City of Chula Vista

Asset Management Program
Technical Advisory Committee

February 12, 2015

"above, below, and all around you"

Agenda

- Asset Management Goals and Objectives
- Asset Management Methodology
- Criticality/Risk Assessment Methodology
- Life Cycle Cost Methodology
- Asset Management Systems:
  - Wastewater Management System
  - Urban Forestry Management System
  - Park Management System
- AMP Tool Demonstration

Asset Management

Delivering an established

level of service

while managing individual assets to

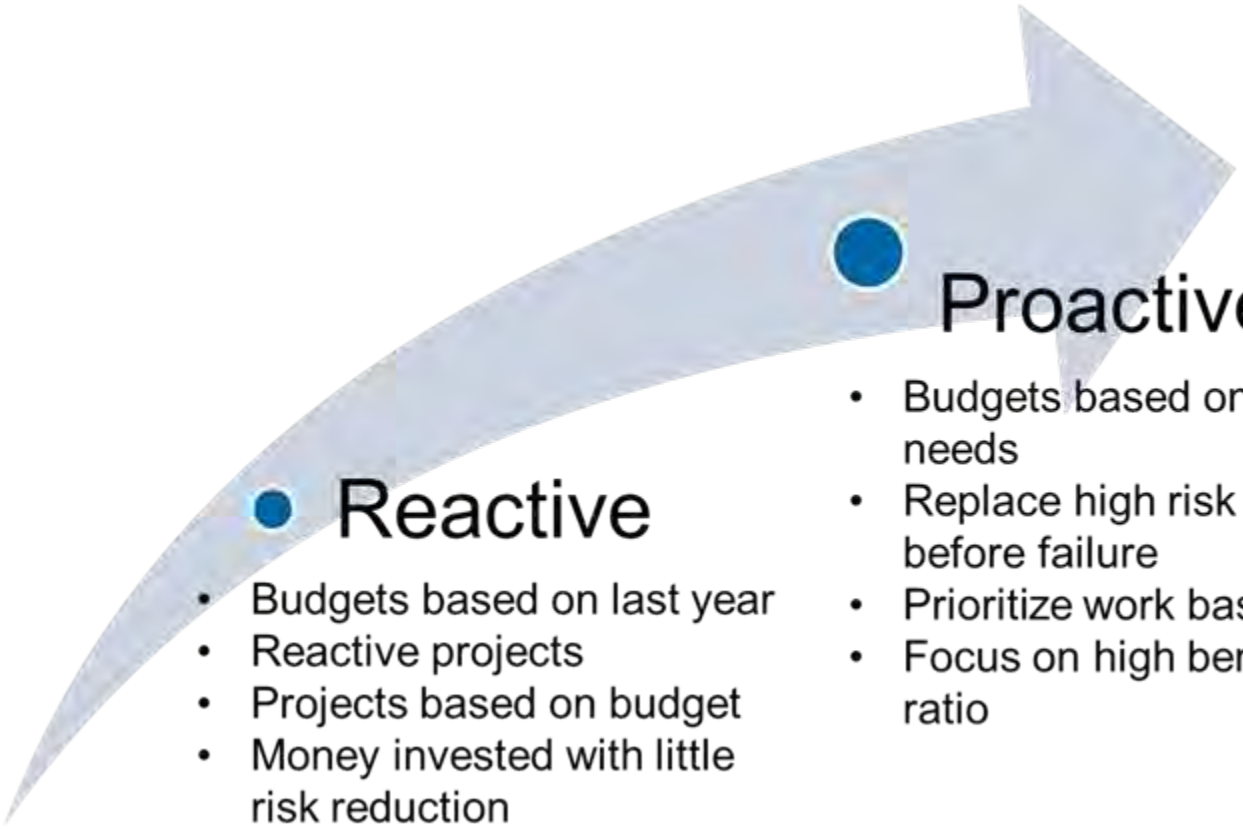
minimize the life cycle cost

with an acceptable

level of risk

Optimized Sustainable Stewardship

Effective Asset Management



Goal of Asset Management

Customer Expectations

Cost of Service

Level of Service

Risk

Asset Management Program Objectives

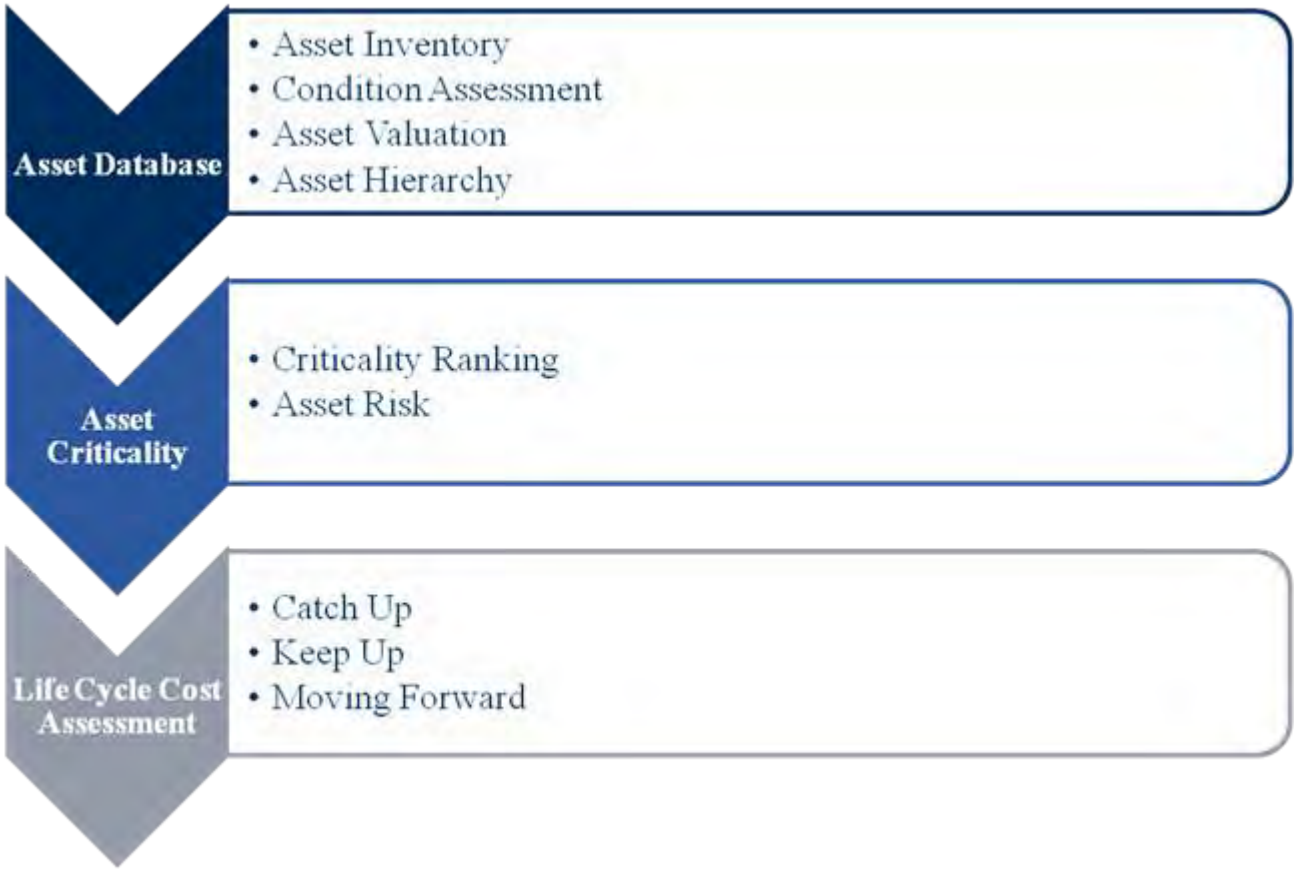
- **Catching Up $**
- **Keeping Up $**
- **Moving Forward $**

Asset Management Program (AMP)

Building Management System	BMS
Drainage Management System	DMS
Fleet Management System	FMS
General Government Management System	GGMS
Open Space Management System	OSMS
Parks Management System	PMS
Roadway Management System	RMS
Urban Forestry Management System	UFMS
Wastewater Management System	WMS

9 Asset Management Systems for 100 years of investments

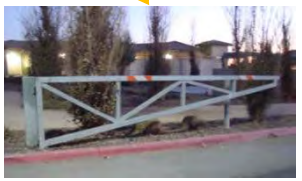
Asset Management Methodology



Data Collection Activities

Condition Assessment

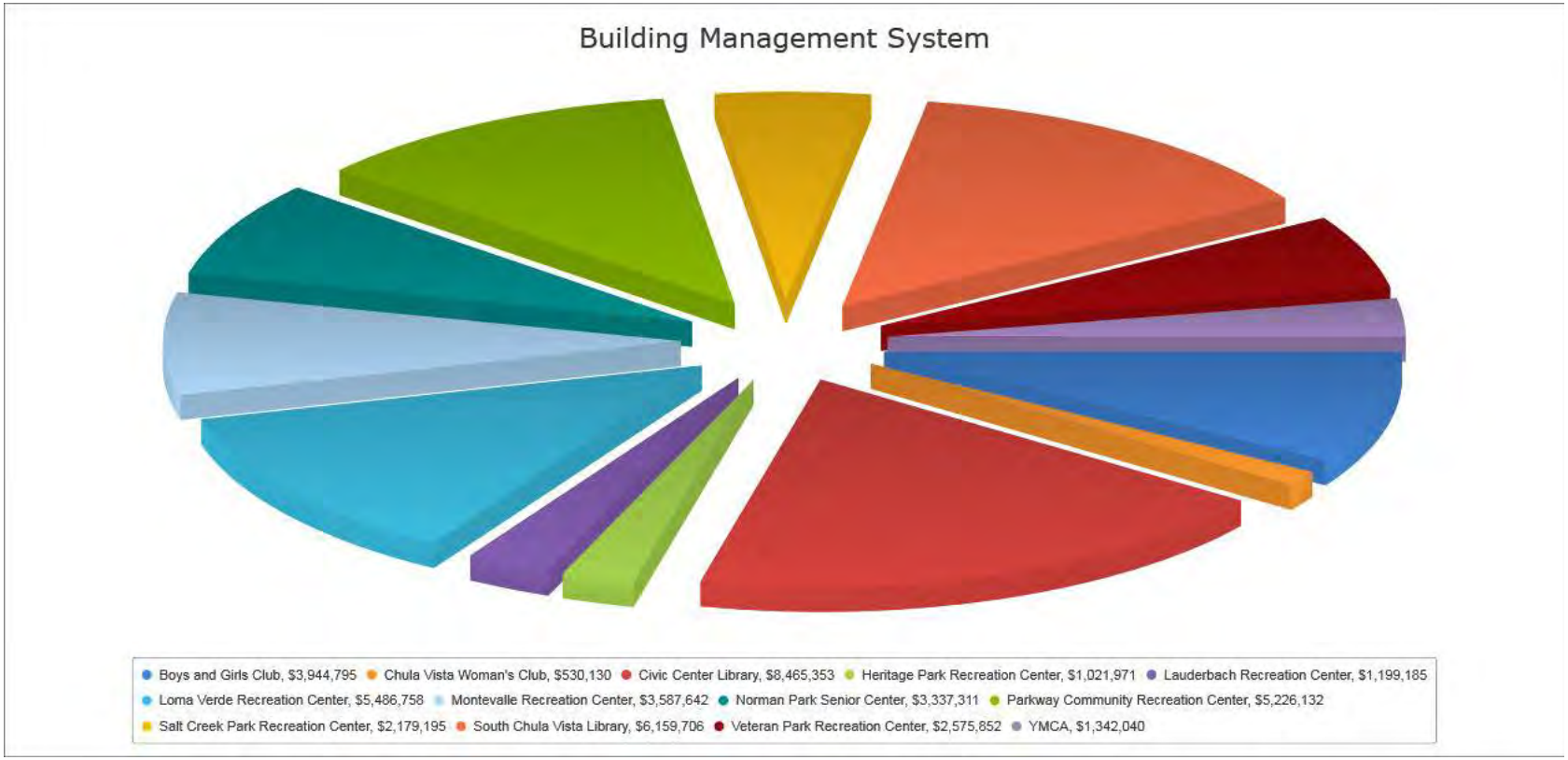
Asset Mapping



Documenting What is Managed (Asset Register)

