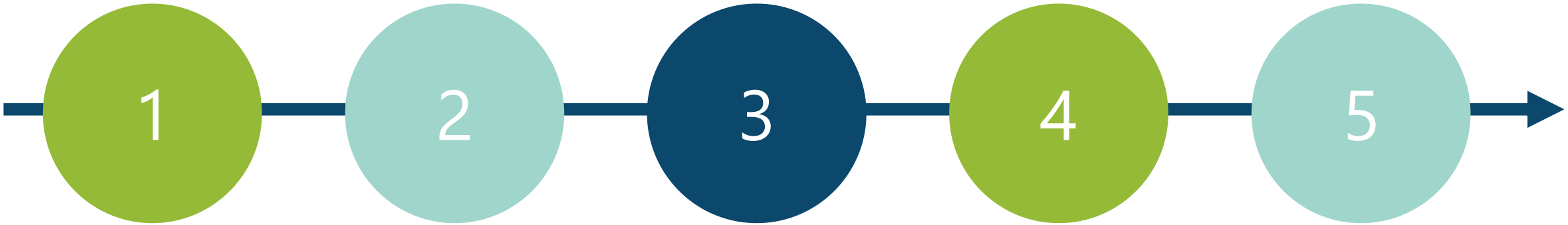
Water Pump Stations – Condition Assessment and Life Cycle Planning

PNWS-AWWA | Spring Conference

Presented by: Marshall Meyer PE and Shelby Asato PE

Agenda


1
2
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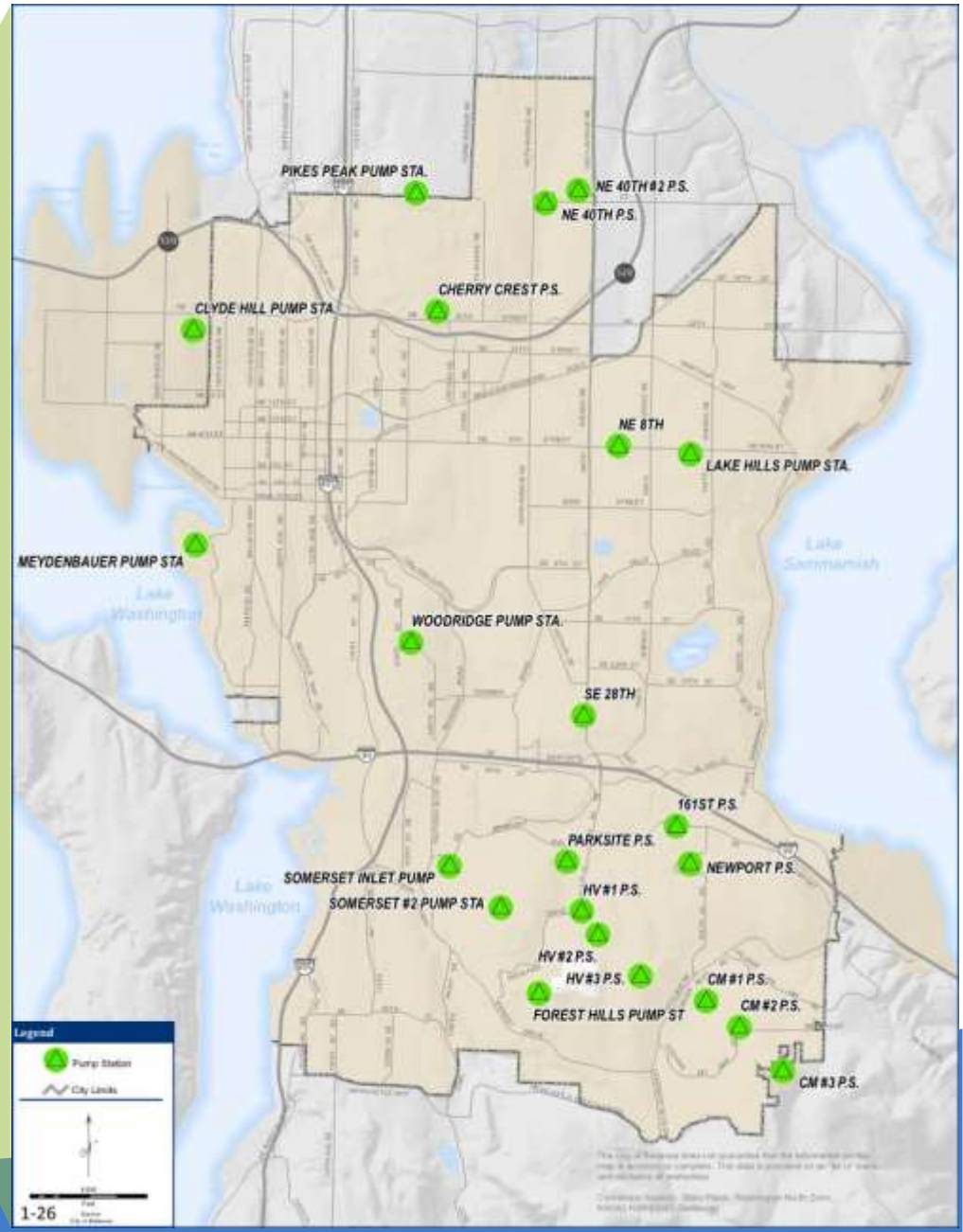
Background and Project Need
Asset Management Philosophy
Planning/Evaluation Approach Development
Capital Improvement Plan
Flexible Long-Range Capital Improvement Plan and Prioritization

