

# Water System Asset Management Program

Pillsbury Lake Village District

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# Presentation Overview

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- What is Asset Management?**
- Existing Infrastructure**
- Hydraulic Model Development**
- Population/Demand Evaluation**
- Non-Revenue Water Review**
- Asset Inventory & Condition Assessment**
- Vertical Asset Review**
- Horizontal Asset Review**
- Priority & Secondary Improvements**
- Financial Implementation Plan**
- Level of Service**
- Next Steps**

## What is Asset Management?

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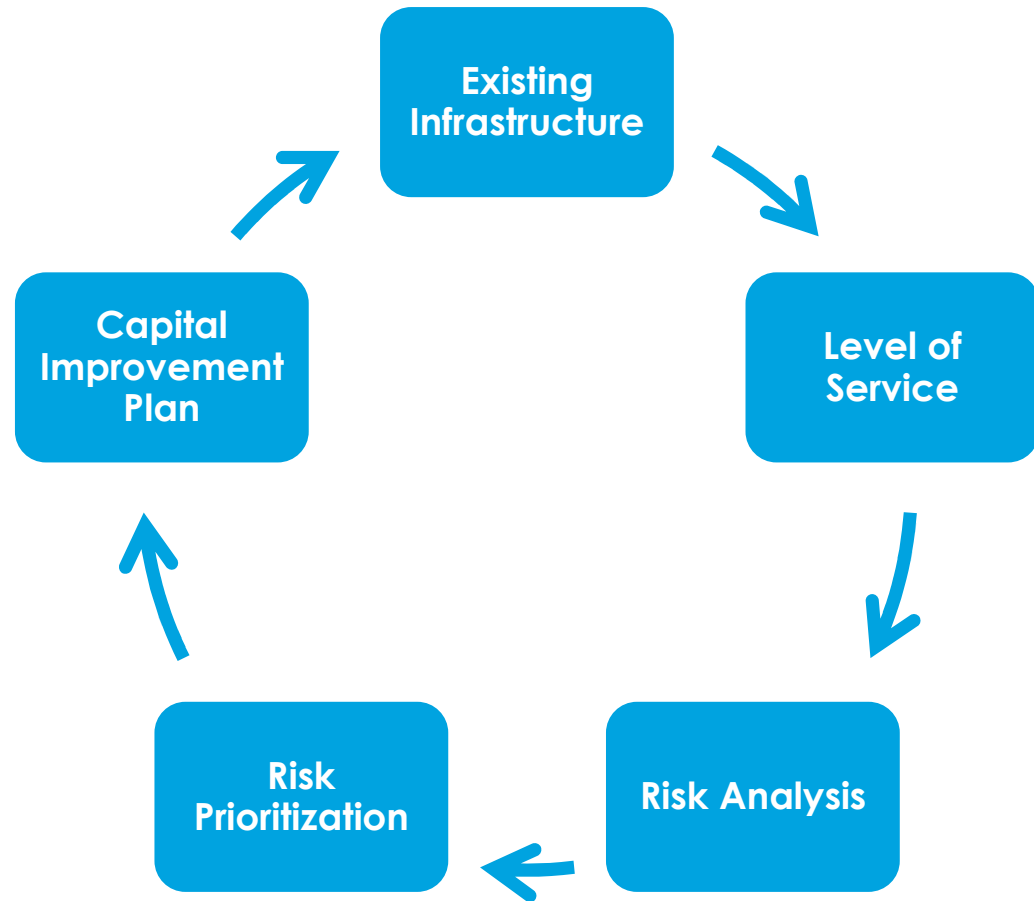


Asset Management is a systematic process of **operating, maintaining, upgrading and disposing of assets** cost-effectively while maintaining a level of service that is acceptable to the customers.



# What is Asset Management?

This is a continuous process that should be revisited annually.





