd Qtr	YTD
Airport	0	1	1	14
City Manager	0	1	1	1
Conference Centre	0	0	0	0
Development Services	0	1	1	1
Finance	0	0	0	1
Fire	0	3	3	4
General Services	0	1	1	2
Human Resources	0	0	0	0
Public Works	0	1	1	2
Marketing & Communications	0	0	0	1
Municipal Court	0	0	0	0
Parks	0	1	1	2
Police	0	5	5	5
Recreation	0	0	0	0
Special Events	0	0	0	0
Streets	0	1	1	3
<b>Grand Total</b>	<b>0</b>	<b>15</b>	<b>15</b>	<b>36</b>

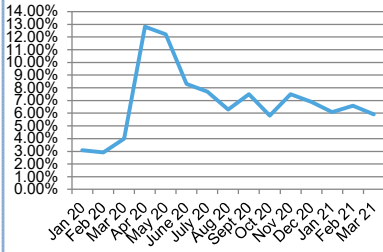
Public Safety Sworn Positions	Budgeted FY 2021	Filled Positions	Percent Filled
Police	66	62	94%
Fire ⁽¹⁾	56	58	104%

⁽¹⁾ FY2021 budget includes 56 budgeted sworn positions plus overfill of 1 Firefighter (F3) position. Fire received approval in Q2 to have an additional temporary overfill.

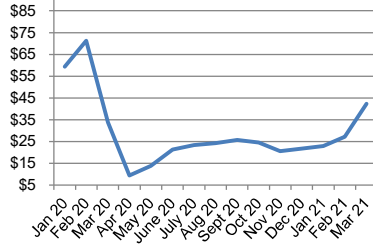
## Executive Dashboard - 2nd Quarter, 2021 Fiscal Year

### Economic Indicators

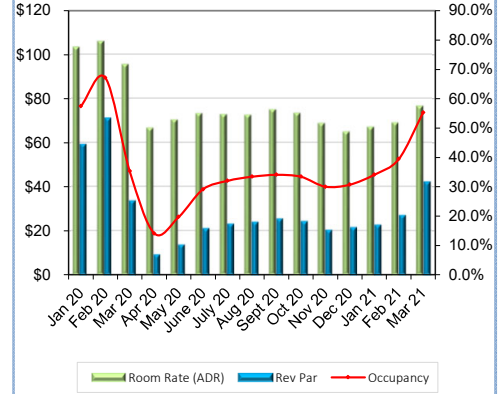
**DFW Unemployment Rate  
Last 12 months**



**Hotel Revenue Per Available  
Room**



**Addison Hotel Statistics**



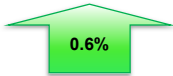
**Occupancy Indicators:**

Office Occupancy =  
79.2%

Retail Occupancy =  
89.1%

Hotel Occupancy =  
42.9%

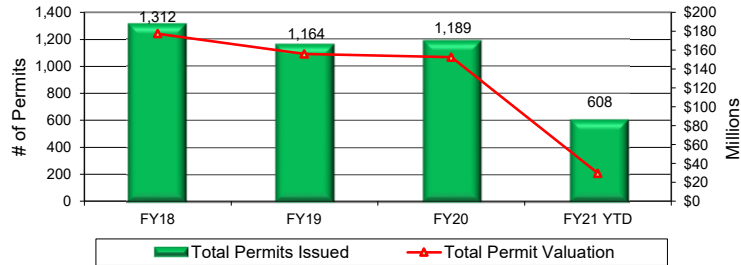
RevPar =  
\$30.84



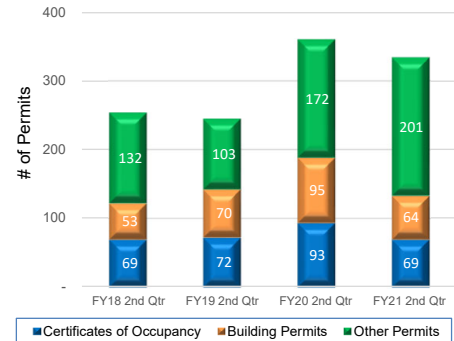
Source: CoStar (compares to prior year Q2)

Source: STR Report (compares to prior year Q2)

**Total Permits Issued and Valuation**



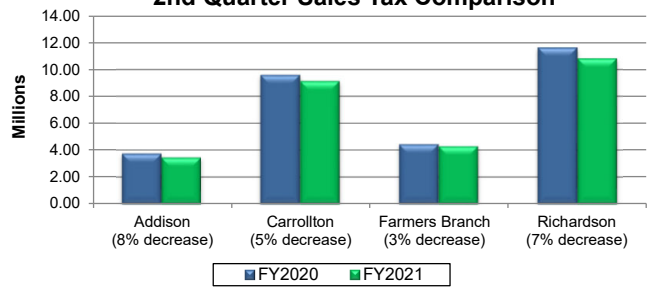
**Quarterly Permit Activity, Year over Year**



### Economic Development Incentives:

Executed Agreements	Amount Paid FY21	Total Incentives Committed
4	\$0	\$205,333

**2nd Quarter Sales Tax Comparison**

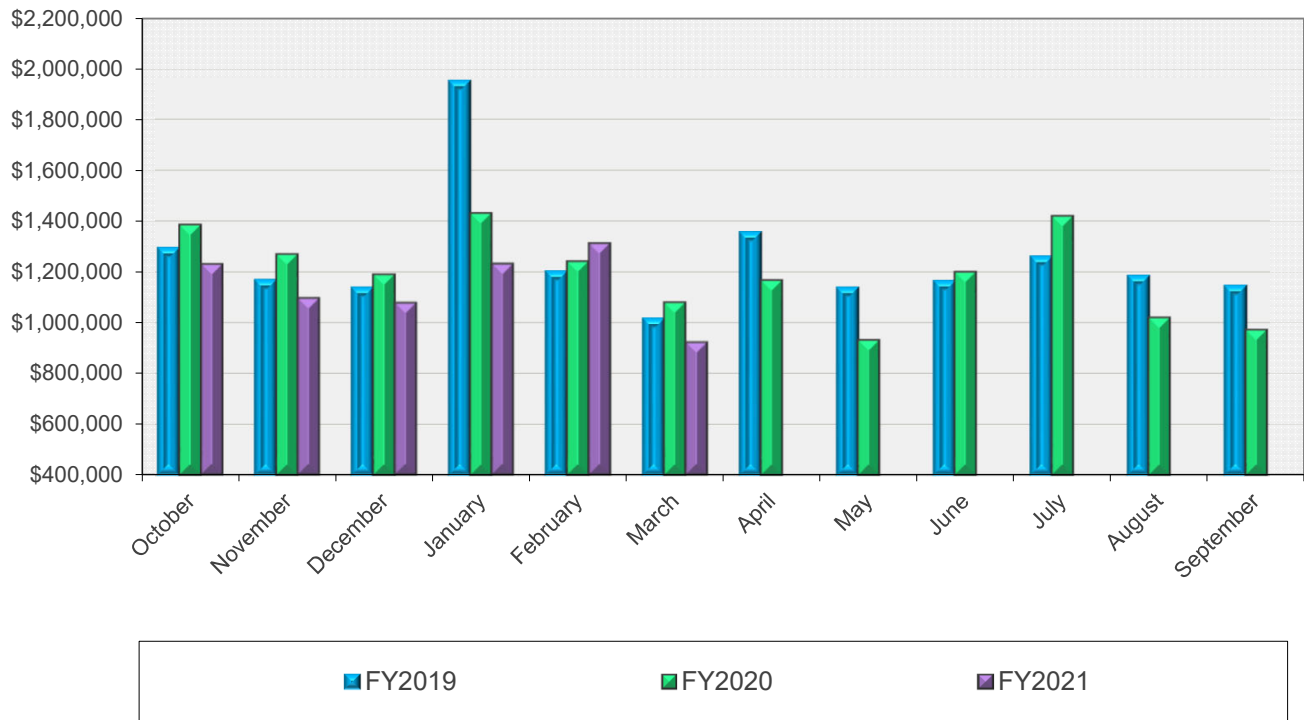




## Executive Dashboard - 2nd Quarter, 2021 Fiscal Year

### Sales Tax Information

#### Monthly Sales Tax Collections



Positive variance compared to historical trends

Negative variance of 3%-5% and more than \$50,000 compared to historical trends

Negative variance of >5% and more than \$50,000 compared to historical trends

Positive

Warning

Negative

## TOWN OF ADDISON

### GENERAL FUND

#### FY2021 QUARTERLY STATEMENT OF REVENUES AND EXPENDITURES COMPARED TO BUDGET

*With Comparative Information from Prior Fiscal Year*

CATEGORY	FY 2019-20 ACTUAL PRIOR YEAR	FY 2020-21 REVISED BUDGET	FY 2020-21 ACTUAL 2ND QTR	FY 2020-21 ACTUAL YTD	ACTUAL YTD as % of Budget
<b>Revenues:</b>					
Ad Valorem taxes:					
Current taxes	\$ 18,925,819	\$ 19,546,156	\$ 15,432,602	\$ 20,122,077	102.9%
Delinquent taxes	(356,413)	(165,758)	(63,398)	(166,544)	100.5% ⁽¹⁾
Penalty & interest	47,840	45,000	23,150	25,443	56.5%
Non-property taxes:					
Sales tax	14,302,624	12,330,000	3,464,577	6,866,834	55.7%
Alcoholic beverage tax	888,599	1,026,000	355,180	355,180	34.6%
Franchise / right-of-way use fees:					
Electric franchise	1,459,652	1,525,000	315,952	733,952	48.1%
Gas franchise	204,919	205,000	185,638	185,638	90.6% ⁽²⁾
Telecommunication access fees	316,471	400,000	50,598	105,114	26.3%
Cable franchise	196,520	130,000	34,702	65,015	50.0%
Street rental fees	(1,000)	-	-	-	0.0%
Licenses and permits:					
Business licenses and permits	110,964	211,650	17,785	38,880	18.4%
Building and construction permits	1,072,321	930,900	182,033	306,585	32.9%
Service fees:					
General government	-	-	-	-	0.0%
Public safety	873,871	984,945	219,676	378,258	38.4%
Urban development	17,727	71,900	6,291	13,584	18.9%
Streets and sanitation	396,436	445,700	128,897	215,824	48.4%
Recreation	34,914	57,800	3,668	6,993	12.1%
Interfund	516,490	410,431	102,926	205,216	50.0%
Court fines	227,998	260,000	38,087	68,428	26.3%
Interest earnings	402,873	200,000	(6,756)	11,852	5.9%
Rental income	9,252	8,000	1,650	3,850	48.1%
Other	171,542	128,000	29,410	109,535	85.6%
<b>Total Revenues</b>	<b>39,819,418</b>	<b>38,750,724</b>	<b>20,522,668</b>	<b>29,651,712</b>	<b>76.5%</b>