Location	Sub-Location	Name	Asset ID	Size	Size Unit	Size 2	Size 2 Unit	Quantity	Material	Asset Class	Type	Installation Year	Age	Life	Condition (1 to 5)	CoF	PoF (%)	Condition Comments	Replacement Cost	Additional Comments
Knots Lane	Wet / Dry Well	Wet Well	SLS16005	449.6	CY			1	Reinforced	Well	Wet	1999	14	75	2	5	8.06%		$ 314,689	
Knots Lane	Wet / Dry Well	Dry Well	SLS16006	1220	CY			1	Reinforced	Well	Dry	1999	14	75	2	5	8.06%		$ 354,156	
Knots Lane	Wet / Dry Well	Stairway	SLS16007					5	Galvanized	Stairway		1998	14	40	2	2	20.71%		$ 21,000	
Knots Lane	Wet / Dry Well	Stairway Handrail	SLS16008	64	LF			1	Galvanized	Handrail	Aluminium	1999	14	40	2	3	20.71%		$ 13,440	
Knots Lane	Wet / Dry Well	Single Leaf Alum. Access Hatch	SLS16009	32	SF			1	Galvanized	Hatch		1999	14	40	2	3	20.71%		$ 5,000	
Knots Lane	Wet / Dry Well	Alum. Pump Removal Hatch	SLS16010	27	SF			1	Galvanized	Hatch		1999	14	40	2	3	20.71%		$ 5,000	
Knots Lane	Wet / Dry Well	Manhole Cover and Frame #1	SLS16011	3	Diam			1	Cast Iron	Manhole Cover		1999	14	75	2	1	8.06%		$ 1,400	
Knots Lane	Wet / Dry Well	Manhole Cover and Frame #2	SLS16012	3	Diam			1	Cast Iron	Manhole Cover		1999	14	75	2	1	8.06%		$ 1,400	
Knots Lane	Wet / Dry Well	Handrail (Pump Removal Hatch)	SLS16013	19	LF			1	Galvanized	Handrail	Aluminium	1999	14	40	2	3	20.71%		$ 3,990	
Knots Lane	Wet / Dry Well	Supply Fan	SLS16014					1		HVAC		1999	14	20	2	2	58.57%		$ 4,200	"No odor contro
Knots Lane	Wet / Dry Well	Exhaust Fan	SLS16015					1		HVAC		1999	14	20	2	2	58.57%		$ 4,200	
Knots Lane	Wet / Dry Well	Pump #1	SLS16016	7.5	HP	355	gpm	1		WW-Pump-S		1998	14	5	5	5	100.00%	Needs to be replaced.	$ 42,000	"0.6 Hours
Knots Lane	Wet / Dry Well	Inflow Plug Valve with Handwheel Operator	SLS16017	6	Inches			1	Steel	WW-Valve-L	Plug	1999	14	40	2	5	20.71%		$ 21,000	"Maintained
Knots Lane	Wet / Dry Well	Outflow Check Valve, Spring Loaded #1	SLS16018	4	Inches			1	Steel	WW-Valve-S	Check	1999	14	30	2	4	50.00%		$ 2,100	"Maintained
Knots Lane	Wet / Dry Well	Outflow Plug Valve with Handwheel	SLS16019	4	Inches			1	Steel	WW-Valve-S	Plug	1999	14	30	2	4	31.88%		$ 6,160	"Maintained
Knots Lane	Wet / Dry Well	Pump #2	SLS16020	7.5	HP	355	gpm	1		WW-Pump-S		1998	14	5	5	5	100.00%	Needs to be replaced.	$ 42,000	"0.6 Hours
Knots Lane	Wet / Dry Well	Inflow Plug Valve with Handwheel Operator	SLS16021	6	Inches			1	Steel	WW-Valve-L	Plug	1999	14	40	2	5	20.71%		$ 21,000	"Maintained
Knots Lane	Wet / Dry Well	Outflow Check Valve, Spring Loaded #2	SLS16022	4	Inches			1	Steel	WW-Valve-S	Check	1999	14	30	2	4	31.88%		$ 2,100	"Maintained
Knots Lane	Wet / Dry Well	Outflow Plug Valve with Handwheel	SLS16023	4	Inches			1	Steel	WW-Valve-S	Plug	1999	14	30	2	4	31.88%		$ 6,160	"Maintained
Knots Lane	Generator & Control	Generator & Control Room Building	SLS16024	190	SF			1	CMU	Non-office		1999	14	60	2	4	11.27%		$ 23,750	"2 x 3" x 4' Louver
Knots Lane	Generator & Control	Flow Meter	SLS16025	6	Inches			1		Flow Meter		2013	0	25	3	2	50.00%		$ 15,000	"K-Factor: 0.9732
Knots Lane	Generator & Control	Bubbler Control System	SLS16026					1		Electric Panel		1999	14	20	2	5	58.57%		$ 10,000	"Wetwell level
Knots Lane	Generator & Control	Security System	SLS16027					1		Electric Panel		1999	14	20	2	5	58.57%		$ 10,000	
Knots Lane	Generator & Control	Telemetry	SLS16028					1		SCADA		1999	14	5	2	3	100.00%		$ 140,000	
Knots Lane	Generator & Control	Switchboard "SE"	SLS16029					1		Electric Panel		1999	14	20	2	5	58.57%		$ 10,000	
Knots Lane	Generator & Control	Transfer Switch (ATS)	SLS16030					1		Electric Panel		1999	14	20	2	5	58.57%		$ 10,000	
Knots Lane	Generator & Control	Main Control Panel (MCP)	SLS16031					1		Electric Panel		1999	14	20	2	5	58.57%		$ 10,000	"Pump on/off
Knots Lane	Generator & Control	Generator	SLS16032					1		Generator		1999	14	30	2	5	31.88%		$ 84,000	"Generator mair
Knots Lane	Generator & Control	Generator Diesel Tank	SLS16033	137	Gal			1		Tank	Diesel	1999	14	30	2	2	31.88%		$ 14,000	
Knots Lane	Generator & Control	MCC	SLS16034	208	V			1		MCC		1999	14	20	2	5	58.57%		$ 210,000	CAT. NO. 858
N. Batiquitos	Site	Paving		5050	SF			1	Asphalt	Pavement-AC		1998	15	50	2	1	16.43%		$ 353,500	condition. UV fadir
N. Batiquitos	Site	Outdoor Lighting #1 (South East)						1		Lighting		1998	15	30	2	1	35.36%		$ 4,900	
N. Batiquitos	Site	Outdoor Lighting #2 (North East)						1		Lighting		1998	15	30	2	1	35.36%		$ 4,900	
N. Batiquitos	Site	Outdoor Lighting #3 (South West)						1		Lighting		1998	15	30	2	1	35.36%		$ 4,900	
N. Batiquitos	Site	Outdoor Lighting #4 (North West)						1		Lighting		1998	15	30	2	1	35.36%		$ 4,900	

Asset Valuation

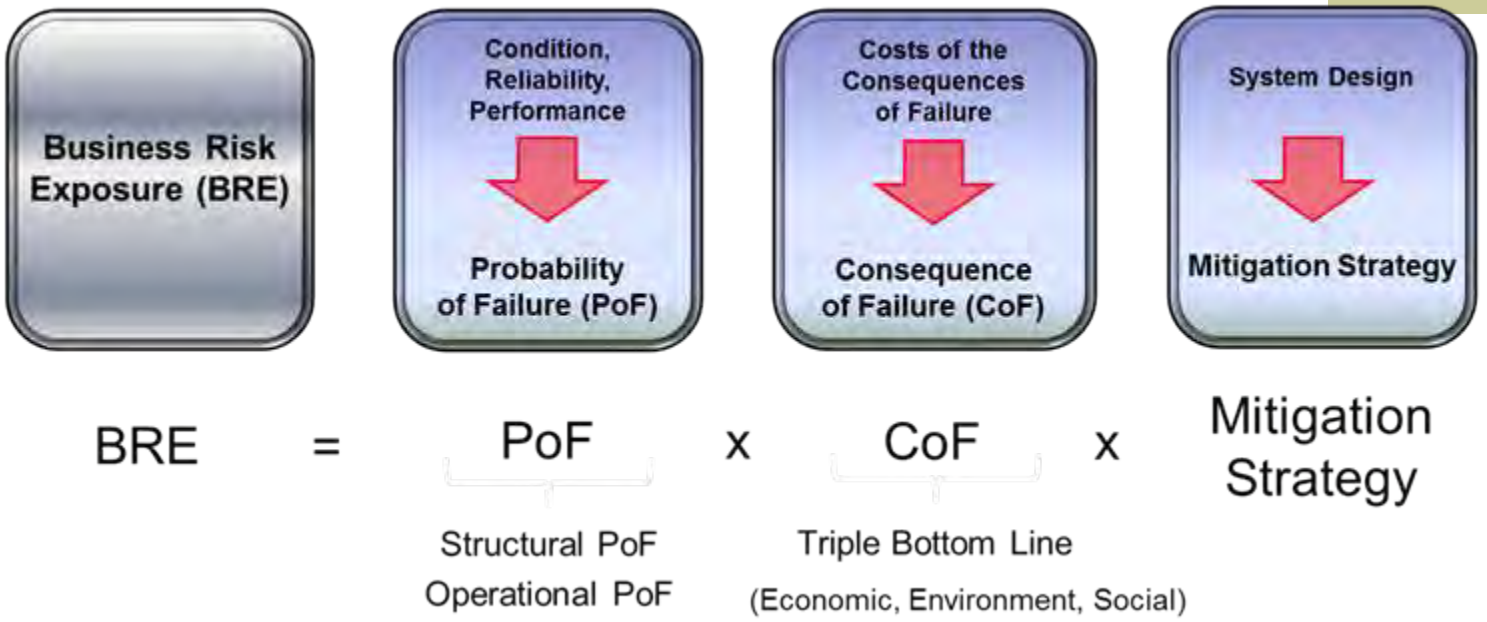


Asset Criticality

Criticality Methodology

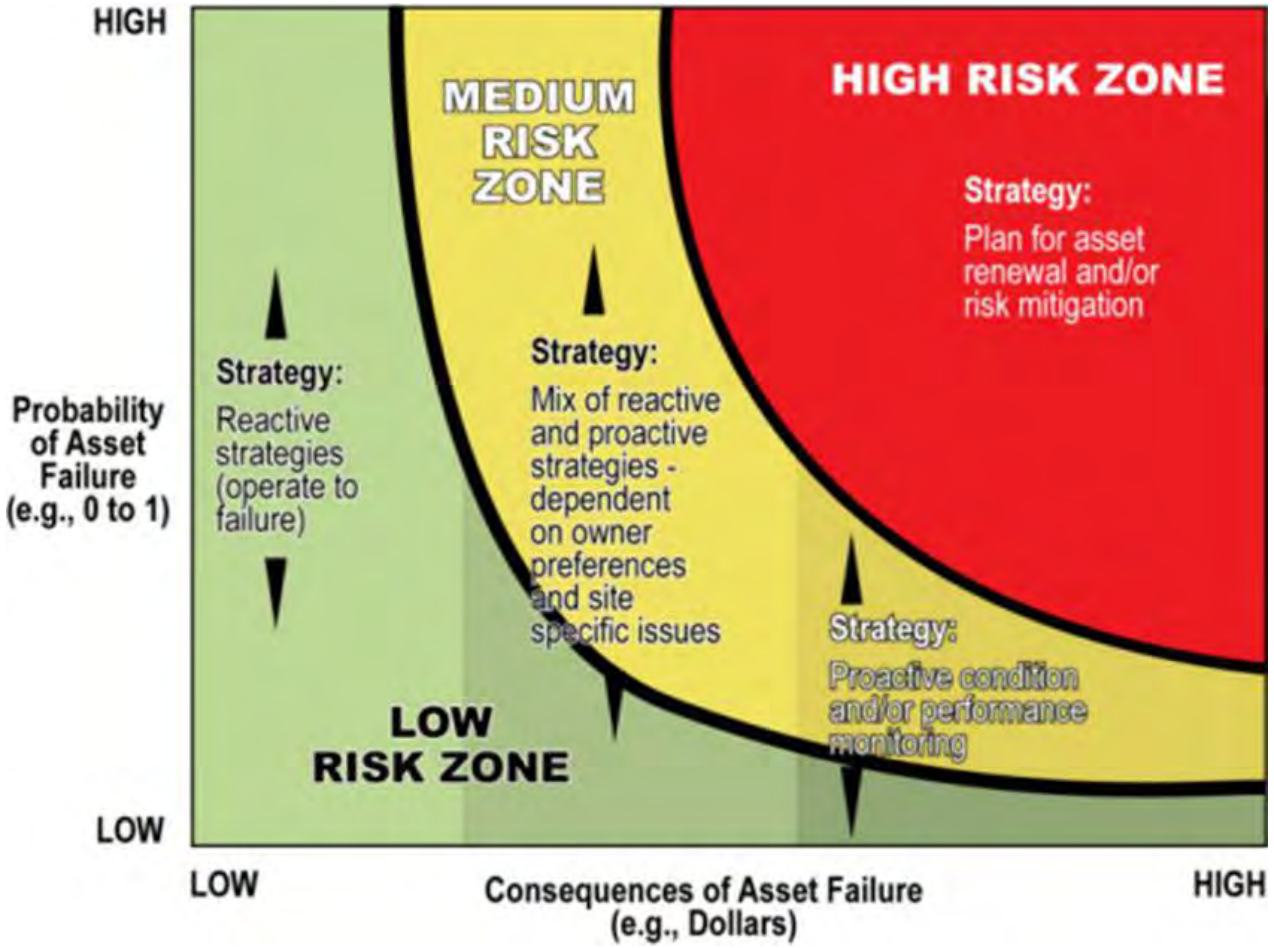
- By asset type and location
  - Type
  - Usage
  - Location
- By asset class
  - Example:
    - Playground
    - Sports courts