Background & Project Need

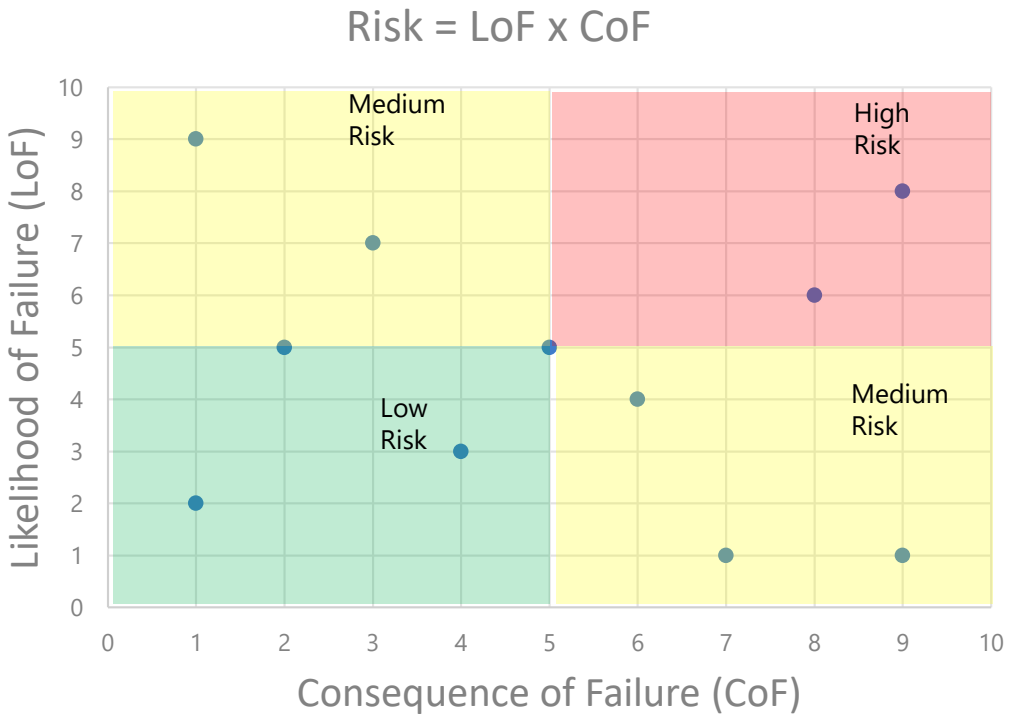
Background & Project Need

- 22 Pump stations
- Built in the 1960s and upgraded in the 1980s
- 19 Pump stations evaluated, 3 pump stations recently upgraded



Asset Management Philosophy

Asset Management Philosophy



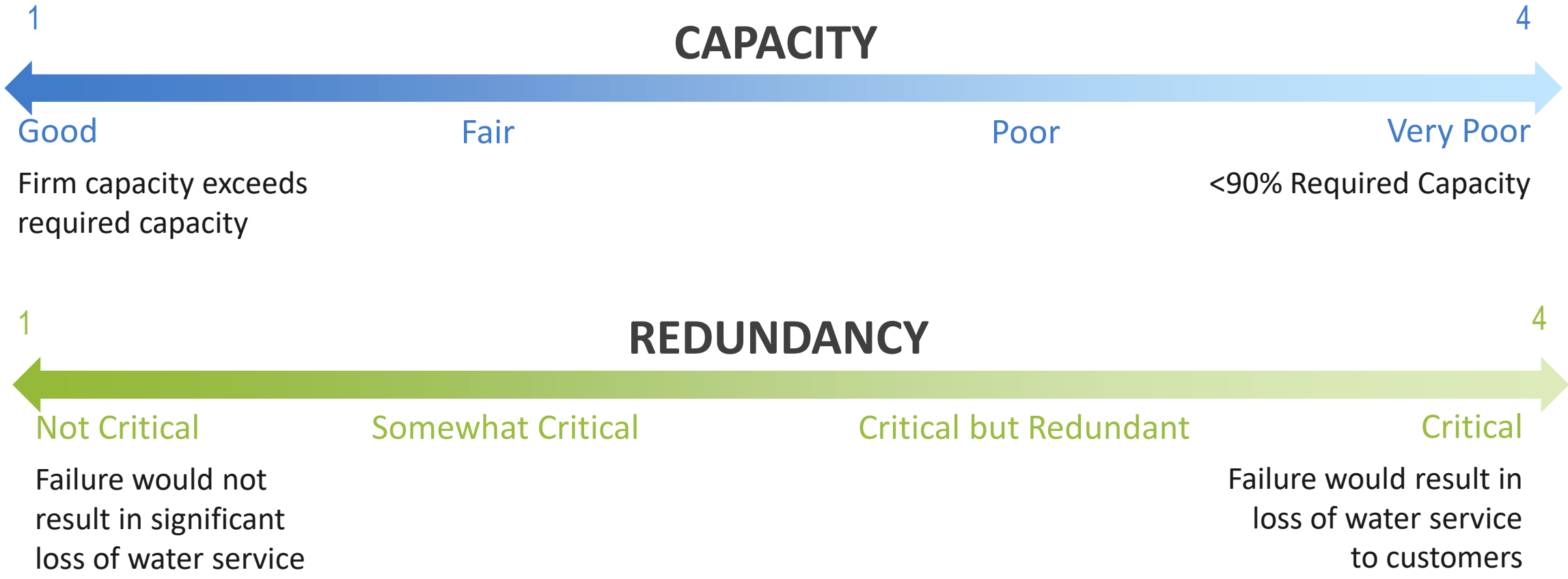
- Likelihood of Failure
  - Condition
  - Capacity
- Consequence of Failure
  - Supply Redundancy
  - Number of Customers Impacted
  - Impact Duration