⁽¹⁾ Represents prior year tax payment refunds

⁽²⁾ Franchise fee payment due in the 3rd quarter

Positive variance compared to historical trends

Negative variance of 3%-5% and more than \$50,000 compared to historical trends

Negative variance of >5% and more than \$50,000 compared to historical trends

Positive

Warning

Negative

## TOWN OF ADDISON

### GENERAL FUND

#### FY2021 QUARTERLY STATEMENT OF REVENUES AND EXPENDITURES COMPARED TO BUDGET

*With Comparative Information from Prior Fiscal Year*

CATEGORY	FY 2019-20 ACTUAL PRIOR YEAR	FY 2020-21 REVISED BUDGET	FY 2020-21 ACTUAL 2ND QTR	FY 2020-21 ACTUAL YTD	ACTUAL YTD as % of Budget
<b>Expenditures:</b>					
General Government:					
City Secretary	173,057	203,088	78,200	108,489	53.4%
City Manager	1,245,323	1,167,665	275,544	547,058	46.9%
Finance	1,826,483	1,775,555	470,963	871,349	49.1%
General Services	682,112	752,269	134,022	274,952	36.5%
Municipal Court	647,095	706,818	145,281	334,366	47.3%
Human Resources	641,387	711,040	157,433	318,557	44.8%
Information Technology	1,905,667	2,248,601	482,045	830,140	36.9%
Combined Services	1,323,634	1,187,951	150,275	439,140	37.0%
Council Projects	339,790	252,132	(11,646)	112,665	44.7%
Public Safety:					
Police	9,318,042	9,975,875	2,269,181	4,418,215	44.3%
Emergency Communications	1,360,463	1,391,519	329,830	1,023,701	73.6% ⁽¹⁾
Fire	8,492,455	8,481,549	1,970,318	4,050,390	47.8%
Development Services	1,501,596	1,637,553	356,394	672,405	41.1%
Streets	1,799,515	2,150,903	347,800	565,472	26.3%
Parks and Recreation:					
Parks	3,772,781	4,261,292	943,565	1,695,932	39.8%
Recreation	1,634,918	1,826,026	365,506	667,820	36.6%
Other financing uses:					
Transfers to other funds	3,608,900	710,950	177,738	355,475	50.0%
<b>Total Expenditures</b>	<b>40,273,218</b>	<b>39,440,786</b>	<b>8,642,446</b>	<b>17,286,125</b>	<b>43.8%</b>
Net Change in Fund Balance	(453,800)	(690,062)	11,880,221	12,365,587	
<b>Fund Balance at Beginning of Year</b>	<b>20,588,244</b>	<b>20,134,444</b>		<b>20,134,444</b>	
<b>Fund Balance at End of Year</b>	<b>\$ 20,134,444</b>	<b>\$ 19,444,382</b>		<b>\$ 32,500,031</b>	

⁽¹⁾ NTECC operations contribution for 3rd quarter posted in period 6

Positive variance compared to historical trends

Negative variance of 3%-5% and more than \$50,000 compared to historical trends

Negative variance of >5% and more than \$50,000 compared to historical trends

Positive

Warning

Negative

## TOWN OF ADDISON

### HOTEL FUND

#### FY2021 QUARTERLY STATEMENT OF REVENUES AND EXPENDITURES COMPARED TO BUDGET

*With Comparative Information from Prior Fiscal Year*

CATEGORY	FY 2019-20 ACTUAL PRIOR YEAR	FY 2020-21 REVISED BUDGET	FY 2020-21 ACTUAL 2ND QTR	FY 2020-21 ACTUAL YTD	ACTUAL YTD as % of Budget
<b>Revenues:</b>					
Hotel/Motel occupancy taxes	\$ 3,240,946	\$ 4,155,000	\$ 429,463	\$ 680,291	16.4% ⁽¹⁾
Proceeds from special events	107,030	1,104,500	43,700	43,700	4.0% ⁽²⁾
Conference centre rental	233,182	-	650	650	0.0% ⁽³⁾
Theatre centre rental	68,781	23,810	8,361	13,901	58.4%
Interest and miscellaneous	57,203	50,100	56,020	58,896	117.6%
<b>Total Revenues</b>	<b>3,707,143</b>	<b>5,333,410</b>	<b>538,195</b>	<b>797,438</b>	<b>15.0%</b>
<b>Expenditures:</b>					
Addison theatre centre	246,578	318,877	47,229	92,101	28.9%
Conference centre	796,480	200,977	55,867	127,953	63.7%
General hotel operations	55,828	154,125	19,152	19,538	12.7%
Marketing	618,006	1,113,915	115,356	251,380	22.6%
Performing arts	505,000	329,089	64,263	292,102	88.8% ⁽⁴⁾
Special events	762,666	931,773	193,836	386,222	41.5% ⁽²⁾
Special events operations	606,660	2,405,808	40,563	40,594	1.7%
Attractions Capital Projects	31,761	-	1,490	4,090	0.0%
Other financing uses:					
Transfer to Economic Development Fund	384,000	384,000	96,000	192,000	50.0%
<b>Total Expenditures</b>	<b>4,006,980</b>	<b>5,838,564</b>	<b>633,756</b>	<b>1,405,981</b>	<b>24.1%</b>
Net Change in Fund Balance	(299,837)	(505,154)	(95,561)	(608,543)	
<b>Fund Balance at Beginning of Year</b>	<b>3,449,095</b>	<b>3,149,258</b>		<b>3,149,258</b>	
<b>Fund Balance at End of Year</b>	<b>\$ 3,149,258</b>	<b>\$ 2,644,104</b>		<b>\$ 2,540,715</b>	

⁽¹⁾ Hotel tax collections have not been received by all hoteliers

⁽²⁾ Special events revenues and expenses are low due to the timing of events

⁽³⁾ Conference Centre is closed for FY2021

⁽⁴⁾ Full NPO primary grant payment and matching funds of \$64,263.02 for non-profit grant funding to Water Tower Theatre

Positive variance compared to historical trends

Negative variance of 3%-5% and more than \$50,000 compared to historical trends

Negative variance of >5% and more than \$50,000 compared to historical trends

Positive

Warning

Negative

## TOWN OF ADDISON

### ECONOMIC DEVELOPMENT FUND

#### FY2021 QUARTERLY STATEMENT OF REVENUES AND EXPENDITURES COMPARED TO BUDGET

*With Comparative Information from Prior Fiscal Year*

CATEGORY	FY 2019-20 ACTUAL PRIOR YEAR	FY 2020-21 REVISED BUDGET	FY 2020-21 ACTUAL 2ND QTR	FY 2020-21 ACTUAL YTD	ACTUAL YTD as % of Budget
<b>Revenues:</b>					
Ad Valorem taxes:	\$ 1,092,347	\$ 1,127,348	\$ 887,773	\$ 1,152,492	102.2%
Business license fee	36,360	50,000	14,150	22,350	44.7%
Interest income and other	44,843	58,000	388	2,881	5.0%
Transfers from General/Hotel Fund	384,000	384,000	96,000	192,000	50.0%
<b>Total Revenues</b>	<b>1,557,550</b>	<b>1,619,348</b>	<b>998,310</b>	<b>1,369,723</b>	<b>84.6%</b>
<b>Expenditures:</b>					
Personnel services	479,215	491,120	111,258	228,834	46.6%
Supplies	8,507	20,932	996	1,529	7.3%
Maintenance	19,393	29,450	1,529	10,442	35.5%
Contractual services	861,621	1,430,153	235,560	420,572	29.4%
Debt Service	16,997	48,160	4,249	8,499	17.6%
<b>Total Expenditures</b>	<b>1,385,734</b>	<b>2,019,815</b>	<b>353,592</b>	<b>669,876</b>	<b>33.2%</b>
Net Change in Fund Balance	171,817	(400,467)	644,718	699,848	
<b>Fund Balance at Beginning of Year</b>	<b>1,797,019</b>	<b>1,968,836</b>		<b>1,968,836</b>	
<b>Fund Balance at End of Year</b>	<b>\$ 1,968,836</b>	<b>\$ 1,568,369</b>		<b>\$ 2,668,683</b>	