# Existing Infrastructure

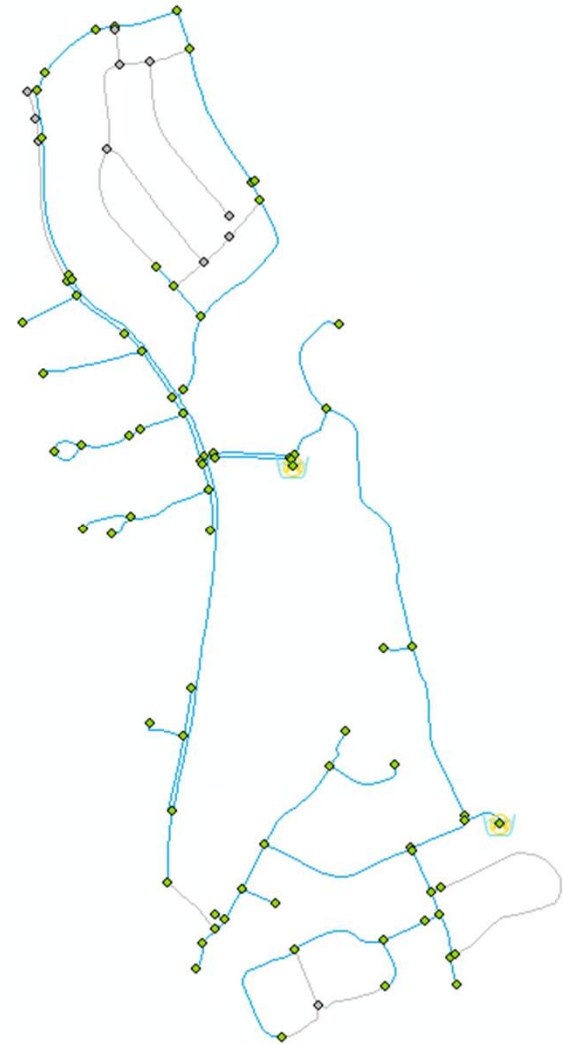


Asset Type	Count
Bedrock Wells	5
Storage Tanks	2
Distribution Main	5.9 miles
Gate Valves	65
Flushing Hydrants	11
Service Connections	68

> \$8.2M  
in assets!

# Hydraulic Model Development

- GIS map of system developed from record drawings and notes
- GIS network used to create hydraulic model
- Model used to simulate variety of expected hydraulic conditions



## Population/Demand Evaluation: Historical Demand Trends

### Franklin Pierce Zone

Month	Total Flow (Gallons)	Average-Day Demand (GPD)	Service Connections	ADD per Service
June	420,864	15,031	38	396
July	434,701	13,584	37	367
August	280,378	9,044	37	244
September	293,459	10,481	37	283
<b>Average</b>	<b>357,351</b>	<b>12,035</b>		<b>323</b>

### Peninsula Zone

Month	Total Flow (Gallons)	Average-Day Demand (GPD)	Service Connections	ADD per Service
June	476,049	15,868	42	378
July	424,771	13,274	41	324
August	333,319	10,752	41	262
September	348,419	12,444	41	304
<b>Average</b>	<b>395,640</b>	<b>13,085</b>		<b>317</b>

## Population/Demand Evaluation: Population Projections

Year	Estimated Franklin Pierce Zone Services	Estimated Peninsula Zone Services
2021	37	33
2026	42	38
2031	47	43

### Projection Assumptions

- 1 Service/Year Growth
- 323 gpd/service – Franklin Pierce Zone
- 317 gpd/service – Peninsula Zone
- Recent trend of customers leaving the system would stop



## Population/Demand Evaluation: Demand Projections

### Franklin Pierce Zone

Year	Average Day Demand (GPD)	Maximum Day Demand (GPD)
2021	11,936	23,872
2026	13,549	27,098
2031	15,162	30,324

### Peninsula Zone

Year	Average Day Demand (GPD)	Maximum Day Demand (GPD)
2021	10,455	20,911
2026	12,040	24,079
2031	13,624	27,247

## Non-Revenue Water Review

Month	Total Production Volume (Gallons)	Billed Volume (Gallons)	Non-Revenue Water	% NRW
June	896,913	139,436	757,477	84%
July	859,472	224,149	635,323	74%
August	613,697	98,460	515,237	84%
September	641,878	108,352	533,526	83%
October	828,064	151,064	677,000	82%
November	751,121	101,556	649,565	86%
December	691,505	110,843	580,662	84%
<b>Total (Jun-Dec 2020)</b>	<b>5,282,650</b>	<b>933,860</b>	<b>4,348,790</b>	<b>82%</b>