Risk

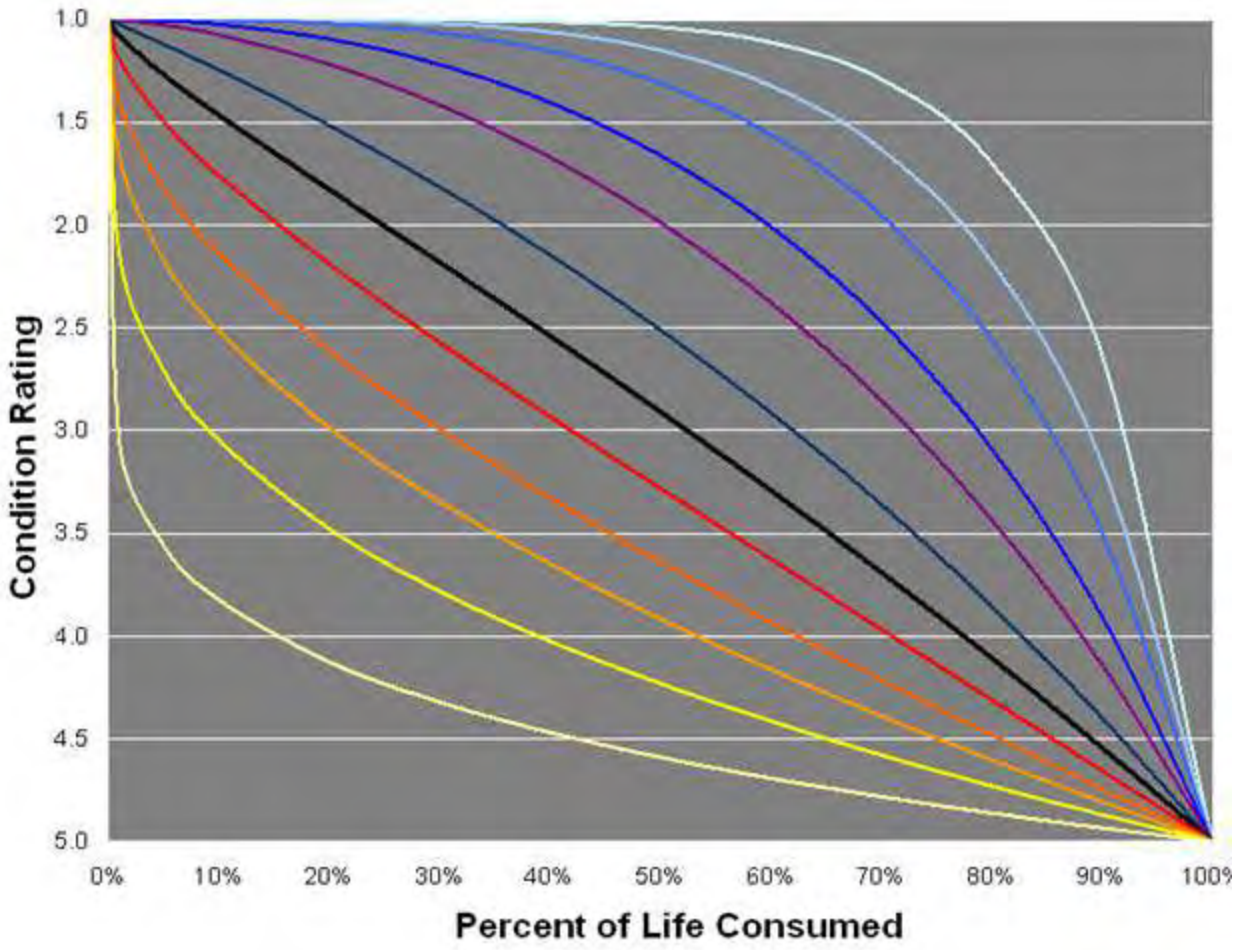


- Where PoF is driven by failure modes
- Physical Mortality (age)
- Capacity
- Levels of Service
- Financial Efficiency (life cycle cost)

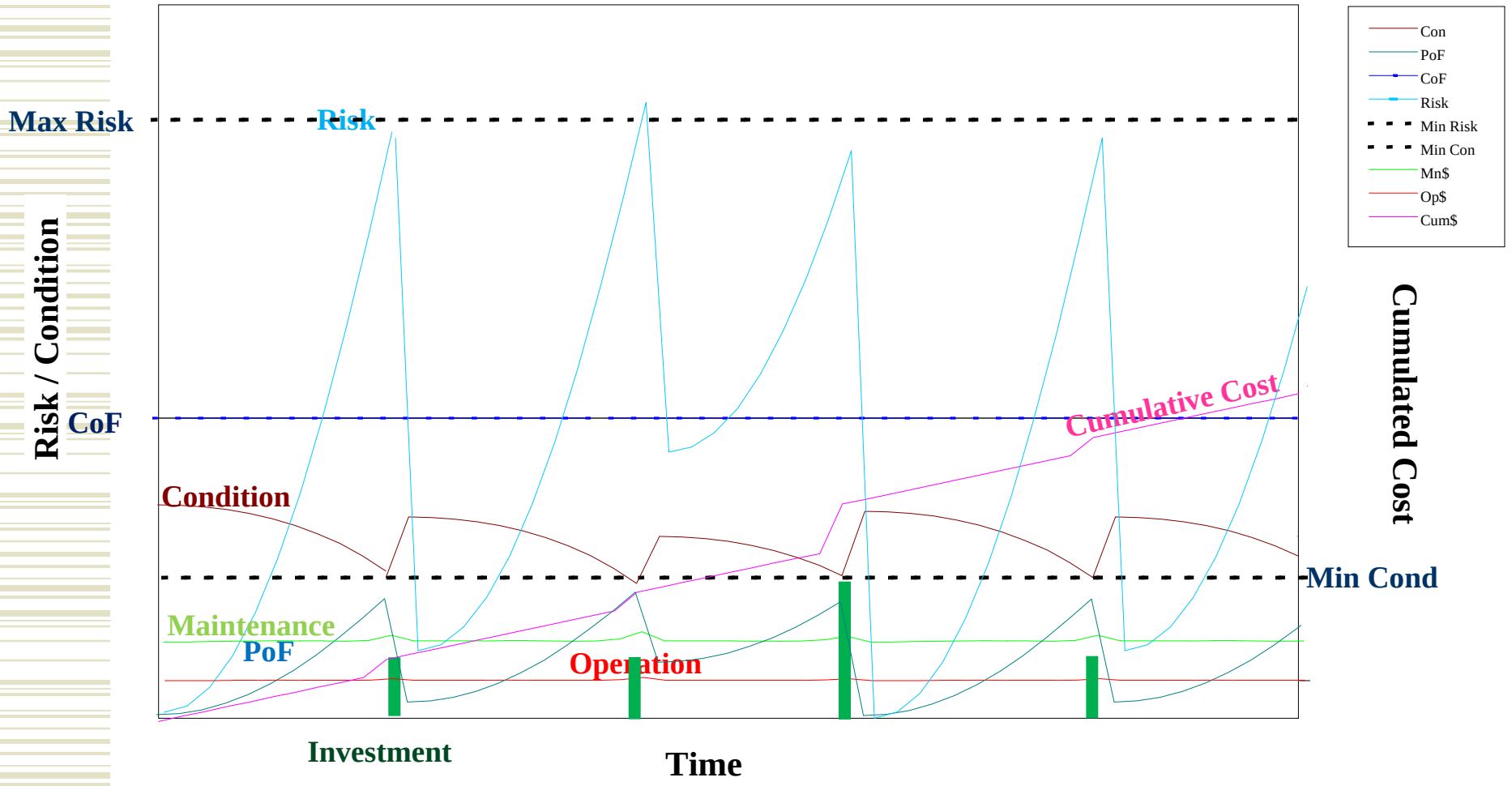
Management Strategy (Risk-Based)



