FIVE-YEAR CAPITAL IMPROVEMENT PLAN FOR WATER STORAGE FACILITIES

Celestial 6 MG Ground Storage Tank, Surveyor 2 MG Ground Storage Tank, & Addison Circle 1 MG Elevated Storage Tank Addison, Texas

Project 00138755.000A
August 25, 2014

August 25, 2014
Project No.: 00138755.000A

Ms. Lisa Pyles
Director Infrastructure Operations and Services
Town of Addison
16801 Westgrove Drive
Addison, Texas 75001

Reference: Five-Year Capital Improvement Plan for Water Storage Facilities
Celestial Ground Storage Tank, Surveyor Ground Storage Tank, and Addison Elevated Storage Tank

Dear Ms. Pyles,

Kleinfelder has completed all authorized site visits and Preliminary Evaluation and Assessment Report for the three (3) water storage facilities in Addison, Texas. In accordance with Task 5 of our proposal related to Professional Services for Captial Improvements Plan - Water Stroage Facilities dated August 23, 2013 submitted herewith is the 5-year Capital Improvement Plan (CIP) for FY 2015 to 2019 related to water storage facilities. The Town of Addison's capital needs have been based on a risk-based asset management approach. This approach will allow the Town to compare and contrast the wide range of projects based on the likelihood of failure and the resulting consequences should a failure occur. The lasting impact is not the report document – it is the dynamic asset management tool Kleinfelder has developed and the framework put in place that will better provide the critical information the Town needs to make informed decisions about capital funding needs going forward.

We look forward to spending time with your staff and you in the near future to reach consensus on finalizing the plan.

Sincerely,

KLEINFELDER CENTRAL, INC.
Texas Registered Engineering Firm F-5592

C.P. Nawal, PE
Project Engineer

Freddie Guerra, RS CAPM
Project Manager

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A Report Prepared for:

Town of Addison
Addison, Texas

FIVE-YEAR CAPITAL IMPROVEMENT PLAN FOR WATER STORAGE FACILITIES

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Bright People. Right Solutions.

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5-YEAR CAPITAL IMPROVEMENT PLAN FOR WATER STORAGE FACILITIES

1 EXECUTIVE SUMMARY

OVERVIEW

The initial determination of capital needs from the Infrastructure Operations and Services Department identified over 22 projects which were considered “important to maintain and preserve the physical assets that support the Town of Addison’s water storage operations, programs, and services”. For the purpose of this report, the physical assets evaluated were limited to the Town’s three (3) water storage facilities infrastructure at:

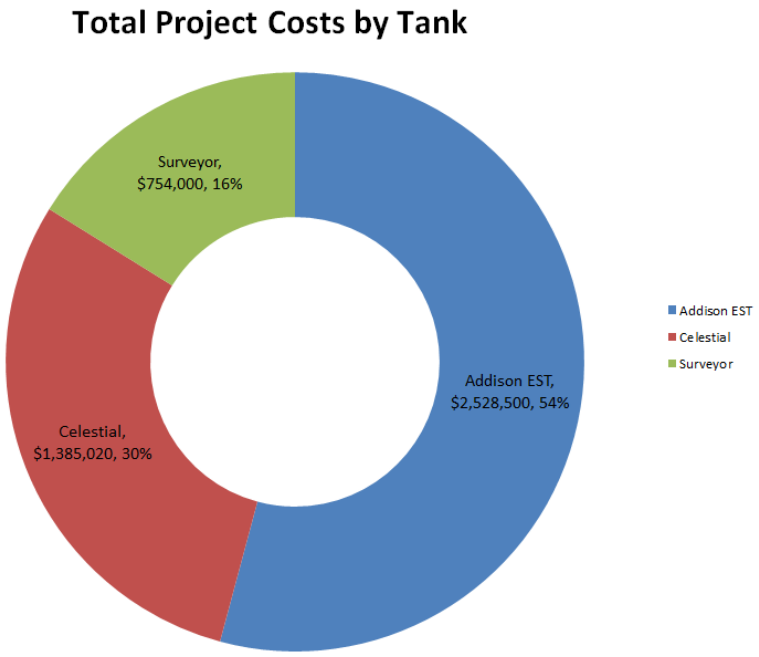
1. Celestial Ground Storage Tank (GST)
2. Surveyor Ground Storage Tank (GST)
3. Addison Circle Elevated Storage Tank (EST)

The investments identified are intended to properly maintain or replace capital assets. All of the project recommendations were evaluated to prioritize when each project should be implemented using the calculated risk associated with the asset(s) involved.

Where it was practical, repair/replacement of like-items were bundled into larger capital investments, while other items were recommended to be migrated to the Department’s operational budget (smaller capital valued at less than $50,000, maintenance items, etc.) This resulted in a final CIP project listing of six (6) projects valued at $4.6 million including, O&M, engineering and construction contingency costs. As the pie chart on the next page illustrates, the majority (54%) of capital needs belong to the Addison Elevated Storage Tank (EST) rehabilitation work. A summary of the highest capital needs for all of the water storage facilities is shown at the end of this section.

The FY2015-2019 Capital Improvement Plan proposes funding allocations for nearly $4.6 million in projects. The entire list of projects broken down by Capital and Operational budgets is located in Appendix B.

Breakdown of Projects by Water Storage Facility



Highlights of Process

This Capital Improvement Plan represents a significant shift in the manner by which capital projects are recorded, reviewed, and eventually executed by the Town of Addison. Like any planning tool, it is fully expected it will continue to evolve, adopting changes that will only improve the process and the manner in which the Town allocates scarce resources to their infrastructure needs.

The goal of this capital improvement plan for the water storage tanks is to identify and prioritize capital needs across the Town, and to allocate funding to implement those projects through **a process that is logical, transparent, and data-driven**. To that end, a Risk model was developed to create a standard framework related to the decision-making process for the Department's water storage facility capital needs.

One of the first steps was to assess the current condition of the capital assets – specifically Celestial GST, Surveyor GST, and Addison Circle EST. Kleinfelder was commissioned to conduct the evaluation and assessment of water storage facilities and to give the Town a current snapshot of both short-term critical needs and longer-term investments needed to

maintain the serviceability of each facility. All assets were rated according to physical, performance and rules-based criteria as defined in the individual assessment reports.

The rating process evaluated and compared the different capital needs using the same criteria: the likelihood of failure and the consequences of failure of a particular asset or proposed project. ***Likelihood of Failure*** considers the physical and performance condition of an asset while ***Consequence of Failure*** considers what would happen if the asset were to fail. The details of this risk-based approach are described in Section 2 of this document. It is important to point out that this methodology is the driver for management's evaluation of capital improvement needs within the context of competing demands.

The Risk Factor is calculated as the highest value of likelihood of failure multiplied by the highest consequence for each asset to yield:

Risk Factor = LoF x CoF

Where: LoF = Likelihood of Failure and CoF = Consequence of Failure

Details of this calculation are further described starting from Section 2 of this report.

