Agawam AMP

Final Report Summary Presentation

July 11, 2024

Woodard & Curran

Project Focus/Objectives

- Complete an asset inventory and assess the current state of the stormwater and wastewater collection systems, and water distribution system assets.
- Update the Town's geographic information system (GIS).
- Evaluate the level of service (LOS) to set utility performance goals.
- Create a 20-year Capital Improvement Plan (CIP), a Priority List of Assets (PLA) and a Secondary List of Assets (SLA) with estimated annual costs under various terms of improvements.

Section 1: Summary of Assets

Town Metrics			
	Stormwater	**Wastewater**	**Drinking Water**
Diameter Range (in.)	40-60	4-30	4-24
Miles of Pipe	80	124	150
Installation Years		1971-1977	1967-1973
Manholes	2,400	3,050	
Outfalls	355		
Culverts	268		
Service Accounts			1,1516
Fire Hydrants			1,580
Gate Valves			475
Material		PVC	
Notes			*Purchased from Springfield Water and Sewer Commission

Stormwater System Asset Inventory

Stormwater System Asset Information	Data Available in GIS Format
Pipes	
Location	Yes
Material	Partial (85%)
Diameter	Partial (88%)
Installation Year	Partial (62%)
Depth	Partial (70%)
Manholes	
Location	Yes
Identification Number	Yes
Invert Elevations	Yes
Catch Basins	
Location	Yes
Condition	Yes
Culverts	
Location	Yes
Condition	Yes
Detention Basins	
Location	Yes
Condition	No

Sewer System Asset Inventory

Sewer System Asset Information	Data Available in GIS Format
Gravity Sewer Pipes	
Location	Yes
Material	Partial (76%)
Diameter	Partial (86%)
Installation Year	No
Depth	Partial (80%)
Manholes	
Location	Yes
Identification Number	Yes
Elevations	Partial (80%)
Force Mains	
Location	Yes
Material	Partial (84%)
Diameter	Partial (92%)
Installation Year	No
Depth	No

Water System Asset Inventory

Water System Asset Information	Data Available in GIS Format
Water Mains	
Location	Yes
Material	Partial (92%)
Diameter	Partial (94%)
Installation Year	Partial (89%)
Valves	
Location	Yes
Identification Number	Yes
Hydrants	
Location	Yes
Identification Number	Yes
Installation Year	Partial (90%)

Section 1: Recommendations

All three system's data could be improved by:

- Addressing data gaps to the extent possible by continuing to update GIS data based on reviewing record drawings.
- Facilitating field data collection so that asset information can be entered from the field during maintenance activities.
- Maintaining a dynamic GIS system that is updated regularly.
- Adding feature classes such as laterals

Section 2: Level of Service and Capacity Analysis

Goals :

1. Minimize water quality complaints by prioritizing projects that supply safe and reliable drinking water.

2. Protect public health and the environment by limiting sanitary sewer backups and overflows through sanitary sewer system maintenance.

3. Note maintenance needs, identify potential funding sources, and manage future rate increases.

4. Maintain staff licensure (e.g., hoisting licenses) in order to complete projects in-house for cost efficiency.

5. Keep staff safety-related training up-to-date and follow safe work practices at all times.

Section 2: Level of Service Metrics

Area	Metric	National Benchmark[(1)]
Customer Relations		
Water service disruptions	Avg time to address water service disruptions (hr.)	3.7
Wastewater service disruptions	Avg time to address wastewater service disruptions (hr.)	3.5
Water disruption frequency	Disruptions/1000 accounts	2.80
Wastewater disruption frequency	Disruptions/1000 accounts	0.15
Water Operations		
Regulatory Compliance	% Compliance	100%
Energy Use	Energy purchased (electricity, NG, etc.) / Avg Daily Production	6,800 kBTU / year / MG
Water distribution system integrity	Breaks/100 mi of pipe	5.9
O&M costs for water services	$/acct	$461
O&M costs for water services	$/MG	$2,437
Wastewater Operations		
Regulatory Compliance	% Compliance	100%
Energy Use	Energy purchased (electricity, NG, etc.) / Avg Daily Production	7,400 kBTU / year / MG
SSOs	Per 100 miles of pipe	1.6
Collection system integrity	Failures/100 mi of pipe	3.3
O&M costs for wastewater services	$/acct	$355
O&M costs for wastewater services	$/MG	$2,298

(1) Median benchmark values from 2020 AWWA Utility Benchmarking: Performance Management for Water and Wastewater.

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Capacity Analysis Recommendations

- Update the water distribution system hydraulic model and complete updates every five years.
  - Revisit pipe diameter recommendations from the 2019 hydraulic model.
  - Reevaluate increased capacity, demand and potential upgrades for future developments.
- More involved SSES program to understand the condition of sewer assets and its impacts on available capacity.
  - Ongoing infiltration and inflow (I/I) removal efforts to remove extraneous flows.
- Perform annual inspections, maintenance and stormwater system components.
- Considering planning efforts for the Downtown Revitalization Plan

Section 3: Risk Assessment

Likelihood of Failure (LoF): The probability of failure based upon an asset's physical condition. Determined via inspection or estimated based upon engineering judgement (i.e., age or material). The score is based on failure mode:

1. **Physical Integrity:** Condition based on structural integrity, given age and material. Useful life of piping (50-75 years). Material has different physical properties and service lives.

