



The Importance of Infrastructure Asset Management

Town of Addison: Asset Management Overview

City Council Briefing
August 22, 2017



Agenda



- Introduction
- Asset Management
 - What – What is asset management? What is an asset?
 - Why – Why is asset management planning important?
 - Who – Who will be involved?
 - How – How will the asset management plan and the core processes be developed?
 - When – When will the asset management plan be completed?
- Addison's Asset Management Plan and Program





What is Asset Management?



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Asset Management Definition – ISO 55000

“Asset Management is the set of coordinated activities that an organization uses to realize value from assets in the delivery of its outcomes or objectives.

Realization of value requires the achievement of a balance of costs, risks and benefits, often over different time scales.”



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Asset Management Definition Simplified 

Managing assets to minimize the total cost of owning, operating, and maintaining those assets while delivering the desired service level at an acceptable level of risk.



Optimized Sustainable Stewardship

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Asset Management is About... 

- Achieving balance

Resident Expectations 	Cost of Service 	Level of Service 	Risk
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Asset Management is About...

• Being proactive

Reactive

- Budgets based on last year
- Reactive projects
- Projects based on budget
- Money invested with little risk reduction

Proactive

- Budgets based on future needs
- Replace high risk assets before failure
- Prioritize work based on risk
- Focus on high benefit to cost ratio

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Asset Management Planning

Driven by forward thinking managers

Demanded by forward thinking leaders

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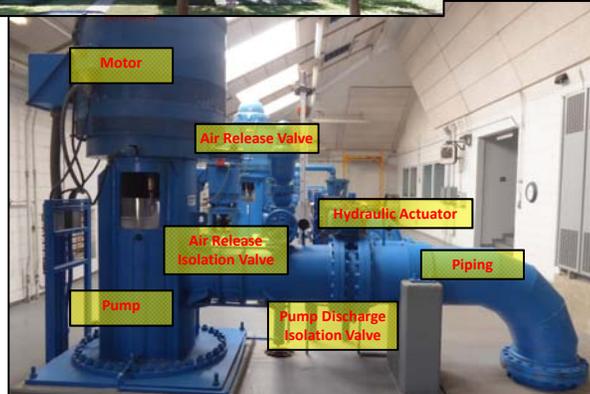
What is an Asset?



What is an Asset?



What Is An Asset?



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Why Asset Management?



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State of America's Infrastructure

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2017 INFRASTRUCTURE REPORT CARD

MAKING THE GRADE AMERICA'S GRADES STATE BY STATE SOLUTIONS THE IMPACT GET INVOLVED

ASCE

America's Infrastructure Scores a **D+**

GET THE FULL STORY

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Failing Assets

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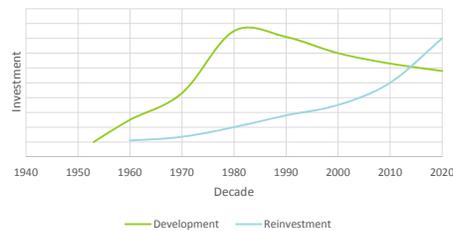
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Addison's Transition from *Development* to *Management*



- Addison - Established in 1953, with peak development taking place from the late 70s to mid-90s
- Many assets when reaching 40+ years require replacement or rehabilitation
- As Addison transitions from development to redevelopment, the need for reinvestment into Addison infrastructure puts pressure on current residents and businesses

Development vs. Reinvestment



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Why Asset Management?