The projects are then prioritized according to the magnitude of the Risk Factor for assets defined within each capital need. Finally, the Town's annual funding capacity determines the degree to which capital projects in the CIP are funded according to the priority. This model provides a transparent decision-making framework that can support the capital improvement planning process into the future.

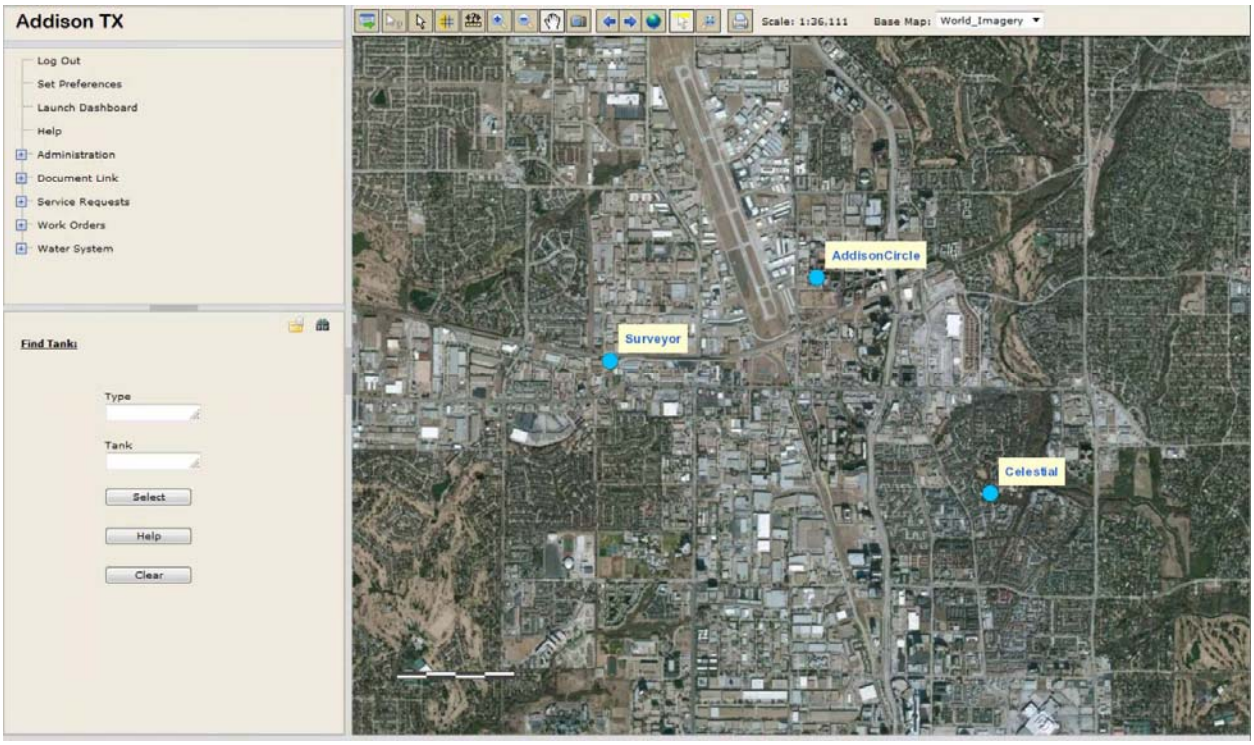
The initial master list of prioritized projects (see Appendix A) included several top priority projects that were identified for FY15 capital funding.

Key Findings

- **No identification of urgent near term needs:** Specific conditions were not noted during the assessment which required immediate attention and a plan for mitigation. These conditions constitute life-safety issues and can result in considerably greater expense due to further facility damage with repair under an emergency condition, or worse, personal injury.

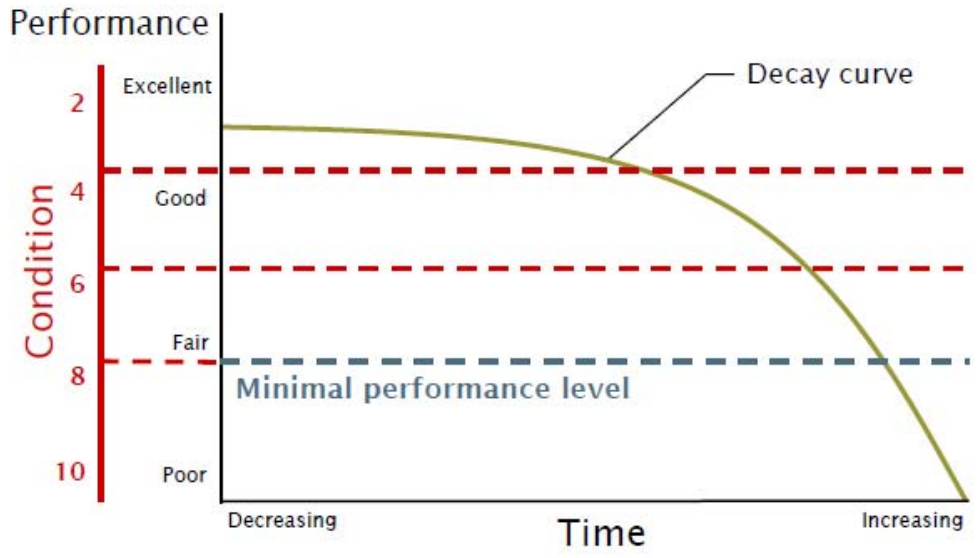
- **No identification of assets that are obsolete or no longer functioning as intended:** Our investigations determined that none of the facilities were obsolete or of limited use to the Town in their current configuration.
- **Increased investments needed in specified asset categories:** In-depth analysis pertaining to various assets in the Department, revealed particular needs critical enough to warrant a proposal for significant investment over the next five years.
- **Migration of smaller capital needs to operational budgets:** As noted earlier, projects of less than $50,000 were not included in the CIP in order to migrate these needs to the operational budget. It is proposed that smaller capital and maintenance needs should be a part of the annual work-plan for the Department and not called out in the CIP.
- **Asset Management Software:** Crucial to the management of the Town's infrastructure, is data documentation in a manner that is accessible and organized, which was accomplished in preparing this CIP. Electronic files allow for quick recovery of information and condition ratings of the various tank system components. The VUEWorks system integrates with GIS to give the spatial orientation of the capital asset.

A view of the database is depicted in the "screen shots" below. This tool helps to manage the vast amount of information about the Town's assets and provides easy, real time access to data needed for cost estimates and renewal recommendations.



- **Preventive maintenance nexus to premature capital investments:** One cannot discuss capital needs planning without thoughtful consideration of the allocation of resources for maintenance. The figure below depicts the typical deterioration of a facility with no maintenance and repair done to it during its projected life. However with an appropriate level of maintenance at the proper time, the deterioration curve can be shifted to the right, indefinitely. This has significant financial implications for the Town trying to manage assets having a replacement value approaching millions of dollars. As the curve depicts, by forgoing relatively inexpensive maintenance, in the course of a few years, the capital dollars needed to return facility back to its operational potential, become exponential.