Positive variance compared to historical trends

Negative variance of 3%-5% and more than \$50,000 compared to historical trends

Negative variance of >5% and more than \$50,000 compared to historical trends

Positive

Warning

Negative

## AIRPORT FUND

### FY2021 QUARTERLY STATEMENT OF REVENUES AND EXPENDITURES COMPARED TO BUDGET

*With Comparative Information from Prior Fiscal Year*

CATEGORY	FY 2019-20 ACTUAL PRIOR YEAR	FY 2020-21 REVISED BUDGET	FY 2020-21 ACTUAL 2ND QTR	FY 2020-21 ACTUAL YTD	ACTUAL YTD as % of Budget
<b>Operating Revenues:</b>					
Operating grants	\$ 1,431,219	\$ 50,000	\$ -	\$ -	0.0% ⁽¹⁾
Service fees	103,234	158,107	24,039	48,949	31.0%
Fuel flowage fees	867,778	625,043	215,460	455,077	72.8%
Rental income	4,421,924	4,305,960	1,134,291	2,208,258	51.3%
Interest income and other	892,665	50,000	33,111	59,437	118.9%
<b>Total Operating Revenues:</b>	<b>7,716,819</b>	<b>5,189,110</b>	<b>1,406,901</b>	<b>2,771,720</b>	<b>53.4%</b>
<b>Operating Expenses:</b>					
Personnel services	356,381	2,157,056	432,000	862,316	40.0%
Supplies	40,793	61,900	9,878	20,278	32.8%
Maintenance	69,292	479,730	78,885	130,463	27.2%
Contractual services	185,511	1,325,914	222,402	475,818	35.9%
Capital Replacement/Lease	217,258	230,958	54,315	125,542	54.4%
Debt service	855,123	819,647	547,435	547,823	66.8%
Capital Outlay	-	35,000	10,989	21,978	62.8%
Operator - Operations and maintenance	3,060,383	-	-	-	0.0% ⁽²⁾
Operator - Service contract	396,815	-	-	-	0.0% ⁽²⁾
<b>Total Operating Expenses:</b>	<b>5,181,556</b>	<b>5,110,205</b>	<b>1,355,903</b>	<b>2,184,217</b>	<b>42.7%</b>
Capital Projects (Cash Funded)	3,633,777	2,043,911	-	-	0.0%
<b>Total Expenses:</b>	<b>8,815,333</b>	<b>7,154,116</b>	<b>1,355,903</b>	<b>2,184,217</b>	<b>30.5%</b>
Net Change in Working Capital	(1,098,515)	(1,965,006)	50,998	587,504	
<b>Working Capital at Beginning of Year</b>	<b>6,710,399</b>	<b>5,611,884</b>		<b>5,611,884</b>	
<b>Working Capital at End of Year</b>	<b>\$ 5,611,884</b>	<b>\$ 3,646,878</b>		<b>\$ 6,199,388</b>	

⁽¹⁾ Percentage is below the quarterly threshold but actuals are in line with historical trends

⁽²⁾ The Town no longer has an operator contract as the Airport operations were insourced in FY2021



Positive variance compared to historical trends

Negative variance of 3%-5% and more than \$50,000 compared to historical trends

Negative variance of >5% and more than \$50,000 compared to historical trends

Positive

Warning

Negative

## UTILITY FUND

### FY2021 QUARTERLY STATEMENT OF REVENUES AND EXPENDITURES COMPARED TO BUDGET

*With Comparative Information from Prior Fiscal Year*

CATEGORY	FY 2019-20 ACTUAL PRIOR YEAR	FY 2020-21 REVISED BUDGET	FY 2020-21 ACTUAL 2ND QTR	FY 2020-21 ACTUAL YTD	ACTUAL YTD as % of Budget
<b>Operating revenues:</b>					
Water sales	\$ 7,460,287	\$ 7,502,499	\$ 1,444,803	\$ 2,788,552	37.2% ⁽¹⁾
Sewer charges	5,380,789	6,270,477	1,402,272	2,381,003	38.0% ⁽¹⁾
Tap fees	11,375	17,500	4,300	4,400	25.1%
Penalties	36,448	75,000	-	-	0.0%
Interest income and other	245,617	108,500	739	8,421	7.8%
<b>Total Operating Revenues:</b>	<b>13,134,515</b>	<b>13,973,976</b>	<b>2,852,115</b>	<b>5,182,376</b>	<b>37.1%</b>
<b>Operating expenses:</b>					
Personnel services	1,943,252	2,318,042	502,926	981,745	42.4%
Supplies	214,536	216,281	60,921	133,607	61.8%
Maintenance	524,182	650,623	96,483	159,677	24.5%
Contractual services					
Water purchases	3,506,330	3,652,672	989,627	1,355,052	37.1%
Wastewater treatment	3,427,714	3,746,596	1,380,440	1,943,471	51.9%
Other services	743,773	1,735,463	345,570	584,328	33.7%
Capital Replacement/Lease	280,401	340,797	82,964	165,929	48.7%
Debt service	1,414,426	1,517,931	1,203,098	1,203,460	79.3%
Capital outlay	84,269	65,000	-	-	0.0%
<b>Total Operating Expenses:</b>	<b>12,138,884</b>	<b>14,243,405</b>	<b>4,662,029</b>	<b>6,527,268</b>	<b>45.8%</b>
Capital Projects (Cash Funded)	860,351	163,000	13,865	146,627	90.0%
<b>Total Expenses:</b>	<b>12,999,234</b>	<b>14,406,405</b>	<b>4,675,894</b>	<b>6,673,895</b>	<b>46.3%</b>
Net Change in Working Capital	135,280	(432,429)	(1,823,779)	(1,491,520)	
<b>Working Capital at Beginning of Year</b>	<b>6,296,869</b>	<b>6,432,149</b>		<b>6,432,149</b>	
<b>Working Capital at End of Year</b>	<b>\$ 6,432,149</b>	<b>\$ 5,999,720</b>		<b>\$ 4,940,629</b>	

⁽¹⁾ Revenues represent a one-month lag in the collection of utility revenues and there is heavy seasonality with water revenue

Positive variance compared to historical trends

Negative variance of 3%-5% and more than \$50,000 compared to historical trends

Negative variance of >5% and more than \$50,000 compared to historical trends

Positive

Warning

Negative

## STORMWATER UTILITY FUND

### FY2021 QUARTERLY STATEMENT OF REVENUES AND EXPENDITURES COMPARED TO BUDGET

*With Comparative Information from Prior Fiscal Year*

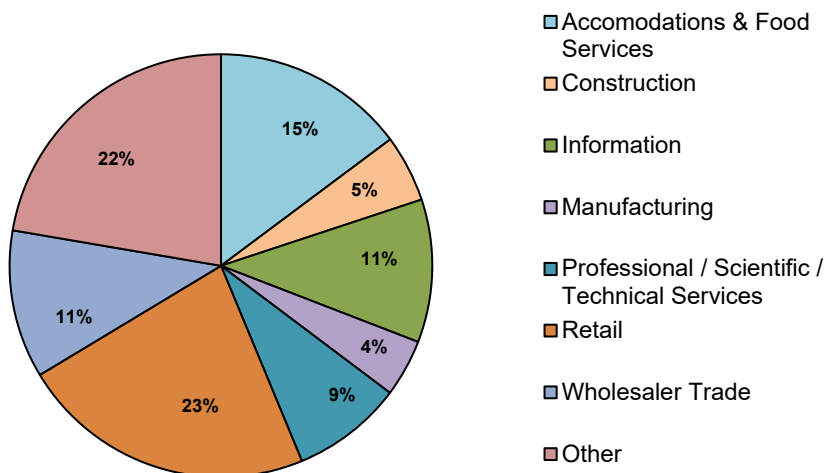
CATEGORY	FY 2019-20 ACTUAL PRIOR YEAR	FY 2020-21 REVISED BUDGET	FY 2020-21 ACTUAL 2ND QTR	FY 2020-21 ACTUAL YTD	ACTUAL YTD as % of Budget
<b>Operating revenues:</b>					
Drainage Fees	\$ 2,320,434	\$ 2,455,791	\$ 614,427	\$ 1,050,002	42.8% ⁽¹⁾
Interest income and other	136,976	40,000	(627)	7,386	18.5%
<b>Total Operating Revenues:</b>	<b>2,457,410</b>	<b>2,495,791</b>	<b>613,800</b>	<b>1,057,388</b>	<b>42.4%</b>
<b>Operating expenses</b>					
Personnel services	273,918	313,093	73,848	143,021	45.7%
Supplies	13,239	17,700	636	2,892	16.3%
Maintenance	32,637	102,620	13,680	29,426	28.7%
Contractual services	172,465	310,224	70,572	105,457	34.0%
Debt service	543,141	542,266	426,683	426,683	78.7%
Capital outlay	48,524	38,610	-	-	0.0%
<b>Total Operating Expenses:</b>	<b>1,083,926</b>	<b>1,324,513</b>	<b>585,420</b>	<b>707,479</b>	<b>53.4%</b>
Capital Projects (Cash Funded)	33,383	2,272,430	2,624	2,624	0.1%
<b>Total Expenses:</b>	<b>1,117,308</b>	<b>3,596,943</b>	<b>588,044</b>	<b>710,103</b>	<b>19.7%</b>
Net Change in Working Capital	1,340,102	(1,101,152)	25,756	347,285	
<b>Working Capital at Beginning of Year</b>	<b>6,431,737</b>	<b>7,771,839</b>		<b>7,771,839</b>	
<b>Working Capital at End of Year</b>	<b>\$ 7,771,839</b>	<b>\$ 6,670,687</b>		<b>\$ 8,119,124</b>	

⁽¹⁾ Fees represent a one-month lag in the collection of stormwater revenue but actuals are in line with historical trends

**TOWN OF ADDISON**  
**Schedule of Sales Tax Collections**  
*For the quarter ending March 31, 2021*

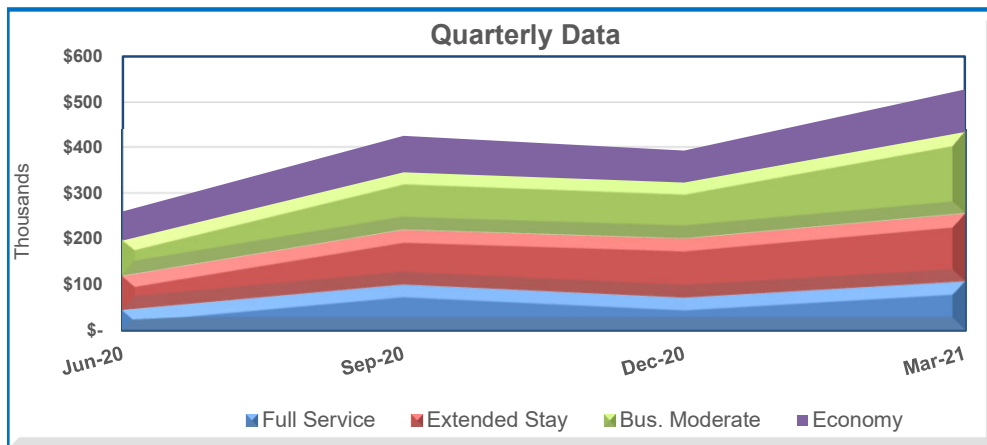
	<b>FY2021 Monthly Collections</b>	<b>% Change from Prior Year</b>	<b>FY2020 Monthly Collections</b>
October	\$ 1,229,815	-11.2%	\$ 1,384,839
November	1,095,667	-13.7%	1,269,353
December	1,076,775	-9.4%	1,188,777
January	1,231,161	-13.9%	1,430,683
February	1,312,153	5.7%	1,241,465
March	921,263	-14.7%	1,080,029
April		-100.0%	1,166,877
May		-100.0%	931,272
June		-100.0%	1,199,683
July		-100.0%	1,418,491
August		-100.0%	1,019,598
September		-100.0%	971,556
	<b>\$ 6,866,834</b>		<b>\$ 14,302,624</b>
 Budget:	 12,330,000	 55.7%	 13,700,000