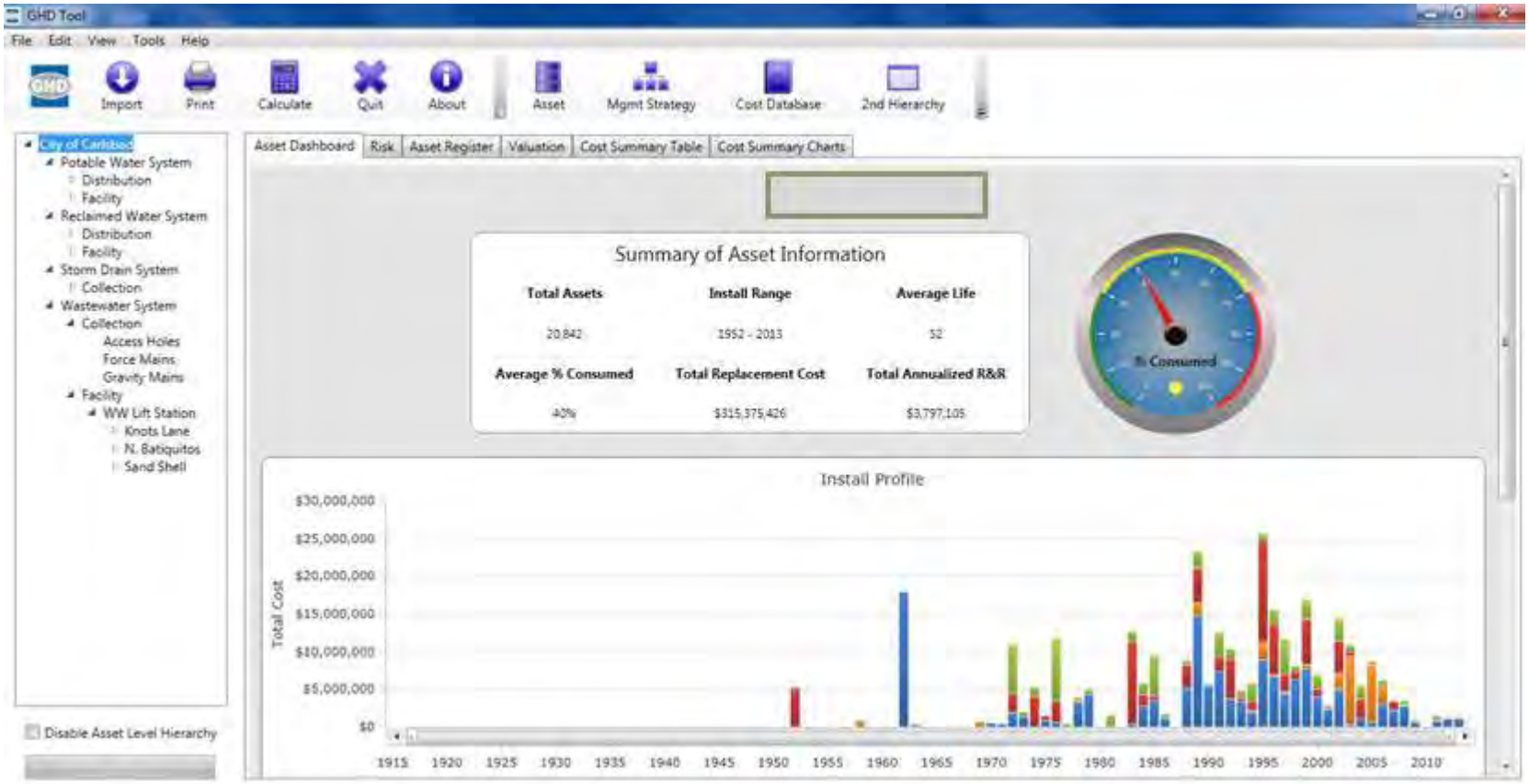
Calculating the Timing to Failure



Asset Life Cycle Investment Logic

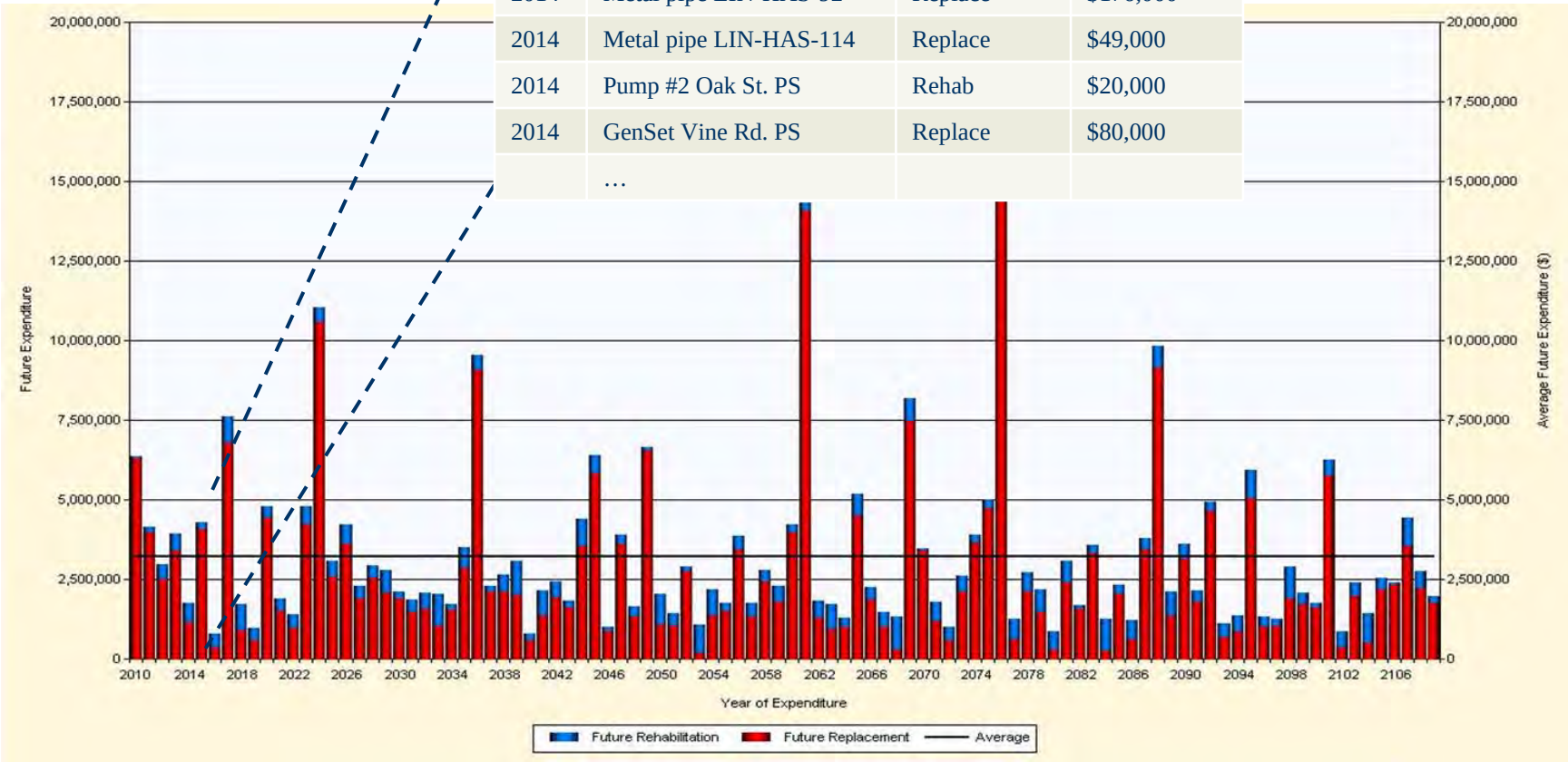


Asset Management Tool



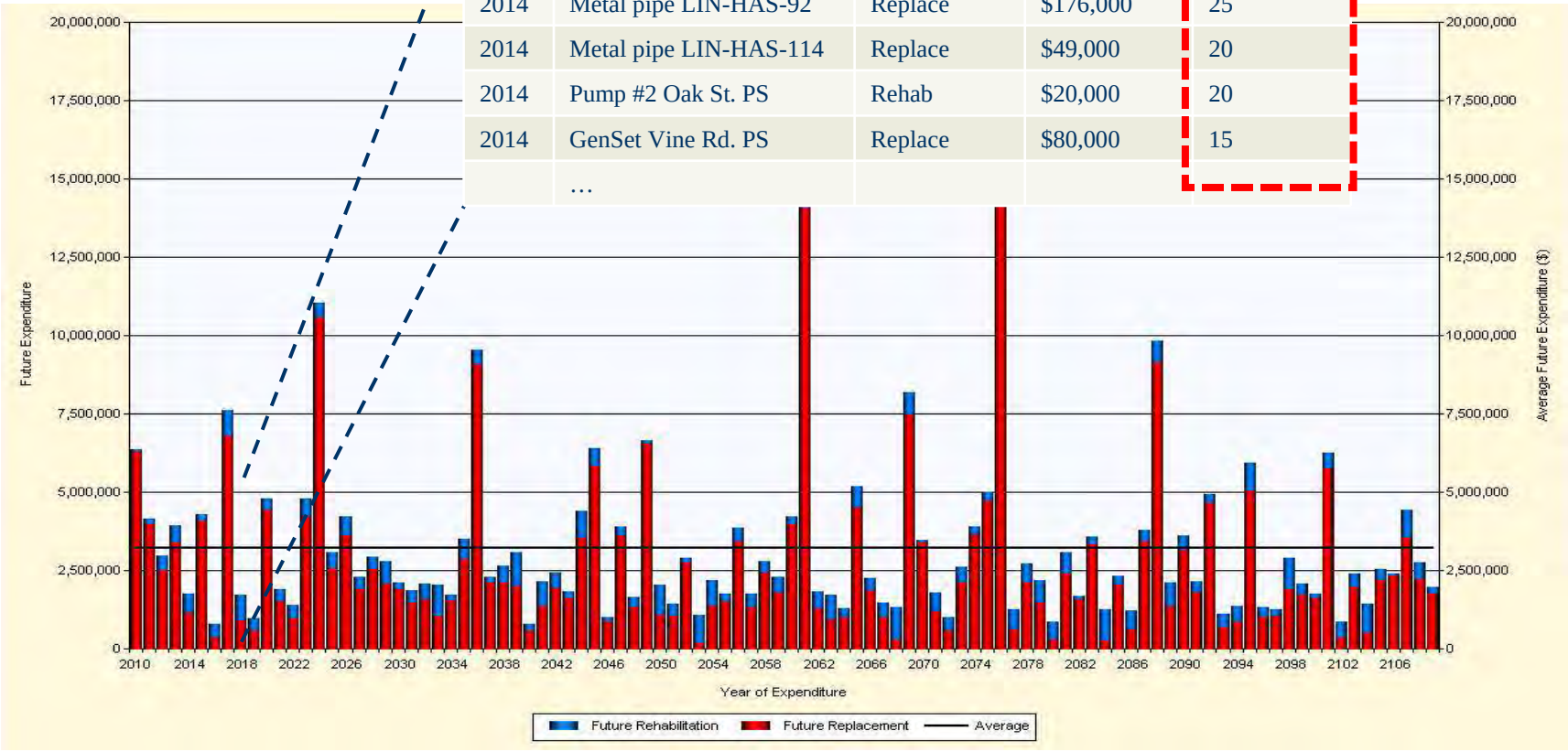
Understanding the Need (Year By Year, Asset By Asset)

Year	Asset Name	Action Type	Action Cost
2014	Metal pipe LIN-HAS-78	Replace	$340,000
2014	Metal pipe LIN-HAS-92	Replace	$176,000
2014	Metal pipe LIN-HAS-114	Replace	$49,000
2014	Pump #2 Oak St. PS	Rehab	$20,000
2014	GenSet Vine Rd. PS	Replace	$80,000
	…		



Risk-Based Prioritization

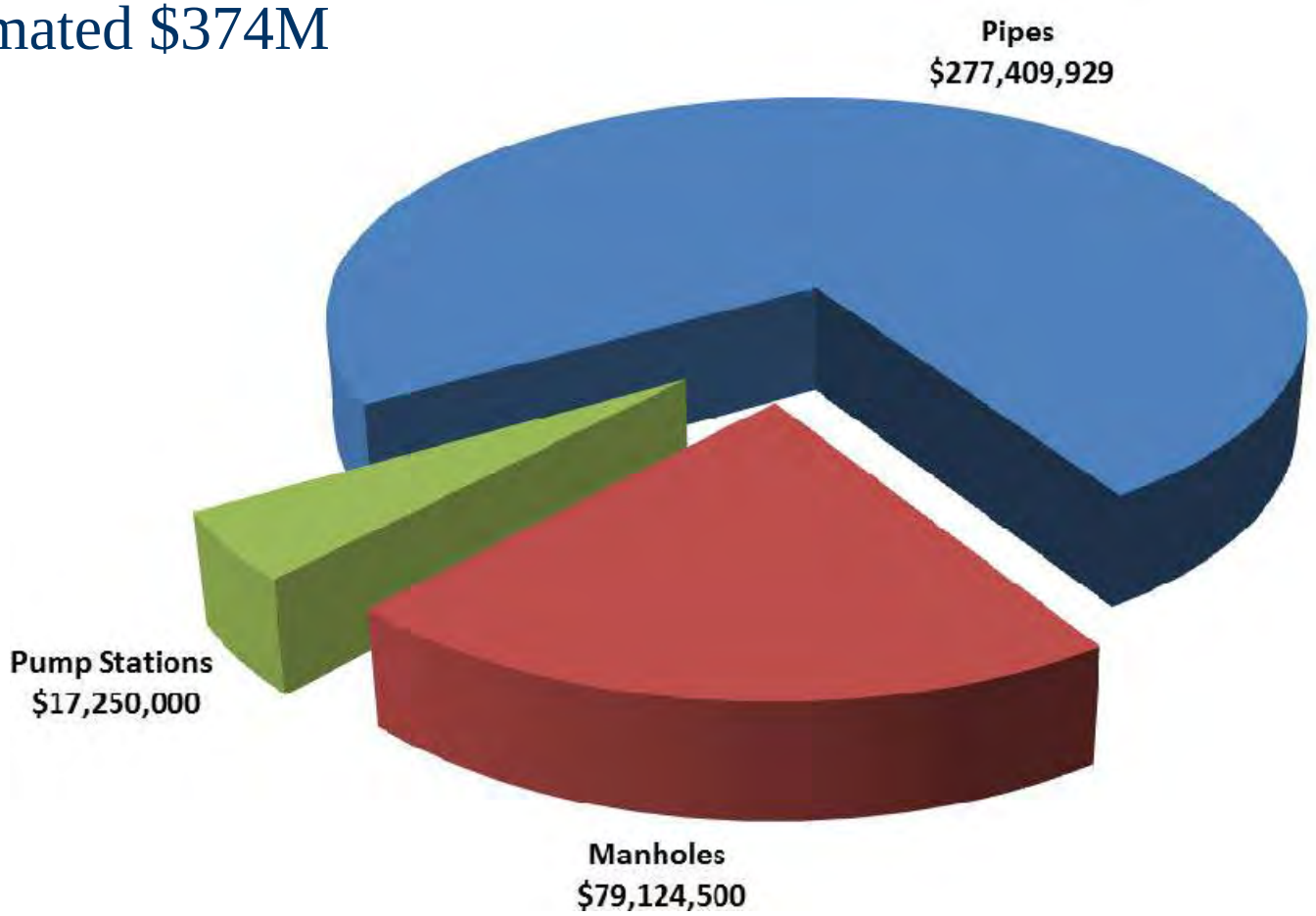
Year	Asset Name	Action Type	Action Cost	Risk Score
2014	Metal pipe LIN-HAS-78	Replace	$340,000	25
2014	Metal pipe LIN-HAS-92	Replace	$176,000	25
2014	Metal pipe LIN-HAS-114	Replace	$49,000	20
2014	Pump #2 Oak St. PS	Rehab	$20,000	20
2014	GenSet Vine Rd. PS	Replace	$80,000	15
	…			