Decay Curve



Water Storage Facility Project Costs

Costs for water storage facility improvement recommendations were developed primarily through the review of recent bid tabulations of similar projects in the DFW area. Estimated costs are for planning purposes only, a detailed engineer's opinion of probably cost will be provided during the design phase of each project. The estimated costs are not a projection of future costs.

Listing of Top 4 Water Storage Facilities in CIP by Total Cost of Repair & Replacement

Water Storage Facility	Project Title	Description	Estimated Project Cost
Addison EST	Coating – Exterior	Option 2: Exterior Coating Complete Replacement Including the Containment Cost	$1,000,000
Celestial GST	Structural – Exterior roof	Add Material to Bring Roof Slope to 0.75 Inches Per Foot Including the Required Structural Modifications	$1,000,000
Addison EST	Coating – Interior	Interior Coating Replacement	$550,000
Surveyor GST	Structural – Exterior Roof	Add Material to Bring Roof Slope to 0.75 Inches Per Foot Including the Required Structural Modification	$500,000

2 FY 2015-2019 CAPITAL IMPROVEMENT PLAN (CIP)

CIP Methodology - A Paradigm Shift to a Risk-Based Approach

Kleinfelder developed this comprehensive and integrated capital plan using a risk-based approach to analyze and prioritize capital needs across the Town's water storage facilities infrastructure.

Risk Approach Overview

In the context of asset management, *Risk* is defined as the probable magnitude of a future loss, and is expressed mathematically as the Likelihood of Failure (LoF) multiplied by the magnitude of its Consequence of Failure or its expected loss (CoF). This risk-based approach considers that an asset may "fail," due to its condition and the inherent consequences of that "failure". Failure here is used to mean that an asset fails to meet its intended purpose or use. Using this methodology, Likelihood of Failure is multiplied by a weighted Consequence (or impact) of Failure to arrive at a Risk Factor.

Calculating Risk

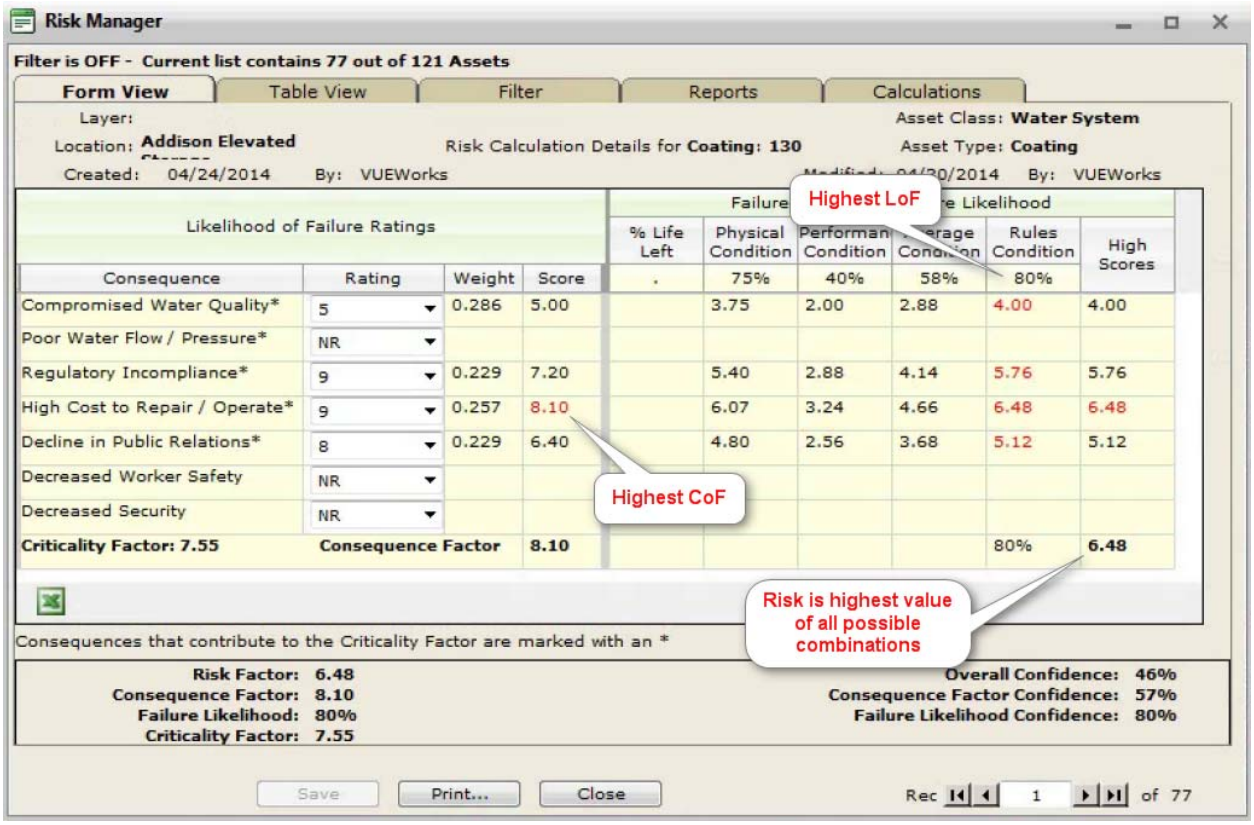
The assessment of Risk begins with the development of a list of Consequences that could occur if any asset identified within the water tank fails. The list of consequences used for Addison is specified herein. Each Consequence is given a relative weight in recognition that while all consequences are important, some consequences have a greater impact on the mission of the tank than others.

A failure of any asset may impact several consequences at varying amounts. Once the list of consequences is determined each asset is assessed against each consequence on a scale of Not Rated to 10. Where 10 indicates when a failure would result in the greatest impact to that consequence.

The Likelihood of Failure (LoF) is derived from one or more failure modes which are typically measures of condition and performance. The modes of failure used for the Addison tank assets are Condition, Performance and Rule based. Assets were assessed against each of these measures and then given a likelihood of failure score of 0% to 100% according to their assessment scores.

At this point the asset has a CoF score for each consequence and an LoF value for each Failure Mode. To determine Risk, a matrix is established so that each combination of CoF and LoF may be evaluated.