**Breakdown of Sales Tax by Economic Category**



**TOWN OF ADDISON**  
**HOTEL OCCUPANCY TAX COLLECTION**  
**Hotels By Service Type for the Quarter and Year-to-Date Ended March 31, 2021**  
*With Comparative Information from Prior Fiscal Year*

	Rooms		Jan. - Mar. 2021		21 to 20
	Number	%	Amount	%	% Diff.
<b>Full Service</b>					
Marriott Quorum	547	15%	\$ 76,475	14%	-66%
Renaissance	528	14%	30,361	6%	-82%
	1,075	29%	106,836	20%	-77%
<b>Extended Stay</b>					
Budget Suites	344	9%	6,825	1%	-31%
⁽¹⁾ Hawthorn Suites	70	2%	-	0%	-100%
⁽²⁾ Mainstay Suites	70	2%	8,841	2%	0%
Marriott Residence Inn	150	4%	33,239	6%	-31%
Hyatt House	132	4%	10,813	2%	-76%
⁽¹⁾ Homewood Suites	120	3%	-	0%	-100%
Home2Suites	132	4%	48,960	9%	-18%
Springhill Suites	159	4%	39,160	7%	-40%
	1,177	32%	147,838	28%	-49%
<b>Business Moderate</b>					
Marriott Courtyard Quorum	176	5%	24,100	5%	-70%
LaQuinta Inn	152	4%	37,492	7%	-19%
Marriott Courtyard Midway	145	4%	20,104	4%	-51%
Radisson - Addison	101	3%	18,465	3%	3%
Hilton Garden Inn	96	3%	28,163	5%	-32%
Holiday Inn Express	97	3%	29,328	6%	100%
⁽¹⁾ Holiday Inn Beltway	102	3%	-	0%	100%
Best Western Plus	84	2%	22,420	4%	-13%
	953	26%	180,072	34%	-41%
<b>Economy</b>					
Motel 6	127	3%	31,414	6%	5%
Hampton Inn	158	4%	19,827	4%	-49%
Red Roof Inn	105	3%	22,160	4%	12%
Quality Suites North/Galleria	78	2%	14,279	3%	-22%
America's Best Value Inn	60	2%	5,273	1%	-11%
	528	14%	92,954	18%	-18%
<b>TOTAL</b>	<b>3,733</b>	<b>100%</b>	<b>\$ 527,700</b>	<b>100%</b>	<b>-55%</b>



⁽¹⁾ Not yet received one or more payments for the quarter

⁽²⁾ New hotel as of 2nd quarter FY2021

**Town of Addison**



**For the Quarter Ended  
March 31, 2021**

### Report Name

Certification Page

Executive Summary

Benchmark Comparison

Detail of Security Holdings

Change in Value

Earned Income

Investment Transactions

Amortization and Accretion

Projected Fixed Income Cash Flows

#### MARKET RECAP - MARCH 2021:

The economic outlook brightened considerably in March as the pace of vaccine distribution accelerated and Congress passed another massive stimulus package. Consumers were already sitting on an abundance of cash and the \$1.9 trillion American Rescue Plan will add to that pile. Progress on the vaccine front suggests herd immunity could be reached by early summer, several months sooner than previously expected, setting the stage for a return to something resembling normal in the second half of 2021.

The headline ISM manufacturing index climbed from 58.7 to a 10-year high of 60.8 in February. Numbers above 50 indicate expansion, while numbers above 60 are consistent with exceptionally strong growth. The ISM non-manufacturing index slipped to a nine-month low as the service sector remains hamstrung by the virus-related shutdowns and restrictions, but it is poised to rebound as the economy normalizes. Employment conditions improved as U.S. businesses added +379k jobs to payrolls in February, nearly twice the median forecast. Upward revisions to prior months boosted the tally by another +38k. The unemployment rate declined from 6.3% to 6.2% and while unemployment remains well above the five-decade low of 3.5% from a year ago, it is much improved from the 14.8% pandemic high ten months ago. Initial jobless claims, though still elevated relative to pre-pandemic levels, fell to their lowest level in over a year. Consumer spending soared in January, with the original +5.3% gain revised even higher to +7.6%. February retail sales couldn't keep up the pace, falling -3.0% month-over-month. This was to be expected as January's torrid pace, supported by stimulus checks, wasn't sustainable. Freezing weather across much of the nation had a negative impact as well. Spending is set to boom in the months ahead as the American Rescue Plan includes almost \$450 billion in aid to individuals and families. If the last round of \$600 stimulus checks managed to bolster retail sales so much in January, imagine what March's \$1,400 checks will do to sales in the next few months. That idea is supported by a big jump in March's consumer confidence index which posted its biggest single month gain in 18 years, climbing to 109.7. March's slate of housing data reflected February's freezing weather with both new and existing home sales declining, though home prices continue to rise. Existing home sales are being restrained by a lack of homes available for sale. Low inventories and higher prices are a recipe for new construction, which will further add to 2021 GDP growth.

With conditions rapidly improving on both the Covid-19 and economic fronts, economists have been busy revising their 2021 growth forecasts higher. The median forecast in Bloomberg's survey of economists currently shows first quarter gross domestic product advancing at a +4.7% quarter-over-quarter annualized rate, followed by a second quarter booming at +7%. GDP could easily expand more than +6% in 2021. Bond markets have taken note. Although the short end remains anchored by a Fed determined to stand pat until they see both sustained inflation and full employment, intermediate to long yields have climbed significantly. The five-year Treasury note yield, which rose 31 basis points during February, climbed another 21 basis points in March to close the month at 0.94%. The 10-year T-note closed March at 1.74%, up 83 bps since the year began.



---

**For the Quarter Ended**  
**March 31, 2021**

This report is prepared for the **Town of Addison** (the "Entity") in accordance with Chapter 2256 of the Texas Public Funds Investment Act ("PFIA"). Section 2256.023(a) of the PFIA states that: "Not less than quarterly, the investment officer shall prepare and submit to the governing body of the entity a written report of the investment transactions for all funds covered by this chapter for the preceding reporting period." This report is signed by the Entity's investment officers and includes the disclosures required in the PFIA. To the extent possible, market prices have been obtained from independent pricing sources.

The investment portfolio complied with the PFIA and the Entity's approved Investment Policy and Strategy throughout the period. All investment transactions made in the portfolio during this period were made on behalf of the Entity and were made in full compliance with the PFIA and the approved Investment Policy.

**Officer Names and Titles:**



Name: Steven Glickman, CPA

Title: Chief Financial Officer

Name: Amanda D. Turner, CPA

Title: Controller

### Account Summary

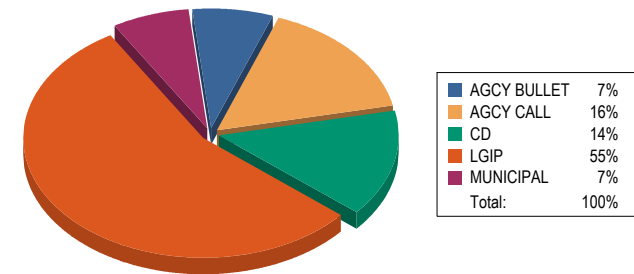
### Allocation by Security Type

Beginning Values as of 12/31/20

Ending Values as of 03/31/21

Par Value	102,437,909.82	106,690,263.15
Market Value	103,228,942.47	107,285,397.40
Book Value	103,100,077.79	107,279,066.55
Unrealized Gain/(Loss)	128,864.68	6,330.85
<b>Market Value %</b>	<b>100.12%</b>	<b>100.01%</b>

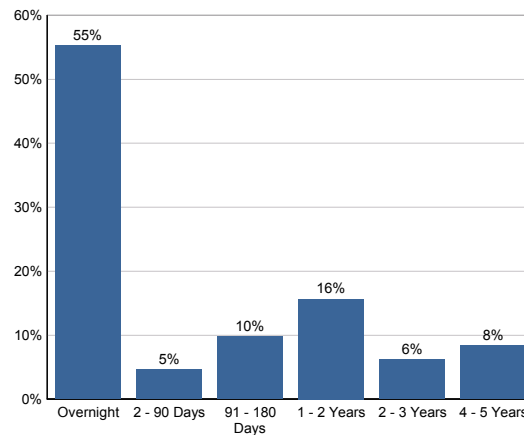
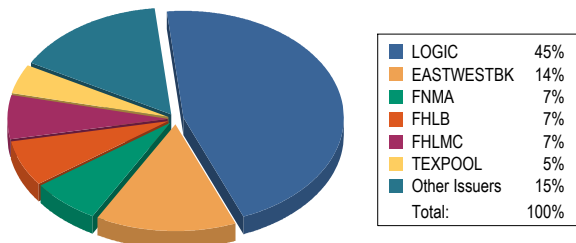
Weighted Avg. YTW	0.477%	0.268%
Weighted Avg. YTM	0.477%	0.268%