2. **Operational Issues:** Historical water main breaks or sanitary sewer overflows (SSOs).

3. **Capacity:** Asset not being able to meet current demands. Quantified using head loss (friction) values which affects system performance and efficiency.

The LoF is scored using a numerical range from 1 to 5 with 1 being the lowest LoF, and 5 being the highest.

Guidance for Assigning Likelihood of Failure Scores

5 (Very High)	4 (High)	3 (Moderate)	2 (Low)	1 (Very Low)
Not functional – requires major repair, rebuild or replacement to operate properly. Beyond useful life.	Operable, but does not function as needed for current operating conditions. At or nearing end of useful life.	Functions as needed for current operating conditions, ½ – ¾ life expended.	Fully functional for current operating conditions, ¼ – ½ life expended.	Fully functional as designed, < ¼ life expended.

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Scoring Guidelines (Horizontal + Vertical)

Category	Likelihood of Failure Score				
	5 (Very High)	4 (High)	3 (Moderate)	2 (Low)	1 (Very Low)
Pump Station Assets	Failed/out of service/does not exist/impact being felt now. Not functional - requires major repair, rebuild or replacement to operate properly. Beyond useful life.	Poor condition/end of life (failure likely within 5 years). Significant deterioration - major repair required, requires excessive maintenance or insufficient capacity for current process. Rehabilitation unlikely. Operable, but does not function as needed for current operating conditions. At or nearing end of useful life.	Fair condition. Some life (5 to 10 years) remaining, requires moderate maintenance, approaching capacity issues. Functions as needed for current operating conditions, ½ -¾ life expended.	Good Condition. Significant life (10-15 years) remaining. Minor defects, only preventative maintenance or minor corrective maintenance required. Fully functional for current operating conditions, ¼ - ½ life expended.	New or nearly so. Full life (15-20 years) remaining, reliable, and sufficient capacity for current and design process needs. Fully functional as designed, < ¼ life expended.

Consequence of Failure

Consequence Factors are organized using Triple Bottom Line (TBL) principles:

- **Environmental:**
  - Changes to ecological conditions when assets fail
  - Failure to meet permit requirements
  - Potential pollution of immediate neighbors (unwanted odors or spills)
  - Environmental footprint from resources (e.g., materials, energy, water) to address failed assets.
- **Economic:**
  - Costs incurred to repair the asset
  - Associated legal, design and permitting fees.
  - Fines for non-compliance with environmental regulations or permits
  - Potential reduction in property values and increased insurance rates.
- **Social**
  - Public and worker health and safety concerns
  - Reputation and public image
  - Outside access into the system -> security threat for the community at large.

These TBL guidelines drive how the specific CoF metrics are assigned scores.

Consequence of Failure Scoring Guidelines

Consequence Factor	5 (Very High)	4 (High)	3 (Moderate)	2 (Low)	1 (Very Low)
Social – Customers & Reputation	Major impact on stakeholders and/or serious threat to long-term reputation	Intermittent service to some customers and or threat to reputation	Minor service impacts and/or diminishes reputation	Contained within the facilities, workarounds making work flows difficult	In-house work item, reduction in efficiency
Service & Financial Impacts	Complete disruption of services; direct or indirect costs trigger state and regional media coverage	Partial disruption of services; direct or indirect costs trigger local media coverage	Partial disruption of services, direct or indirect costs do not trigger media coverage	No disruption of services; direct or indirect costs do not trigger media coverage	No impact to operations; direct or indirect costs do not trigger media coverage
Environmental Regulatory	Fine, compliance order or other regulatory action likely or significant damage to the environment	Fine, compliance order or other regulatory action possible or localized damage to the environment	Non-compliance possible or some damage to the environment	Non-compliance possible if not addressed or minimal damage to the environment	Non-compliance unlikely or minor damage to the environment