Asset Management Philosophy

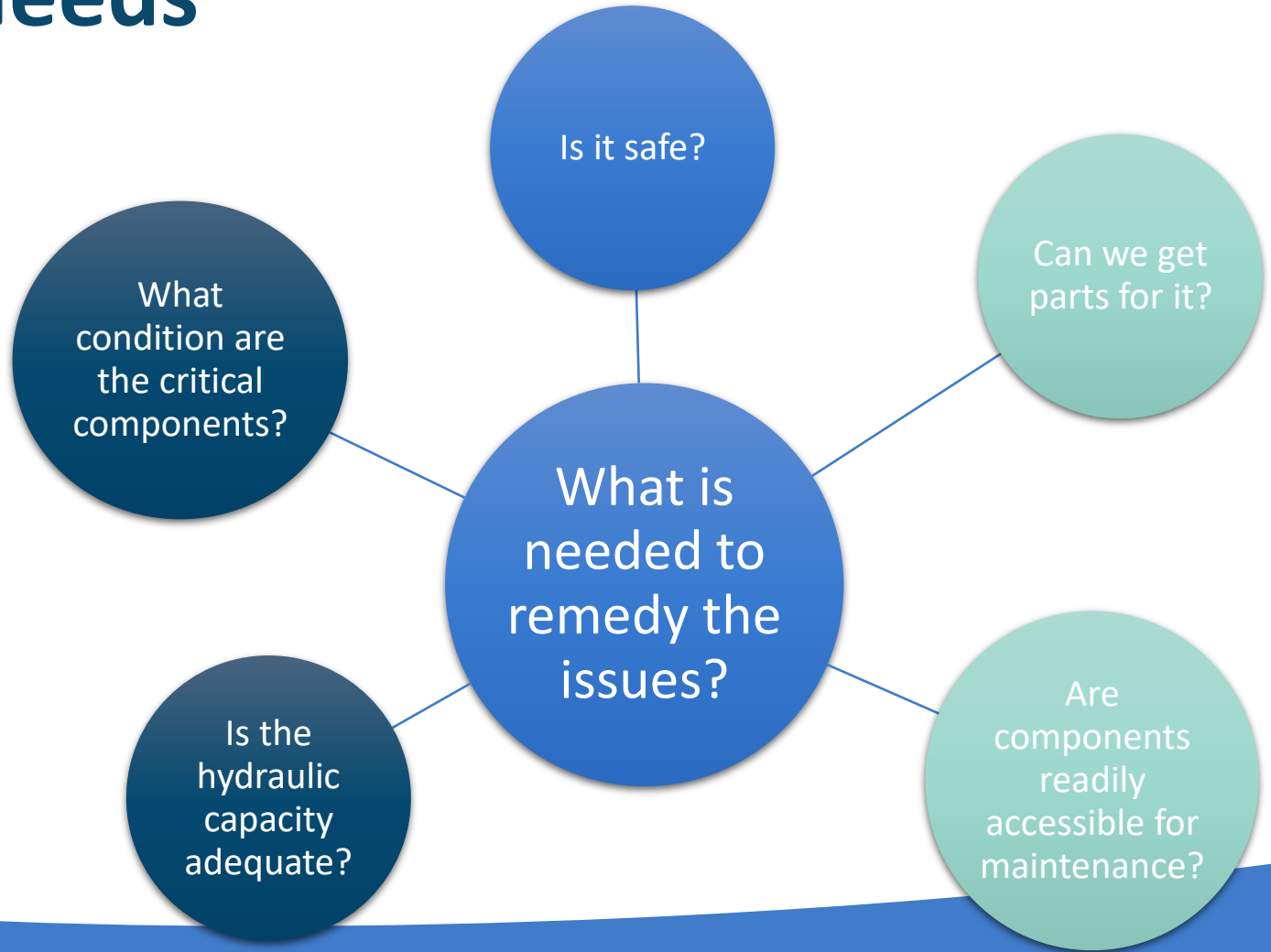
Risk = Consequence x Likelihood

Planning/Evaluation Approach Development

Overall Pump Station Impact

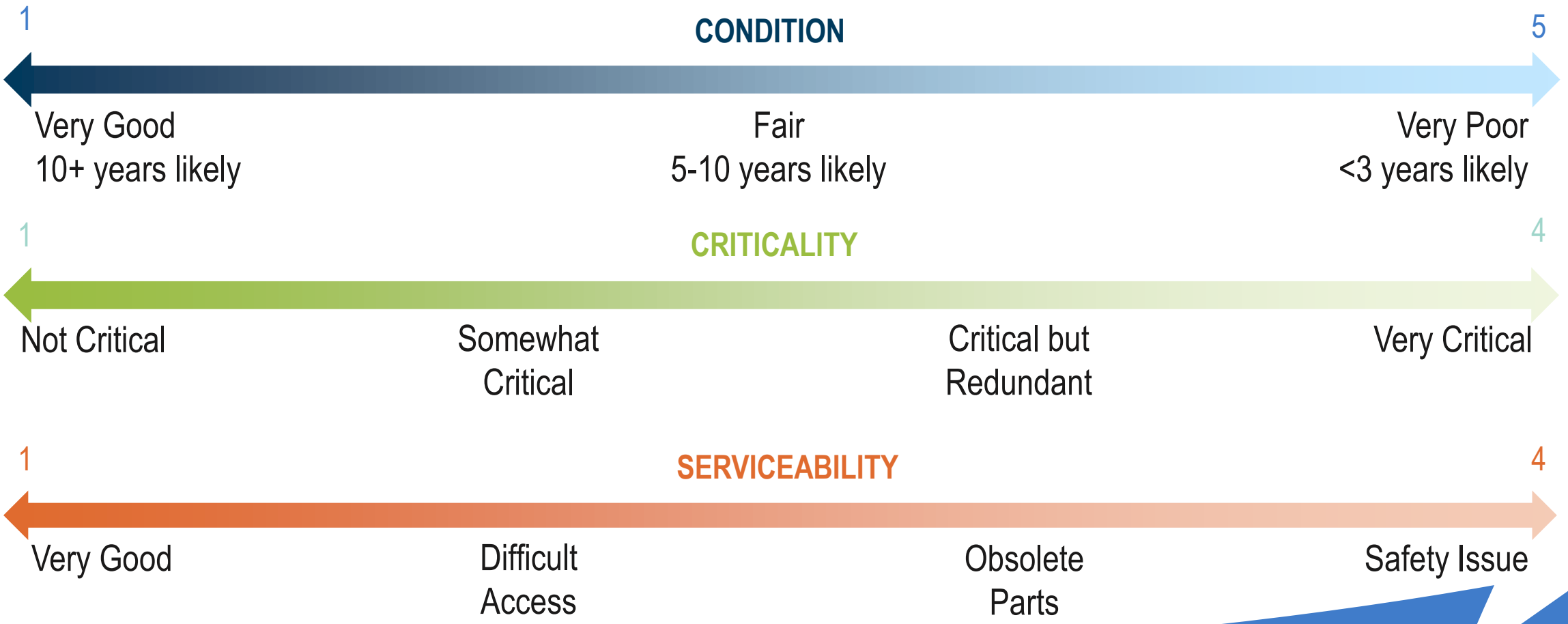


Individual Component of Pump Station: Focus on Needs



