Town Manager
David A. Mekarski

Town Attorney
Sally Hankins

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Chief of Police
Cynthia A. McAlister

Town Clerk
Diana Hays

Department Directors
Elizabeth Krens, Finance
Buster Nicholson, Public Works
Patrick Sullivan, Community Development
Shannon Bohince, Information Technology
Hooper McCann, Administration

DATE: **October 3, 2019**

TO: **Purcellville Town Council**
Sally Hankins, Town Attorney

FROM: **Kimberly Bandy, Deputy Town Clerk**

SUBJECT: **Notice of Town Council Special Meeting/Work** Session

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As previous noticed on September 27, 2019, and in accordance with the Code of Virginia §15.2-1418, the Mayor called a special meeting on Wednesday, October 9, 2019 at 7:00 PM at Town Hall, 221 S. Nursery Avenue, Purcellville, VA 20132. This is to notify you that the agenda for this special meeting has been revised.

The topics of discussion are those listed on the agenda for the special meeting. A copy of the agenda is attached.

AGENDA
PURCELLVILLE TOWN COUNCIL SPECIAL MEETING
WEDNESDAY, OCTOBER 9, 2019, 7:00 PM
TOWN HALL COUNCIL CHAMBERS

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1. **CALL TO ORDER OF SPECIAL MEETING**
2. **PLEDGE OF ALLEGIANCE**
3. **INVOCATION**
4. **CITIZEN/BUSINESS COMMENTS**
5. **DISCUSSION/INFORMATIONAL ITEMS**
   - **a.** Water CIP Risk Analysis
6. **ADJOURNMENT**

Water CIP Risk Analysis
10/09/2019
Town of Purcellville

The Risk Analysis was completed using standards derived from a 2018 study conducted by Utah State University's Buried Structure Laboratory titled, " Water Main Breaks Rates In the USA and Canada: A Comprehensive Study."

The study compiles the collective experience of 308 utilities with a total of 200,000 miles of pipe serving a population of 52 million.

Three metrics were chosen from the study to determine likelihood of breakage:

1. Pipe Age
2. Pressure
3. Recorded Breaks

Data ranges were calculated using the following parameters:

Pipe Age – Along with age, the type of material used to construct the pipe weighs heavily in the determination of stability. Prior to WWII, stronger and thicker material was used in the construction of cast iron pipe. The war effort took its toll on raw materials, and manufacturers went to a lower grade solution. The effects of this change can be documented with frequency of breaks in CI installed after WWII.

Pipe Breakage by Age Data Range Computation

*Decade of construction with recorded breaks in 2018 by %:

30s = .1
40s = .1
50s= .27
60s= .2
70s= .37
80s= .25
90s= .1

Likelihood Range - .1-.4

* Cast Iron cited from 1930 – 1960, Ductile Iron cited from 1960-2000

Pipe Pressure – The mean pressure value for water supply pipes in the Utah study group is 69 psi. That being said, any pressure on supply pipes has an adverse effect on integrity. The pressure risk measure was based on this premise. PSI is converted into a scalable value with higher pressures having greater impact on likelihood of failure.

Recorded Breaks – Although this is a very important metric, the town data on this is not complete. The average replacement based on breakages within the study group was 11 per year within the same span of pipe made from the same materials. Using the data we have, the range for pipe failure due to multiple breakage was determined to be .1-.11.