Risk Interpretation & Action Levels

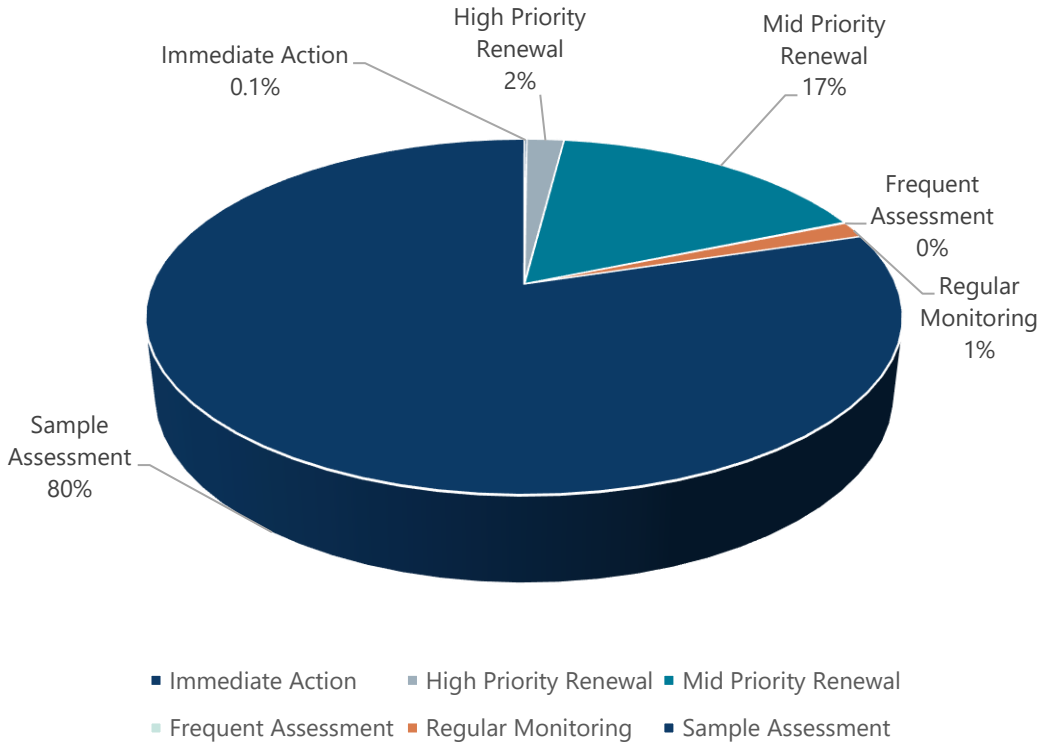
Action level is one of six categories that describe the recommended monitoring frequency or renewal priority for an asset, depending upon its combination of LoF and CoF.

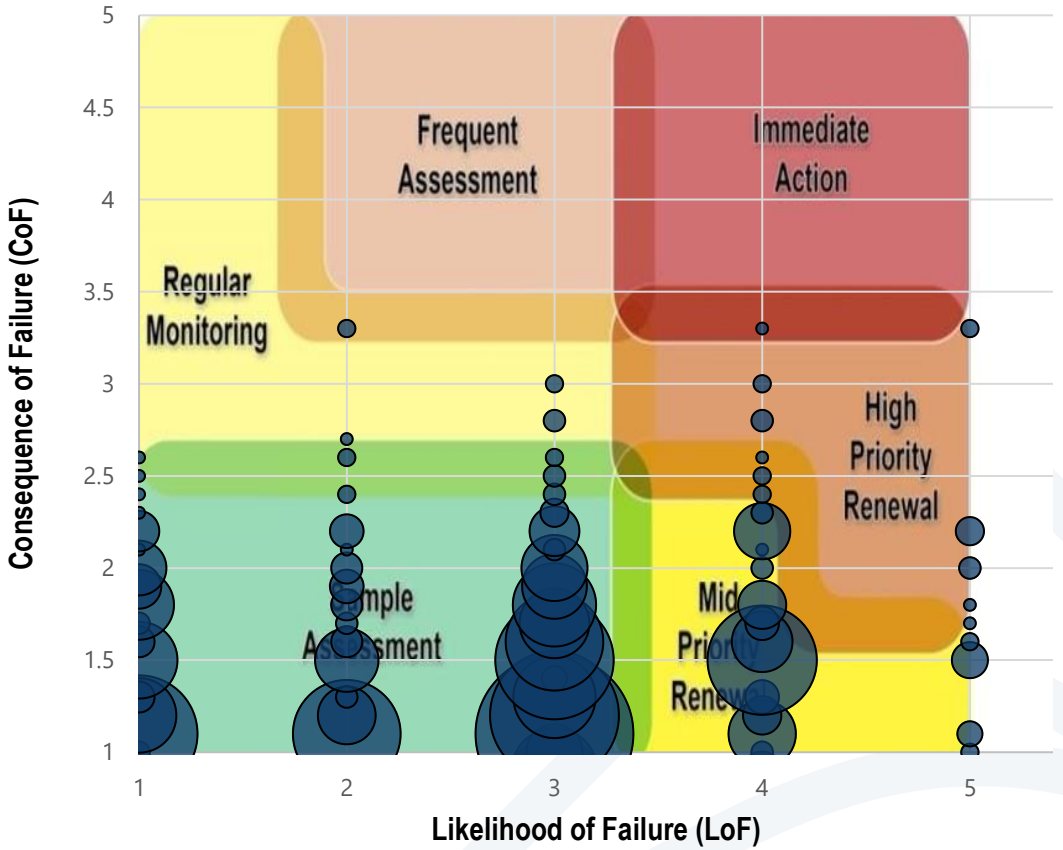
- **Sample Assessment** – The lowest risk and priority; failure would have a very low impact.
  - periodic observations
  - Inspection frequency: every 10-15 years
- **Regular Monitoring** – Prioritized for inspection and maintenance.
  - High-risk if LoF increase
  - frequent inspection or immediate attention
  - Inspection frequency: every 5-10 years
- **Frequent Assessment** – Critical to the operation of the system; highest priority for maintenance.
  - Immediate Action if LoF increase
  - Inspection frequency: every 1-5 years
- **Mid-Priority Renewal** – Low criticality to the system; lowest priority for renewal or replacement.
  - Poor physical condition and/or hydraulically limited
  - Replacement is not an immediate need, considered based on available budget and opportunistic contracts
- **High-Priority Renewal** – High priority for renewal or replacement; critical function within the system.
  - Poor physical condition and/or hydraulically limited
  - Should be included on a near-term CIP for renewal or replacement
- **Immediate Action** – Highly critical to the system and likely to fail shortly
  - Should be given individual attention for expedited renewal or replacement

*In general, assets with an LoF of 3.5 or higher should be prioritized for renewal, and assets with an LoF of less than 3.5 should be monitored for changes in their condition.