WASTEWATER

Wastewater Asset Valuation

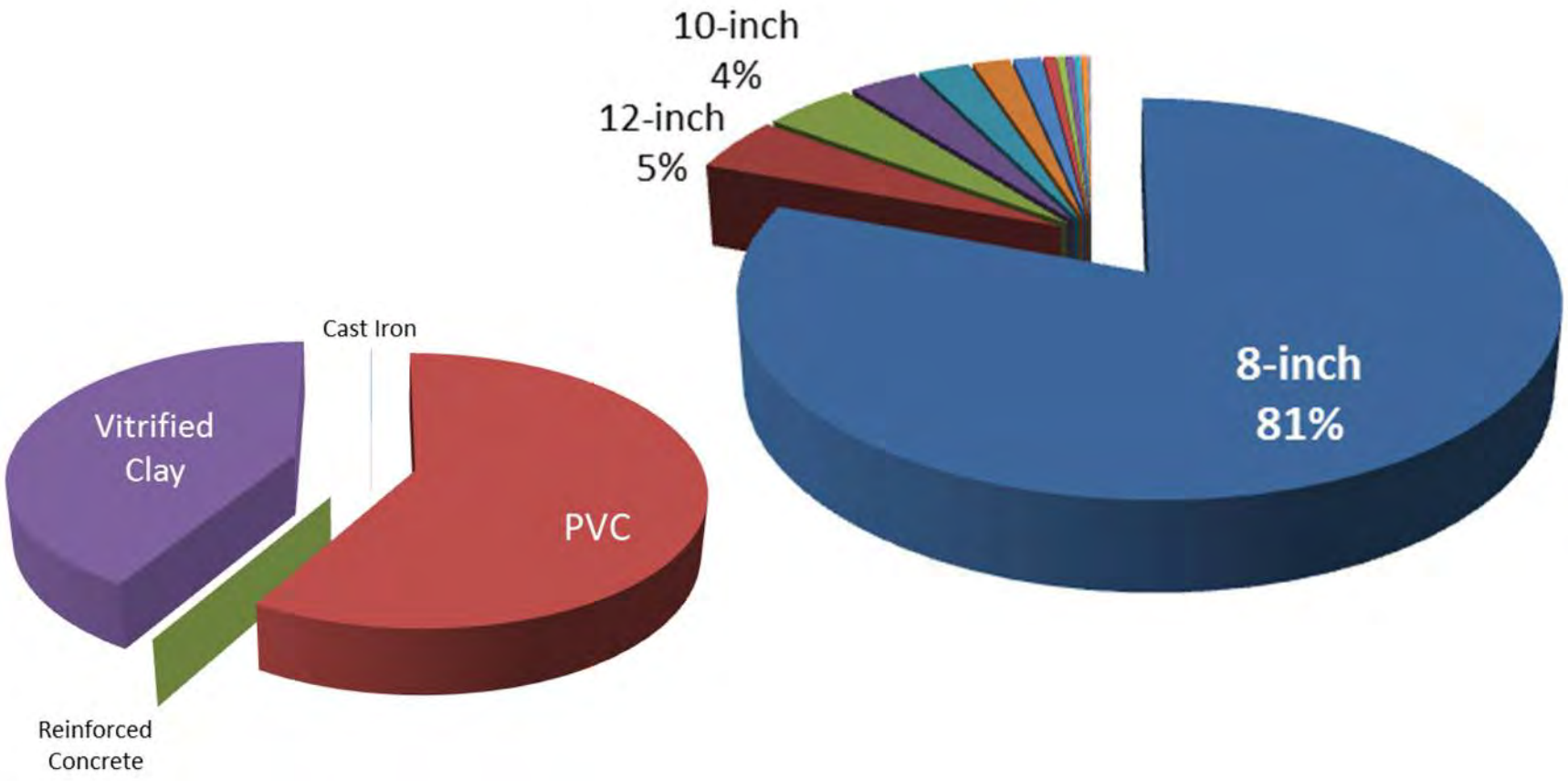
Estimated $374M



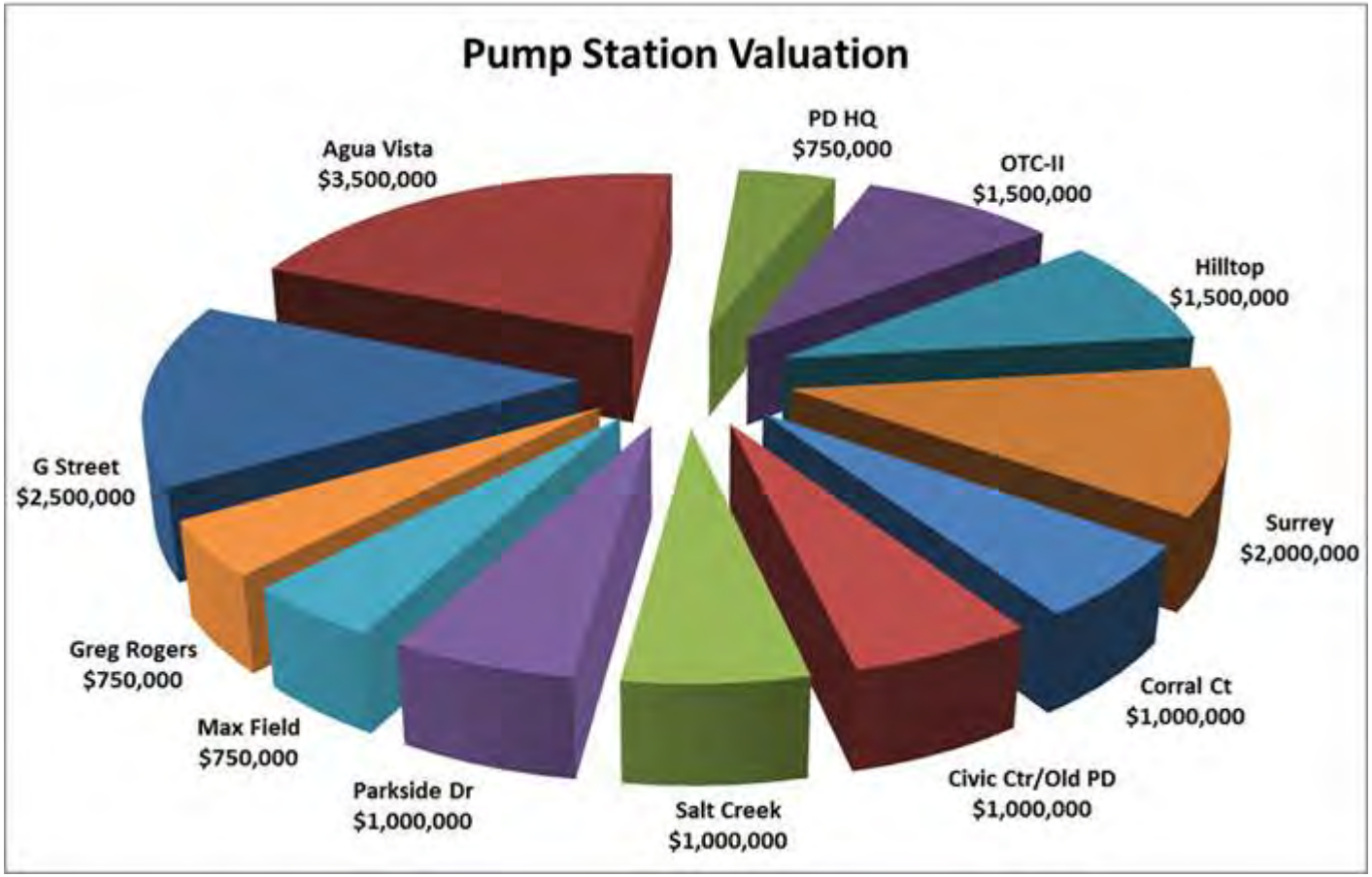
Collection Pipe Summary

Size (in)	Cast Iron	PVC	Reinforced Concrete	Vitrified Clay	Total (ft)	Total (miles)
4	659	8,609		120	9,388	2
6	335	12,681		32,718	45,734	9
8		1,216,297		890,926	2,107,223	399
10		68,201		41,888	110,089	21
12		68,534		49,222	117,756	22
14		3,146			3,146	1
15		40,162	823	41,513	82,498	16
16		683			683	>1
18		36,936		24,742	61,678	12
20		458			458	>1
21		8,807		6,426	15,233	3
24		8,386		663	9,049	2
27		665			665	>1
30		7,455		58	7,513	1
36		8,406		48	8,454	2
42		34,033			34,033	6
Total (ft)	994	1,523,459	823	1,088,324	**2,613,600**	
Total (miles)	>1	289	>1	206		**495**

Collection Pipe Summary



Pump Station Valuation



Pipe Criticality

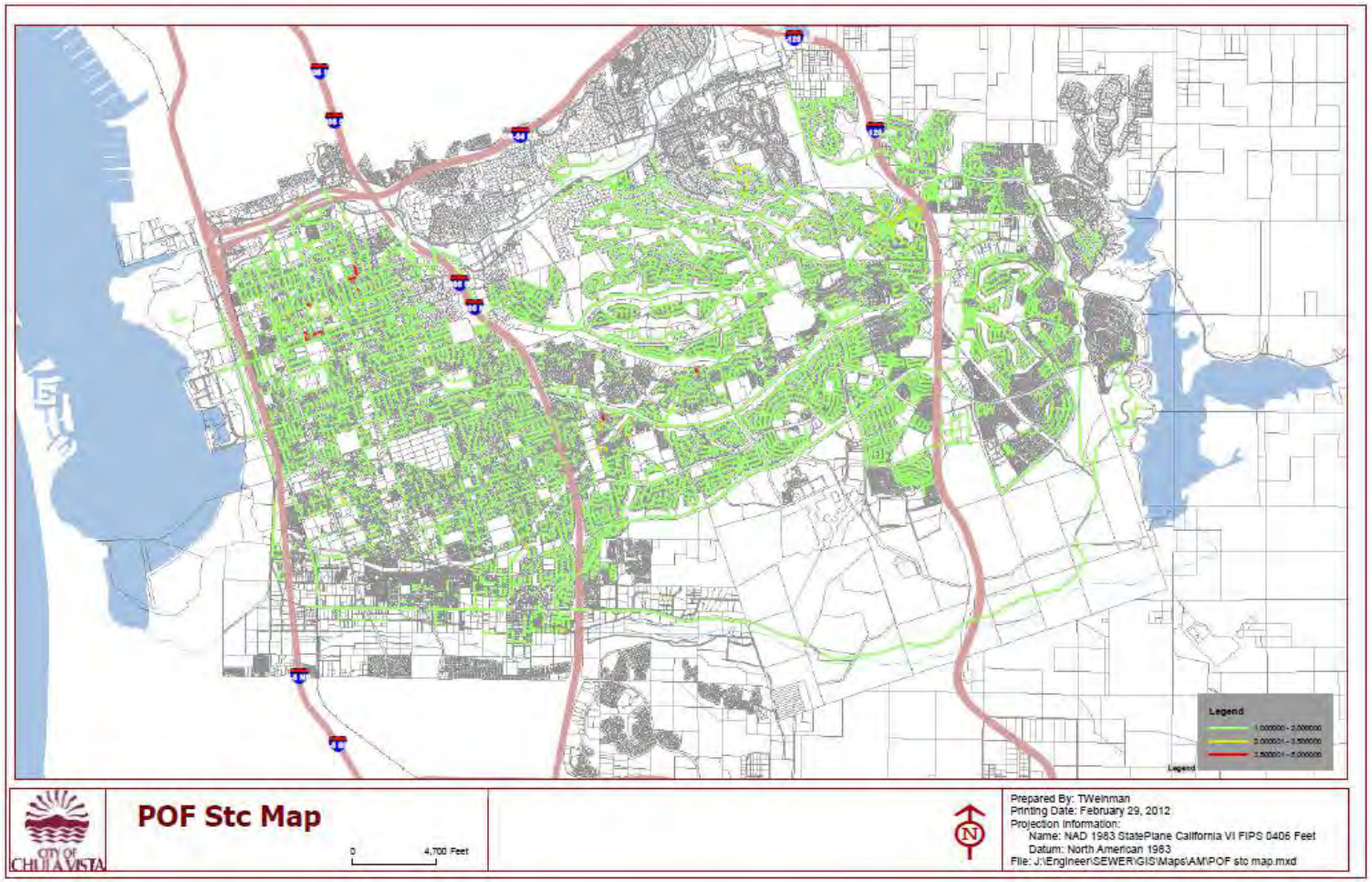
Factor	Contribution to CoF
Zone	20%
Water Bodies	30%
Street	25%
Size	15%
Depth	10%
Total	**100%**