Likelihood Computation

Pipe Age x Pipe Pressure x Frequency of Breaks = Likelihood of Failure

Severity Rating

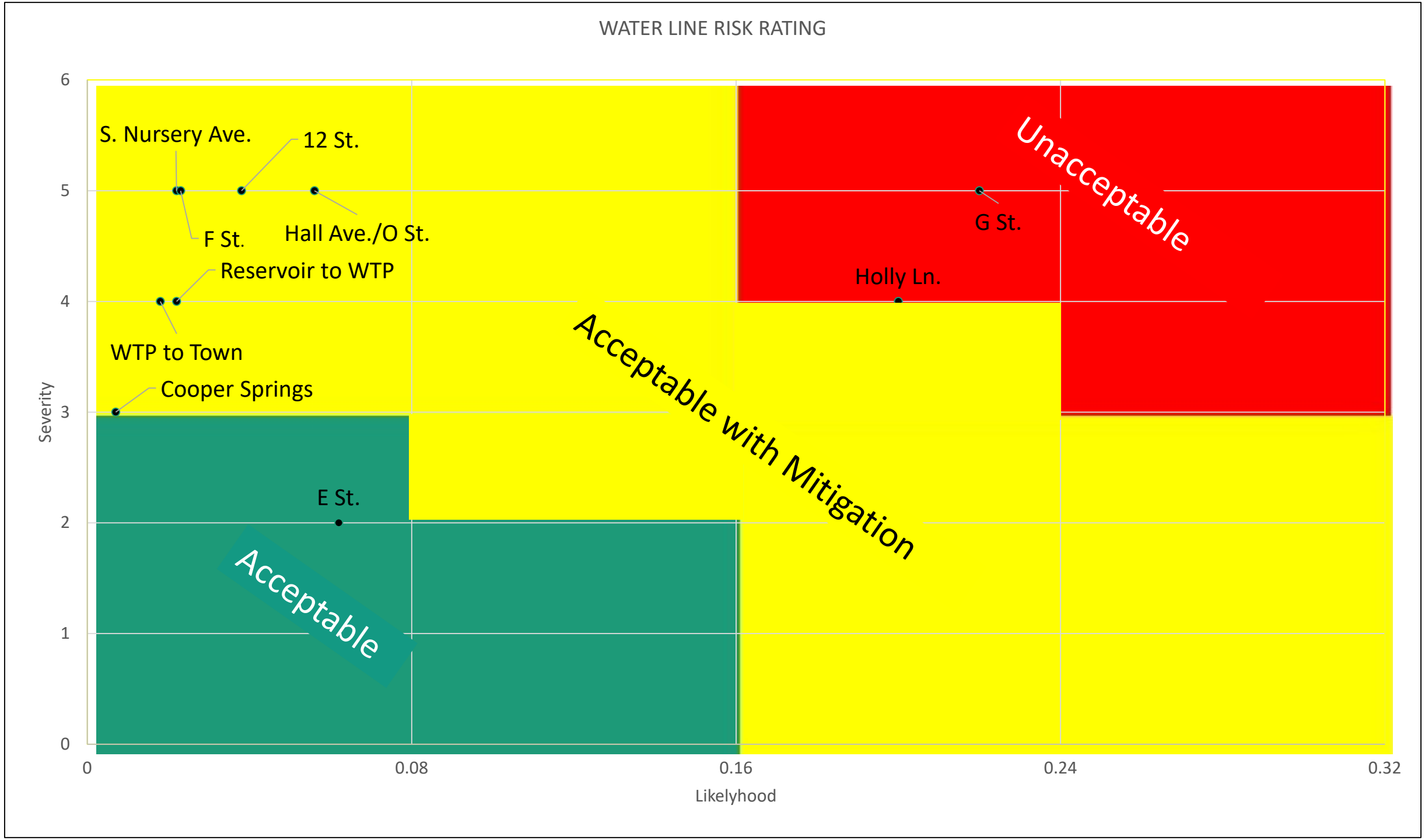
Catastrophic - 5 Operating conditions are such that environment, element, subsystem or component failure, or procedural deficiencies may commonly cause major system loss resulting in potentially hazardous conditions and inability to provide adequate supply or meet fire protection regulation 12VAC5-590-1120 thereby requiring immediate corrective action.

Critical - 4 Operating conditions are such that environment, element, subsystem or component failure or procedural deficiencies may attribute to property loss, inability to provide adequate supply, or major system damage thereby requiring corrective action.

Marginal - 3 Operating conditions may commonly cause minor systems damage such environment, design deficiencies, subsystem or component failure or procedural deficiencies, possible supply issues, can be counteracted or controlled without major system damage.