Water Distribution Risk Analysis

- Action Level Results & Distribution





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Water Vertical Risk Analysis

- The only vertical asset in the water distribution system is the Hamar Drive Booster Pump Station. In a discussion with the Town in January 2020, this asset was given a 3 for the LoF score based on the Town's opinion of the booster station condition.

- Consequence of Failure Results

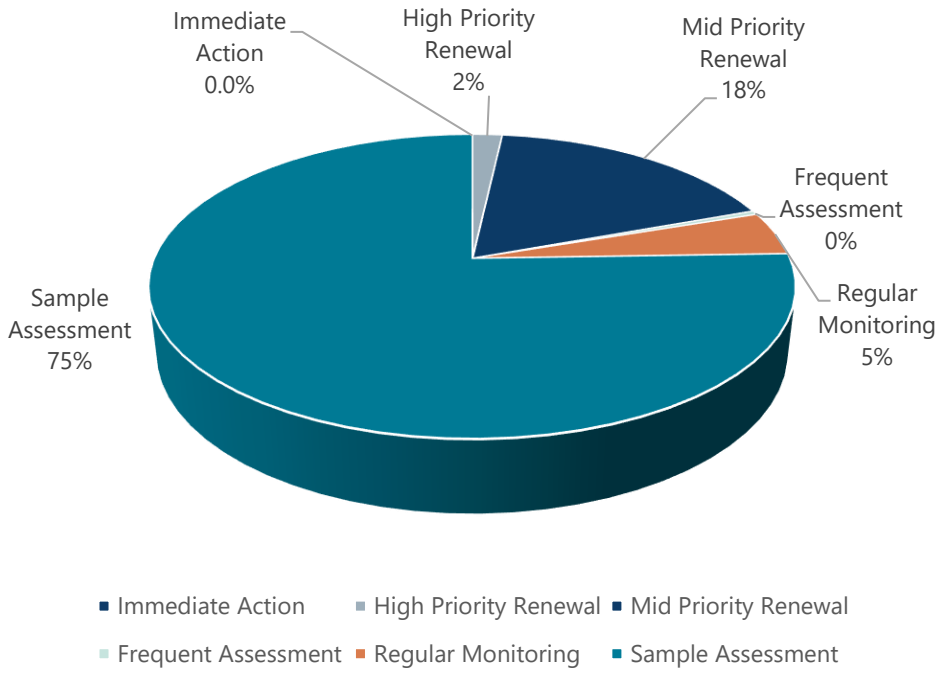
Vertical Asset	CoF (Social, Customers, & Reputation)	CoF (Service & Financial Impacts)	CoF (Environmental & Regulatory)	CoF Total
Hamar Drive Booster Pump Station	5	4	5	4.67