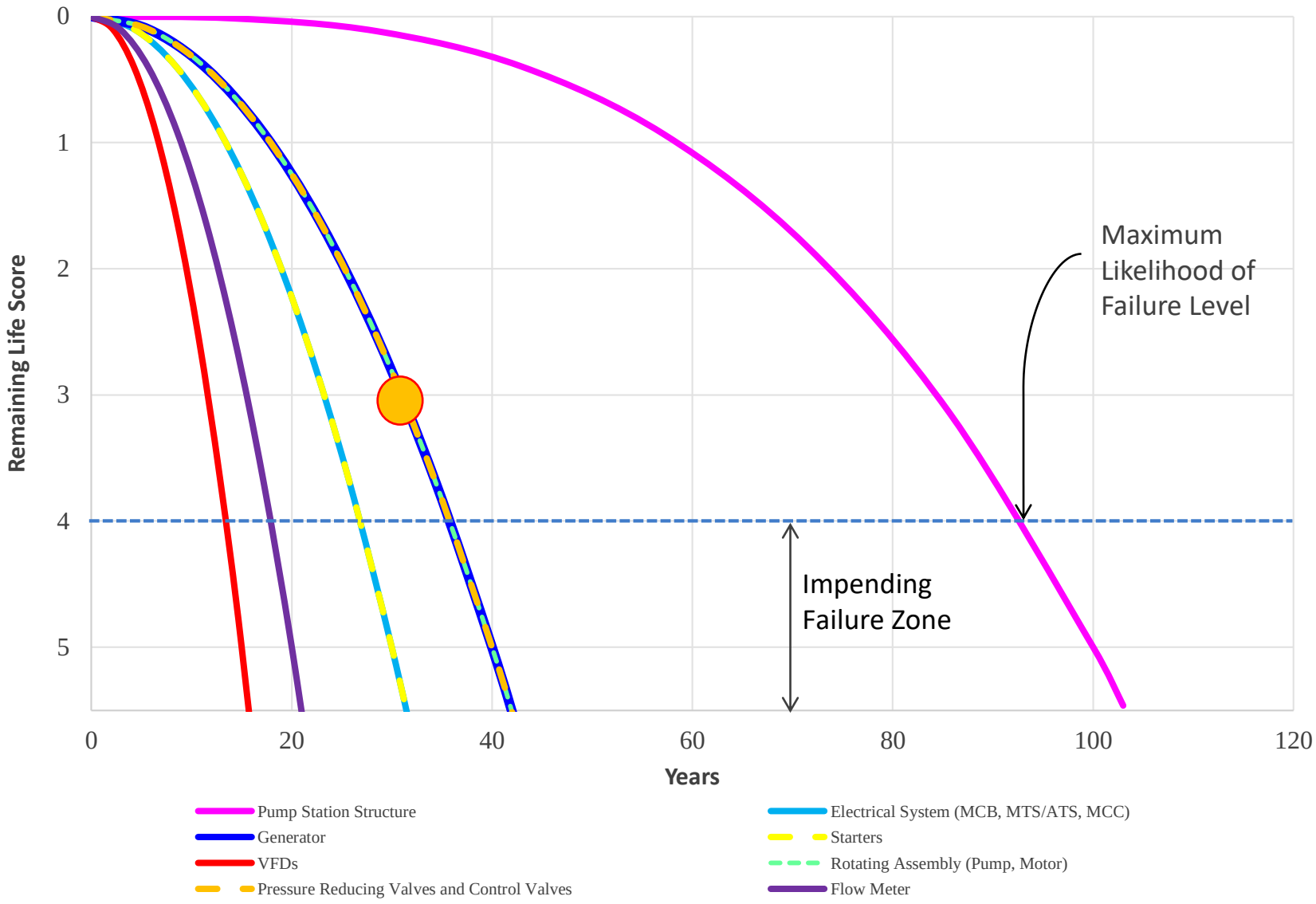
Field Evaluation Approach

Pump Station Component Evaluation Categories



Capital Improvement Plan

Pump Station Component Evaluation Remaining Life

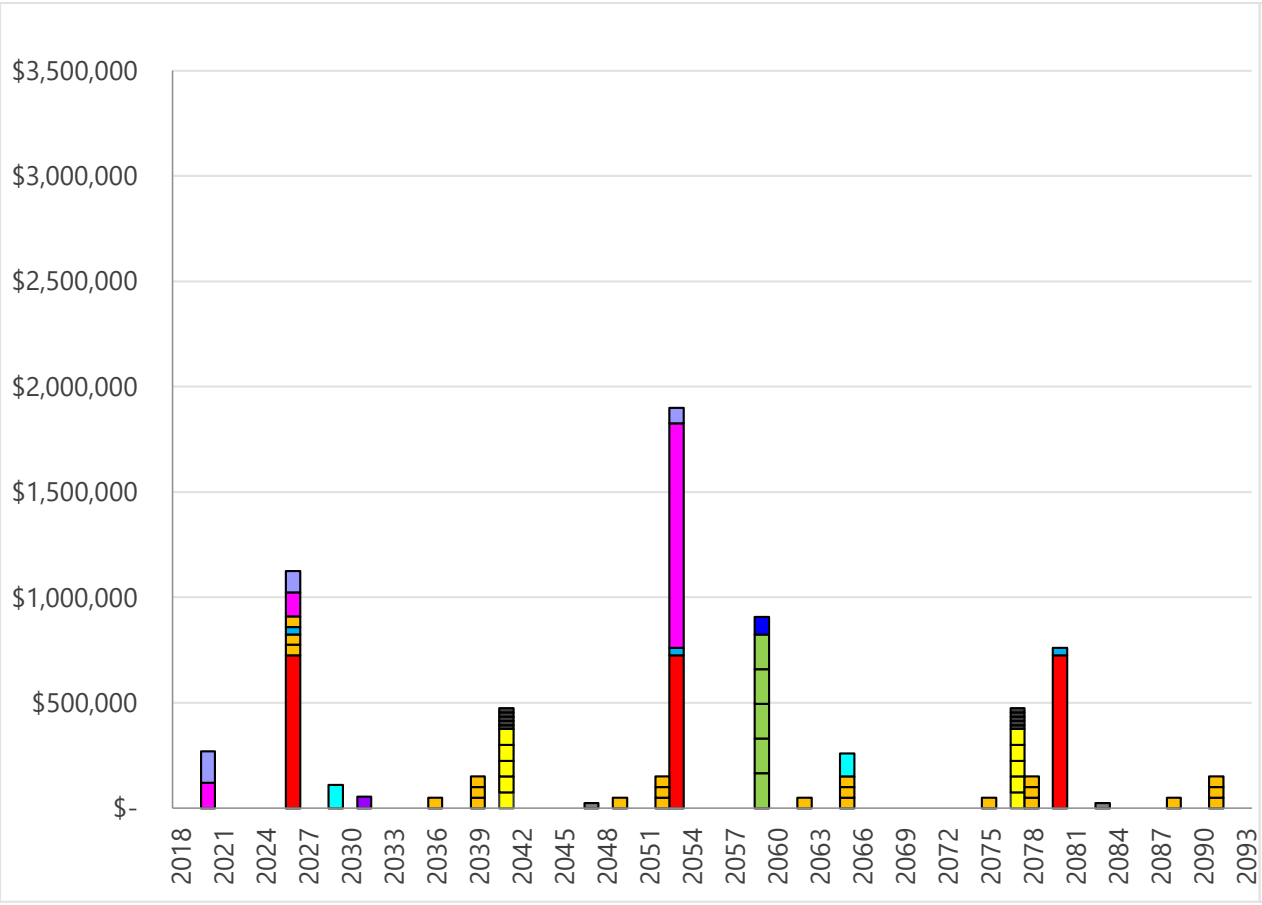