Negligible - 2 Operating conditions are such that environment, design deficiencies, subsystem or component failure or procedural deficiencies will result in no, or less than minor system damage with uninterrupted supply.

Insignificant - 1 Operating conditions are such that environment, design deficiencies, subsystem or component failure or procedural deficiencies will result in no noticeable effect on system supply.


WATER LINE RISK RATING
Severity
Likelyhood
0
1
2
3
4
5
6
0
0.08
0.16
0.24
0.32
S. Nursery Ave.
12 St.
F St.
Hall Ave./O St.
Reservoir to WTP
WTP to Town
Cooper Springs
E St.
G St.
Holly Ln.
Unacceptable
Acceptable with Mitigation
Acceptable

Factors Used to Determine CIP Needs

- Risk Analysis
- Transportation Projects
- Capacity Needs
- Regulatory Compliance

WATER FUND CIP

(in Thousands)

Projects	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	Ten Year Total	Beyond FY30
F Street Water Main Replacement	140	140										**280**	
12th Street Water Main Replacement		190	100									**290**	
Intake Structure for Hirst Reservoir	80	500	500									**1,080**	
Jeffries Filter Facility		300	300									**600**	
Cooper Springs Raw Water Main			240	880								**1,120**	
WTP to Town Water Main Replacement-PH 1				400	1,600							**2,000**	
Reservoir to WTP Raw Water Main					320	160	1,760					**2,240**	
Holly Lane Water Main Replacement					150	150						**300**	
G Street Water Main Replacement					150	550						**700**	
Additional Water Supply						650	650	650				**1,950**	
A Street Water Line Loop						126						**126**	
Water Treatment Plant Improvements										1,150	1,150	**2,300**	2,300
New Elevated Water Tank													3,422
WTP to Town Water Main Replacement-PH 2													2,300
E Street Water Main Replacement													337
LVSC Water Main Replacement													232
Springsbury Drive Water Main Extension													163
Rugby Court Water Main Extension													112
Total by Fiscal Year	**220**	**1,131**	**1,140**	**1,280**	**2,220**	**1,636**	**2,410**	**650**	**-**	**1,150**	**1,150**	**12,987**	**8,865**

Purcellville Water Resources Study Update – Project Prioritization Framework

Town Council Meeting

October 9, 2019

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Agenda

1. Overview of draft project prioritization framework
2. Framework category measurement and ranking
3. Draft category weighting
4. Pipelines

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Overview of Draft Project Prioritization Framework

Goals of the Project Prioritization Framework

- Provide consistent evaluation of CIP projects
  - Independent and non-redundant/unique criteria
  - Comprehensive
  - Easily understood by all stakeholders
  - Qualitative and/or quantitative
- Defined based on the projects identified for the Water Resource Plan Update

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Project Prioritization Framework Development

1. Draft framework developed by Jacobs
2. Meetings with Town staff to discuss and refine
3. Joint assessment of draft weighting
4. Refinement based on detailed project assessment
5. Utilized with project cost estimates (equivalent uniform annualized cost) to determine Benefit-Cost score for final project prioritization

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Project Prioritization Framework Overview

- Five ranking categories:
  - Capacity Provided
  - Reliability & Availability
  - Complexity of Implementing Rehabilitation/Project
  - Regulatory Compliance Considerations
  - Public Health & Safety
- Base 10 score for each (measurement defined for each in later slides)
- Final scores weighted by category

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Project Prioritization Framework Sub-Categories

- Capacity Provided
  - Increases available water supply
- Reliability & Availability
  - Increases water system reliability
  - Improves water quality
  - Increases water supply drought resiliency
- Complexity of Implementing Rehabilitation/Project
  - Complexity of project implementation
  - Time to implement
- Regulatory Compliance Considerations
  - Addresses existing regulatory issues
- Public Health & Safety
  - Addresses potential public health or safety concern

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Categories – Measurement & Ranking