Matrix Used to Calculate Risk for One Asset



Once Risk is calculated for each asset the results can be presented in a number ways including a prioritized list or plotted in a quadrant graph as shown below. The quadrant the asset falls within provides guidance on how to proceed with each asset as follows:

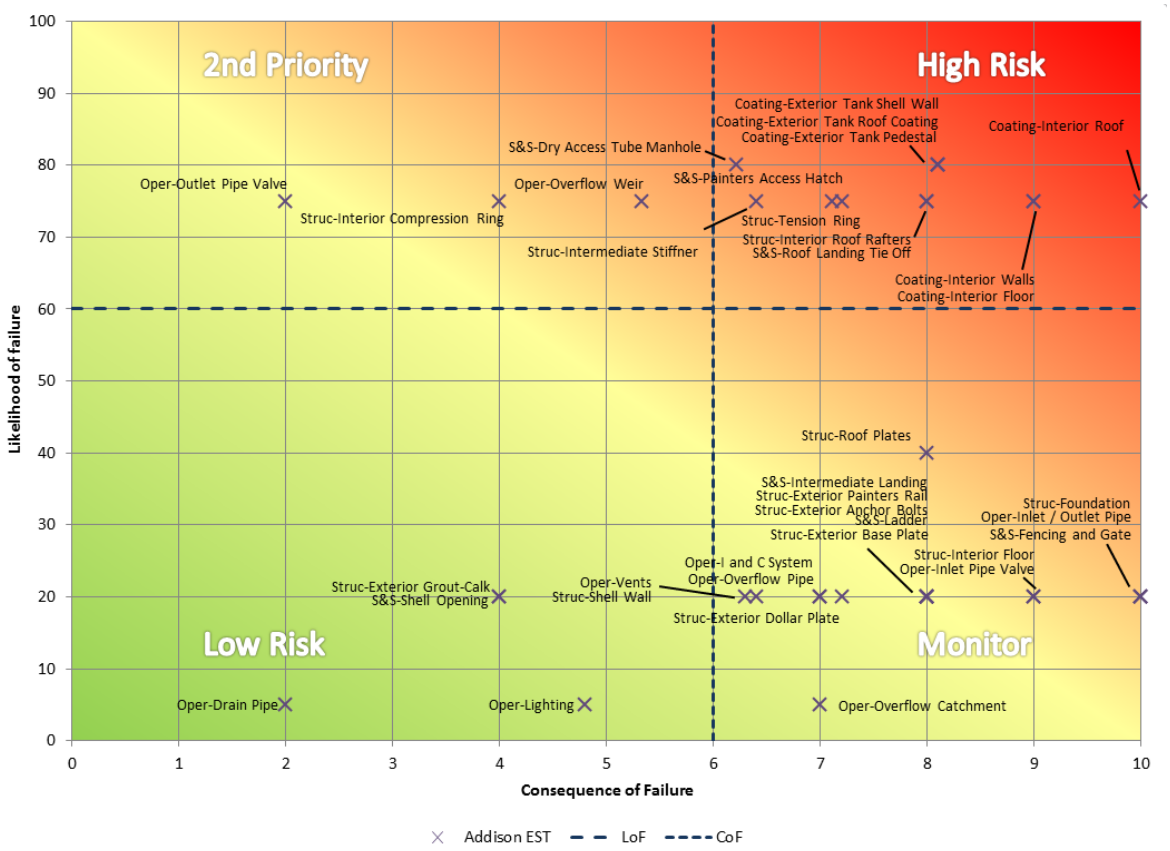
Lowest Priority – Low CoF, Low LoF = no action required at this time, may re-inspect at longer intervals

Regular Monitoring – High CoF, Low LoF = no action required at this time, but set up an aggressive maintenance and inspection routines

Second Priority – Low CoF, High LoF = take remedial action to repair or replace as budget allows

Highest Priority – High CoF, High LoF = Asset requires remedial action as soon as possible. Continue aggressive monitoring

Asset Risk by Quadrant for Addison EST Tank



Referring to the prioritization grid above, if a coating is in poor condition, the likelihood of a coating failure leading to a consequential tank roof leak could be very high for a metal tank but has much smaller risk associated with a concrete tank (because concrete does not corrode as metal does).

Recommendations to correct specific asset deficiencies can then be prioritized based on risk. With a high LoF and CoF, the asset would also rate as a high priority for repair. However, if the likelihood of a failure for an asset is low, while the consequences of that failure remains high, aggressive maintenance and monitoring should be scheduled to ensure that remedial action takes place before a failure is allowed to disrupt the mission of the Tank.

This data driven methodology allows the Town to more consistently and objectively evaluate assets for potential CIP projects across the spectrum of asset types to assure that capital dollars are allocated properly. While beyond the scope of this project, it also provides the basis forr setting up inspection and maintenance schedules to assure cost effective actions take place before more costly rehabilitation projects are required.

Criteria Used to Calculate Risk

The criteria for risk ranking each asset was developed based on the mission of the Water Tanks relevant to the value they deliver to the Town of Addison community. Accomplishing this goal typically begins with a mission statement that reflects the value the assets deliver to the community:

1. Mission of Water Storage Facilities

Cost effectively provide reliable water supply and pressure for industrial, domestic and fire suppression needs while preserving water quality and meeting regulatory requirements in a manner that demonstrates community pride while providing a safe environment for workers in a secure setting.

2. Develop a List of Consequences

Consequences reflect the impact a failure would have on the mission of the Water Tanks and are therefore typically expressed as an undesired occurrence. Developing this list begins with identifying key words in the mission statement such as:

- "Cost effectively"
- "Reliable water supply and pressure"
- "Preserving water quality"
- "Meeting regulatory requirements"
- "Community pride"
- "Safe environment for workers"
- "Secure setting"

The list of consequences or 'undesirable impacts' developed from these key words are as follows:

- High Cost to Repair or Operate
- Poor Water Flow / Pressure
- Compromised Water Quality
- Regulatory Incompliance
- Decline in Public Relations

- Decreased Worker Safety
- Decreased Security

The next step involves understanding that while all consequences are important, some may be considered more important than others. To accomplish this each consequence is ranked on a relative scale of 1 to 10 where 10 signifies the most important consequence to consider and where 5 indicates that the consequence is half as an important. The following is the criteria applied to the Addison's list of consequences:

Ranking of Consequences

Consequence	Value
Compromised Water Quality	10
Poor Water Flow / Pressure	10
Regulatory Incompliance	8
High Cost to Repair/ Operate	9
Decline in Public Relations	8
Decreased Worker Safety	8
Decreased Security	7

With this information developed, each asset is then evaluated based on how severe the impact would be on each consequence if the asset were to fail. Severity is based on a scale of 1 to 10 where 1 represents little Impact and 10 represents a high or more urgent impact. For instance an inadequate coating thickness could be classified as a coating failure. While such a failure may lead to corrosion and eventual leaking of the tank wall (a severe impact to water flow) the urgency of the failure is diminished substantially by the fact that it would take a long time for a coating failure to manifest itself to this level. Therefore, the impact to poor water flow/pressure would be low. However more urgent consequences such as high cost to repair and Regulatory Incompliance would be high. Another factor that will modify the Consequence rating of an asset is redundancy. For instance in the case of outlet pipes, two outlet pipes are rated at about half the consequence rating that only one outlet pipe would receive.