- Aging assets in need of rehabilitation or replacement
- Limited budget and limited work force
- Need to understand the cost and timing of infrastructure maintenance, refurbishment, and replacement
- Need to understand the risk if assets are not maintained properly
- Need data backed justification to plan and prioritize infrastructure needs
- Need to transition from reactive to proactive state of infrastructure management
- Need to understand the cost to provide service
- Need to communicate the infrastructure needs to taxpayers
- Need to have a consistent and transparent decision making process
- Need to develop a sound foundation for continuous improvement



A Managed and Defendable Solution is Needed

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Addison Needs - Asset Management

- To invest in and manage infrastructure to ensure Accountability, Transparency, and Consistency
- To have an integrated vision for infrastructure – residents, businesses, Council
- To educate and communicate need for infrastructure reinvestment
- To consider life-cycle costs, future renewal needs, and risk
- To develop a long-term planning horizon, based on risk assessment and priorities
- To demonstrate that funds are being spent effectively and efficiently


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Asset Management Framework (Five Core Questions)

1. What is the current state of the assets?
2. What is the required level of service?
3. Which assets are critical?
4. What are the optimized management strategies?
5. What is needed to fund it?


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Who is Involved with Asset Management?

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Who's Involved in the Asset Management Process?

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graph TD; Engage[Engage Consultant] --> Inventory[Inventory]; Inventory --> Condition[Condition Assessment]; Condition --> Define[Define Service Levels]; Define --> Critical[Critical Assets]; Critical --> Strategy[Asset Management Strategy]; Strategy --> Funding[Funding Strategy]; Funding --> Plan[Asset Management Plan]; Plan --> Engage; Plan --> Engage; Consultant[Consultant and Staff]; Council[Council Input];
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Consultant and Staff

Council Input

Engage Consultant

Inventory

Condition Assessment

Define Service Levels

Critical Assets

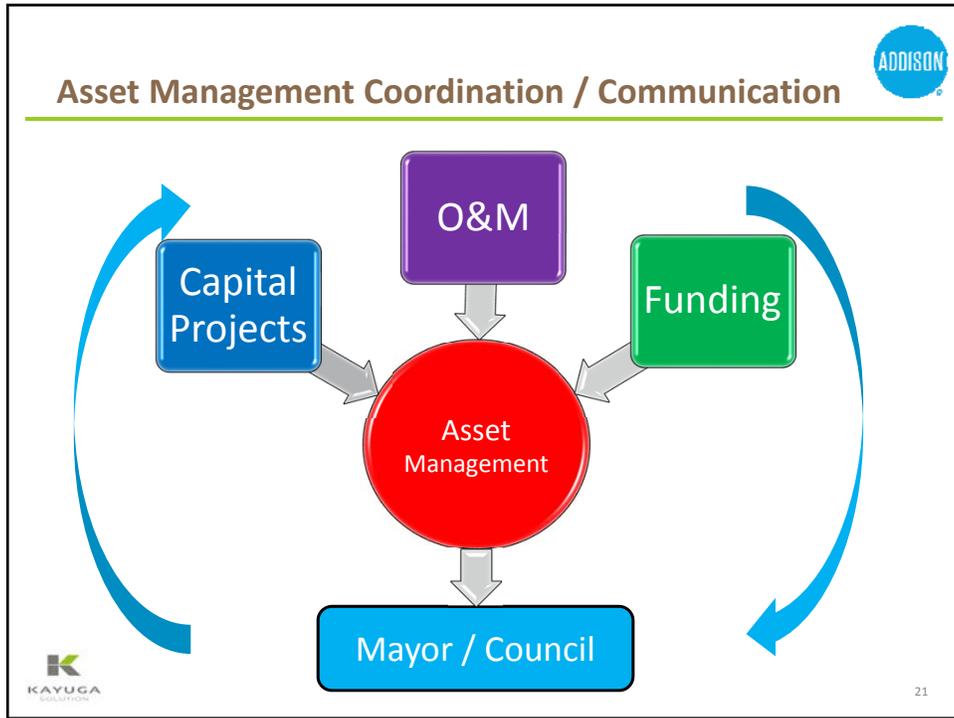
Asset Management Strategy

Funding Strategy

Asset Management Plan

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How - Asset Management Process

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What assets does Addison own? How do we manage them?



- Develop a database (asset register) to document all assets owned and managed → Asset data foundation
 - Define an asset
 - Inventory asset
 - Understand asset attributes required to support asset management decisions
 - Establish an asset hierarchy to organize the asset
 - Assign asset classes to group similar assets



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What is the Current State of The Asset?