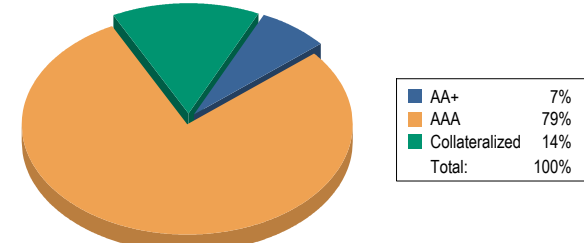
### Allocation by Issuer

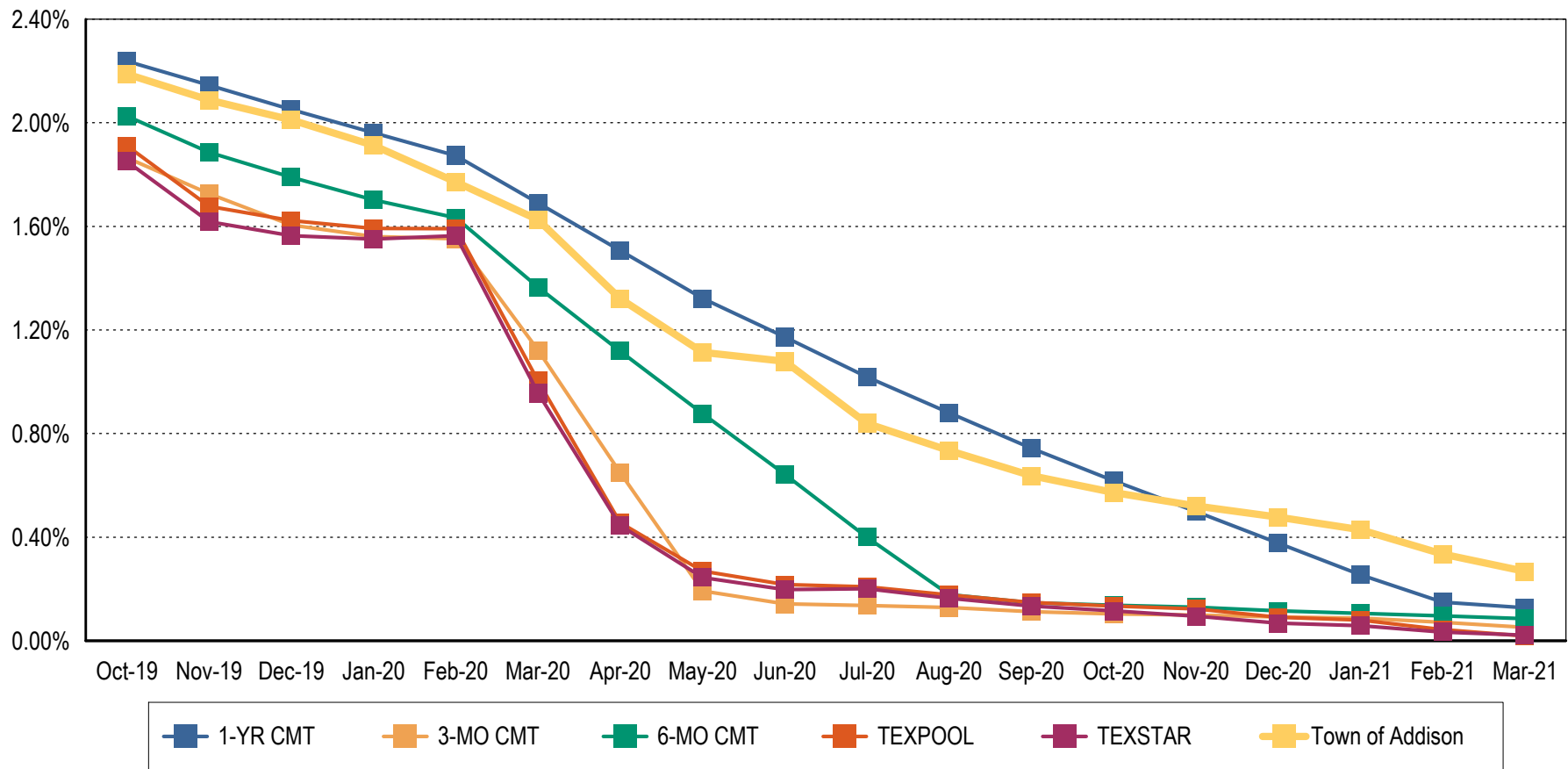
### Maturity Distribution %

### Credit Quality



Weighted Average Days to Maturity: 297





**Note 1:** CMT stands for Constant Maturity Treasury. This data is published in Federal Reserve Statistical Release H.15 and represents an average of all actively traded Treasury securities having that time remaining until maturity. This is a standard industry benchmark for Treasury securities. The CMT benchmarks are moving averages. The 3-month CMT is the daily average for the previous 3 months, the 6-month CMT is the daily average for the previous 6 months, and the 1-year and 2-year CMT's are the daily averages for the previous 12-months.

**Note 2:** Benchmark data for TexPool is the monthly average yield.

**Note 3:** Benchmark data for TexSTAR is the monthly average yield.

CUSIP	Settle Date	Sec. Type	Sec. Description	CPN	Mty Date	Next Call	Call Type	Par Value	Purch Price	Orig Cost	Book Value	Mkt Price	Market Value	Days to Mty	Days to Call	YTM	YTW
<b>Pooled Funds</b>																	
LOGIC		LGIP	LOGIC					48,738,486.37	100.000	48,738,486.37	48,738,486.37	100.000	48,738,486.37	1		0.096	0.096
TEXPOOL		LGIP	TexPool					4,885,226.94	100.000	4,885,226.94	4,885,226.94	100.000	4,885,226.94	1		0.019	0.019
TEXSTAR		LGIP	TexSTAR					3,203,108.54	100.000	3,203,108.54	3,203,108.54	100.000	3,203,108.54	1		0.022	0.022
TXCLASS		LGIP	Texas CLASS					2,500,532.42	100.000	2,500,532.42	2,500,532.42	100.000	2,500,532.42	1		0.105	0.105
CD-5883	06/04/20	CD	East West Bk CD	0.580	06/04/21			2,511,986.07	100.000	2,511,986.07	2,511,986.07	100.000	2,511,986.07	65		0.580	0.580
CD-1790	06/08/20	CD	East West Bk CD	0.440	06/08/21			2,508,966.68	100.000	2,508,966.68	2,508,966.68	100.000	2,508,966.68	69		0.440	0.440
CD-8603-3	07/28/20	CD	East West Bk CD	0.410	07/28/21			5,262,364.96	100.000	5,262,364.96	5,262,364.96	100.000	5,262,364.96	119		0.410	0.410
CD-8019-3	08/12/20	CD	East West Bk CD	0.380	08/12/21			5,177,924.50	100.000	5,177,924.50	5,177,924.50	100.000	5,177,924.50	134		0.380	0.380
3134GVUK2	05/15/20	AGCY CALL	FHLMC	0.300	05/13/22	5/13/2021	ONE TIME	5,000,000.00	99.975	4,998,750.00	4,999,299.25	100.013	5,000,651.50	408	43	0.313	0.313
052403GX4	11/12/20	MUNICIPAL	Austin Comm Clg, TX	5.000	08/01/22			1,875,000.00	107.717	2,019,693.75	1,987,285.16	106.186	1,990,989.38	488		0.488	0.488
3133EFUJ4	04/09/20	AGCY BULET	FFCB	2.150	12/29/22			3,000,000.00	104.242	3,127,260.00	3,081,778.83	103.480	3,104,393.70	638		0.577	0.577
882669BR4	12/23/20	MUNICIPAL	TX Pub Fin Auth	0.286	02/01/23			2,000,000.00	100.000	2,000,000.00	2,000,000.00	100.070	2,001,398.80	672		0.286	0.286
3130ADRG9	03/13/20	AGCY BULET	FHLB	2.750	03/10/23			4,500,000.00	105.640	4,753,806.46	4,665,440.52	104.912	4,721,040.00	709		0.837	0.837
3135G05R0	08/13/20	AGCY CALL	FNMA	0.300	08/10/23	8/10/2022	QRTLY	3,000,000.00	99.806	2,994,180.00	2,995,407.03	100.020	3,000,611.40	862	497	0.365	0.365
3130AJZJ1	08/31/20	AGCY CALL	FHLB	0.320	08/25/23	Anytime	CONT	2,666,666.67	99.950	2,665,333.34	2,665,593.12	100.003	2,666,747.74	877	5	0.337	0.337
882669BS2	12/23/20	MUNICIPAL	TX Pub Fin Auth	0.503	02/01/24			1,000,000.00	100.000	1,000,000.00	1,000,000.00	100.084	1,000,836.80	1,037		0.503	0.503
3136G4A45	07/22/20	AGCY CALL	FNMA	0.710	07/22/25	7/22/2021	QRTLY	1,500,000.00	99.995	1,499,925.00	1,499,935.22	99.461	1,491,912.90	1,574	113	0.711	0.711
150461M57	10/23/20	MUNICIPAL	City of Cedar Park, TX	2.950	08/15/25			2,360,000.00	110.976	2,619,033.60	2,595,730.94	109.187	2,576,815.80	1,598		0.630	0.630
3136G4N74	08/21/20	AGCY CALL	FNMA	0.560	08/21/25	2/21/2023	QRTLY	1,500,000.00	100.000	1,500,000.00	1,500,000.00	98.601	1,479,007.80	1,604	692	0.560	0.560
3136G4V59	08/27/20	AGCY CALL	FNMA	0.625	08/27/25	8/27/2021	QRTLY	1,500,000.00	100.000	1,500,000.00	1,500,000.00	98.865	1,482,982.50	1,610	149	0.625	0.625
3134GWUG9	09/24/20	AGCY CALL	FHLMC	0.570	09/24/25	9/24/2021	QRTLY	2,000,000.00	100.000	2,000,000.00	2,000,000.00	98.971	1,979,412.60	1,638	177	0.570	0.570
<b>Total for Pooled Funds</b>								<b>106,690,263.15</b>	<b>100.768</b>	<b>107,466,578.63</b>	<b>107,279,066.55</b>	<b>100.592</b>	<b>107,285,397.40</b>	<b>297</b>		<b>0.268</b>	<b>0.268</b>
<b>Total for Town of Addison</b>								<b>106,690,263.15</b>	<b>100.768</b>	<b>107,466,578.63</b>	<b>107,279,066.55</b>	<b>100.592</b>	<b>107,285,397.40</b>	<b>297</b>		<b>0.268</b>	<b>0.268</b>