# Non Revenue Water Review

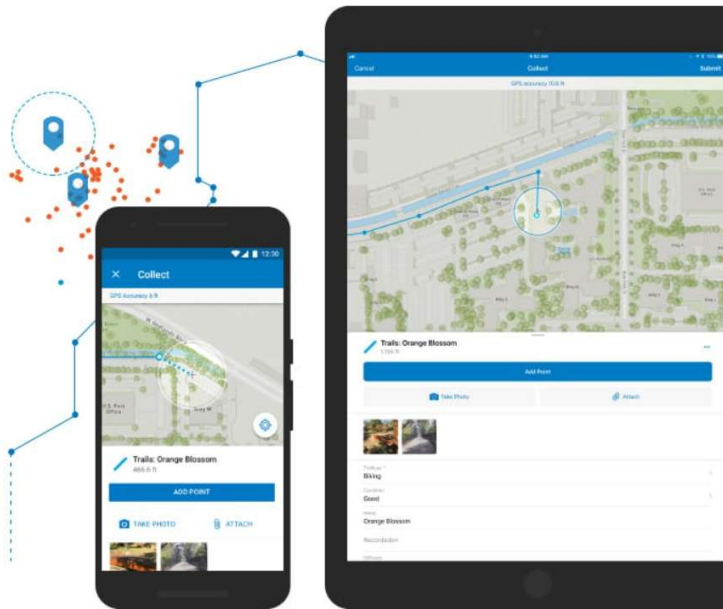
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## Ways to Reduce

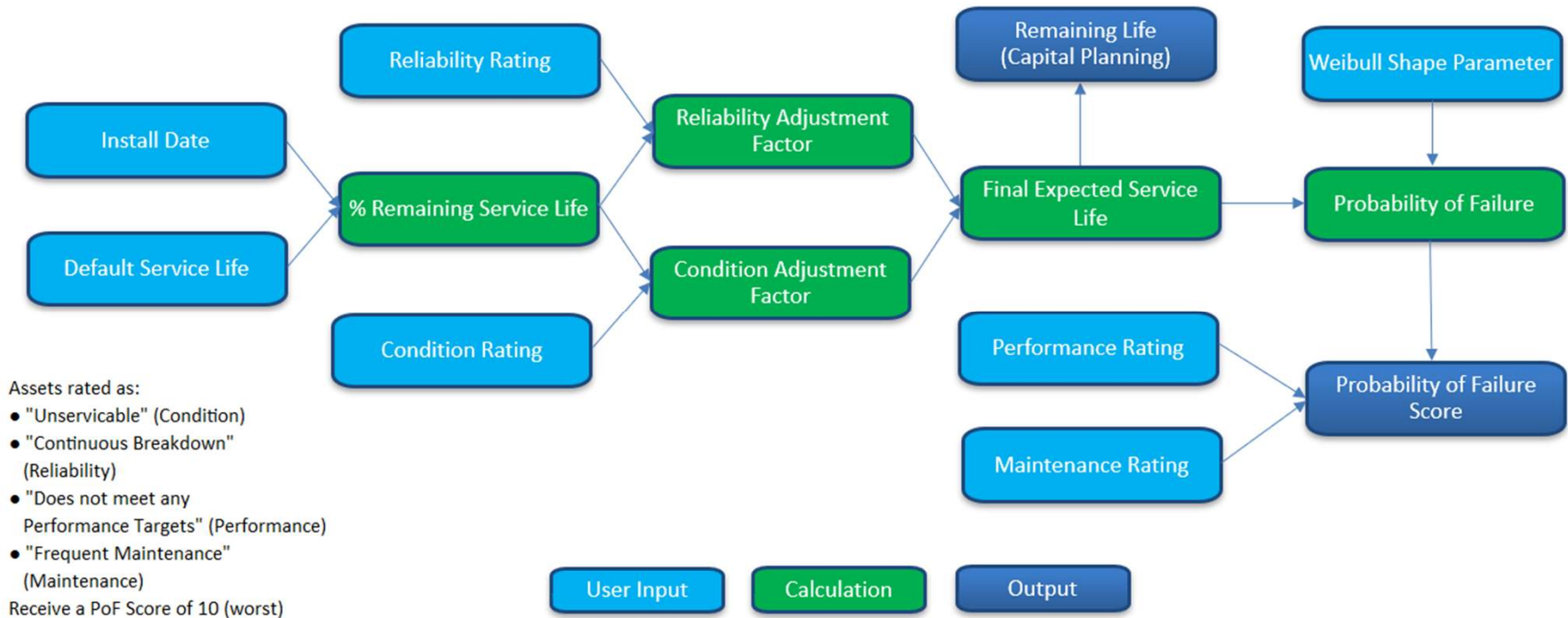
- Eliminate sections of water main that are not currently needed to support existing customers.
- Replace water mains with extensive break history
- Replace or repair faulty customer meters.
- Track water usage associated with:
  - Main breaks
  - Seasonal flushing