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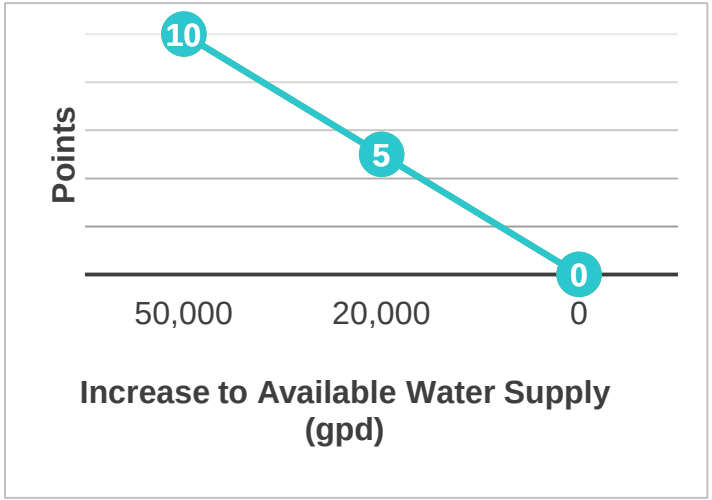
Category 1 - Capacity Provided

- How does the project increase the available water supply?
- Sub-category
  - Increases to available water supply
- Measurement & Ranking
  - Linear ranking based on the range of supply increases projected for the group of projects



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Category 2 - Reliability & Availability

- How does the project increase the resiliency of the water supply?
- Three Sub-categories
  1. Increases water system reliability
  2. Improves water quality
  3. Increases water supply drought resiliency
- Measurement & Ranking
  - Based on answering a series of questions for each project (see following slides..)

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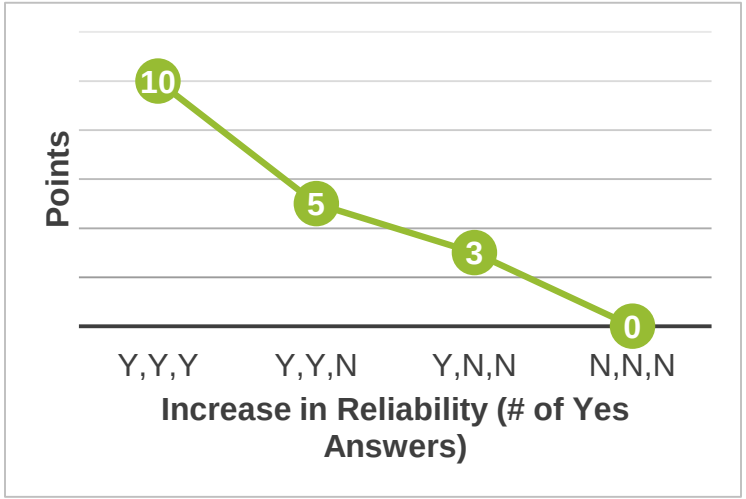
Category 2 - Reliability & Availability

- Increases water system reliability
- Measurement
  - Does the project improve or eliminate existing water shortages?
  - Does the project improve or eliminate existing water service interruptions?
  - Does the project improve water system operability?
- Ranking
  - Weighting toward those projects with more affirmative answers



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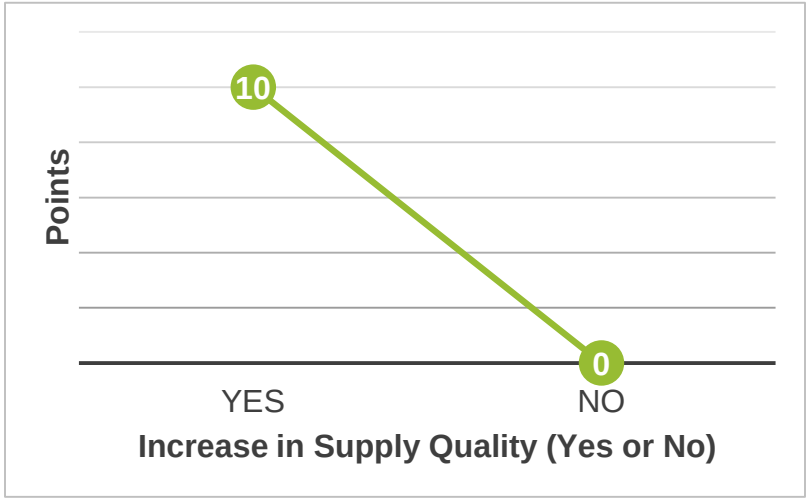
Category 2 - Reliability & Availability