Values for Consequence Severity by Asset

Description	Value
No Impact	NR
Low Severity	1
	2
	3
	4
	5
	6
	7
	8
	9
High Severity	10

3. Develop Likelihood of Failure Criteria

Likelihood of Failure is developed from the criteria for Physical Condition, Performance Condition, and Rules Condition as defined in the accompanying Evaluation and Assessment Reports. Physical and Performance condition were rated on a 1 to 5 scale using the following criteria:

Rating Criteria

Rating	Physical Condition	Performance
1 - Excellent	No Visible Degradation	Component Functioning as Intended
2 - Good	Slightly Visible Degradation	In-service, but Higher Than Expected O&M
3 - Moderate	Visible Degradation	In-service, but Function is Impaired
4 - Poor	Integrity of Component Moderately Compromised	In-service, but Function is Highly Impaired
5 - Critical	Integrity of Component Severely Compromised	Component not Functioning as Intended

Assets that must meet various state and federal regulatory requirements were also assessed with a Rules rating scale as follows:

Rating Scale for Compliance with Rules

Rating	Rule (or Regulation)
1 - Exceeds	Component Functioning as Intended by Rule
2 - Acceptable	In-service, but Function Minimally Meets Rule
3 - Needs Improvement	In-service, but Function Does Not Meet Rule

The Likelihood of Failure is set to a scale of 0% Likely to 100% Likely that failure will occur in a given year as summarize in the following table:

Interpreting Likelihood of failure levels

Likelihood of Failure	What it means
100%	Failure likely to occur within a year
90%	90% chance of Failure in any year – Failure likely within 2 years
50%	50% chance of Failure within any year
20%	20% chance of Failure within any year
10%	10% chance of Failure within any year – 90% chance it won't
2%	2% chance of Failure within any year – 98% chance it won't

Failure likelihood relative to physical and performance condition was set as follows:

Condition Score	Likelihood
1	5%
2	20%
3	40%
4	75%
5	100%

Failure likelihood relative to Rules Condition was set as follows:

Rules Condition	Likelihood
1	5%
2	40%
3	80%

Calculation of the Risk Value for each Asset:

As mentioned earlier Risk is calculated as the product of Consequence of Failure and Likelihood of Failure.

$$Risk = CoF \times LoF$$

VUEWorks was used to calculate the consequence for each asset. The calculation is illustrated as follows:

Layer:
Location: **Addison Elevated**
Created: 04/24/2014 By: VUEWorks

Risk Calculation Details for **Rafter: 171**

Asset Class: **Water System**
Asset Type: **Rafter**
Modified: 05/05/2014 By: VUEWorks

Likelihood of Failure Ratings				Failure Modes and Failure Likelihood					
				% Life Left	Physical Condition	Performan Condition	Average Condition	Rules Condition	High Scores
Consequence	Rating	Weight	Score	.	75%	40%	58%	0%	
Compromised Water Quality*	8	0.286	8.00		6.00	3.20	4.60	0.00	6.00
Poor Water Flow / Pressure*	NR								
Regulatory Incompliance*	8	0.229	6.40		4.80	2.56	3.68	0.00	4.80
High Cost to Repair / Operate*	8	0.257	7.20		5.40	2.88	4.14	0.00	5.40
Decline in Public Relations*	NR								
Decreased Worker Safety	8	0.229	6.40		4.80	2.56	3.68	0.00	4.80
Decreased Security	NR								
Criticality Factor: 8.10	**Consequence Factor**		**8.00**		75%				**6.00**

Risk Calculation Further Described

Referring to the screenshot above, each consequence rating is modified by the relative rank (weight) of the consequence and adjusted to a scale of 1 to 10 (see page 14 for consequence ranks). The highest consequence score is set as the Consequence Factor. To determine the Risk Factor each consequence score is multiplied by the Likelihood of Failure for each Failure Mode. The highest scores for each consequence (shown in red) are compared to determine the highest value. The highest value is then set as the Risk Factor for the asset.

In the example above, Compromised Water Quality received the highest consequence score and was therefore set as the Consequence Factor. This score (along with the other consequence scores) was multiplied by the Likelihood of Failure for each Failure Mode. In this case the Likelihood for Physical Condition of 75% is the influencing Failure Mode with a risk

score of 6.00. This value was determined to be the highest risk score and thus set as the Risk Factor for the asset. The scores noted in red tell us that the influencing consequence is 'Compromised Water Quality' due to a 75% likelihood that the asset (rafters) may fail within any year due to the physical condition of the rafters. Failure only indicates a high likelihood that a consequence will occur, which is not necessarily a catastrophic failure (such as a collapse). In this case the system is telling us that there is a risk that corroded material from the rafter could enter the water supply if left untreated (this asset is identified for a project in the first year).

Risk-based Project Ranking

Included in each Evaluation and Assessment report is a list of recommended projects for each tank. To rank these projects the Risk Factor of the asset(s) with the highest risk in each project is used.

Below is a summary of the highest Risk assets and the projects they are associated with:

Highest Risk Assets and Their Associated Projects

Facility	System	Asset Name	Asset Risk	Project Name	Project Description	Project Risk
Addison EST	Coating	Coating-Interior Roof	7.50	Addison EST-Interior Coating Replacement	Interior Coating Replacement	7.50
Surveyor	Operational	Oper-Inlet Pipe and Valves	7.50	Surveyor- inlet repairs	Upsize the inlet pipe (Approximately 100 LF) from 12-inches to 24-inches.	7.50
Addison EST	Coating	Coating-Interior Walls	6.75	Addison EST-Interior Coating Replacement	Interior Coating Replacement	7.50
Addison EST	Coating	Coating-Interior Floor	6.75	Addison EST-Interior Coating Replacement	Interior Coating Replacement	7.50
Addison EST	Coating	Coating-Exterior Tank Pedestal	6.48	Addison EST-Exterior Coating Replacement	Exterior Coating Replacement	6.48
Addison EST	Coating	Coating-Exterior Tank Roof Coating	6.48	Addison EST-Exterior Coating Replacement	Exterior Coating Replacement	6.48

A complete list can be found in Appendix A

Regarding the Asset Management Software

All of the data collected during the inspection of the water storage facilities is stored in a GIS centric enterprise asset management application called VUEWorks. The value of such system is that data manipulation can be accomplished quickly, shared with as many users as needed, and can be interactive by flagging suggested work timeframes or provide high-speed consolidated town-wide assessment (i.e. the condition and cost to repair all the different ladders at the water storage facilities). A screen-shot of the VUEWorks software is below.