- Visual condition assessment
 - Identify immediate needs
 - Identify future needs



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Condition Assessment Scale

- Inspection based

Scale	Description
1	New or nearly new condition
2	Very good condition or better than expected
3	Good or as expected condition
4	Poor or recommended replacement within 2 years
5	Failed or nearing failure, need immediate attention
- Age based

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What is the agreed level of service?

- Roadway Level of Service (Pavement Condition Index)

Excellent Condition (PCI >90)

Breedlove Place

Good Condition (PCI 80-90)

Buckingham Court

Fair Condition (PCI 70-80)

Quorum Drive

Poor Condition (PCI 60-70)

Airport Parkway

Failed Condition (<60)

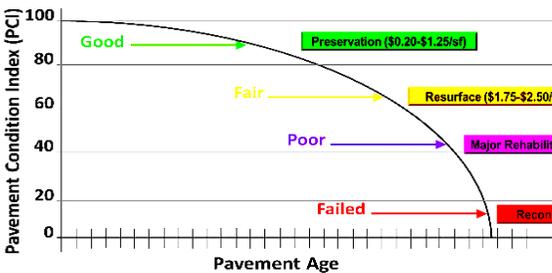
Midway Road

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Level of Service → Management Decision → \$\$\$\$



- Higher service level = \$\$\$\$ (Capital, O&M)
- Establishing a high level of service requires more frequent maintenance and refurbishments
- More frequent maintenance helps to extend the life of the asset, but requires more resources




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Life Cycle Cost (LCC) Example: Parkview Park






Assets	Quantity
Artwork	1
Backflow Preventer	1
Brick Pavers	1
Chair	12
Electrical Outlet	10
Gravel	3
Irrigation Control Valve	12
Irrigation Controller	1
Lighting – Double Headed Pole	6
Lighting – Down Light	8
Lighting – Up Light	3
Lighting – Retaining Wall Lights	12
Meter	3
Panel	1
Park Monument	1
Pergola	1
Pet Waste Station	2
Table	6
Pedestrian Ramp	4
Signage	3
Trash Can	4
Trellis	6
Retaining Wall	2
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LCC Example: Parkview Park