- Improves quality of water supply
- Measurement
  - Does the project improve the quality of the water supply?
- Ranking
  - All or nothing score based on Y/N answer



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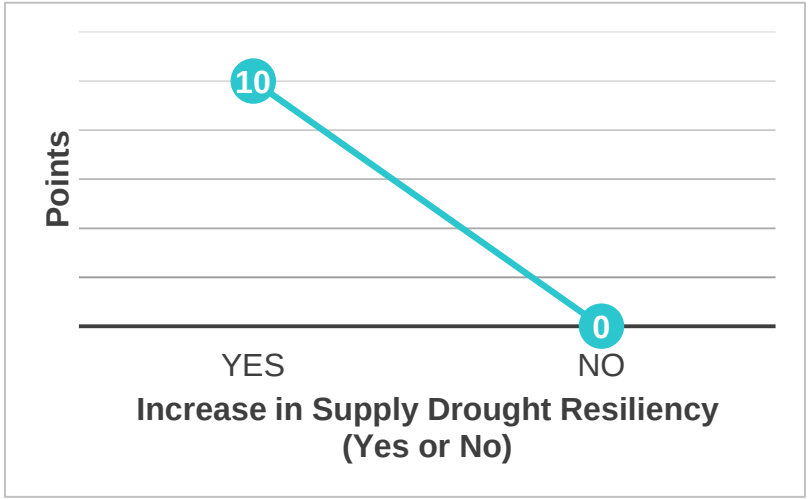
Category 2 - Reliability & Availability

- <u>Increases drought resiliency</u>
- Measurement
  - Does the project increase drought resiliency of the water supply?
- Ranking
  - All or nothing score based on Y/N answer



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Category 3 - Complexity of Implementation

- What is the relative complexity of implementation for a particular project?
- Sub-categories
  - Complexity of Project Implementation
  - Time to Implement
- Measurement & Ranking
  - Based on assessment of project timing and complexity (see following slides)

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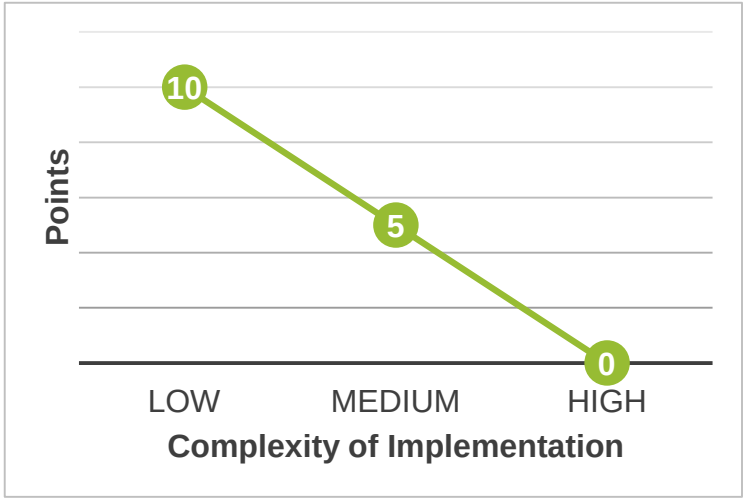
Category 3 - Complexity of Implementation

- Complexity of project implementation
- Measurement
  - Does the project utilize non-Town ROW?
  - Is the project anticipated to include complex permitting?
- Ranking
  - Linear weighting based on affirmative (higher complexity) answers.