APPENDIX A

Asset Priority and Associated Projects

Facility	System	Asset Name	Condition Score	Failure Likelyhood	Consequence	Criticality	Asset Risk	Project Name	Project Description	Project Risk
Addison EST	Coating	Coating-Interior Roof	3.50	75.00	10.00	10.00	7.50	Addison EST-Interior Coating Replacement	Interior Coating Replacement	7.50
Surveyor	Operational	Oper-Inlet Pipe and Valves	3.00	75.00	10.00	5.92	7.50	Surveyor- inlet repairs	Upsize the inlet pipe (Approximately 100 LF) from 12-inches to 24-inches.	7.50
Addison EST	Coating	Coating-Interior Walls	3.50	75.00	9.00	9.00	6.75	Addison EST-Interior Coating Replacement	Interior Coating Replacement	7.50
Addison EST	Coating	Coating-Interior Floor	3.50	75.00	9.00	9.00	6.75	Addison EST-Interior Coating Replacement	Interior Coating Replacement	7.50
Addison EST	Coating	Coating-Exterior Tank Pedestal	3.50	80.00	8.10	8.10	6.48	Addison EST-Exterior Coating Replacement	Exterior Coating Replacement	6.48
Addison EST	Coating	Coating-Exterior Tank Roof Coating	3.50	80.00	8.10	8.10	6.48	Addison EST-Exterior Coating Replacement	Exterior Coating Replacement	6.48
Addison EST	Coating	Coating-Exterior Tank Shell Wall	3.50	80.00	8.10	8.10	6.48	Addison EST-Exterior Coating Replacement	Exterior Coating Replacement	6.48
Surveyor	Structural	Struc-Exterior Roof	3.00	80.00	8.00	5.46	6.40	Surveyor-Ext. Roof Upgrades	Add material to bring roof slope to 0.75 inches per foot including the required structural modifications.	6.40
Addison EST	Structural	Struc-Interior Roof Rafters	3.50	75.00	8.00	8.10	6.00	Addison EST-Roof Rafter Repairs	Repair Roof Rafters, Patch Corrosion Pitting on Roof Plates	6.00
Addison EST	Safety & Security	S&S-Roof Landing Tie Off	3.00	75.00	8.00	6.00	6.00	Addison EST-Roof Landing Repairs	Remove Cable System and Install Perimeter Railing	6.00
Surveyor	Operational	Oper-Roof Vent	3.00	75.00	8.00	6.37	6.00	Surveyor-Roof vent repairs	Remove roof vent and replace with larger necked vent.	6.00
Celestial	Other	Level Indicator	4.00	80.00	7.00	3.33	5.60	Celestial-Operational Upgrades	Abrasive blast and recoat sonic level indicator and overflow weir and piping	5.60
Addison EST	Safety & Security	S&S-Painters Access Hatch	3.50	75.00	7.20	6.53	5.40	Addison EST-Manhole and Hatch Repairs	Repair of 30-inch Wet Side Manhole Replacement of 24-inch "Vent Manhole" Painter's Hatch	5.40
Addison EST	Structural	Struc-Tension Ring	3.50	75.00	7.11	5.00	5.33	Addison EST-Roof Rafter Repairs	Repair Roof Rafters, Patch Corrosion Pitting on Roof Plates	6.00
Addison EST	Safety & Security	S&S-Dry Access Tube Manhole	3.50	80.00	6.22	4.28	4.98	Addison EST-Roof Rafter Repairs	Repair Roof Rafters, Patch Corrosion Pitting on Roof Plates	6.00
Addison EST	Structural	Struc-Intermediate Stiffner	3.50	75.00	6.40	7.10	4.80	Addison EST-Roof Rafter Repairs	Repair Roof Rafters, Patch Corrosion Pitting on Roof Plates	6.00
Celestial	Operational	Oper-Weir Boxes	4.00	80.00	5.40	3.73	4.32	Celestial-Operational Upgrades	Abrasive blast and recoat sonic level indicator and overflow weir and piping	5.60
Celestial	Operational	Oper-Weir Boxes	4.00	80.00	5.40	3.73	4.32	Celestial-Overflow weirs	Replace the overflow weirs and corroded bolts	4.32
Surveyor	Structural	Struc-Interior Roof	3.00	40.00	10.00	7.67	4.00	Surveyor-Int. Roof Repairs	Repair Spalling and Reinforcing Corrosion	4.00
Surveyor	Coating	Coating-Exterior Roof	3.00	40.00	10.00	6.55	4.00	Surveyor-Ext. Roof Upgrades	Add material to bring roof slope to 0.75 inches per foot including the required structural modifications.	6.40

Facility	System	Asset Name	Condition Score	Failure Likelyhood	Consequence	Criticality	Asset Risk	Project Name	Project Description	Project Risk
Celestial	Structural	Struc-Interior Roof	3.00	40.00	10.00	7.40	4.00	Celestial-Interior Roof Repairs	Repair Spalling and Reinforcing Corrosion (Assumes 400 SF Spalling Repair)	4.00
Addison EST	Safety & Security	S&S-Wet Side Manhole	2.00	40.00	10.00	8.40	4.00	Addison EST-Manhole and Hatch Repairs	Repair of 30-inch Wet Side Manhole Replacement of 24-inch "Vent Manhole" Painter's Hatch	5.40
Addison EST	Operational	Oper-Overflow Weir	3.50	75.00	5.33	5.17	4.00	Addison EST-Overflow Repairs	Install Access Lid for Overflow Catchment Bay	4.00
Celestial	Operational	Oper-Overflow Pipes	4.00	75.00	5.33	3.70	4.00	Celestial-Operational Upgrades	Abrasive blast and recoat sonic level indicator and overflow weir and piping	5.60
Celestial	Structural	Struc-Interior Floor	2.00	40.00	9.00	5.24	3.60	Celestial-Interior Floor Sealing	Seal cracking (Assumes 200 LF Repair)	3.60
Addison EST	Structural	Struc-Roof Plates	3.00	40.00	8.00	8.10	3.20	Addison EST-Roof Rafter Repairs	Repair Roof Rafters, Patch Corrosion Pitting on Roof Plates	6.00
Surveyor	Structural	Struc-Interior Grout- Calk	3.50	80.00	4.00	2.48	3.20			
Surveyor	Safety & Security	S&S- Roof Hatch	2.50	40.00	8.00	7.20	3.20	Surveyor-Roof Hatch Repairs	Repair surface corrosion on Roof Hatch	3.20
Surveyor	Safety & Security	S&S- Interior Ladder	3.00	40.00	8.00	4.83	3.20	Surveyor-Ladders Repairs	Remove ladder cages and cable climb system. Install safety climb rail system.	3.20
Surveyor	Safety & Security	S&S- Exterior Ladder	3.00	40.00	8.00	4.83	3.20	Surveyor-Ladders Repairs	Remove ladder cages and cable climb system. Install safety climb rail system.	3.20
Celestial	Structural	Struc-External Roof	3.00	40.00	8.00	5.46	3.20	Celestial-Ext. Roof Repairs	Add material to bring roof slope to 0.75 inches per foot including the required structural modifications.	3.20
Celestial	Structural	Struc-Exterior Grout- Calk	4.00	80.00	4.00	2.48	3.20			
Celestial	Other	Grounds	3.00	40.00	8.00	5.00	3.20	Celestial-Erosion Control	Revegitation to control erosion	3.20
Addison EST	Structural	Struc-Interior Compression Ring	3.50	75.00	4.00	4.00	3.00			
Celestial	Safety & Security	S&S-Ladders	3.00	40.00	6.40	3.13	2.56	Celestial-Safety Improvements	Remove ladder cage and cable climb system . Install safety climb rail system.	2.56
Addison EST	Structural	Struc-Foundation	2.00	20.00	10.00	11.00	2.00			
Addison EST	Operational	Oper-Inlet / Outlet Pipe	2.00	20.00	10.00	7.45	2.00			
Addison EST	Safety & Security	S&S-Fencing and Gate	2.00	20.00	10.00	8.00	2.00			
Surveyor	Structural	Struc-Shell Wall	2.00	20.00	10.00	6.24	2.00			
Celestial	Structural	Struc-Shell Walls	2.00	20.00	10.00	6.24	2.00			
Celestial	Safety & Security	S&S-Fencing and Gate	2.00	20.00	10.00	5.00	2.00			
Celestial	Operational	Oper-Inlet Pipe and Valves	2.00	20.00	10.00	7.00	2.00			
Celestial	Operational	Oper-Outlet Pipe and	2.00	40.00	5.00	3.73	2.00			
Addison EST	Structural	Struc-Interior Floor	2.00	20.00	9.00	7.00	1.80			
Addison EST	Operational	Oper-Inlet Pipe Valve	2.00	20.00	9.00	7.37	1.80			
Surveyor	Operational	Oper-Overflow Pipe Weir and Catchment	2.00	20.00	8.89	7.07	1.78			
Addison EST	Structural	Struc-Exterior Base Plate	2.00	20.00	8.00		1.60			
Addison EST	Structural	Struc-Exterior Anchor Bolts	2.00	20.00	8.00		1.60			
Addison EST	Safety & Security	S&S-Ladder	2.00	20.00	8.00	6.00	1.60	Addison EST-Ladder Repairs	Interior Wet Side Ladder and Safety Climb Device Replacement	1.60