CUSIP	Security Type	Security Description	12/31/20 Book Value	Cost of Purchases	Maturities / Calls / Sales	Amortization / Accretion	Realized Gain/(Loss)	03/31/21 Book Value	12/31/20 Market Value	03/31/21 Market Value	Change in Mkt Value
<b>Pooled Funds</b>											
LOGIC	LGIP	LOGIC	27,170,676.47	21,567,809.90	0.00	0.00	0.00	48,738,486.37	27,170,676.47	48,738,486.37	21,567,809.90
TEXPOOL	LGIP	TexPool	4,884,658.98	567.96	0.00	0.00	0.00	4,885,226.94	4,884,658.98	4,885,226.94	567.96
TEXSTAR	LGIP	TexSTAR	3,202,809.30	299.24	0.00	0.00	0.00	3,203,108.54	3,202,809.30	3,203,108.54	299.24
TXCLASS	LGIP	Texas CLASS	0.00	2,500,532.44	0.00	0.00	0.00	2,500,532.42	0.00	2,500,532.42	2,500,532.42
07287CP97	CP - DISC	Baylor Scott & White 0.000 02/09/21	2,999,415.00	0.00	(3,000,000.00)	585.00	0.00	0.00	2,999,490.00	0.00	(2,999,490.00)
9128283X6	TREAS NOTE	U.S. Treasury 2.250 02/15/21	5,003,640.40	0.00	(5,000,000.00)	(3,640.40)	0.00	0.00	5,011,974.00	0.00	(5,011,974.00)
9128284B3	TREAS NOTE	U.S. Treasury 2.375 03/15/21	5,007,042.70	0.00	(5,000,000.00)	(7,042.70)	0.00	0.00	5,021,691.00	0.00	(5,021,691.00)
89233GQP4	CP - DISC	Toyota Mtr Cr 0.000 03/23/21	1,998,830.00	0.00	(2,000,000.00)	1,170.00	0.00	0.00	1,999,353.20	0.00	(1,999,353.20)
CD-5883	CD	East West Bk CD 0.580 06/04/21	2,508,396.19	3,589.88	0.00	0.00	0.00	2,511,986.07	2,508,396.19	2,511,986.07	3,589.88
CD-1790	CD	East West Bk CD 0.440 06/08/21	2,506,246.11	2,720.57	0.00	0.00	0.00	2,508,966.68	2,506,246.11	2,508,966.68	2,720.57
CD-8603-3	CD	East West Bk CD 0.410 07/28/21	5,257,047.63	5,317.33	0.00	0.00	0.00	5,262,364.96	5,257,047.63	5,262,364.96	5,317.33
CD-8019-3	CD	East West Bk CD 0.380 08/12/21	5,173,075.14	4,849.36	0.00	0.00	0.00	5,177,924.50	5,173,075.14	5,177,924.50	4,849.36
3134GVUK2	AGCY CALL	FHLMC 0.300 05/13/22	4,999,142.70	0.00	0.00	156.55	0.00	4,999,299.25	5,000,089.50	5,000,651.50	562.00
052403GX4	MUNICIPAL	Austin Comm Clg, TX 5.000 08/01/22	2,008,274.03	0.00	0.00	(20,988.87)	0.00	1,987,285.16	2,011,800.00	1,990,989.38	(20,810.62)
3133EFUJ4	AGCY BULET	FFCB 2.150 12/29/22	3,093,440.73	0.00	0.00	(11,661.90)	0.00	3,081,778.83	3,117,672.30	3,104,393.70	(13,278.60)
882669BR4	MUNICIPAL	TX Pub Fin Auth 0.286 02/01/23	2,000,000.00	0.00	0.00	0.00	0.00	2,000,000.00	2,000,240.00	2,001,398.80	1,158.80
3130ADRG9	AGCY BULET	FHLB 2.750 03/10/23	4,686,537.02	0.00	0.00	(21,096.50)	0.00	4,665,440.52	4,756,492.80	4,721,040.00	(35,452.80)
3135G05R0	AGCY CALL	FNMA 0.300 08/10/23	2,994,922.38	0.00	0.00	484.65	0.00	2,995,407.03	3,000,769.20	3,000,611.40	(157.80)
3130AJZJ1	AGCY CALL	FHLB 0.320 08/25/23	2,998,667.40	0.00	(333,333.33)	259.05	0.00	2,665,593.12	2,997,600.90	2,666,747.74	(330,853.16)
882669BS2	MUNICIPAL	TX Pub Fin Auth 0.503 02/01/24	1,000,000.00	0.00	0.00	0.00	0.00	1,000,000.00	1,000,310.00	1,000,836.80	526.80
3133ELU85	AGCY CALL	FFCB 0.600 01/15/25	1,498,309.74	0.00	(1,500,000.00)	1,690.26	0.00	0.00	1,499,658.00	0.00	(1,499,658.00)
3136G4A45	AGCY CALL	FNMA 0.710 07/22/25	1,499,931.53	0.00	0.00	3.69	0.00	1,499,935.22	1,500,305.55	1,491,912.90	(8,392.65)
150461M57	MUNICIPAL	City of Cedar Park, TX 2.950 08/15/25	2,609,014.34	0.00	0.00	(13,283.40)	0.00	2,595,730.94	2,624,036.80	2,576,815.80	(47,221.00)
3134GWHU3	AGCY CALL	FHLMC 0.700 08/18/25	3,000,000.00	0.00	(3,000,000.00)	0.00	0.00	0.00	3,000,340.20	0.00	(3,000,340.20)
3136G4N74	AGCY CALL	FNMA 0.560 08/21/25	1,500,000.00	0.00	0.00	0.00	0.00	1,500,000.00	1,492,943.70	1,479,007.80	(13,935.90)
3136G4V59	AGCY CALL	FNMA 0.625 08/27/25	1,500,000.00	0.00	0.00	0.00	0.00	1,500,000.00	1,495,283.10	1,482,982.50	(12,300.60)
3134GWUG9	AGCY CALL	FHLMC 0.570 09/24/25	2,000,000.00	0.00	0.00	0.00	0.00	2,000,000.00	1,995,982.40	1,979,412.60	(16,569.80)
<b>Total for Pooled Funds</b>			<b>103,100,077.79</b>	<b>24,085,686.68</b>	<b>(19,833,333.33)</b>	<b>(73,364.57)</b>	<b>0.00</b>	<b>107,279,066.55</b>	<b>103,228,942.47</b>	<b>107,285,397.40</b>	<b>4,056,454.93</b>
<b>Total for Town of Addison</b>			<b>103,100,077.79</b>	<b>24,085,686.68</b>	<b>(19,833,333.33)</b>	<b>(73,364.57)</b>	<b>0.00</b>	<b>107,279,066.55</b>	<b>103,228,942.47</b>	<b>107,285,397.40</b>	<b>4,056,454.93</b>

CUSIP	Security Type	Security Description	Beg. Accrued	Interest Earned	Interest Rec'd / Sold / Matured	Interest Purchased	Ending Accrued	Disc Accr / Prem Amort	Net Income
<b>Pooled Funds</b>									
LOGIC	LGIP	LOGIC	0.00	10,440.06	10,440.06	0.00	0.00	0.00	10,440.06
TEXPOOL	LGIP	TexPool	0.00	567.96	567.96	0.00	0.00	0.00	567.96
TEXSTAR	LGIP	TexSTAR	0.00	299.24	299.24	0.00	0.00	0.00	299.24
TXCLASS	LGIP	Texas CLASS	0.00	532.42	532.42	0.00	0.00	0.00	532.42
07287CP97	CP - DISC	Baylor Scott & White 0.000 02/09/21	0.00	0.00	0.00	0.00	0.00	585.00	585.00
9128283X6	TREAS NOTE	U.S. Treasury 2.250 02/15/21	42,493.21	13,756.79	56,250.00	0.00	0.00	(3,640.40)	10,116.39
9128284B3	TREAS NOTE	U.S. Treasury 2.375 03/15/21	35,428.18	23,946.82	59,375.00	0.00	0.00	(7,042.70)	16,904.12
89233GQP4	CP - DISC	Toyota Mtr Cr 0.000 03/23/21	0.00	0.00	0.00	0.00	0.00	1,170.00	1,170.00
CD-5883	CD	East West Bk CD 0.580 06/04/21	39.86	3,589.94	3,589.88	0.00	39.92	0.00	3,589.94
CD-1790	CD	East West Bk CD 0.440 06/08/21	30.21	2,720.61	2,720.57	0.00	30.25	0.00	2,720.61
CD-8603-3	CD	East West Bk CD 0.410 07/28/21	59.05	5,317.39	5,317.33	0.00	59.11	0.00	5,317.39
CD-8019-3	CD	East West Bk CD 0.380 08/12/21	53.86	4,849.41	4,849.36	0.00	53.91	0.00	4,849.41
3134GVUK2	AGCY CALL	FHLMC 0.300 05/13/22	2,000.00	3,750.00	0.00	0.00	5,750.00	156.55	3,906.55
052403GX4	MUNICIPAL	Austin Comm Clg, TX 5.000 08/01/22	12,760.42	23,437.50	20,572.92	0.00	15,625.00	(20,988.87)	2,448.63
3133EFUJ4	AGCY BULET	FFCB 2.150 12/29/22	358.33	16,125.00	0.00	0.00	16,483.33	(11,661.90)	4,463.10
882669BR4	MUNICIPAL	TX Pub Fin Auth 0.286 02/01/23	127.11	1,430.00	0.00	0.00	1,557.11	0.00	1,430.00
3130ADRG9	AGCY BULET	FHLB 2.750 03/10/23	38,156.25	30,937.50	61,875.00	0.00	7,218.75	(21,096.50)	9,841.00
3135G05R0	AGCY CALL	FNMA 0.300 08/10/23	3,525.00	2,250.00	4,500.00	0.00	1,275.00	484.65	2,734.65
3130AJZJ1	AGCY CALL	FHLB 0.320 08/25/23	3,360.00	2,293.33	4,800.00	0.00	853.33	259.05	2,552.38
882669BS2	MUNICIPAL	TX Pub Fin Auth 0.503 02/01/24	111.78	1,257.50	0.00	0.00	1,369.28	0.00	1,257.50
3133ELU85	AGCY CALL	FFCB 0.600 01/15/25	4,150.00	350.00	4,500.00	0.00	0.00	1,690.26	2,040.26
3136G4A45	AGCY CALL	FNMA 0.710 07/22/25	4,703.75	2,662.50	5,325.00	0.00	2,041.25	3.69	2,666.19
150461M57	MUNICIPAL	City of Cedar Park, TX 2.950 08/15/25	26,300.89	17,405.00	34,810.00	0.00	8,895.89	(13,283.40)	4,121.60
3134GWHU3	AGCY CALL	FHLMC 0.700 08/18/25	7,758.33	2,741.67	10,500.00	0.00	0.00	0.00	2,741.67
3136G4N74	AGCY CALL	FNMA 0.560 08/21/25	3,033.33	2,100.00	4,200.00	0.00	933.33	0.00	2,100.00
3136G4V59	AGCY CALL	FNMA 0.625 08/27/25	3,229.17	2,343.75	4,687.50	0.00	885.42	0.00	2,343.75
3134GWUG9	AGCY CALL	FHLMC 0.570 09/24/25	3,071.67	2,850.00	5,700.00	0.00	221.67	0.00	2,850.00
<b>Total for Pooled Funds</b>			<b>190,750.40</b>	<b>177,954.39</b>	<b>305,412.24</b>	<b>0.00</b>	<b>63,292.55</b>	<b>(73,364.57)</b>	<b>104,589.82</b>
<b>Total for Town of Addison</b>			<b>190,750.40</b>	<b>177,954.39</b>	<b>305,412.24</b>	<b>0.00</b>	<b>63,292.55</b>	<b>(73,364.57)</b>	<b>104,589.82</b>