# Asset Inventory & Condition Assessment

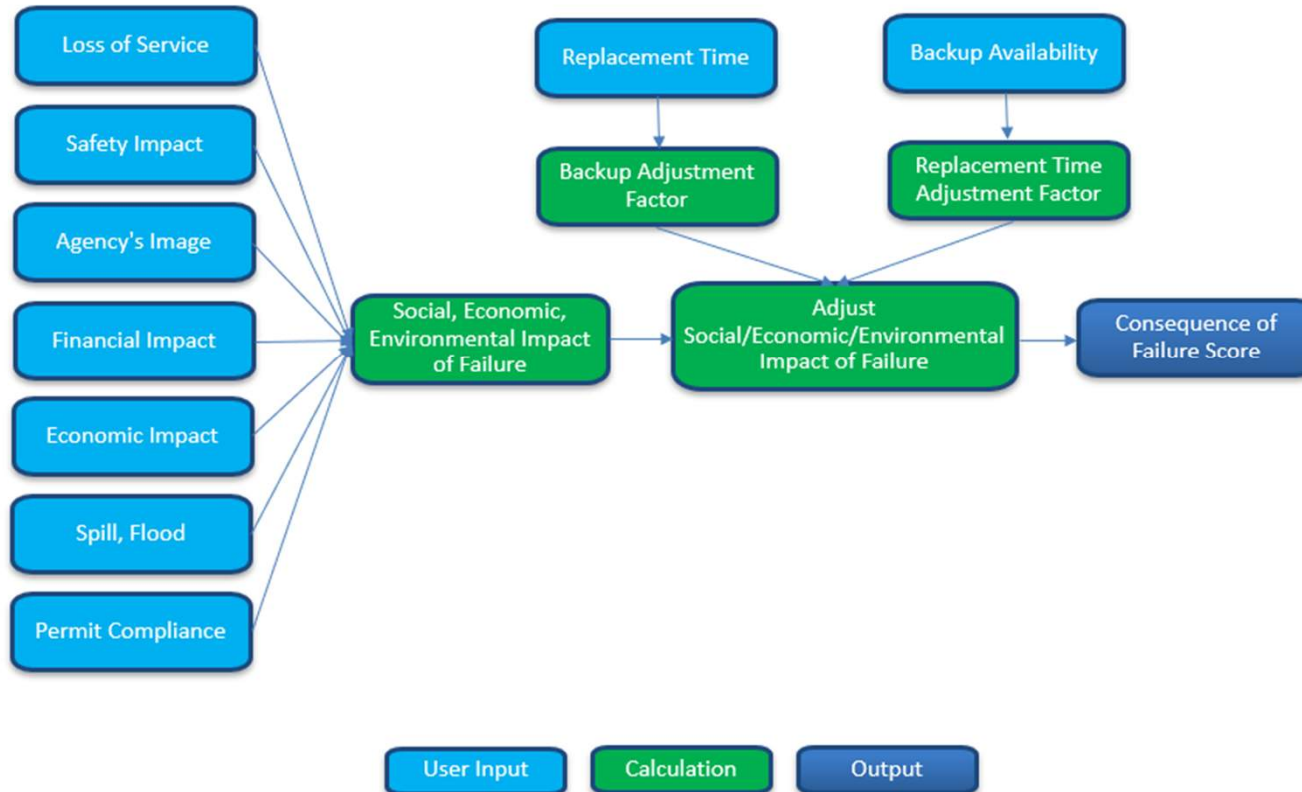


- District Operators use online tools like Google Sheets for record information storage and data collection
- Asset Inventory and condition assessment information on vertical assets included in Fulcrum
- Distribution system assets and attributes included in GIS database