Capital Improvement Plan

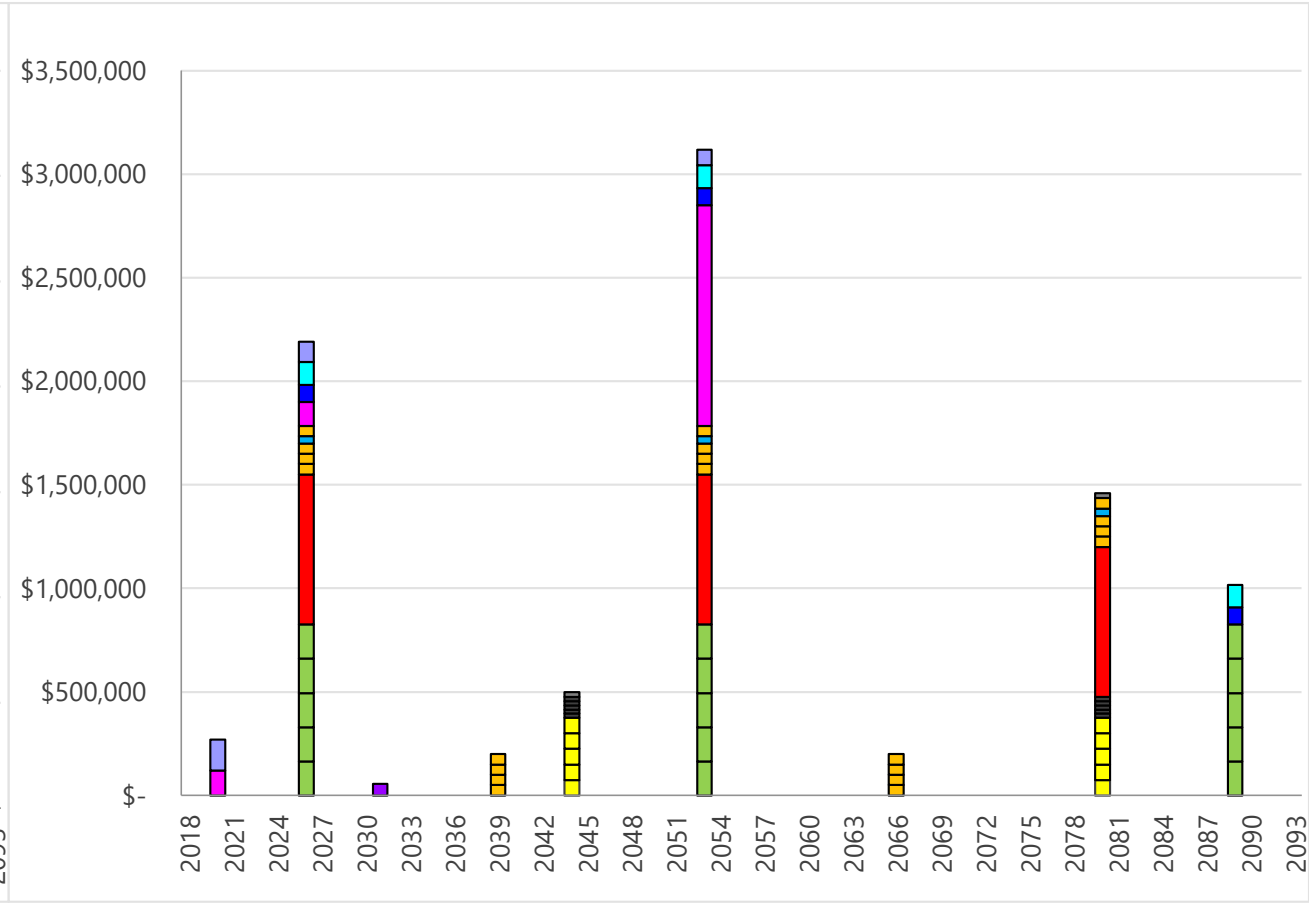
Station Component Condition Rating	5	4	3	2	1
Action time frame	<3 years	5+/- years	5-10 years	10+/- years	>10 years
Calendar window	2018-2021	2021-2025	2023-2028	2026-2029	Long term planning