Diameter and Slope Criticality

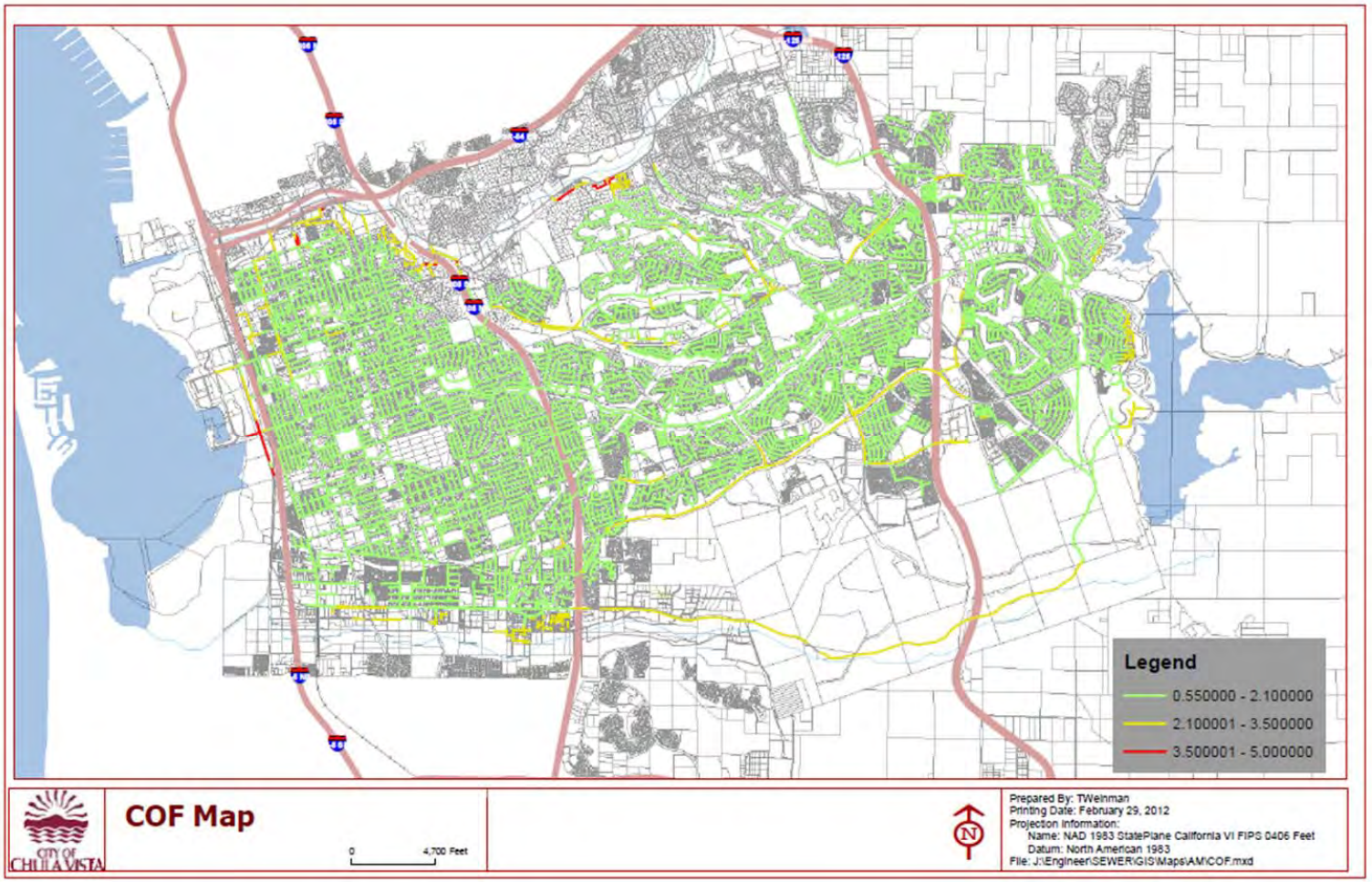
Rating	Diameter
1	$6 < d \leq 8$
2	$10 < d \leq 12$
5	$12 < d \leq 15$

Rating	Slope(s)
5	< 1%
Standard	2%

Probability of Failure



Consequence of Failure



Pump Station Criticality

G Street	5
Agua Vista	5
PD HQ Sewer Pump	5
OTC-II Pump	3
Hilltop Pump	3
Surrey Pump	2
Corral Ct Pump	2
Civic Ctr/Old PD	2
Salt Creek	1
Parkside Dr Pump	1
Max Field Pump	1
Greg Rogers	1

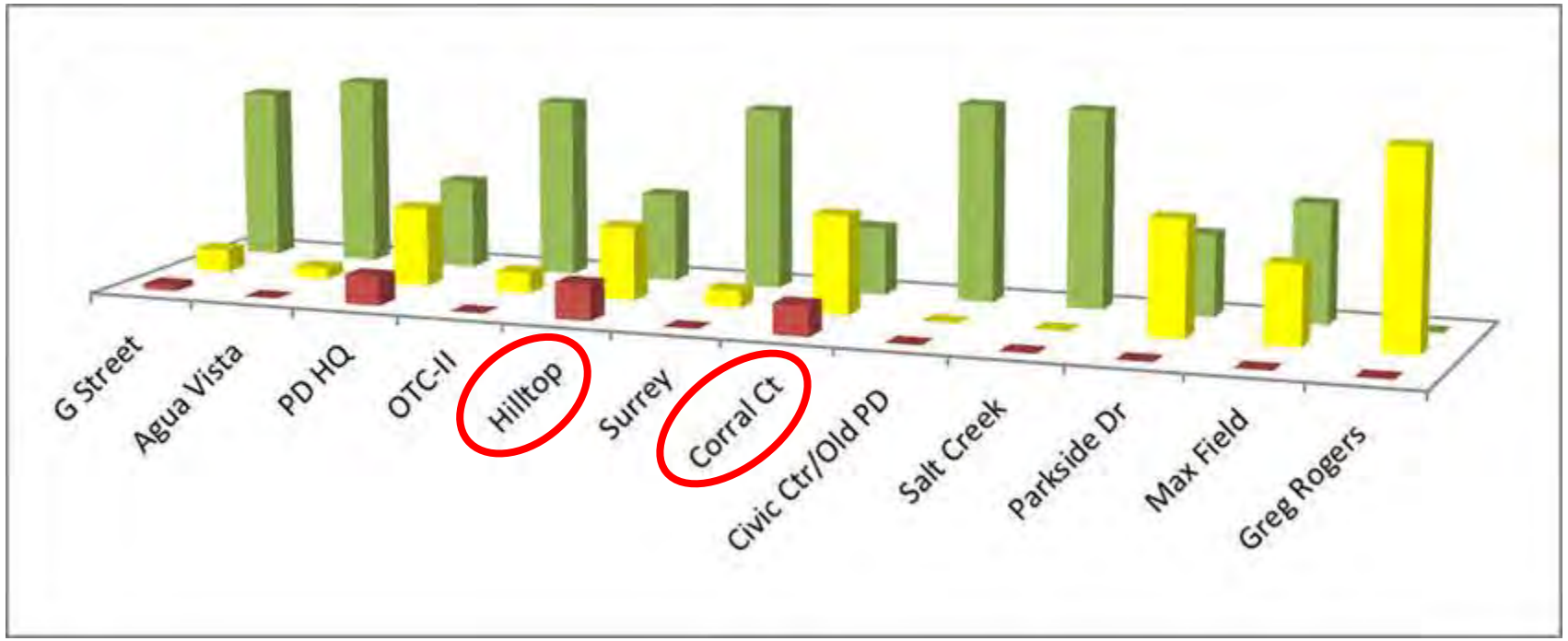
Criticality by Asset

	Class ID	Asset Class	CoF
CIVIL / SITE			
	BLD	Building	5
	STR	Structure	4
	ENC	Building - Enclosure	1
	WW	Wet Well	5
	YP	Yard Piping	5
	PAV	Pavement	1
	FNC	Fencing	1
	FM	Forcemain	5
	MH	Forcemain Manhole	1
	CO	Forcemain Cleanout	5

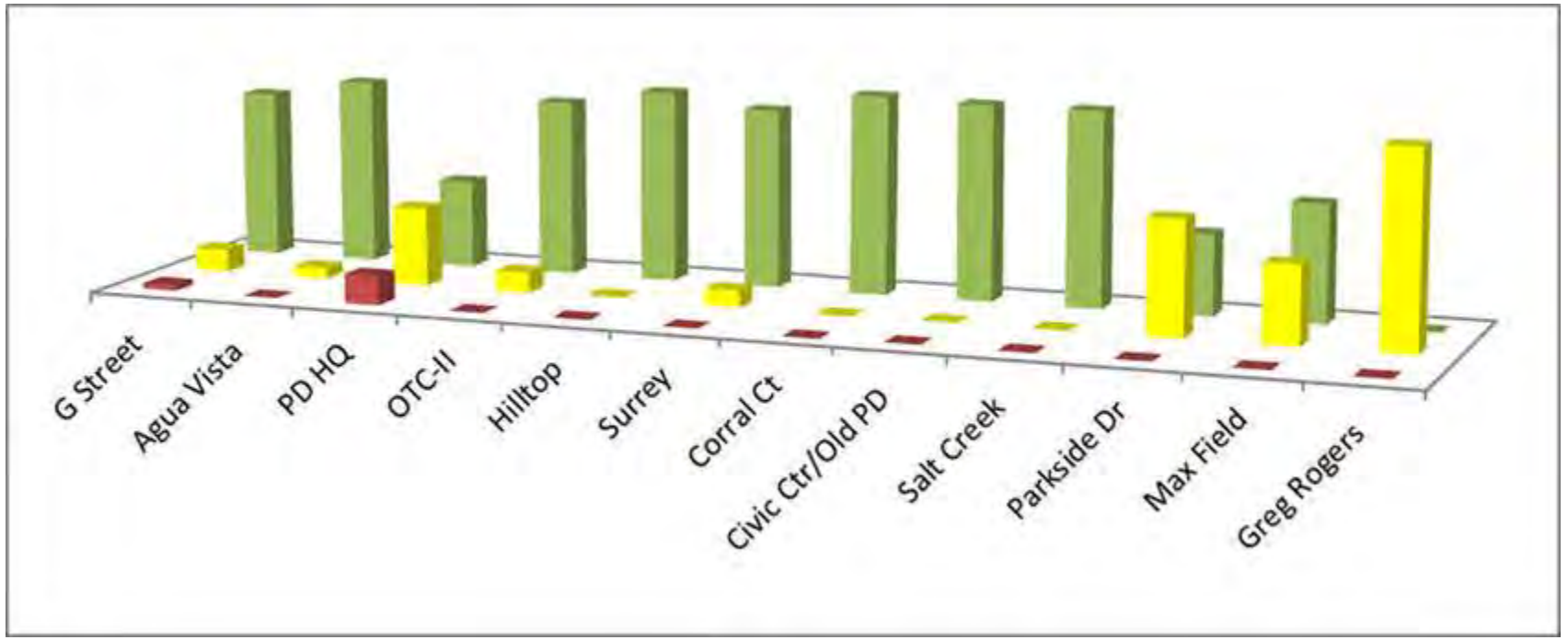
	Class ID	Asset Class	CoF
ELEC / INST			
	SCD	SCADA	3
	INST	Instruments	3
	PNL	Electric Panels	5
	MCC	Motor Control Center	5
	M	Motor	5
	SM	Motor - Small	2
	TR	Transformer	5
	TSW	Transfer Switch	4
	PLC	Programmable Loginc Controller	5

	Class ID	Asset Class	CoF
MECHANICAL			
	ARV	Air Releif Valve	2
	VLV	Valve	3
	AVA	Automatic Valve Actuator	2
	CMP	Compressor	3
	GEN	Genset	4
	CPS	Cathodic Protection System	3
	PMP	Pump	5
	SPMP	Submersible Pump	5
	HC	Hoist / Crane	1
	OTK	Tank - Outdoor	1
	SG	Sluice / Slide Gate	3