# Vertical Asset Review: Probability of Failure



# Vertical Asset Review: Consequence of Failure





# Vertical Asset Review: Peninsula Pump House



Asset ID	Asset Description	Recommended Management Strategies	Estimated Renewal Date
100-101-CO-03	Auto Dialing Controls	Opportunistic R&R	2021
100-101-PP-04	Well Pump 6	Critical R&R	2021
100-101-CF-01	Chemical Metering Pump for Chlorine	Add PdM Schedule	2023
100-101-CF-02	Chemical Metering Pump for Orthophosphate	Add PdM Schedule	2023
100-101-FI-01	Cartridge Filter	Run to Fail	2026
100-101-SD-01	Part of SCADA Equipment	Rt or PM Schedule	2030
100-101-CG-01	System Pressure Gauge	Run to Fail	2030
100-101-CO-02	Tank and Well Alarm Controls	Rt or PM Schedule	2030

**An asset is a resource with economic value and the expectation that it will provide a future benefit.**

# Vertical Asset Review: Franklin Pierce Pump House



Asset ID	Asset Description	Recommended Management Strategies	Estimated Renewal Date
100-102-CO-02	Submersible Pump Controls Well 4	Priority R&R	2021
100-102-CO-03	Submersible Pump Controls Well 7	Priority R&R	2021
100-102-HV-01	Heater	Add PdM Schedule	2021
100-102-TM-02	Pressure Transmitter Booster Pump 1	Add PdM Schedule	2021
100-102-TM-01	Pressure Transmitter Booster Pump 2	Add PdM Schedule	2021
100-102-SI-01	Pump Control Switch for Compressor	Add PdM Schedule	2021
100-102-CO-01	Control Panel for All The Pumps	Add PdM Schedule	2021
100-102-TK-01	Storage Tank	Priority R&R	2026
100-102-LE-01	Storage Tank Level Indicator	Run to Fail	2030

# Horizontal Asset Review

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## Evaluation Parameters

- Water system pressure
- Pipe velocities and headloss
- Dead-end mains
- Pipe reliability and redundancy
- Pipe criticality
- Operational practices

## Recommendations

- Implement annual flushing program
- Implement valve exercising program
- Inspect and clean system storage tanks and hydropneumatic tanks
- Abandon the following mains:
  - Brookfield Circle
  - Manchester Drive (past New London Drive)
  - Merrimack Circle
  - New London Drive (one branch)
  - Newport Circle
  - Windsor Terrace

# Horizontal Asset Review: Probability of Failure

Street Name	Asset Life Consumed	Material	Static Pressure	Break History	Condition Ranking
	0.1	0.1	0.1	0.7	1-10
Concord Dr	5	2	7.0	9.0	7.7
Deer Meadow Rd	5	2	7.0	9.0	7.7
Merrimack Cir	5	2	7.0	1.0	2.1
Penacook Cir	5	2	7.0	1.0	2.1
Windsor Terrace	5	2	7.0	3.0	3.5
Deer Meadow Rd	5	2	7.0	1.0	2.1
-	5	2	7.0	1.0	2.1
-	5	2	7.0	3.0	3.5
Newport Cir	5	2	7.0	1.0	2.1
Newport Cir	5	2	7.0	1.0	2.1
Mount Vernon Ter	5	2	7.0	9.0	7.7
Brookfield Cir	5	2	7.0	1.0	2.1
Centennial Dr	5	2	7.0	1.0	2.1
Centennial Dr	5	2	7.0	5.0	4.9
Rumford Dr	5	2	7.0	3.0	3.5
Deer Meadow Rd	5	2	7.0	9.0	7.7
Christopher Robert Dr	5	2	7.0	1.0	2.1
Corn Hill Rd	5	2	7.0	1.0	2.1
New Hampshire Dr	5	2	7.0	5.0	4.9