Capital Improvement Plan

Clyde Hill Pump Station CIP



Clyde Hill Pump Station CIP (Grouped Projects)



"Plans are worthless, but planning is everything."

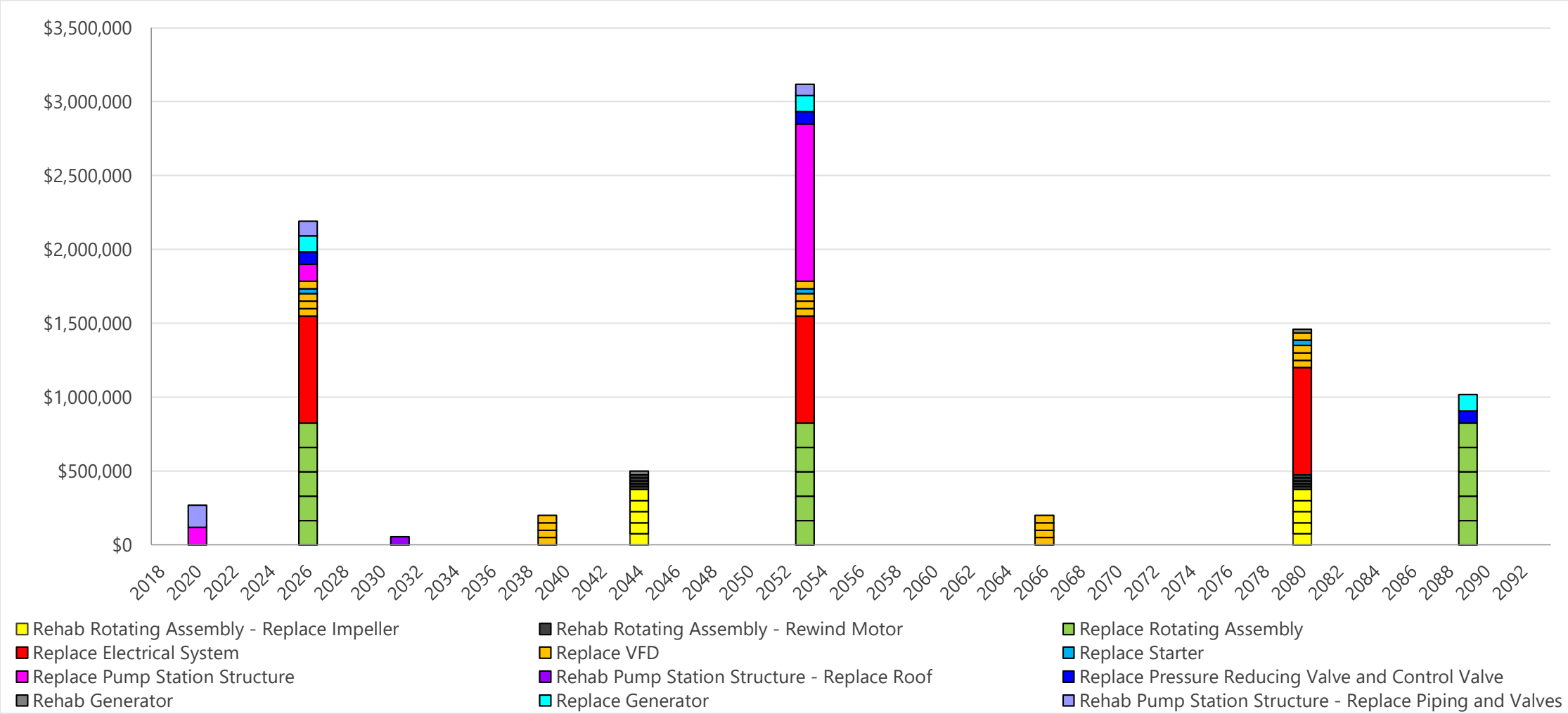
- Dwight D. Eisenhower

Flexible Long-Range Capital Improvement Plan and Prioritization

Flexible 75-Year Capital Improvement Plan

Asset Group	Replacement Component	Quantity	Estimated Complexity/Size Cost Range				
			Low				High
Rotating Assembly #1	Pumps Motors Ancillary components	-	$40,000 $10,000 $5,000	$85,000 $20,000 $5,000	$135,000 $20,000 $10,000	$175,000 $30,000 $10,000	$235,000 $40,000 $15,000
Rotating Assembly #2	Pumps Motors Ancillary components	-	$40,000 $10,000 $5,000	$85,000 $20,000 $5,000	$135,000 $20,000 $10,000	$175,000 $30,000 $10,000	$235,000 $40,000 $15,000
Rotating Assembly #3	Pumps Motors Ancillary components	-	$40,000 $10,000 $5,000	$85,000 $20,000 $5,000	$135,000 $20,000 $10,000	$175,000 $30,000 $10,000	$235,000 $40,000 $15,000
Rotating Assembly #4	Pumps Motors Ancillary components	-	$40,000 $10,000 $5,000	$85,000 $20,000 $5,000	$135,000 $20,000 $10,000	$175,000 $30,000 $10,000	$235,000 $40,000 $15,000
Pressure Reducing Valve and Control Valve	Pressure Reducing Valve Pressure Relief Valve Pump Control Valve Pump Check Valve Ancillary components	N/A 1 N/A 5 6	$15,000 $20,000 $15,000 $15,000 $1,500	$25,000 $30,000 $20,000 $20,000 $1,500	$35,000 $45,000 $25,000 $25,000 $1,500	$50,000 $70,000 $30,000 $30,000 $1,500	$55,000 $90,000 $35,000 $35,000 $1,500
Flow Meter	Flow Meter Ancillary components	1	$25,000 $5,000	$25,000 $5,000	$35,000 $5,000	$35,000 $5,000	$45,000 $5,000