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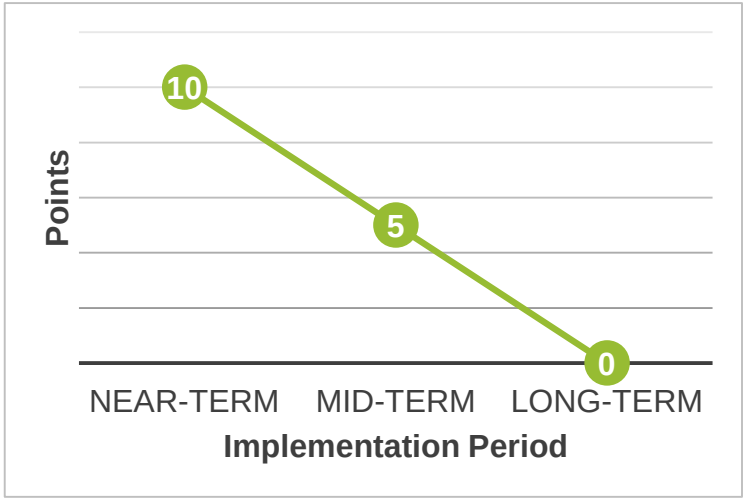
Category 3 - Complexity of Implementation

- Anticipated project timeline
- Measurement
  - Given our understanding of the project, is it likely to be:
    - Near-term (2020-2025)
    - Mid-term (2026-2030)
    - Long-term (2031+)
- Ranking
  - Linear weighting prioritizes those projects that are near-term.



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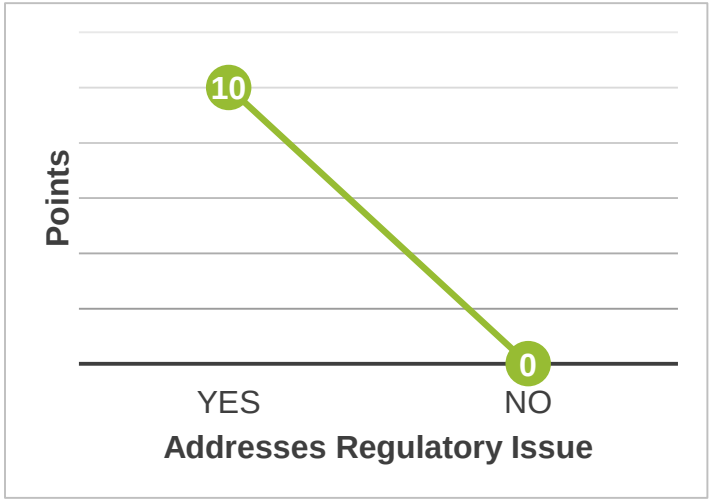
Category 4 - Regulatory Compliance

- Does the project addresses an existing regulatory issue?
- Sub-category
  - Addresses existing regulatory issue
- Measurement & Ranking
  - Simple “all or nothing” ranking based on Y/N answer



Example:

- Rehabilitation of Hirst Reservoir intake structure

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Category 5 - Public Health & Safety

- Goal: Assessment of whether a project addresses a potential public health or safety concern.
- Sub-category
  - Addresses potential public health or safety concerns
- Measurement & Ranking
  - Simple “all or nothing” ranking based on Y/N answer