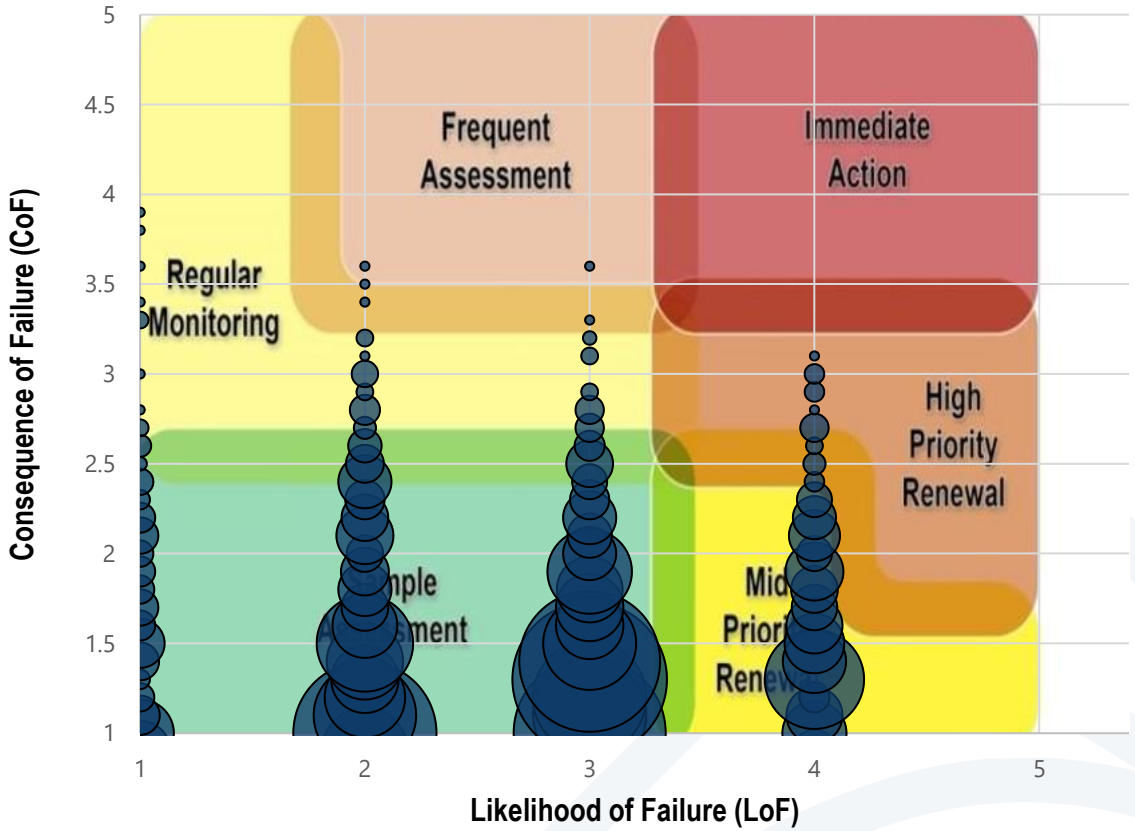
- Risk Action Level Results

Based on the LoF score of 3 and the CoF score of 4.67, the Hamar Drive Booster Pump Station was given a total risk score of 14, which corresponds with an action level of frequent assessment. This indicates that the Town should continue to maintain this pump station and be sure that all equipment is operating efficiently.

Wastewater Collection Risk Analysis

- Sewer Main Action Level Results & Distribution





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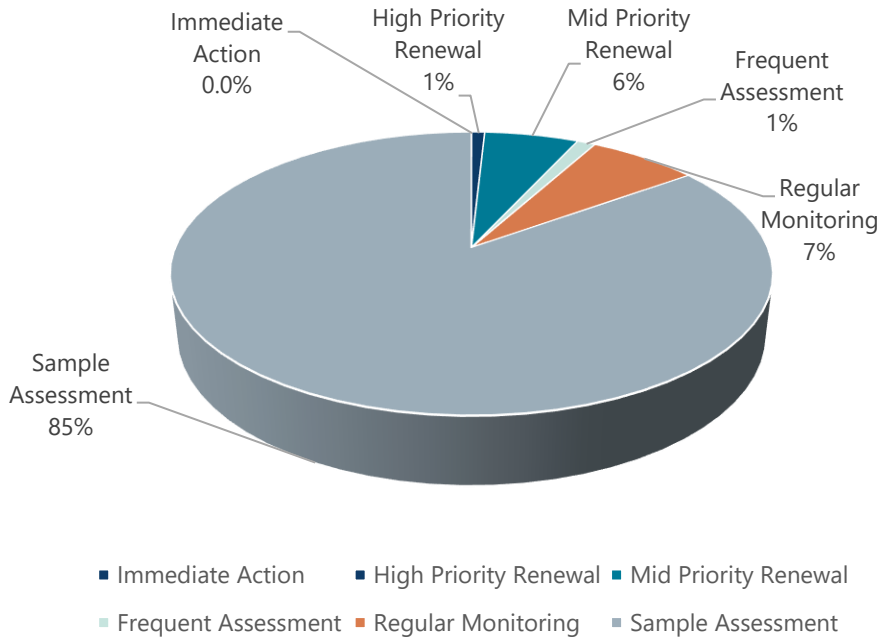
Wastewater Vertical Risk Analysis