Pump Station Risk 2012

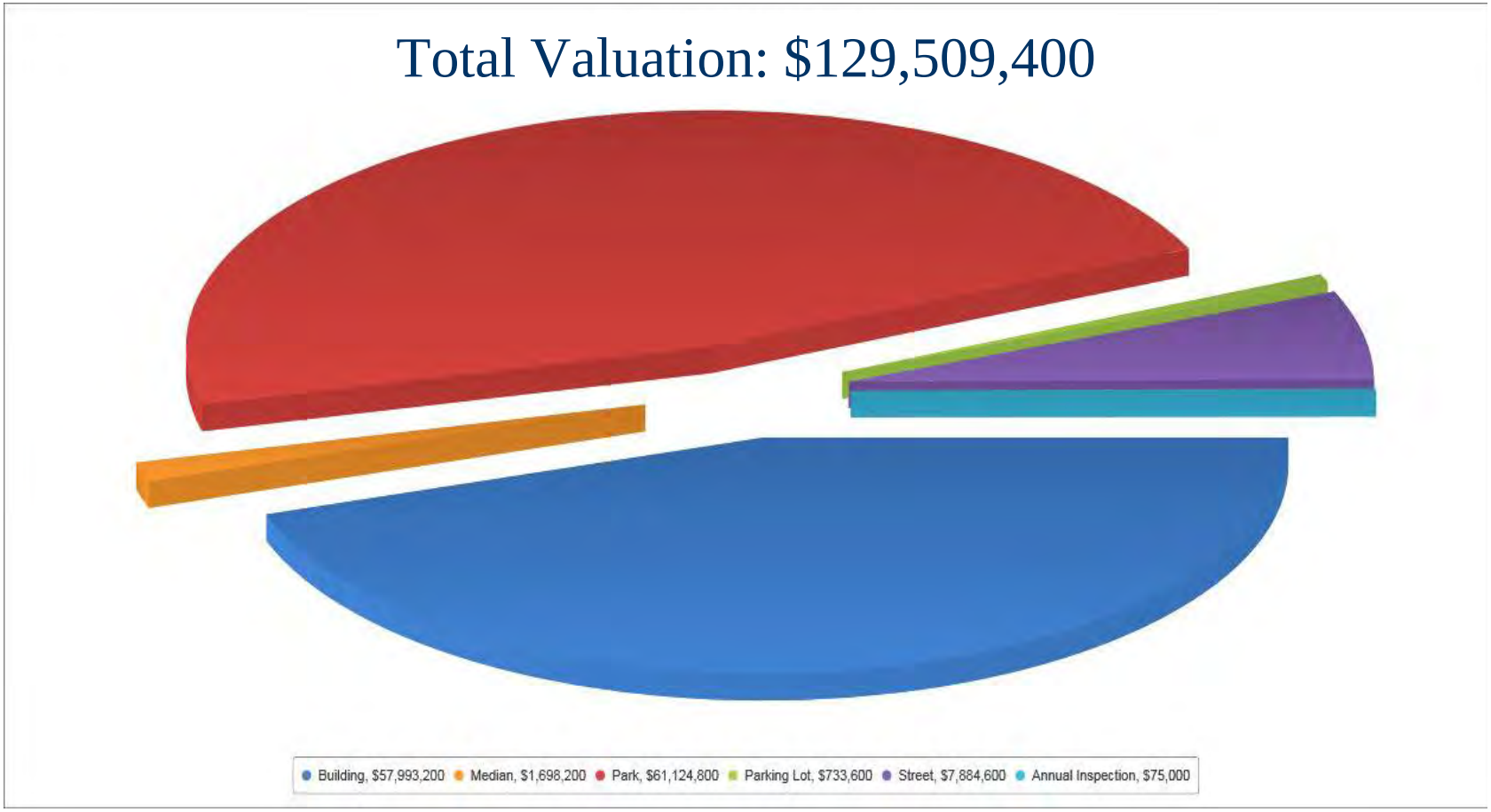


Pump Station Risk 2015



URBAN FORESTRY

Urban Forestry Asset Valuation

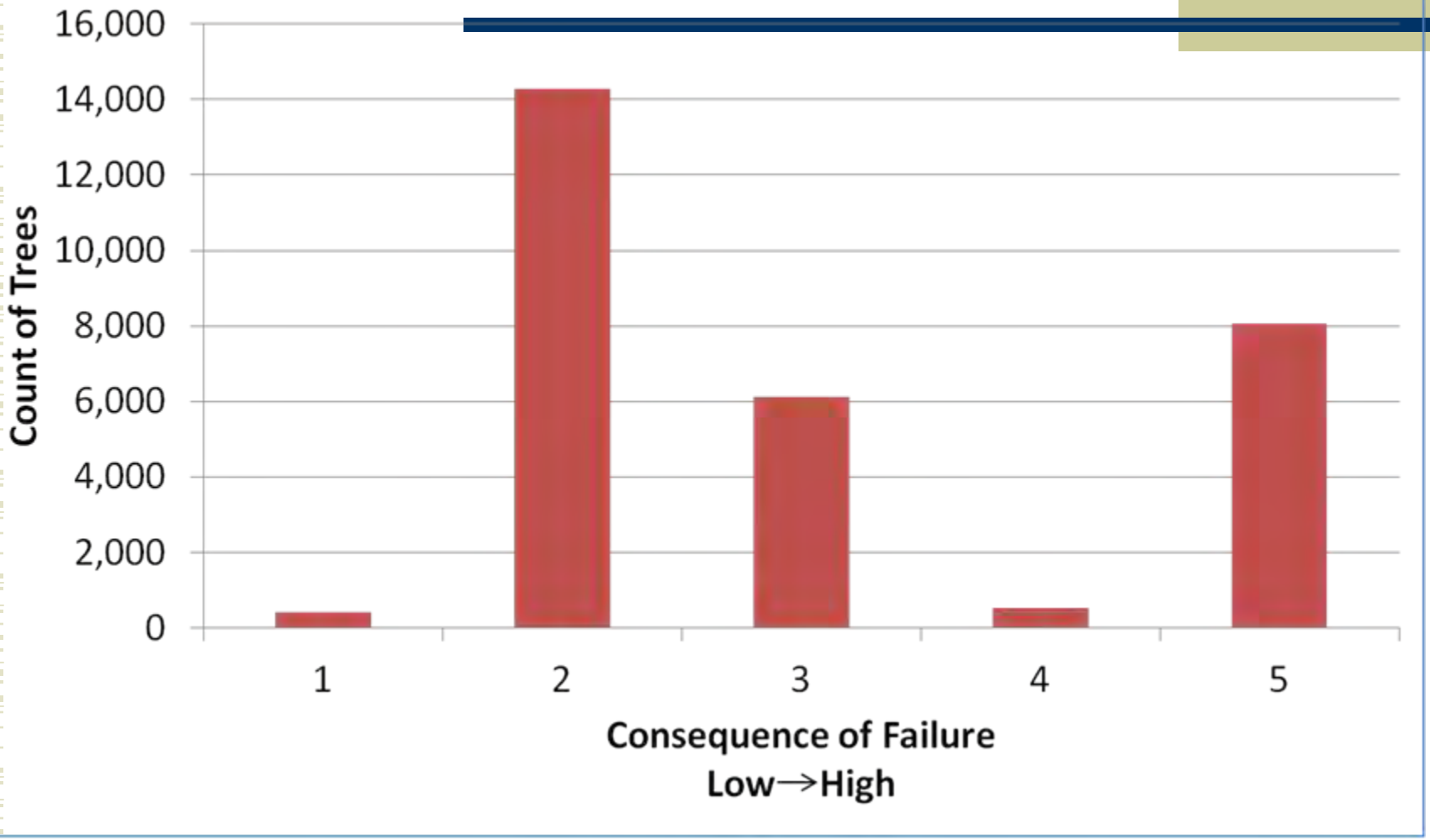


Criticality / Consequence of Failure

Location	Description	CoF
Parks	Decorative, high visibility, high traffic, presence of targets	5
City Streets, Arterial	high visibility, high traffic, presence of targets	4
City Streets, Collector	Some traffic, presence of targets	3
City Streets, Residential	Some traffic, presence of targets	2
Public Office Buildings	Medium visibility, medium traffic, presence of targets, functional people spaces	2
Rec Centers	Low visibility, low traffic, presence of targets	1
Libraries	Low visibility, low traffic, presence of targets	1

Target - surrounding persons or property at risk for injury or damage in the case of critical failure which presents a liability

CoF Frequencies



Valuation vs. Replacement Cost

Valuation

- Total: $129,434,400
- **Valuation** is calculated by Basic Tree Cost (which is based on size) and adjusted by:
  - Species Rating
  - Location Rating
  - Condition Rating

Replacement Cost

- Total: $33,379,400
- Replacement cost includes
  - Dead tree removal: $750
  - Stump removal: $200
  - Planting: $500

Valuation Adjustment Factors: Location

Location	Description	Location Rating
Parks	Decorative, high visibility, high traffic, presence of targets	1
City Streets, Arterial	high visibility, high traffic, presence of targets	0.9
City Streets, Collector	Some traffic, presence of targets	0.8
City Streets, Residential	Some traffic, presence of targets	0.7
Public Office Buildings	Medium visibility, medium traffic, presence of targets, functional people spaces	0.6
Rec Centers	Low visibility, low traffic, presence of targets	0.5
Libraries	Low visibility, low traffic, presence of targets	0.5

Valuation Adjustment Factors: Species

Species	Species Rating
OAK	1
PALM-DATES	1
CHITALPA	1
PEPPER	0.5
CAJEPUT	0.5
BERRY	0.5
BUSH	0.5
MYOPORUM	0.4