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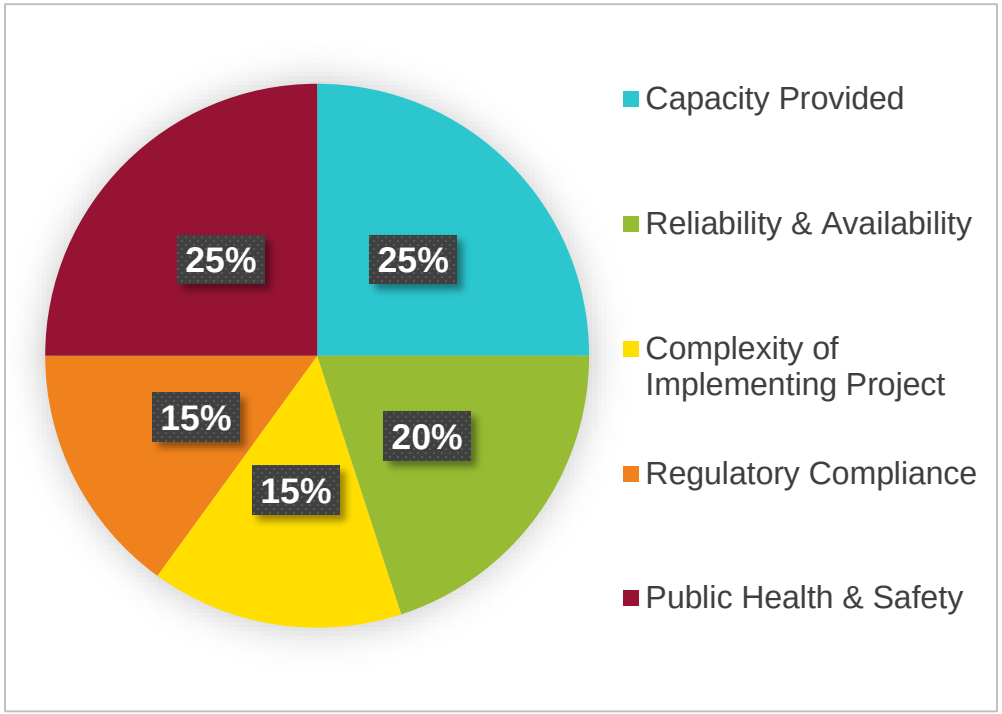
Draft Category Weighting

Draft Weighting of Categories

- Based on discussions with the project team
- Highest ratings for increases to supply and public health & safety



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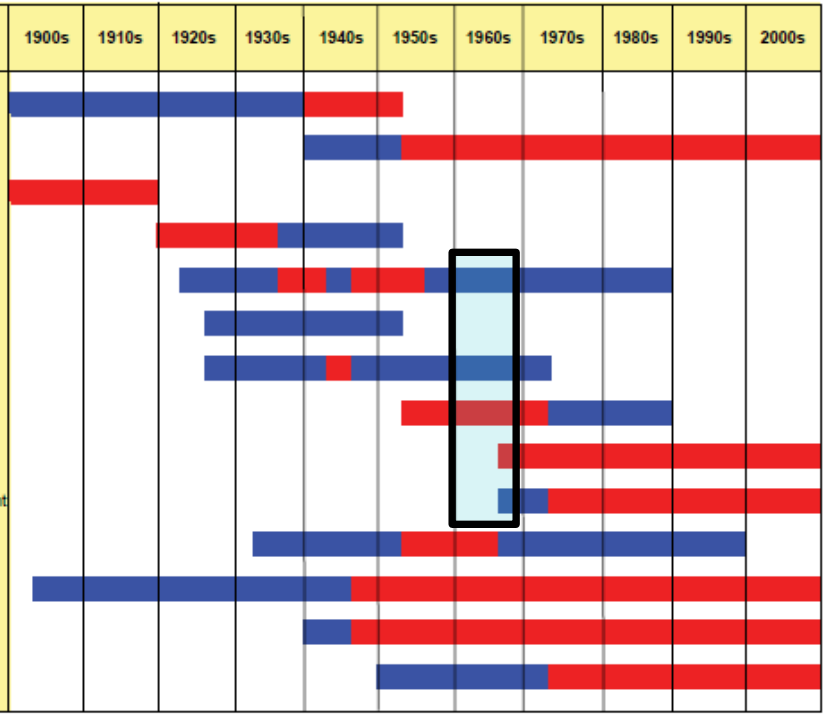
Supplemental Information on Pipeline Projects

Historic Production & Use of Water Pipe by Material (AWWA)

Pipe Material	Joint Type	Internal Corrosion Protection	External - Corrosion Protection
Steel	Welded	None	None
Steel	Welded	Cement	None
Cast Iron (Pit Cast)	Lead	None	None
Cast Iron	Lead	None	None
Cast Iron	Lead	Cement	None
Cast Iron	Leadite	None	None
Cast Iron	Leadite	Cement	None
Cast Iron	Rubber	Cement	None
Ductile Iron	Rubber	Cement	None
Ductile Iron	Rubber	Cement	PE Encasement
Asbestos Cement	Rubber	Material	Material
Reinforced Conc.	Rubber	Material	Material
Prestressed Conc.	Rubber	Material	Material
Polyvinyl Chloride (PVC)	Rubber	Material	Material