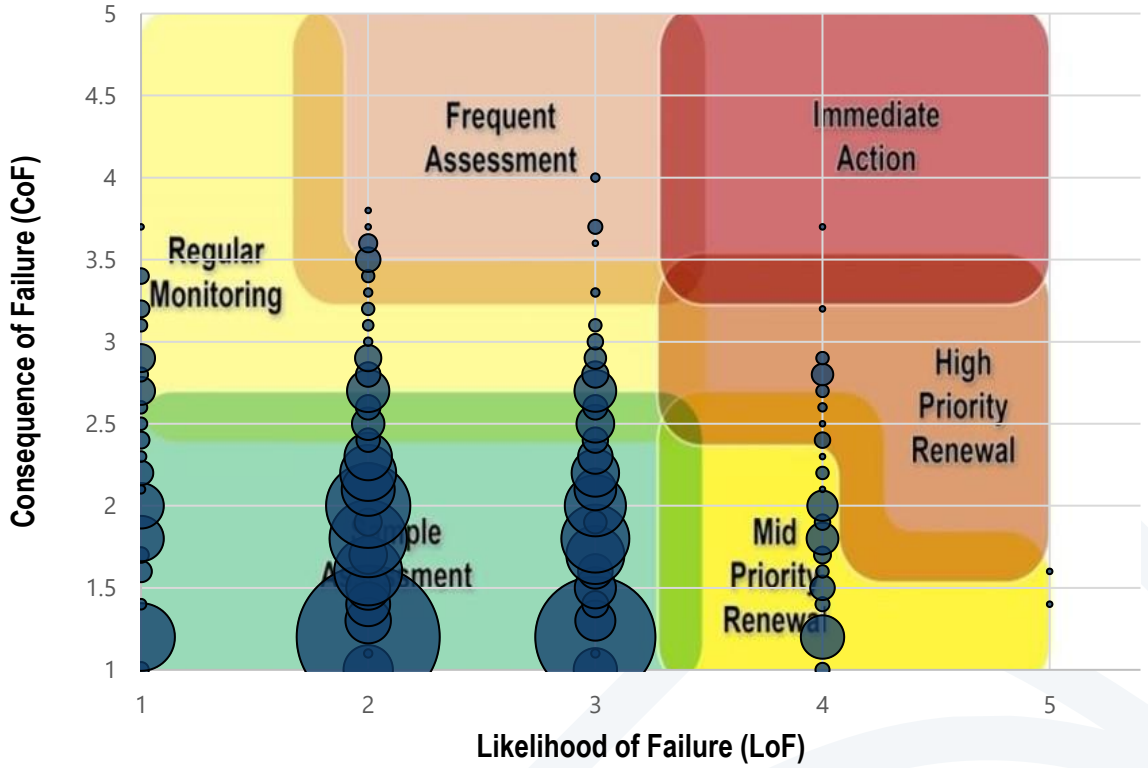
- Pump Station Risk Analysis Results

Vertical Asset	Risk (CoF * LoF)	Action Level
Campbell Drive Pump Station	11	Frequent Assessment
Hendom Drive Pump Station	14.67	Immediate Action
Losito Lane Pump Station	11	Frequent Assessment
May Hollow Pump Station	13	Frequent Assessment
Meadow Brook Pump Station	11	Frequent Assessment
North Street Pump Station	13	Frequent Assessment
Pleasant Valley Pump Station	11	Frequent Assessment
River Road Pump Station	15	Frequent Assessment
Riverview Avenue Pump Station	11	Frequent Assessment
School Street Pump Station	15	Frequent Assessment
South Street Pump Station	13	Frequent Assessment
Valley Street Pump Station	7.33	Frequent Assessment
Westfield River Pump Station	10	Frequent Assessment

Stormwater Collection Risk Analysis

- Stormwater Action Level Results & Distribution





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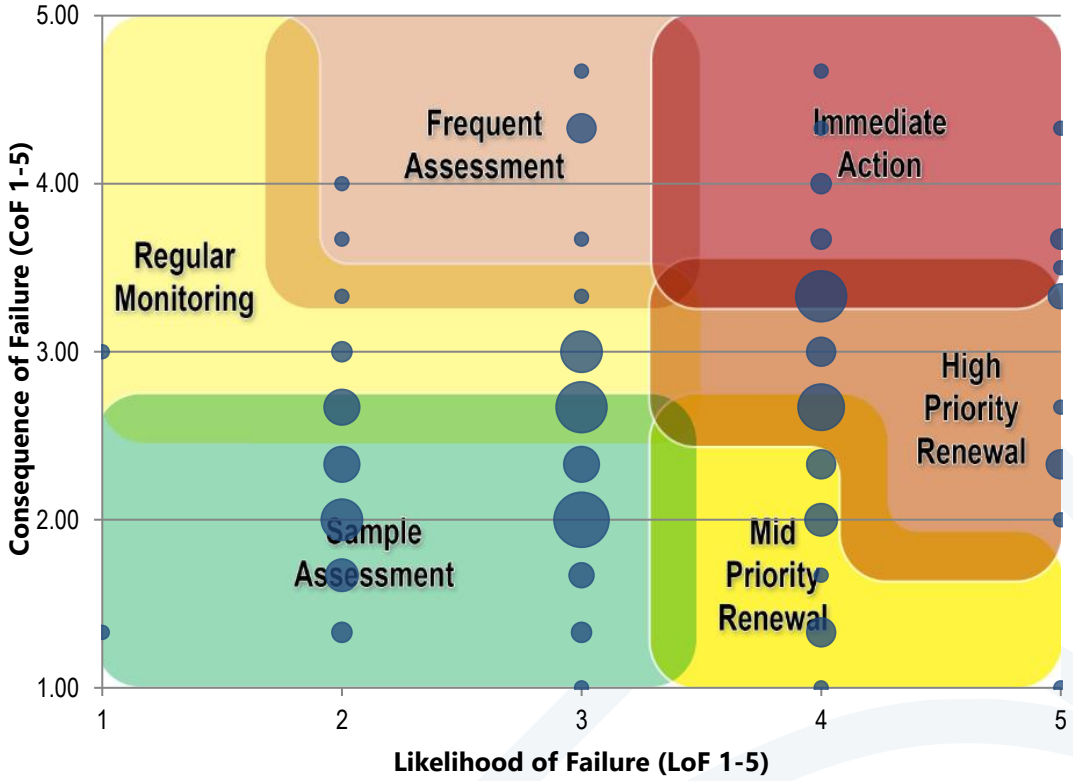
Culvert Risk Analysis

- Culvert Assessment Action Level Results & Distribution

Action Level	Count	Percentage
Immediate Action	22	15%
High Priority Renewal	23	16%
Mid Priority Renewal	16	11%
Frequent Assessment	10	7%
Regular Monitoring	29	20%
Sample Assessment	48	32%