Facility	System	Asset Name	Condition Score	Failure Likelyhood	Consequence	Criticality	Asset Risk	Project Name	Project Description	Project Risk
Addison EST	Safety & Security	S&S-Intermediate Landing	2.00	20.00	8.00	6.00	1.60	Addison EST-Interm. Landing Repairs	Replace Nuts on 24-inch Diaphragm Manhole Install losing Mechanism 24-inch Shaft Manhole	1.60
Addison EST	Structural	Struc-Exterior Painters Rail	2.00	20.00	8.00		1.60			
Celestial	Coating	Coating-Exterior Shell Coating	1.50	20.00	8.00	5.50	1.60			
Celestial	Structural	Struc-Interior Grout-Calk	2.50	40.00	4.00	2.48	1.60			
Celestial	Safety & Security	S&S-Roof Hatch	2.00	20.00	8.00	6.40	1.60			
Celestial	Operational	Oper-Roof Vent	2.00	20.00	8.00	5.18	1.60			
Surveyor	Safety & Security	S&S-Fencing and Gate	2.00	20.00	7.78	4.56	1.56			
Addison EST	Operational	Oper-Outlet Pipe Valve	3.50	75.00	2.00	1.89	1.50			
Addison EST	Structural	Struc-Exterior Dollar Plate	2.00	20.00	7.20	6.53	1.44	Addison EST-Dollar Plate Repairs	Abandoned CPS Handhole Covers Replacement Couplings and Welding Plates removal from Dollar Plate	1.44
Surveyor	Structural	Struc-Interior Columns	2.00	20.00	7.20	4.60	1.44			
Celestial	Structural	Struc-Columns	2.00	20.00	7.20	6.10	1.44			
Surveyor	Coating	Coating-Exterior Shell Walls	2.00	20.00	7.11	5.06	1.42			
Addison EST	Operational	Oper-I and C System	2.00	20.00	7.00	6.15	1.40			
Addison EST	Operational	Oper-Overflow Pipe	2.00	20.00	7.00	6.17	1.40	Addison EST-Overflow Repairs	Install Access Lid for Overflow Catchment Box	4.00
Celestial	Operational	Oper-SCADA	2.00	20.00	7.00	6.15	1.40			
Addison EST	Structural	Struc-Shell Wall	2.00	20.00	6.40	5.25	1.28			
Addison EST	Operational	Oper-Vents	2.00	20.00	6.30	5.70	1.26			
Celestial	Coating	Coating-Exterior Tank Roof	1.50	20.00	5.60	3.93	1.12			
Surveyor	Operational	Oper-Outlet Pipe and	2.00	20.00	5.40	3.16	1.08			
Addison EST	Structural	Struc-Exterior Grout-Calk	2.00	20.00	4.00		0.80			
Addison EST	Safety & Security	S&S-Shell Opening	2.00	20.00	4.00	0.33	0.80			
Surveyor	Structural	Struc-Foundation	1.00	5.00	10.00	5.64	0.50	Surveyor-Foundation Repairs	Removal and Mitigation of vegetation around tank base	
Celestial	Structural	Struc-Foundation	1.00	5.00	10.00	5.64	0.50			
Surveyor	Structural	Struc-Floor	1.00	5.00	9.00	5.24	0.45			
Addison EST	Operational	Oper-Overflow Catchment	1.00	5.00	7.00	7.00	0.35	Addison EST-Overflow Repairs	Install Access Lid for Overflow Catchment Box	4.00
Surveyor	Operational	Oper-SCADA	1.00	5.00	7.00	6.10	0.35			
Surveyor	Operational	Oper-Lights	1.00	5.00	5.44	2.33	0.27			
Addison EST	Operational	Oper-Lighting	1.00	5.00	4.80	1.70	0.24			
Addison EST	Operational	Oper-Drain Pipe	1.00	5.00	2.00	1.89	0.10			

Appendix B:
Risk-based Prioritization Plan for Capital and O&M Projects for FY 2015 to 2019
All Projects

	2015	2016	2017	2018	2019	Totals
CIP Total	$ 1,675,000	$ 500,000	$ 150,000	$ -	$ 1,000,000	**$ 3,325,000**
O&M Total	$ 75,000	$ 37,500	$ 40,000	$ 5,000	$ 107,900	**$ 265,400**
Contingency	$ 263,000	$ 81,000	$ 29,000	$ 1,000	$ 167,000	**$ 541,000**
Engineering	$ 263,000	$ 81,000	$ 29,000	$ 1,000	$ 167,000	**$ 541,000**
Year Total	$ 2,276,000	$ 699,500	$ 248,000	$ 7,000	$ 1,441,900	**$ 4,672,400**