Assets	Quantity	Replacement	Activity
Artwork	1	Replace in 30 years	
Backflow Preventer	1	Replace in 20 years	Inspect yearly
Brick Pavers	1	Replace in 50 years	
Chair	12	Replace in 3 years	
Electrical Outlet	10	Replace in 10 years	
Gravel	3	Replenish yearly	
Irrigation Control Valve	12	Replace in 20 years	
Irrigation Controller	1	Replace in 10 years	
Lighting – Double Headed Pole	6	Replace in 30 years	Paint every 5 years
Lighting – Down Light	8	Replace in 5 years	
Lighting – Up Light	3	Replace in 3 years	
Lighting – Retaining Wall Lights	12	Replace in 5 years	
Meter	3	Replace in 20 years	
Panel	1	Replace in 20 years	
Park Monument	1	Replace in 20 years	
Pergola	1	Replace in 50 years	Paint every 5 years
Pet Waste Station	2	Replace in 5 years	
Table	6	Replace in 3 years	
Pedestrian Ramp	4	Replace in 50 years	
Signage	3	Replace in 5 years	
Trash Can	4	Replace in 10 years	
Trellis	6	Replace in 30 years	Paint every 5 years
Retaining Wall	2	Replace in 80 years	
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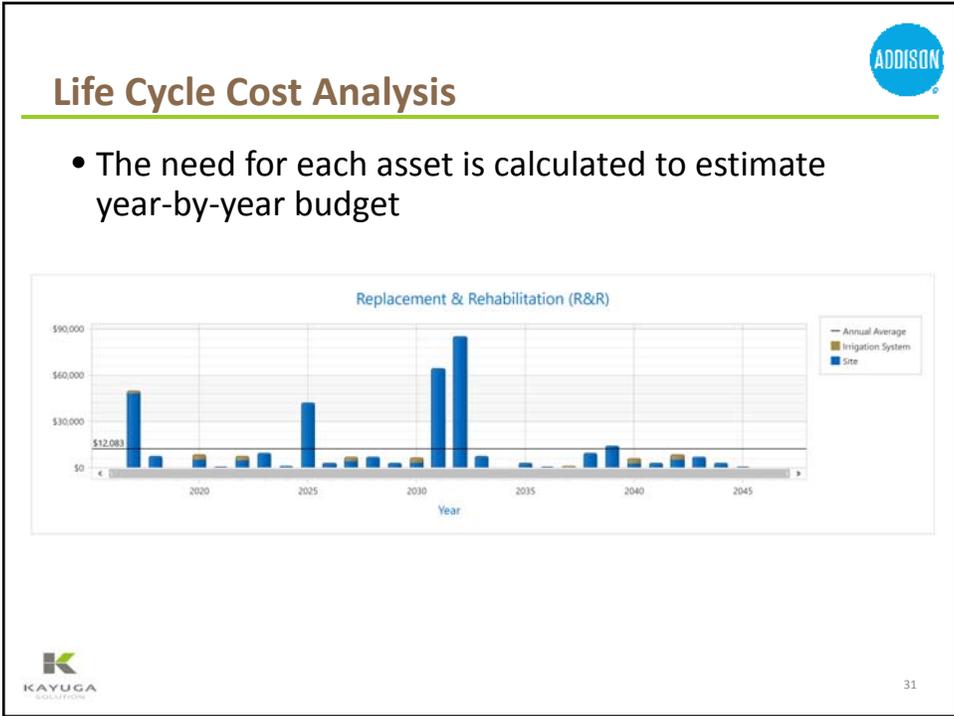
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LCC Example: Parkview Park



Assets	Quantity	Replacement	Cost	Activity	Cost
Artwork	1	Replace in 30 years	\$80,000	Paint every 4 years	\$2,000
Backflow Preventer	1	Replace in 20 years	\$2,000	Inspect yearly	\$300
Brick Pavers	1	Replace in 50 years	\$5/SF		
Chair	12	Replace in 3 years	\$100		
Electrical Outlet	10	Replace in 10 years	\$200		
Gravel	3	Replace in 80 years	\$2/SF	Replenish yearly	\$0.50/SF
Irrigation Control Valve	12	Replace in 20 years	\$200		
Irrigation Controller	1	Replace in 10 years	\$3,000		
Lighting – Double Headed Pole	6	Replace in 30 years	\$5,000	Paint every 5 years	\$800
Lighting – Down Light	8	Replace in 5 years	\$200		
Lighting – Up Light	3	Replace in 3 years	\$200		
Lighting – Retaining Wall Lights	12	Replace in 5 years	\$300		
Meter	3	Replace in 20 years	\$800		
Panel	1	Replace in 20 years	\$1,500		
Park Monument	1	Replace in 20 years	\$4,000		
Pergola	1	Replace in 50 years	\$25,000	Paint every 5 years	\$4,000
Pet Waste Station	2	Replace in 5 years	\$500		
Table	6	Replace in 3 years	\$250		
Pedestrian Ramp	4	Replace in 50 years	\$6,000		
Signage	3	Replace in 5 years	\$200		
Trash Can	4	Replace in 10 years	\$800		
Trellis	6	Replace in 30 years	\$2,000	Paint every 5 years	\$400
Retaining Wall	2	Replace in 80 years	\$25/SF		
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Target Level of Service