## Weighting Factors

- Asset Age
- Material Type
- Static Pressure
- Break History

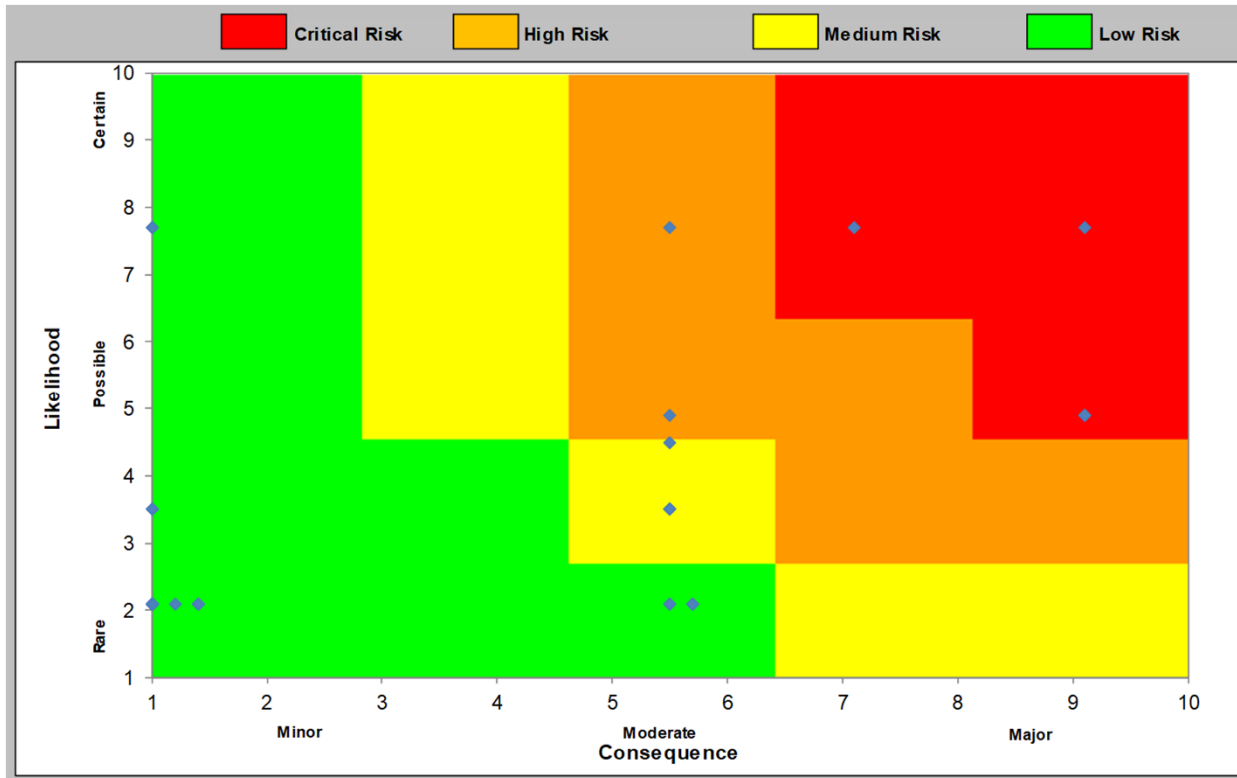
# Horizontal Asset Review: Consequence of Failure

Street Name	Number of Customers	Diameter	Criticality	Condition Ranking
	0.4	0.1	0.5	1-10
Concord Dr	10.0	1	10	9.1
Deer Meadow Rd	5.0	1	10	7.1
Merrimack Cir	0.0	3	1	1.2
Penacook Cir	0.0	1	1	1.0
Windsor Terrace	0.0	1	1	1.0
Deer Meadow Rd	1.0	3	10	5.7
-	0.0	3	10	5.7
-	0.0	1	10	5.5
Newport Cir	0.0	1	1	1.0
Newport Cir	0.0	1	1	1.0
Mount Vernon Ter	0.0	1	1	1.0
Brookfield Cir	0.0	1	1	1.0
Centennial Dr	0.0	3	10	5.7
Centennial Dr	10.0	1	10	9.1
Rumford Dr	0.0	1	1	1.0
Deer Meadow Rd	0.0	1	10	5.5
Christopher Robert Dr	0.0	5	1	1.4
Corn Hill Rd	1.0	1	1	1.0
New Hampshire Dr	10.0	1	10	9.1

## Weighting Factors

- Number of Customers per Pipe Segment
- Diameter
- Criticality

# Horizontal Asset Review: Business Risk Exposure



Street Name	PoF Score	CoF Score	BRE Score
Concord Dr	7.7	9.1	70.1
Deer Meadow Rd	7.7	7.1	54.7
Merrimack Cir	2.1	1.2	2.5
Penacook Cir	2.1	1.0	2.1
Windsor Terrace	3.5	1.0	3.5
Deer Meadow Rd	2.1	5.7	12.0
-	2.1	5.7	12.0
-	3.5	5.5	19.3
Newport Cir	2.1	1.0	2.1
Newport Cir	2.1	1.0	2.1
Mount Vernon Ter	7.7	1.0	7.7
Brookfield Cir	2.1	1.0	2.1
Centennial Dr	2.1	5.7	12.0
Centennial Dr	4.9	9.1	44.6
Rumford Dr	3.5	1.0	3.5
Deer Meadow Rd	7.7	5.5	42.4
Christopher Robert Dr	2.1	1.4	2.9
Corn Hill Rd	2.1	1.0	2.1
New Hampshire Dr	4.9	9.1	44.6