Trade Date	Settle Date	CUSIP	Security Type	Security Description	Coupon	Mty Date	Call Date	Par Value	Price	Principal Amount	Int Purchased / Received	Total Amount	Realized Gain / Loss	YTM	YTW
<b>Pooled Funds</b>															
<b>Calls</b>															
01/14/21	01/15/21	3133ELU85	AGCY CALL	FFCB	0.600	01/15/25	01/15/21	1,500,000.00	100.000	1,500,000.00	0.00	1,500,000.00		0.628	0.600
02/17/21	02/18/21	3134GWHU3	AGCY CALL	FHLMC	0.700	08/18/25	02/18/21	3,000,000.00	100.000	3,000,000.00	0.00	3,000,000.00		0.700	0.700
02/25/21	02/25/21	3130AJZJ1	AGCY CALL	FHLB	0.320	08/25/23	02/25/21	333,333.33	100.000	333,333.33	0.00	333,333.33		0.337	0.320
<b>Total for: Calls</b>								<b>4,833,333.33</b>		<b>4,833,333.33</b>	<b>0.00</b>	<b>4,833,333.33</b>		<b>0.653</b>	<b>0.643</b>
<b>Maturities</b>															
02/09/21	02/09/21	07287CP97	CP - DISC	Baylor Scott & White		02/09/21		3,000,000.00	100.000	3,000,000.00	0.00	3,000,000.00		0.180	
02/15/21	02/15/21	9128283X6	TREAS NOTE	U.S. Treasury	2.250	02/15/21		5,000,000.00	100.000	5,000,000.00	0.00	5,000,000.00		1.650	
03/15/21	03/15/21	9128284B3	TREAS NOTE	U.S. Treasury	2.375	03/15/21		5,000,000.00	100.000	5,000,000.00	0.00	5,000,000.00		1.671	
03/23/21	03/23/21	89233GQP4	CP - DISC	Toyota Mtr Cr		03/23/21		2,000,000.00	100.000	2,000,000.00	0.00	2,000,000.00		0.260	
<b>Total for: Maturities</b>								<b>15,000,000.00</b>		<b>15,000,000.00</b>	<b>0.00</b>	<b>15,000,000.00</b>		<b>1.178</b>	
<b>Income Payments</b>															
01/15/21	01/15/21	3133ELU85	AGCY CALL	FFCB	0.600	01/15/25				0.00	4,500.00	4,500.00			
01/22/21	01/22/21	3136G4A45	AGCY CALL	FNMA	0.710	07/22/25				0.00	5,325.00	5,325.00			
01/31/21	01/31/21	CD-5883	CD	East West Bk CD	0.580	06/04/21				0.00	1,235.93	1,235.93			
01/31/21	01/31/21	CD-8019-3	CD	East West Bk CD	0.380	08/12/21				0.00	1,669.82	1,669.82			
01/31/21	01/31/21	CD-8603-3	CD	East West Bk CD	0.410	07/28/21				0.00	1,830.92	1,830.92			
01/31/21	01/31/21	CD-1790	CD	East West Bk CD	0.440	06/08/21				0.00	936.75	936.75			
02/01/21	02/01/21	052403GX4	MUNICIPAL	Austin Comm Clg, TX	5.000	08/01/22				0.00	20,572.92	20,572.92			
02/10/21	02/10/21	3135G05R0	AGCY CALL	FNMA	0.300	08/10/23				0.00	4,500.00	4,500.00			
02/16/21	02/15/21	150461M57	MUNICIPAL	City of Cedar Park, TX	2.950	08/15/25				0.00	34,810.00	34,810.00			
02/16/21	02/15/21	9128283X6	TREAS NOTE	U.S. Treasury	2.250	02/15/21				0.00	56,250.00	56,250.00			
02/18/21	02/18/21	3134GWHU3	AGCY CALL	FHLMC	0.700	08/18/25				0.00	10,500.00	10,500.00			
02/22/21	02/21/21	3136G4N74	AGCY CALL	FNMA	0.560	08/21/25				0.00	4,200.00	4,200.00			
02/25/21	02/25/21	3130AJZJ1	AGCY CALL	FHLB	0.320	08/25/23				0.00	4,800.00	4,800.00			
02/28/21	02/28/21	CD-8603-3	CD	East West Bk CD	0.410	07/28/21				0.00	1,654.28	1,654.28			
02/28/21	02/28/21	CD-1790	CD	East West Bk CD	0.440	06/08/21				0.00	846.40	846.40			
02/28/21	02/28/21	CD-5883	CD	East West Bk CD	0.580	06/04/21				0.00	1,116.86	1,116.86			
02/28/21	02/28/21	CD-8019-3	CD	East West Bk CD	0.380	08/12/21				0.00	1,508.69	1,508.69			

Trade Date	Settle Date	CUSIP	Security Type	Security Description	Coupon	Mty Date	Call Date	Par Value	Price	Principal Amount	Int Purchased / Received	Total Amount	Realized Gain / Loss	YTM	YTW
<b>Pooled Funds</b>															
<b>Income Payments</b>															
03/01/21	02/27/21	3136G4V59	AGCY CALL	FNMA	0.625	08/27/25				0.00	4,687.50	4,687.50			
03/10/21	03/10/21	3130ADRG9	AGCY BULET	FHLB	2.750	03/10/23				0.00	61,875.00	61,875.00			
03/15/21	03/15/21	9128284B3	TREAS NOTE	U.S. Treasury	2.375	03/15/21				0.00	59,375.00	59,375.00			
03/24/21	03/24/21	3134GWUG9	AGCY CALL	FHLMC	0.570	09/24/25				0.00	5,700.00	5,700.00			
03/31/21	03/31/21	CD-8603-3	CD	East West Bk CD	0.410	07/28/21				0.00	1,832.13	1,832.13			
03/31/21	03/31/21	CD-1790	CD	East West Bk CD	0.440	06/08/21				0.00	937.42	937.42			
03/31/21	03/31/21	CD-5883	CD	East West Bk CD	0.580	06/04/21				0.00	1,237.09	1,237.09			
03/31/21	03/31/21	CD-8019-3	CD	East West Bk CD	0.380	08/12/21				0.00	1,670.85	1,670.85			
<b>Total for: Income Payments</b>										<b>0.00</b>	<b>293,572.56</b>	<b>293,572.56</b>			
<b>Capitalized Interest</b>															
01/31/21	01/31/21	CD-5883	CD	East West Bk CD	0.580	06/04/21		1,235.93	100.000	1,235.93	0.00	1,235.93			
01/31/21	01/31/21	CD-8019-3	CD	East West Bk CD	0.380	08/12/21		1,669.82	100.000	1,669.82	0.00	1,669.82			
01/31/21	01/31/21	CD-8603-3	CD	East West Bk CD	0.410	07/28/21		1,830.92	100.000	1,830.92	0.00	1,830.92			
01/31/21	01/31/21	CD-1790	CD	East West Bk CD	0.440	06/08/21		936.75	100.000	936.75	0.00	936.75			
02/28/21	02/28/21	CD-8603-3	CD	East West Bk CD	0.410	07/28/21		1,654.28	100.000	1,654.28	0.00	1,654.28			
02/28/21	02/28/21	CD-1790	CD	East West Bk CD	0.440	06/08/21		846.40	100.000	846.40	0.00	846.40			
02/28/21	02/28/21	CD-5883	CD	East West Bk CD	0.580	06/04/21		1,116.86	100.000	1,116.86	0.00	1,116.86			
02/28/21	02/28/21	CD-8019-3	CD	East West Bk CD	0.380	08/12/21		1,508.69	100.000	1,508.69	0.00	1,508.69			
03/31/21	03/31/21	CD-8603-3	CD	East West Bk CD	0.410	07/28/21		1,832.13	100.000	1,832.13	0.00	1,832.13			
03/31/21	03/31/21	CD-1790	CD	East West Bk CD	0.440	06/08/21		937.42	100.000	937.42	0.00	937.42			
03/31/21	03/31/21	CD-5883	CD	East West Bk CD	0.580	06/04/21		1,237.09	100.000	1,237.09	0.00	1,237.09			
03/31/21	03/31/21	CD-8019-3	CD	East West Bk CD	0.380	08/12/21		1,670.85	100.000	1,670.85	0.00	1,670.85			
<b>Total for: Capitalized Interest</b>								<b>16,477.14</b>		<b>16,477.14</b>	<b>0.00</b>	<b>16,477.14</b>			

Trade Date	Settle Date	CUSIP	Security Type	Security Description	Coupon	Mty Date	Call Date	Par Value	Price	Principal Amount	Int Purchased / Received	Total Amount	Realized Gain / Loss	YTM	YTW
------------	-------------	-------	---------------	----------------------	--------	----------	-----------	-----------	-------	------------------	--------------------------	--------------	----------------------	-----	-----