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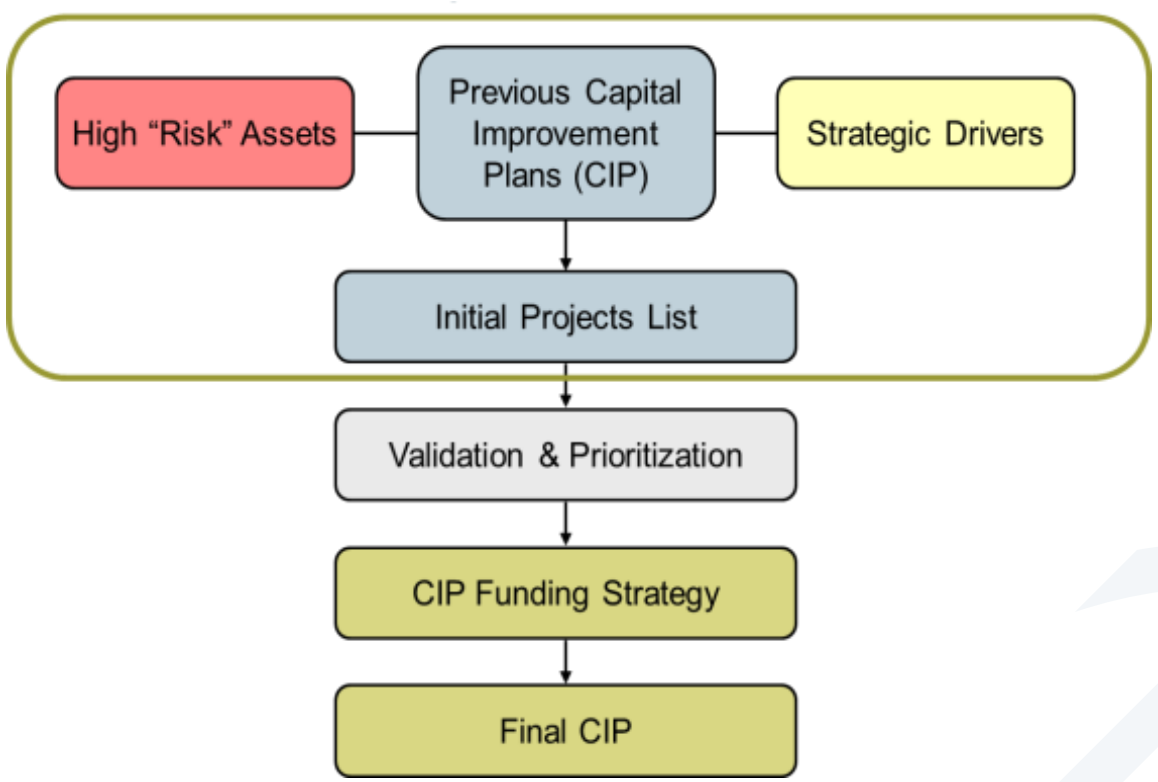
Section 5: Capital Improvement Plan

- Project Identification Process



Summary of Annual Costs

- Recommended Annual Storm and Sewer Inspections

Asset Inspection Frequency Category	Recommended Annual Length of Sewer Pipe Inspection LF (miles)	Recommended Annual Length of Storm Pipe Inspection LF (miles)
Every 5 years	602 (0.11)	982 (0.19)
Every 10 years	3,344 (0.63)	2,938 (0.56)
Every 15+ years	36,305 (6.88)	23,663 (4.48)
Total	40,251 (7.62)	27,582 (5.2

Short-Term Water Improvements (0-5 Years)

SHORT TERM (0-5 YEARS)	
Budget Item	Cost
Immediate Action Replacement (1,037 LF)	$261,000
High Priority Replacement (15,592 LF)	$3,895,000
Unanticipated Replacement (500 LF per year)	$629,000
Subtotal	$4,785,000
Construction Total	$4,785,000
Engineering Oversight (15%)	$933,000
Police Details (15%)	$933,000
Contingency (30%)	$1,436,000
Total	$8,087,000

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Intermediate-Term Water Improvements (5-10 Years)

INTERMEDIATE (5-10 YEARS)	
Budget Item	Cost
Mid-Priority Renewal (137,306 LF)	$33,066,000
Unanticipated Replacement (500 LF per year)	$629,000
Subtotal	$33,695,000
Construction Total	$33,695,000
Engineering Oversight (15%)	$6,571,000
Police Details (15%)	$6,571,000
Contingency (30%)	$10,109,000
Total	$56,946,000

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Long-Term Water Improvements (10-20 Years)

LONG TERM (10-20 YEARS)	
Budget Item	Cost
Unanticipated Replacement (500 LF per year)	$1,258,000
Subtotal	$1,258,000
Construction Total	$1,258,000
Engineering Oversight (15%)	$245,000
Police Details (15%)	$245,000
Contingency (30%)	$377,000
Total	$2,125,000

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Short-Term Wastewater Improvements (0-5 Years)

SHORT TERM (0-5 YEARS)	
Budget Item	Cost
Replacement/Rehabilitation	
Immediate Action Replacement (0 LF)	$0
High Priority Replacement (12,808 LF)	$3,840,000
Replacement/Rehabilitation based on Inspections (5%)	$1,875,000
Subtotal	$5,715,000
Inspection and Planning (over 5 years period)	
Sewer Inspections	$905,600
Subtotal	$905,600
Construction Total	$5,715,000
Engineering Oversight (15%)	$1,115,000
Police Details (15%)	$1,115,000
Contingency (30%)	$1,715,000
Inspection & Planning Costs	$905,600
Total	$10,565,600