Oak

Palm – Dates

Chitalpa

Pepper

Cajeput

Berry

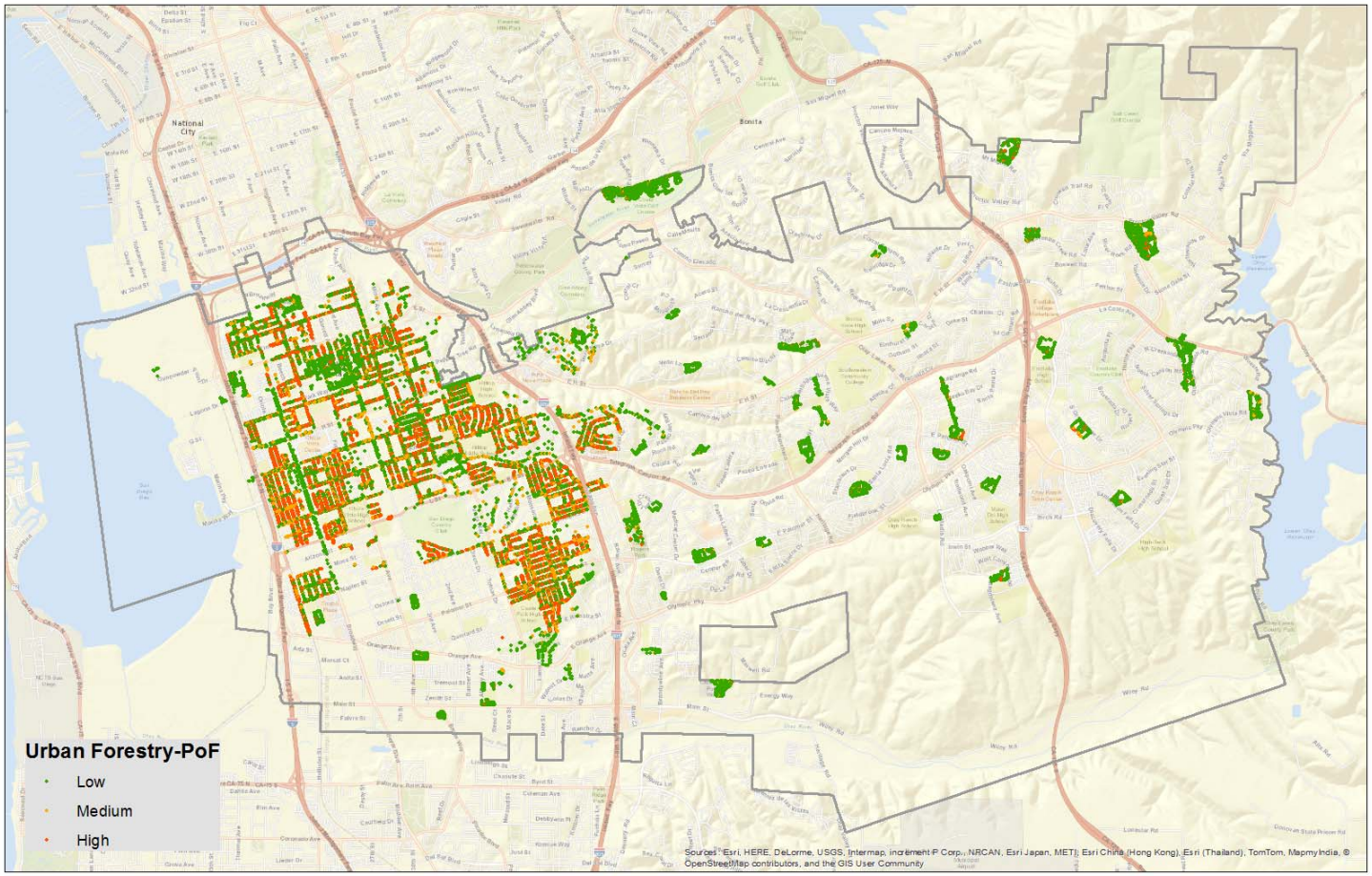
Bush

Myoporum

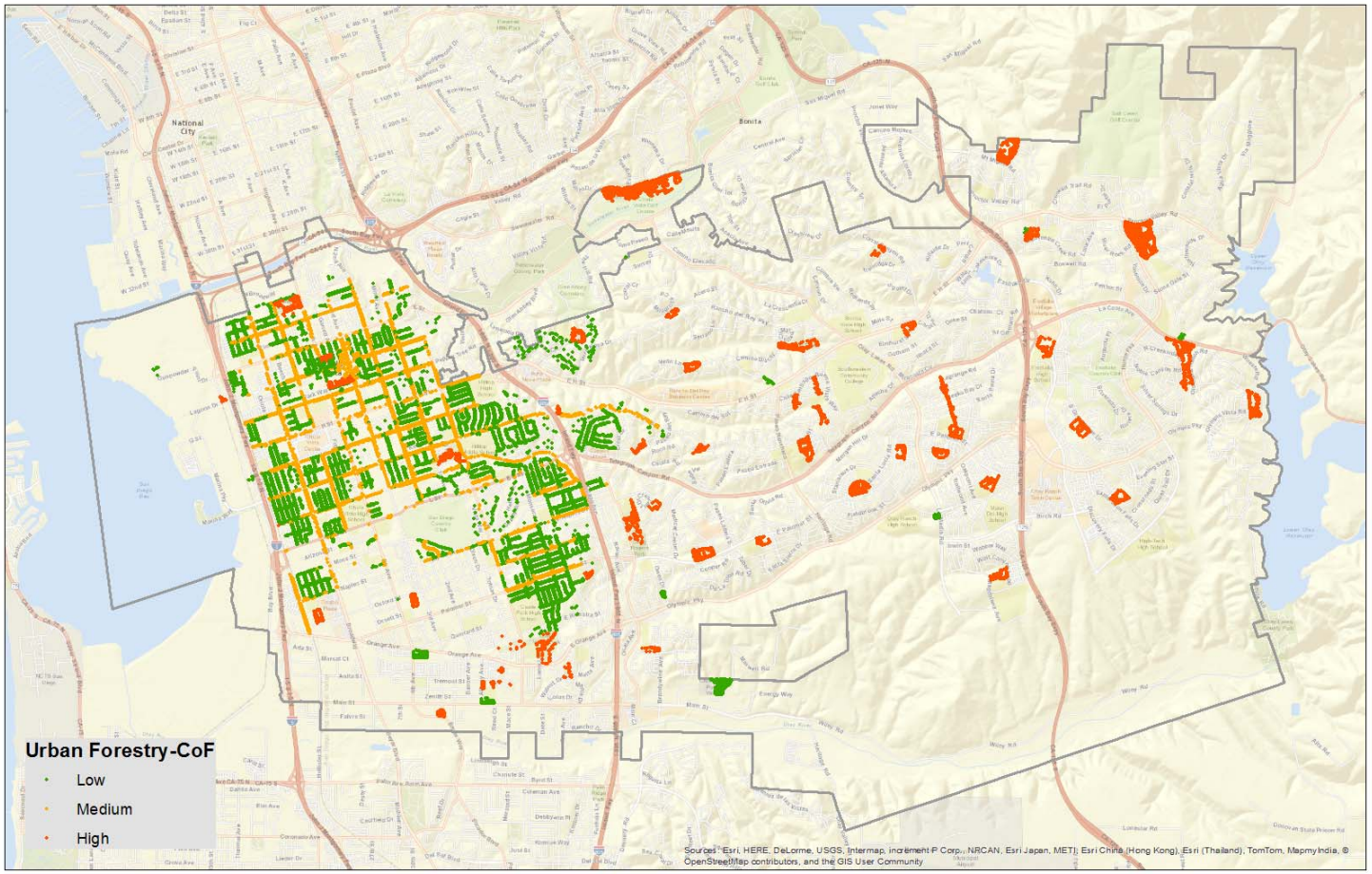
Valuation Adjustment Factors: Condition

Condition	Condition Rating
Good	1
Fair	0.9
Poor	0.75
Very Poor	0.5
Dead	0

Probability of Failure



Consequence of Failure



Life Cycle Costing Logic

Tree Category	Life	Activity	Frequency	Cost
PALM-Queen-Parks	125	Trimming	1	$20
PALM-Fan-Parks	125	Trimming	2	$35
PALM-Dates-Parks	125	Trimming	2	$150
EUCALYPTUS-Small-Parks	125	Trimming	3	$55
EUCALYPTUS-Medium-Parks	125	Trimming	3	$140
EUCALYPTUS-Large-Parks	125	Trimming	3	$205
EUCALYPTUS-Mature-Parks	125	Trimming	3	$325
PINE-Parks	125	Trimming	3	$150
Broadleaf Tree-Parks	125	Trimming	3	$75

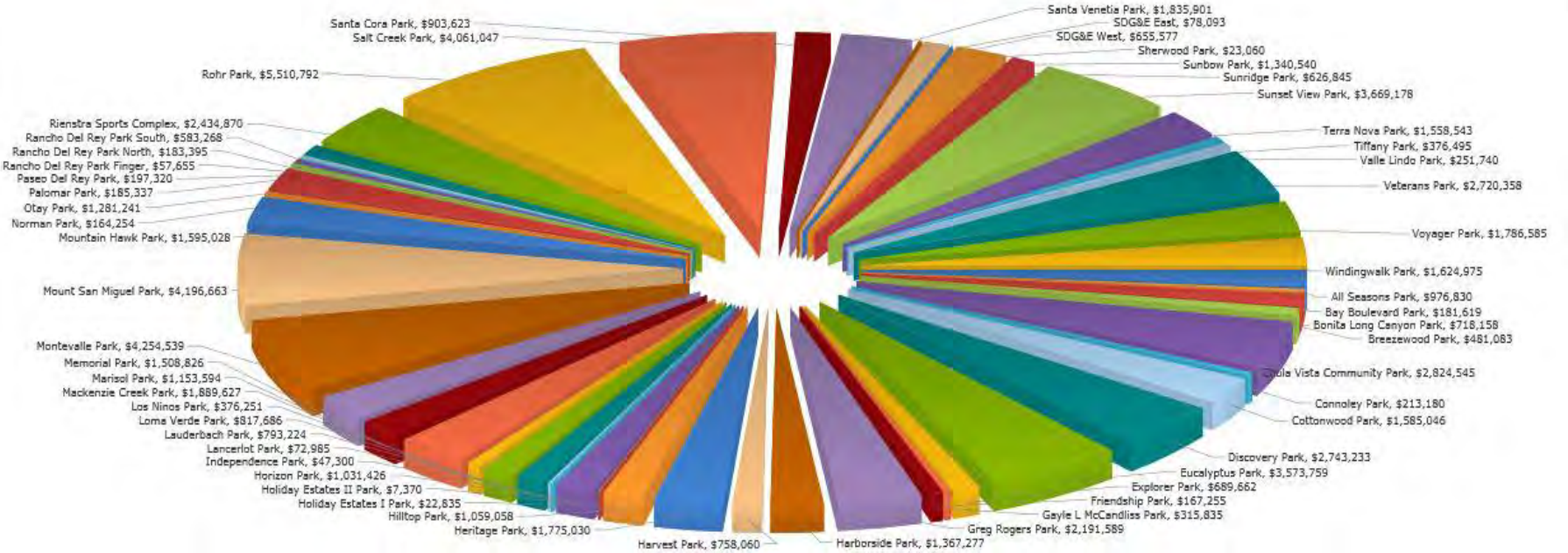
Catch Up

- What is the nature of the backlog?
- $1.6M Backlog
  - Includes
    - Trimming Cost
    - Removal Cost
    - Replacement Cost

PARKS

Park Asset Valuation

Total Valuation: $72,045,065



Critical Parks

- By Usage
- By Type of Service/ Amenities
- By Class

Park Name	Criticality Rating	Park Usage
Chula Vista Community Park	5	High Use Community
Memorial Park	4	High Use Community
Greg Rogers Park	3	High Use Community
Friendship Park	1	High Use Community
Norman Park	1	High Use Community
Bonita Long Canyon Park	5	High Use Neighborhood
Santa Cora Park	4	High Use Neighborhood
SDG&E West	3	High Use Neighborhood
Breezewood Park	1	High Use Neighborhood
Lancerlot Park	1	High Use Neighborhood
SDG&E East	5	Low Use Parks/Areas
Bay Boulevard Park	4	Low Use Parks/Areas
Connoley Park	4	Low Use Parks/Areas
Rancho Del Rey Park North	3	Low Use Parks/Areas
Rancho Del Rey Park South	3	Low Use Parks/Areas
Holiday Estates I Park	1	Low Use Parks/Areas

Critical Assets

Sort ID	Class ID	Class ID	Criticality	Class ID
1	**Sports Court & Field**			**Sports Court & Field**
2	Sports Court & Field	Baseball Field	5	Sports Court & Field
3	Sports Court & Field	Basketball Court	5	Sports Court & Field
4	Sports Court & Field	Batting Cage	5	Sports Court & Field
5	Sports Court & Field	Soccer Field-Grass, Dirt	5	Sports Court & Field
6	Sports Court & Field	Tennis Court	5	Sports Court & Field
7	Sports Court & Field	Arena Soccer Field	5	Sports Court & Field
8	Sports Court & Field	Hockey Field	5	Sports Court & Field
9	Sports Court & Field	Softball Field	5	Sports Court & Field
10	Sports Court & Field	Surfacing-Compacted Soil	5	Sports Court & Field
11	**Dog Park**			**Dog Park**
12	Dog Park	Dog Park-Compacted Soil	4	Dog Park
13	Dog Park	Dog Park-Grass, Dirt	4	Dog Park
14	**Skateboard Park**			**Skateboard Park**
15	Skateboard Park	Skating Court-Concrete	5	Skateboard Park
16	**Pedestrian Bridge**			**Bridge**
17	Pedestrian Bridge	Pedestrian Bridge-Steel,Wood	5	Bridge
18	Pedestrian Bridge	Pedestrian Bridge-Wood	5	Bridge
19	Pedestrian Bridge	Pedestrian Bridge-Concrete,Steel	5	Bridge
20	**Gazebo/Pergola**			**Gazebo/Pergola**
21	Pergola	Pergola (Trellis) - Steel	3	Pergola
22	Pergola	Pergola (Trellis) - Wood	3	Pergola
23	Gazebo	Gazebo-Concrete	3	Gazebo
24	Gazebo	Gazebo-Concrete, Wood	3	Gazebo
25	Gazebo	Gazebo-Concrete, Wood, Aluminum	3	Gazebo
26	Gazebo	Gazebo-Concrete, Wood, Steel	3	Gazebo
27	Gazebo	Gazebo-Steel, Aluminum	3	Gazebo
28	Gazebo	Gazebo-Wood	3	Gazebo
29	Gazebo	Gazebo-Wood, Aluminum	3	Gazebo
30	Gazebo	Gazebo-Wood, Steel	3	Gazebo
31	**Decorative Structure**			**Decorative Structure**
32	Decorative Structure	Decorative Structure-Stone	5	Decorative Structure
33	Decorative Structure	Decorative Column-Steel, Concrete, Stone	5	Decorative Structure
34	Decorative Structure	Statue	5	Decorative Structure
35	**Building**			**Building**
36	Scorekeeper Building	Scorekeeper Building-CMU	3	Scorekeeper Building
37	Building	Restroom Building-CMU	3	Building
37	Building	Restroom Building-Wood	3	Building
37	Building	Building-CMU	3	Building
38	Building	Building-CMU	3	Building

Life Cycle Costing Logic

Parks - Management Strategy

Category	Type	Useful Life	Preservation Activity	Preservation Frequency	Preservation Cost	Preservation Activity	Preservation Frequency	Preservation Cost
Sports Courts & Field	Baseball Field	100	Maintenance	1	3% of Restoration Cost			
	Basketball Court	50	Resurface	3	18% of Restoration Cost			
	Batting Cage	25						
	Soccer Field	100	Maintenance	1	9% of Restoration Cost			
	Tennis Court	50	Resurface	3	10% of Restoration Cost			
	Arena Soccer Field	50	Rehabilitation	5	$140,000			
	Hockey Field	50	Resurface	5	18% of Restoration Cost			
	Softball Field	100	Maintenance	1	2% of Restoration Cost			
	Surfacing-Compacted Soil	5						
Dog Park	Dog Park-Compacted Soil	5						
	Dog Park-Grass, Dirt	100	Maintenance	1	10% of Restoration Cost			
Skateboard Park	Skating Court-Concrete	50	Rehabilitation	5	20% of Restoration Cost			
	Pedestrian Bridge-Steel, Wood	80	Minor Repair	10	15% of Restoration Cost			