# Horizontal Asset Review: Business Risk Exposure



## BRE Scoring

- 0-20 - Green
- 20-40 - Yellow
- 40 < - Red

## Priority & Secondary Improvements

Priority Improvement Description	Purpose of Improvement	Length (ft)	Total Project Cost
Water Storage Tank Inspection & Cleaning	Maintenance	-	\$5,000
Concord Drive Water Main Replacement	Breaks, Age, Criticality	1,900	\$525,000
Franklin Pierce Pump House Improvements	Condition	-	\$33,500
Peninsula Pump House Improvements	Condition	-	\$13,000
		<b>SUBTOTAL</b>	<b>\$576,500</b>

Secondary Improvement Description	Purpose of Improvement	Length (ft)	Total Project Cost
Franklin Pierce Pump House Improvements	Condition	-	\$28,500
Peninsula Pump House Improvements	Condition	-	\$35,450
Water Storage Tank Inspection & Cleaning	Maintenance	-	\$5,000
		<b>SUBTOTAL</b>	<b>\$68,950</b>

# Financial Implementation Plan

Year	Capital Project Costs	Rate Increase Needed to Fund CIP	Balance With Additional Rate Increase
2021	\$86,273	0%	\$40,025
2022	\$35,288	0%	\$64,225
2023	\$37,473	0%	\$86,375
2024	\$35,288	0%	\$110,850
2025	\$35,288	0%	\$135,466
2026	\$69,080	0%	\$126,439
2027	\$35,288	0%	\$151,355
2028	\$35,288	0%	\$176,427
2029	\$35,288	0%	\$201,659
2030	\$83,199	0%	\$179,147
2031	\$35,288	0%	\$204,716

## Revenue

- Water bills and meter charges
- Cash in hand
- Taxes

## Expenses

- Operating and maintenance
- Existing debt service
- Proposed capital projects

# Financial Implementation Plan: Funding Options/Partners



NH Municipal  
Bond Bank



Private Loans



Cash



## Level of Service

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- A LOS Agreement defines how the utility owners, managers, operators and customers want the system to perform over the long term
- PLVD chose to create a LOS that covers both vertical and distribution system assets
- “Report Card” for the system

# Level of Service

Goal	Target Level	Frequency of Measurement	Goal Date	Goal Outcome
All federal and state water quality regulations will be met	<MCL	Annually		
Water balance unmetered/unbilled water less than 15%	<15%	Annually		
The system will maintain a minimum pressure of 35 psi	>35 psi	Each Complaint		
All customer complaints will be investigated within 1 business days of reporting the complaint.	1 day	Annually		
Breaks will be repaired within 24 hours of being reported 95% of the time.	> 95%	Monthly		
Contact the Board of Commissioners at least 48 hours prior to water main shutdown in planned situations and ASAP in emergency situations.	< 48 hrs	Monthly		
No bulk water deliveries.	0	Annually		



## Level of Service

Goal	Target Level	Frequency of Measurement	Goal Date	Goal Outcome
Maintain a full inventory of distribution system parts.	100%	Annually		
Treatment operator training level.	Grade IA	Annually		
Distribution operator training level.	Grade IA	Annually		
Ensure GIS is up to date.	100%	Annually		
Perform backflow testing at appropriate frequency.	100%	Annually		
Maintain a safety committee and deliver service in the safest possible manner.	0 accidents	Annually		
Maintain water system facilities power and communications capacity.	95%	Annually		

## Next Steps: Asset Management Maintenance Plan

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**1** Continue collection of missing assets and asset characteristics.

**3** Add asset information assessment information to GIS.

**2** Revise asset information as inspections, rehabilitation, and repair projects are completed.

**4** Revise CIP and FIP annually as part of the budget development process.

# THANK YOU

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