**Total for All Portfolios**

Transaction Type	Quantity	Total Amount	Realized G/L	YTM	YTW
Total Calls	4,833,333.33	4,833,333.33		0.653	0.643
Total Maturities	15,000,000.00	15,000,000.00		1.178	
Total Income Payments	0.00	293,572.56			
Total Capitalized Interest	16,477.14	16,477.14			

CUSIP	Settle Date	Security Type	Security Description	Next Call Date	Purchase Qty	Orig Price	Original Cost	Amrt/Accr for Period	Total Amrt/Accr Since Purch	Remaining Disc / Prem	Book Value
<b>Pooled Funds</b>											
07287CP97	10/06/20	CP - DISC	Baylor Scott & White 0.000 02/09/21		0.00	99.937	0.00	585.00	0.00	0.00	0.00
9128283X6	12/27/19	TREAS NOTE	U.S. Treasury 2.250 02/15/21		0.00	100.672	0.00	(3,640.40)	0.00	0.00	0.00
9128284B3	11/26/19	TREAS NOTE	U.S. Treasury 2.375 03/15/21		0.00	100.902	0.00	(7,042.70)	0.00	0.00	0.00
89233GQP4	09/23/20	CP - DISC	Toyota Mtr Cr 0.000 03/23/21		0.00	99.869	0.00	1,170.00	0.00	0.00	0.00
CD-5883	06/04/20	CD	East West Bk CD 0.580 06/04/21		2,511,986.07	100.000	2,511,986.07	0.00	0.00	0.00	2,511,986.07
CD-1790	06/08/20	CD	East West Bk CD 0.440 06/08/21		2,508,966.68	100.000	2,508,966.68	0.00	0.00	0.00	2,508,966.68
CD-8603-3	07/28/20	CD	East West Bk CD 0.410 07/28/21		5,262,364.96	100.000	5,262,364.96	0.00	0.00	0.00	5,262,364.96
CD-8019-3	08/12/20	CD	East West Bk CD 0.380 08/12/21		5,177,924.50	100.000	5,177,924.50	0.00	0.00	0.00	5,177,924.50
3134GVUK2	05/15/20	AGCY CALL	FHLMC 0.300 05/13/22	05/13/21	5,000,000.00	99.975	4,998,750.00	156.55	549.25	700.75	4,999,299.25
052403GX4	11/12/20	MUNICIPAL	Austin Comm Clg, TX 5.000 08/01/22		1,875,000.00	107.717	2,019,693.75	(20,988.87)	(32,408.59)	(112,285.16)	1,987,285.16
3133EFUJ4	04/09/20	AGCY BULET	FFCB 2.150 12/29/22		3,000,000.00	104.242	3,127,260.00	(11,661.90)	(45,481.17)	(81,778.83)	3,081,778.83
882669BR4	12/23/20	MUNICIPAL	TX Pub Fin Auth 0.286 02/01/23		2,000,000.00	100.000	2,000,000.00	0.00	0.00	0.00	2,000,000.00
3130ADRG9	03/13/20	AGCY BULET	FHLB 2.750 03/10/23		4,500,000.00	105.640	4,753,806.46	(21,096.50)	(88,365.94)	(165,440.52)	4,665,440.52
3135G05R0	08/13/20	AGCY CALL	FNMA 0.300 08/10/23	08/10/22	3,000,000.00	99.806	2,994,180.00	484.65	1,227.03	4,592.97	2,995,407.03
3130AJZJ1	08/31/20	AGCY CALL	FHLB 0.320 08/25/23	02/25/21	2,666,666.67	99.950	2,665,333.34	259.05	259.78	1,073.55	2,665,593.12
882669BS2	12/23/20	MUNICIPAL	TX Pub Fin Auth 0.503 02/01/24		1,000,000.00	100.000	1,000,000.00	0.00	0.00	0.00	1,000,000.00
3133ELU85	07/20/20	AGCY CALL	FFCB 0.600 01/15/25	01/15/21	0.00	99.875	0.00	1,690.26	0.00	0.00	0.00
3136G4A45	07/22/20	AGCY CALL	FNMA 0.710 07/22/25	07/22/21	1,500,000.00	99.995	1,499,925.00	3.69	10.22	64.78	1,499,935.22
150461M57	10/23/20	MUNICIPAL	City of Cedar Park, TX 2.950 08/15/25		2,360,000.00	110.976	2,619,033.60	(13,283.40)	(23,302.66)	(235,730.94)	2,595,730.94
3134GWHU3	08/18/20	AGCY CALL	FHLMC 0.700 08/18/25	02/18/21	0.00	100.000	0.00	0.00	0.00	0.00	0.00
3136G4N74	08/21/20	AGCY CALL	FNMA 0.560 08/21/25	02/21/23	1,500,000.00	100.000	1,500,000.00	0.00	0.00	0.00	1,500,000.00
3136G4V59	08/27/20	AGCY CALL	FNMA 0.625 08/27/25	08/27/21	1,500,000.00	100.000	1,500,000.00	0.00	0.00	0.00	1,500,000.00
3134GWUG9	09/24/20	AGCY CALL	FHLMC 0.570 09/24/25	09/24/21	2,000,000.00	100.000	2,000,000.00	0.00	0.00	0.00	2,000,000.00
<b>Total for Pooled Funds</b>					<b>47,362,908.88</b>		<b>48,139,224.36</b>	<b>(73,364.57)</b>	<b>(187,512.08)</b>	<b>(588,803.40)</b>	<b>47,951,712.28</b>
<b>Total for Town of Addison</b>					<b>47,362,908.88</b>		<b>48,139,224.36</b>	<b>(73,364.57)</b>	<b>(187,512.08)</b>	<b>(588,803.40)</b>	<b>47,951,712.28</b>

CUSIP	Security Type	Security Description	Pay Date	Interest	Principal	Total Amount
<b>Pooled Funds</b>						
CD-1790	CD	East West Bk CD 0.440 06/08/21	04/30/21	919.95	0.00	919.95
CD-5883	CD	East West Bk CD 0.580 06/04/21	04/30/21	1,214.12	0.00	1,214.12
CD-8019-3	CD	East West Bk CD 0.380 08/12/21	04/30/21	1,639.67	0.00	1,639.67
CD-8603-3	CD	East West Bk CD 0.410 07/28/21	04/30/21	1,797.97	0.00	1,797.97
3134GVUK2	AGCY CALL	FHLMC 0.300 05/13/22	05/13/21	7,500.00	0.00	7,500.00
CD-1790	CD	East West Bk CD 0.440 06/08/21	05/31/21	919.95	0.00	919.95
CD-5883	CD	East West Bk CD 0.580 06/04/21	05/31/21	1,214.12	0.00	1,214.12
CD-8019-3	CD	East West Bk CD 0.380 08/12/21	05/31/21	1,639.67	0.00	1,639.67
CD-8603-3	CD	East West Bk CD 0.410 07/28/21	05/31/21	1,797.97	0.00	1,797.97
CD-5883	CD	East West Bk CD 0.580 06/04/21	06/04/21	159.66	2,511,986.07	2,512,145.73
CD-1790	CD	East West Bk CD 0.440 06/08/21	06/08/21	241.96	2,508,966.68	2,509,208.64
3133EFUJ4	AGCY BULET	FFCB 2.150 12/29/22	06/29/21	32,250.00	0.00	32,250.00
CD-8019-3	CD	East West Bk CD 0.380 08/12/21	06/30/21	1,639.67	0.00	1,639.67
CD-8603-3	CD	East West Bk CD 0.410 07/28/21	06/30/21	1,797.97	0.00	1,797.97
3136G4A45	AGCY CALL	FNMA 0.710 07/22/25	07/22/21	5,325.00	0.00	5,325.00
CD-8603-3	CD	East West Bk CD 0.410 07/28/21	07/28/21	1,655.12	5,262,364.96	5,264,020.08
CD-8019-3	CD	East West Bk CD 0.380 08/12/21	07/31/21	1,639.67	0.00	1,639.67
052403GX4	MUNICIPAL	Austin Comm Clq, TX 5.000 08/01/22	08/01/21	46,875.00	0.00	46,875.00
882669BR4	MUNICIPAL	TX Pub Fin Auth 0.286 02/01/23	08/01/21	3,463.77	0.00	3,463.77
882669BS2	MUNICIPAL	TX Pub Fin Auth 0.503 02/01/24	08/01/21	3,045.94	0.00	3,045.94
3135G05R0	AGCY CALL	FNMA 0.300 08/10/23	08/10/21	4,500.00	0.00	4,500.00
CD-8019-3	CD	East West Bk CD 0.380 08/12/21	08/12/21	646.88	5,177,924.50	5,178,571.38
150461M57	MUNICIPAL	City of Cedar Park, TX 2.950 08/15/25	08/15/21	34,810.00	0.00	34,810.00
3136G4N74	AGCY CALL	FNMA 0.560 08/21/25	08/21/21	4,200.00	0.00	4,200.00
3130AJZJ1	AGCY CALL	FHLB 0.320 08/25/23	08/25/21	4,266.66	0.00	4,266.66
3136G4V59	AGCY CALL	FNMA 0.625 08/27/25	08/27/21	4,687.50	0.00	4,687.50
3130ADRG9	AGCY BULET	FHLB 2.750 03/10/23	09/10/21	61,875.00	0.00	61,875.00
3134GWUG9	AGCY CALL	FHLMC 0.570 09/24/25	09/24/21	5,700.00	0.00	5,700.00
<b>Total for Pooled Funds</b>				<b>237,423.22</b>	<b>15,461,242.21</b>	<b>15,698,665.43</b>

CUSIP	Security Type	Security Description	Pay Date	Interest	Principal	Total Amount
-------	---------------	----------------------	----------	----------	-----------	--------------

**Total for All Portfolios**

April 2021	5,571.71	0.00	5,571.71
May 2021	13,071.71	0.00	13,071.71
June 2021	36,089.26	5,020,952.75	5,057,042.01
July 2021	8,619.79	5,262,364.96	5,270,984.75
August 2021	106,495.75	5,177,924.50	5,284,420.25
September 2021	67,575.00	0.00	67,575.00

<b>Total Projected Cash Flows for Town of Addison</b>	<b>237,423.22</b>	<b>15,461,242.21</b>	<b>15,698,665.43</b>
-------------------------------------------------------	-------------------	----------------------	----------------------