Project Name	Project Description	Facility	Project Risk	Project Type	2015	2016	2017	2018	2019
Surveyor- inlet repairs	Upsize the inlet pipe (Approximately 100 LF) from 12-inches to 24-inches.	Surveyor	7.50	O&M	$ 30,000				
Addison EST-Interior Coating Replacement	Interior Coating Replacement	Addison EST	7.50	CIP	$ 550,000				
Addison EST-Exterior Coating Replacement	Exterior Coating Replacement	Addison EST	6.48	CIP	$ 1,000,000				
Surveyor-Ext. Roof Upgrades	Add material to bring roof slope to 0.75 inches per foot including the required structural modifications	Surveyor	6.40	CIP		$ 500,000			
Addison EST-Roof Rafter Repairs	Repair Roof Rafters, Patch Corrosion Pitting on Roof Plates	Addison EST	6.00	CIP	$ 125,000				
Surveyor-Roof vent repairs	Remove roof vent and replace with larger necked vent.	Surveyor	6.00	O&M	$ 15,000				
Addison EST-Roof Landing Repairs	Remove Cable System and Install Perimeter Railing	Addison EST	6.00	O&M	$ 20,000				
Celestial-Operational Upgrades	Abrasive blast and recoat sonic level indicator and overflow weir and piping	Celestial	5.60	O&M		$ 7,500			
Addison EST-Manhole and Hatch Repairs	Repair of 30-inch Wet Side Manhole Replacement of 24-inch “Vent Manhole” Painter’s Hatch	Addison EST	5.40	O&M		$ 25,000			
Celestial-Overflow weirs	Replace the overflow weirs and corroded bolts	Celestial	4.32	O&M		$ 5,000			
Surveyor-Int. Roof Repairs	Repair Spalling and Reinforcing Corrosion	Surveyor	4.00	O&M	$ 10,000				
Celestial-Interior Roof Repairs	Repair Spalling and Reinforcing Corrosion (Assumes 400 SF Spalling Repair)	Celestial	4.00	O&M			$ 20,000		
Addison EST-Overflow Repairs	Install Access Lid for Overflow Catchment Box	Addison EST	4.00	CIP			$ 150,000		
Celestial-Interior Floor Sealing	Seal cracking (Assumes 200 LF Repair)	Celestial	3.60	O&M					$ 5,400
Surveyor-Roof Hatch Repairs	Repair surface corrosion on Roof Hatch	Surveyor	3.20	O&M				$ 5,000	
Surveyor-Ladders Repairs	Remove ladder cages and cable climb system. Install safety climb rail system.	Surveyor	3.20	O&M			$ 20,000		
Celestial-Ext. Roof Repairs	Add material to bring roof slope to 0.75 inches per foot including the required structural	Celestial	3.20	CIP					$ 1,000,000
Celestial-Erosion Control	Revegitation to control erosion	Celestial	3.20	O&M					$ 7,500
Celestial-Safety Improvements	Remove ladder cage and cable climb system . Install safety climb rail system.	Celestial	2.56	O&M					$ 20,000
Addison EST-Interm. Landing Repairs	Replace Nuts on 24-inch Diaphragm Manhole Install losing Mechanism 24-inch Shaft Manhole	Addison EST	1.60	O&M					$ 25,000
Addison EST-Ladder Repairs	Interior Wet Side Ladder and Safety Climb Device Replacement	Addison EST	1.60	O&M					$ 25,000
Addison EST-Dollar Plate Repairs	Abandoned CPS Handhole Covers Replacement Couplings and Welding Plates removal from Dollar Plate	Addison EST	1.44	O&M					$ 25,000

- Due to design, bidding, mobilization, and demobilization costs, the following table has been prepared to indicate costs for completing projects by tank within the same year to avoid additional costs to the Town.

	2015	2016	2017	2018	2019	Totals
CIP Total	$ 1,825,000	$ 500,000	$ -	$ -	$ 1,000,000	$ 3,325,000
O&M Total	$ 120,000	$ 80,000	$ -	$ -	$ 65,400	$ 265,400
Contingency	$ 291,750	$ 87,000	$ -	$ -	$ 159,810	$ 538,560
Engineering	$ 61,763	$ 25,050	$ -	$ -	$ 33,782	$ 120,594
Year Total	$ 2,298,513	$ 692,050	$ -	$ -	$ 1,258,992	$ 4,249,554

Project Name	Project Description	Facility	Project Risk	Project Type	2015	2016	2017	2018	2019
Surveyor- inlet repairs	Upsize the inlet pipe (Approximately 100 LF) from 12-inches to 24-inches.	Surveyor	7.50	O&M		$ 30,000			
Addison EST-Interior Coating Replacement	Interior Coating Replacement	Addison EST	7.50	CIP	$ 550,000				
Addison EST-Exterior Coating Replacement	Exterior Coating Replacement	Addison EST	6.48	CIP	$ 1,000,000				
Surveyor-Ext. Roof Upgrades	Add material to bring roof slope to 0.75 inches per foot including the required structural modifications.	Surveyor	6.40	CIP		$ 500,000			
Addison EST-Roof Rafter Repairs	Repair Roof Rafters, Patch Corrosion Pitting on Roof Plates	Addison EST	6.00	CIP	$ 125,000				
Surveyor-Roof vent repairs	Remove roof vent and replace with larger necked vent.	Surveyor	6.00	O&M		$ 15,000			
Addison EST-Roof Landing Repairs	Remove Cable System and Install Perimeter Railing	Addison EST	6.00	O&M	$ 20,000				
Celestial-Operational Upgrades	Abrasive blast and recoat sonic level indicator and overflow weir and piping	Celestial	5.60	O&M					$ 7,500
Addison EST-Manhole and Hatch Repairs	Repair of 30-inch Wet Side Manhole Replacement of 24-inch "Vent Manhole" Painter's Hatch	Addison EST	5.40	O&M	$ 25,000				
Celestial-Overflow weirs	Replace the overflow weirs and corroded bolts	Celestial	4.32	O&M					$ 5,000
Surveyor-Int. Roof Repairs	Repair Spalling and Reinforcing Corrosion	Surveyor	4.00	O&M		$ 10,000			
Celestial-Interior Roof Repairs	Repair Spalling and Reinforcing Corrosion (Assumes 400 SF Spalling Repair)	Celestial	4.00	O&M					$ 20,000
Addison EST-Overflow Repairs	Install Access Lid for Overflow Catchment Box	Addison EST	4.00	CIP	$ 150,000				
Celestial-Interior Floor Sealing	Seal cracking (Assumes 200 LF Repair)	Celestial	3.60	O&M					$ 5,400
Surveyor-Roof Hatch Repairs	Repair surface corrosion on Roof Hatch	Surveyor	3.20	O&M		$ 5,000			
Surveyor-Ladders Repairs	Remove ladder cages and cable climb system. Install safety climb rail system.	Surveyor	3.20	O&M		$ 20,000			
Celestial-Ext. Roof Repairs	Add material to bring roof slope to 0.75 inches per foot including the required	Celestial	3.20	CIP					$ 1,000,000
Celestial-Erosion Control	Revegitation to control erosion	Celestial	3.20	O&M					$ 7,500
Celestial-Safety Improvements	Remove ladder cage and cable climb system . Install safety climb rail system.	Celestial	2.56	O&M					$ 20,000
Addison EST-Interm. Landing Repairs	Replace Nuts on 24-inch Diaphragm Manhole Install losing Mechanism 24-inch Shaft Manhole	Addison EST	1.60	O&M	$ 25,000				
Addison EST-Ladder Repairs	Interior Wet Side Ladder and Safety Climb Device Replacement	Addison EST	1.60	O&M	$ 25,000				
Addison EST-Dollar Plate Repairs	Abandoned CPS Handhole Covers Replacement Couplings and Welding Plates removal from Dollar Plate	Addison EST	1.44	O&M	$ 25,000				
Surveyor-Foundation Repairs	Removal and Mitigation of vegetation around tank base	Surveyor	0.50	O&M		$ 7,500