Flexible 75-year Capital Improvement Plan



System Wide 75-Year Costs

Station Name	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Clyde Hill	-	$55,000	-	-	-	-	$40,000	-	-	$200,000	-	-	-
Cherry Crest	-	-	-	-	-	-	-	-	-	-	-	$160,000	-
NE 40th (670)	-	$75,000	-	-	-	-	-	-	-	-	-	-	-
Parksite	-	-	-	-	-	-	-	-	-	-	-	$195,000	-
Horizon View 2	-	-	-	-	-	-	-	-	-	-	$170,000	-	-
Forest Hills	-	$75,000	-	-	-	-	$126,000	-	-	-	$60,000	-	-
Cougar Mountain 1	-	-	-	-	-	-	-	-	-	$455,000	-	-	-
Cougar Mountain 2	-	-	-	-	-	-	$80,000	-	-	-	-	-	$170,000
Newport	-	-	$835,000	-	-	-	$846,000	-	-	-	-	-	-
161st Ave Inlet	-	$570,000	-	-	-	-	$220,000	-	-	-	-	-	-
Somerset 2	-	$95,000	-	-	-	-	-	-	-	-	-	-	-
Somerset Inlet	-	$120,000	-	-	-	-	-	-	$40,000	-	-	-	$65,000
Woodridge	-	-	-	-	-	-	-	-	$485,500	-	-	-	-
Meydenbauer	-	-	-	-	-	-	$836,500	-	-	-	-	-	-
Pike's Peak	-	-	-	$65,000	-	-	-	-	$530,000	-	-	-	-
NE 40th (Reservoir)	-	-	-	-	$215,000	-	$290,000	-	-	-	-	-	-
Crossroads	-	-	-	-	-	-	-	-	-	$2,533,000	-	-	-
NE 8th Inlet	-	-	-	-	-	-	-	-	-	-	-	-	-
SE 28th Inlet	-	-	-	-	-	-	-	-	-	-	-	-	-
Horizon View 1	-	$170,000	-	-	-	-	$40,000	-	-	-	-	-	-
Horizon View 3	-	$280,000	-	-	-	$205,000	-	-	-	-	-	-	-
Cougar Mountain 3	-	$250,000	-	-	-	$265,000	-	-	-	-	-	-	-
Total	**$0**	**$1,690,000**	**$835,000**	**$65,000**	**$215,000**	**$470,000**	**$2,478,500**	**$0**	**$1,055,500**	**$3,188,000**	**$230,000**	**$355,000**	**$235,000**

Note: Refer to pump station sections for description of required work. Timing of projects have been prioritized based on Section 3 discussions.