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Intermediate-Term Wastewater Improvements (5-10 Years)

INTERMEDIATE (5-10 YEARS)	
Budget Item	Cost
Replacement/Rehabilitation	
Mid Priority Replacement (127,436 LF)	$23,749,000
Replacement/Rehabilitation based on Inspections (5%)	$1,875,000
Subtotal	$25,624,000
Inspection and Planning (over 5 years period)	
Sewer Inspections	$905,600
Subtotal	$905,600
Construction Total	$25,624,000
Engineering Oversight (15%)	$4,997,000
Police Details (15%)	$4,997,000
Contingency (30%)	$7,687,000
Inspection & Planning Costs	$905,600
Total	$44,210,600

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Long-Term Wastewater Improvements (10-20 Years)

LONG TERM (10-20 YEARS)	
Budget Item	Cost
Replacement/Rehabilitation	
Replacement/Rehabilitation based on Inspections (5%)	$3,750,000
Subtotal	$3,750,000
Inspection and Planning (over 10 years period)	
Sewer Inspections	$1,811,300
Subtotal	$1,811,300
Construction Total	$3,750,000
Engineering Oversight (15%)	$731,000
Police Details (15%)	$731,000
Contingency (30%)	$1,125,000
Inspection & Planning Costs	$1,811,300
Total	$8,148,300

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Short-Term Stormwater Improvements (0-5 Years)

SHORT TERM (0-5 YEARS)	
Budget Item	Cost
Replacement/Rehabilitation	
Immediate Action Replacement (56 LF)	$12,000
High Priority Replacement (3,510 LF)	$583,000
Replacement/Rehabilitation based on Inspections (5%)	$1,109,000
Subtotal	$1,704,000
Inspection and Planning (over 5 years period)	
Drainage Pipe Inspections	$620,600
Subtotal	$620,600
Construction Total	$1,704,000
Engineering Oversight (15%)	$332,000
Police Details (15%)	$332,000
Contingency (30%)	$511,000
Inspection & Planning Costs	$620,600
Total	$3,499,600

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Intermediate-Term Stormwater Improvements (5-10 Years)

INTERMEDIATE (5-10 YEARS)	
Budget Item	Cost
Replacement/Rehabilitation	
Mid Priority Replacement (25,150 LF)	$3,690,000
Replacement/Rehabilitation based on Inspections (5%)	$1,109,000
Subtotal	$4,799,000
Inspection and Planning (over 5 years period)	
Drainage Pipe Inspections	$620,600
Subtotal	$620,600
Construction Total	$4,799,000
Engineering Oversight (15%)	$936,000
Police Details (15%)	$936,000
Contingency (30%)	$1,440,000
Inspection & Planning Costs	$620,600
Total	$8,731,600

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Long-Term Stormwater Improvements (10-20 Years)

LONG TERM (10-20 YEARS)	
Budget Item	Cost
Replacement/Rehabilitation	
Replacement/Rehabilitation based on Inspections (5%)	$2,219,000
Subtotal	$2,219,000
Inspection and Planning (over 10 years period)	
Drainage Pipe Inspections	$1,241,200
Subtotal	$1,241,200
Construction Total	$2,219,000
Engineering Oversight (15%)	$433,000
Police Details (15%)	$433,000
Contingency (30%)	$666,000
Inspection & Planning Costs	$1,241,200
Total	$4,992,200

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Summary

Years	Drinking Water	Wastewater	Stormwater	Total
0-5	$8,087,000	$10,565,600	$3,499,600	$22,152,200
5-10	$56,946,000	$44,210,600	$8,731,600	$109,888,200
10-20	$2,125,000	$8,148,300	$4,992,200	$15,265,500
Total:	$67,158,000	$62,924,500	$17,223,400	$147,305,900

Funding Sources

Raising the capital to fund public infrastructure projects can be handled in ways that include bonding, grants, low-interest loans, and betterments. Grant and low-interest loan programs are often used to mitigate the financial impacts to users. The following information describes potential funding available for planning, design and/or construction to the Town for capital improvement projects:

- **MassDEP Clean Water State Revolving Fund Loan**

- **The Massachusetts Clean Water State Revolving Fund** (CWSRF) loan programs provide low-interest loans to finance community sewer projects, both publicly and privately owned. Projects are selected annually using a priority ranking system called the Intended Use Plan (IUP). IUP ranking is based upon protection of the public health and improved compliance together with affordability.

Section 6: Implementation

In order to make this AMP useful and effective, several next steps should be taken:

- **Maintenance Program Updates (ongoing)** – The Town should assess their current maintenance programs to ensure that routine and critical maintenance is performed so that assets that are considered most critical to the process (CoF higher than 3) are in good working order and performing according to function. The Town should also continue their horizontal infrastructure inspection work on a regular basis.

- **Asset Management Software Implementation (Phase 2)–** Asset tracking through a computerized maintenance management system or enterprise asset management system can provide a large benefit to the organization and management of assets. The Town's existing system for tracking work orders and other operation and maintenance activities combines paper-based documentation and inHANCE, a utility billing and customer information software. The manual work order tracking system is challenging to incorporate into GIS and is not feasible for long-term asset management. Therefore, it is recommended that the Town complete an evaluation and implementation of an asset management software application.