Metric	Definition	Target
Asset Accountability	The percentage of assets that are properly recorded in the asset registry	98 – 100%
Asset Availability	The portion of time that an asset is delivering its service level	95 – 99%
Maintenance Backlog	The percentage of work orders that are open as a percent of total work orders	5 – 10%
Failure Analysis	The portion of equipment downtime events that undergo a thorough analysis of failure modes, effects, and root causes	85 – 100%
Planned Work	The portion of corrective maintenance work hours that are planned and scheduled in advance	85 – 95%
Overtime	The portion of maintenance work hours that are performed at an overtime rate	5 – 8%
Relative Maintenance Cost	Maintenance spending as a percentage of asset replacement value of the plant being maintained	1.5 – 2.5%
Technician Productivity	The percentage of work hours spent on productive activities versus nonproductive (e.g., rework, waiting for parts)	70 – 85%
Rework	The portion of maintenance work that has to be redone due to poor installation, shoddy workmanship or incorrect diagnosis	2 – 5%

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Assets are Prioritized According to Risk of Failure

- With limited budget and resources, asset needs are prioritized using risk
- Risk considers not only timing to an asset failure, but also the impact of an asset failure
- Every asset receives a risk score



Probability of Failure
(Timing to Failure)

- Mortality
- Capacity
- Level of Service
- Financial Efficiency

Consequence of Failure
(Impact of a failure)

- Economic
- Environment
- Social



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Multi-Tiered Asset Criticality Methodology

- For asset criticality, multi-tiered methodology is used
 - By facility (e.g., warehouse vs. City Hall)
 - By asset (e.g., play structure vs. bench)
- Same asset in a more critical facility will receive a higher consequence of failure score

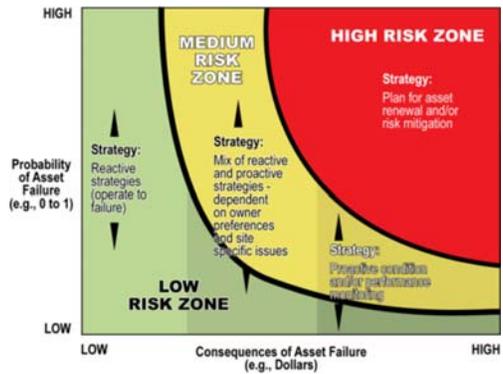


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Risk-Based Strategy



- The goal of the AMP is to identify assets in the red zone and to correct them before assets in the yellow and green zones



When - Timeline





Timeline

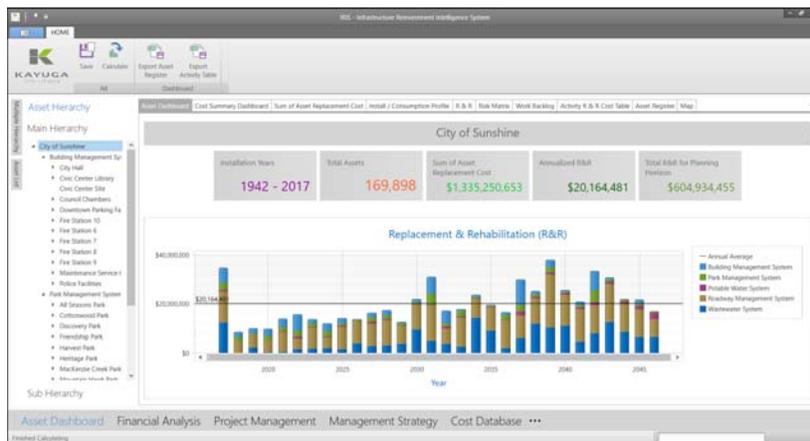
- Asset management plans for buildings, water, wastewater, parks, landscape areas, trails, roadway, and fleet will be completed by March 2018

Tasks	Description	2017						2018			
		6	7	8	9	10	11	12	1	2	3
0	Project Management										
1	Project Kick-off Meeting / AM Training										
2	Asset Management Plan Development										
2.1	Buildings										
2.2	Water/Wastewater										
2.3	Parks, Landscape Areas, and Trails										
2.4	Roadway										
2.5	Fleet										
3	Communication										



Asset Management Decision Support System

- IRIS (Infrastructure Reinvestment Intelligence System)





Thank you!