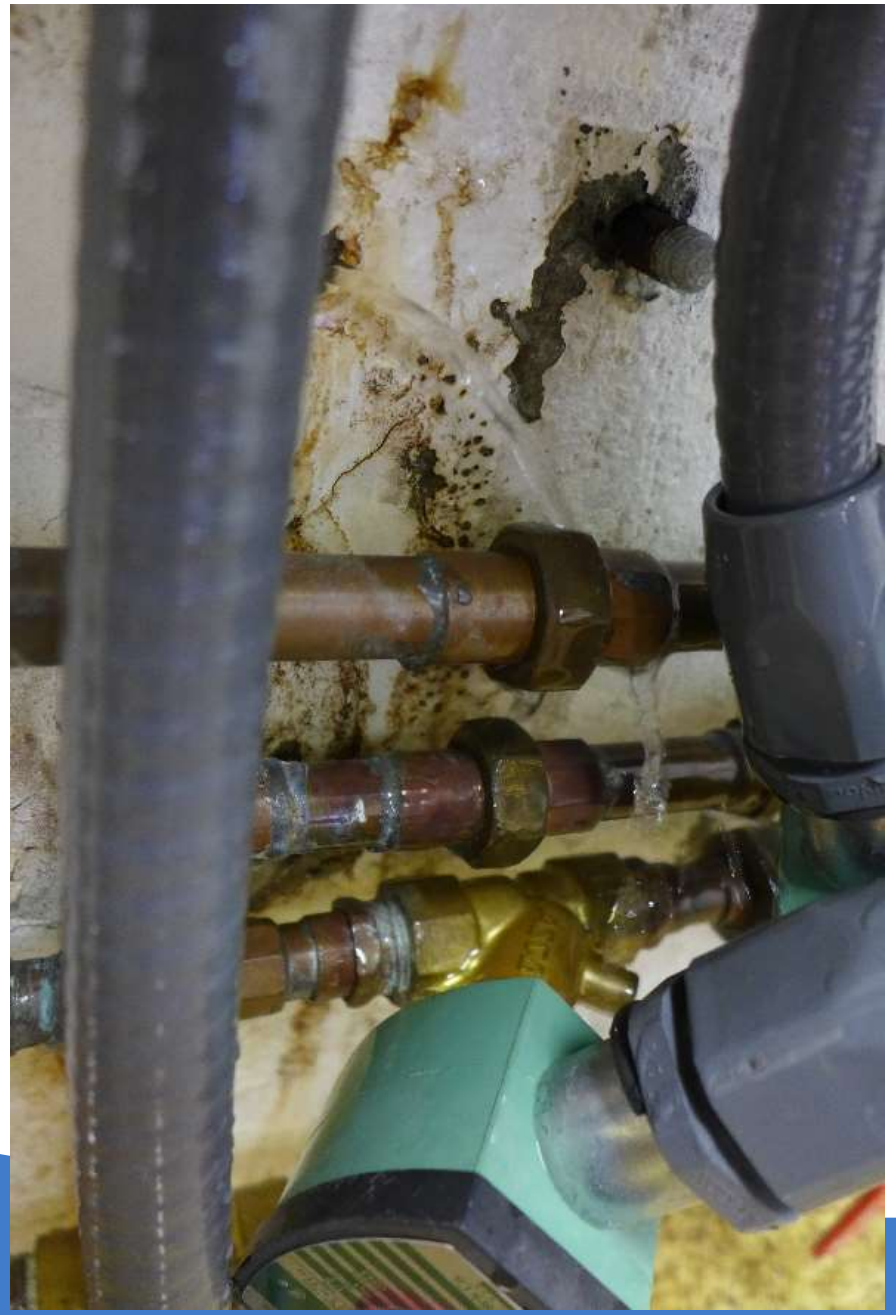
Conclusions

- Determine qualitative or quantitative approach
- Determine data you can track over time
- Establish evaluation approach
- Consider likelihood vs. consequence of failure
- Individual components and system wide impacts
- Revisit over time

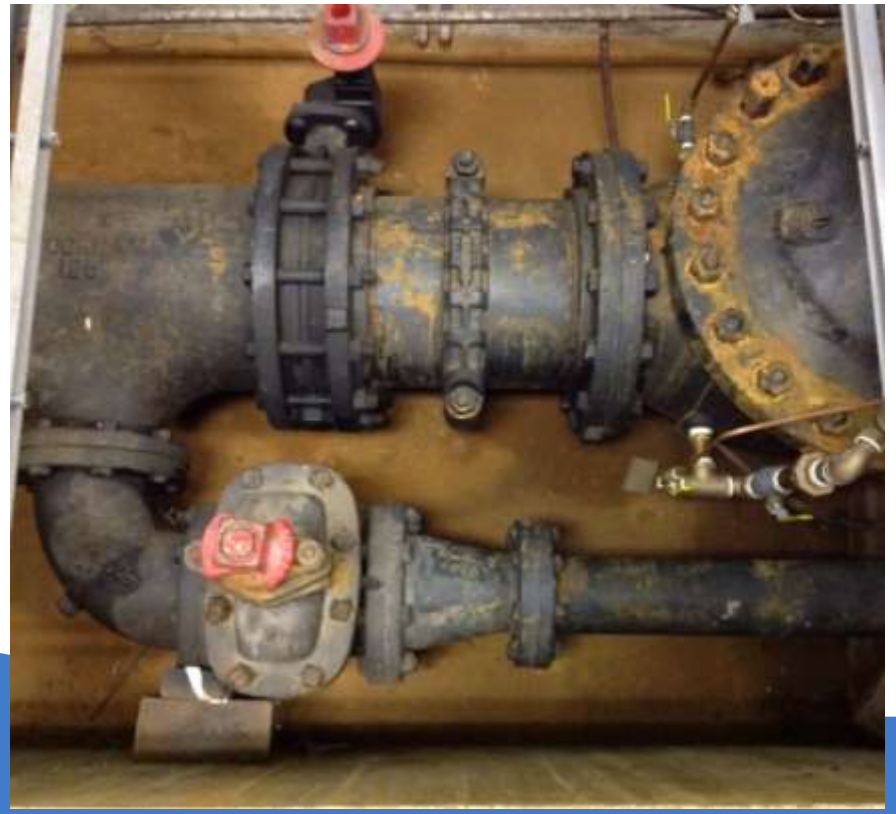
Q&A




Clyde Hill PS



Cherry Crest



NE 40th - 670 Zone

Parksite

Horizon View 2

Forest Hills

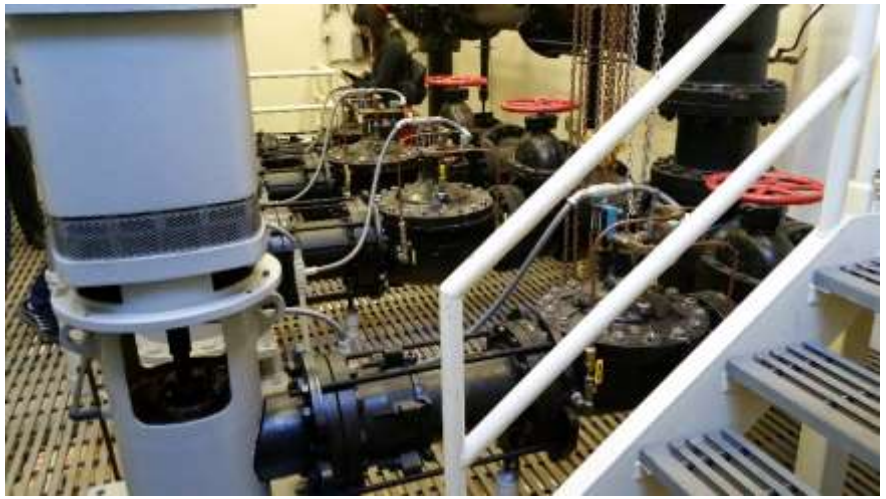
Cougar Mountain 1

Cougar Mountain 2

Newport

161st Ave Inlet

Somerset 2



Somerset Inlet

Woodridge

Meydenbauer

Pikes Peak

NE 40th Reservoir

Crossroads

NE 8th Inlet

SE 28th Inlet

Thank you!