Commercially Available
Predominantly in Use

Source: American Water

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Estimated Distribution of Materials (South)

	6 – 10 inch diameter					>10 inch diameter			
	CI	CICL (LSL)	CICL (SSL)	DI (LSL)	DI (SSL)	CI	CICL (LSL)	CICL (SSL)	DI (LSL)
1950		25%					40%		
1960		25%		2%	3%		40%		5%
1970		10%		10%	10%				45%
1980				30%	30%				60%

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Average Estimated Service Life by Pipe Material

Derived Current Service Lives (Years)	CI	CICL (LSL)	CICL (SSL)	DI (LSL)	DI (SSL)
Northeast Large	130	120	100	110	50
Midwest Large	125	120	85	110	50
South Large	110	100	100	105	55
West Large	115	100	75	110	60
Northeast Medium & Small	115	120	100	110	55
Midwest Medium & Small	125	120	85	110	50
South Medium & Small	105	100	100	105	55
West Medium & Small	105	100	75	110	60
Northeast Very Small	115	120	100	120	60
Midwest Very Small	135	120	85	110	60
South Very Small	130	110	100	105	55
West Very Small	130	100	75	110	60

- LSL: Long service life
- SSL: Short service life
  - Ground conditions
  - Pipe laying practices
  - Other factors

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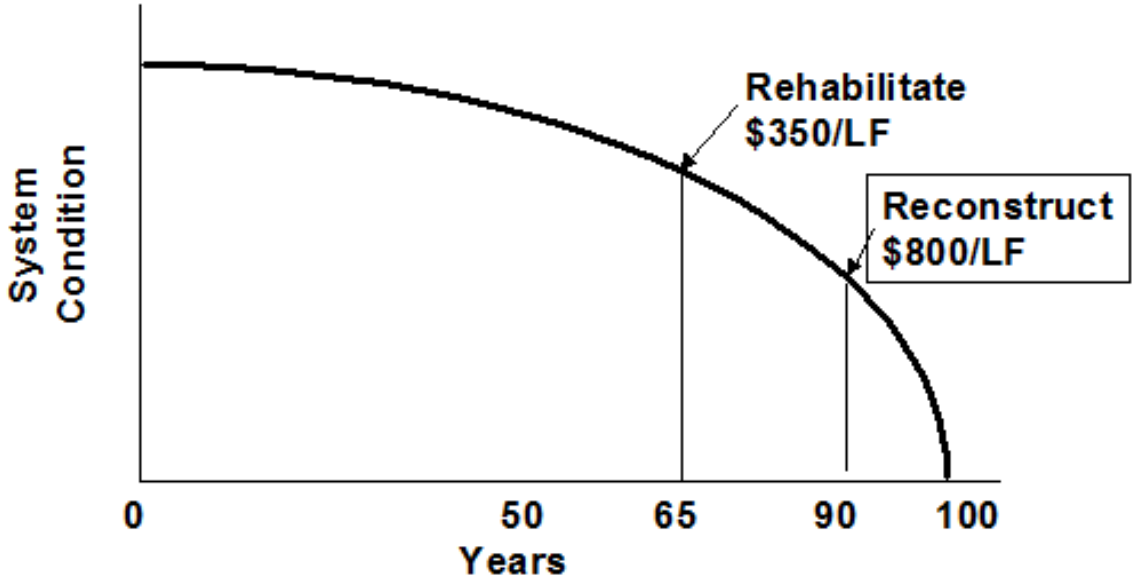
Timely, cost-effective renewal and replacement is a key objective of a sound asset management strategy



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Purcellville Water Resources Study Update – Project Prioritization Framework

Town Council Meeting

October 9, 2019

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