

## Council Presentation

February 22, 2022

### Township of Asphodel-Norwood Village of Norwood Potable Water Storage

Schedule 'B' Municipal Class  
Environmental Assessment

# Agenda

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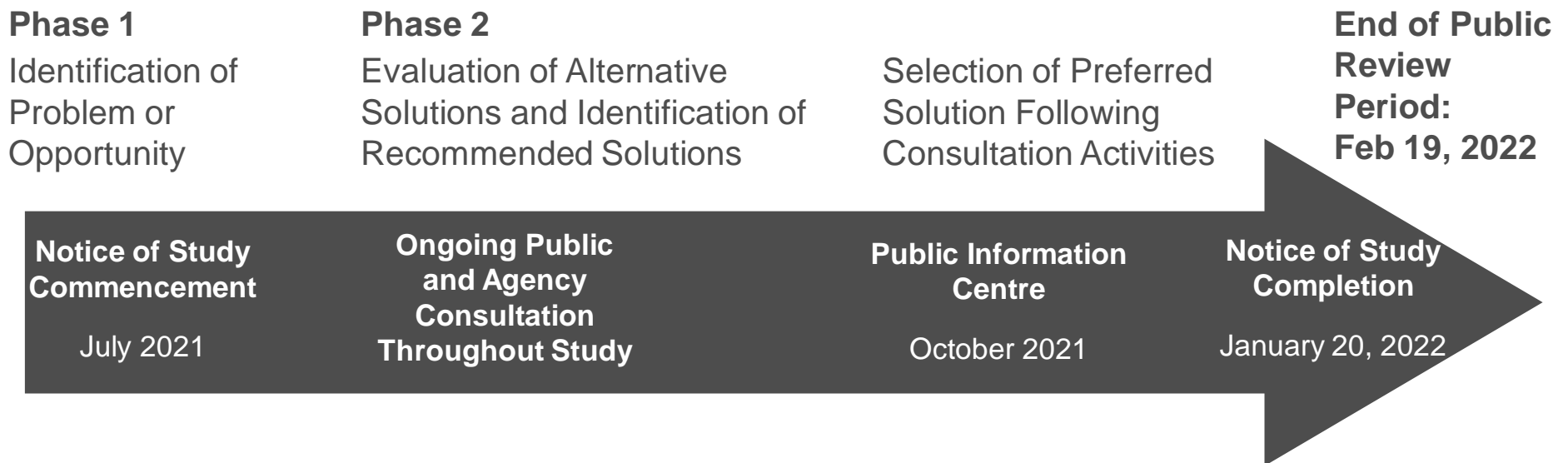
- Introduction
- Overview of the Existing Norwood Water System
- Phase 1 - Problem/Opportunity Statement
- Phase 2 - Evaluation of Alternative Solutions and Identification of Recommended Solutions
- Source Water Protection
- Project Description and Mitigation Measures
- Public Consultation Summary
- Project Schedule and Next Steps

# Introduction

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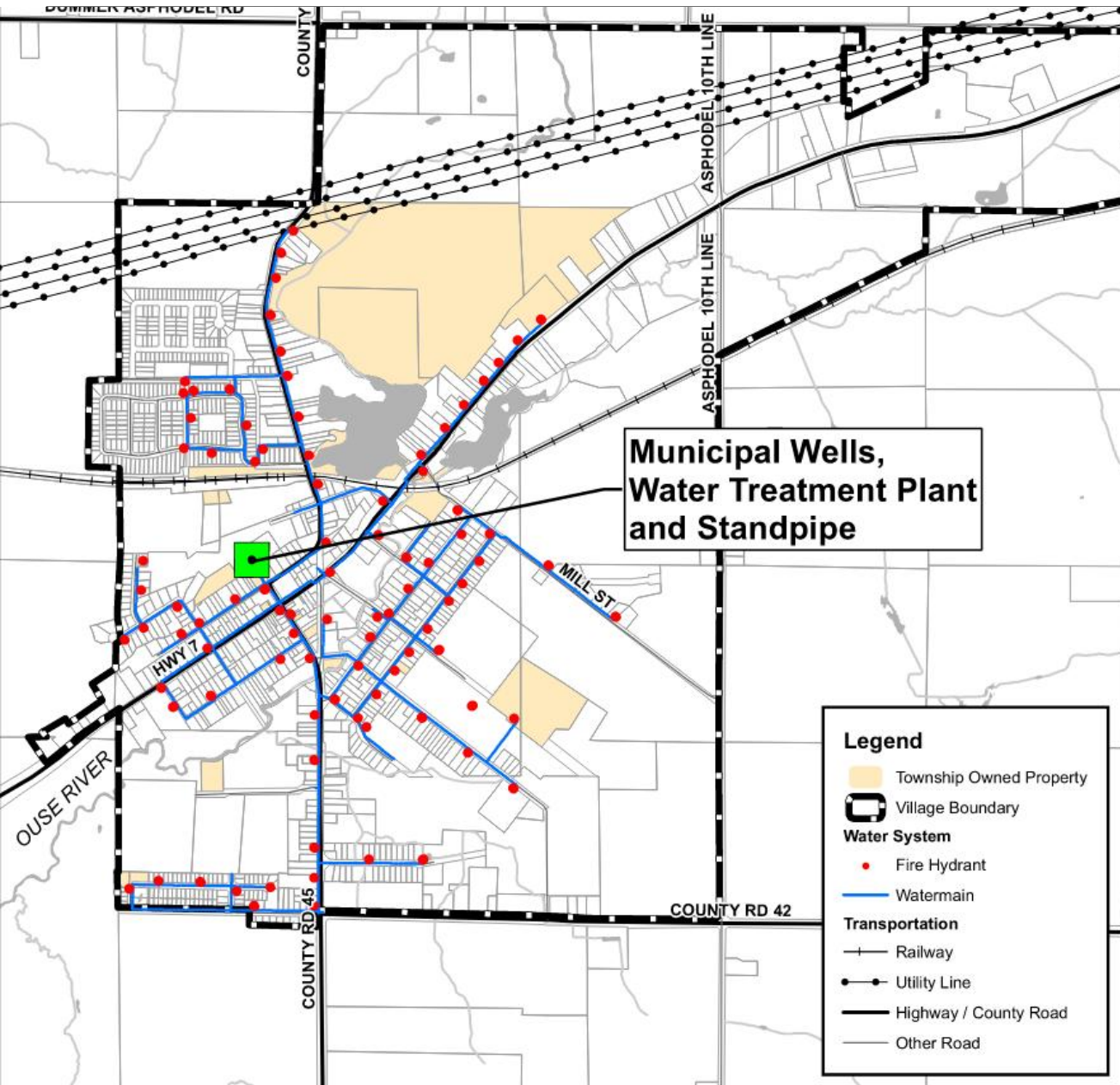
- In 2018, a standpipe inspection report identified the exterior and interior condition of the standpipe as good and fair, respectively. The action plan called for interior rehabilitation in the near future.
- In July 2020, an Infrastructure Assessment Report completed by Engage Engineering identified that the existing standpipe did not have adequate storage for the current population.
- The Township of Asphodel-Norwood (the Township) identified water pressure issues in the northwest corner of the village.
- In December 2020, the Township initiated a Municipal Schedule 'B' Class Environmental Assessment (Class EA) to assess the alternate potable water storage solutions for the Village of Norwood for the next 20 years and more.
- J.L. Richards & Associates Limited (JLR) has been retained as the prime consultant to undertake the Class EA work.

# Overview of the Schedule 'B' Class EA Process



- ✓ **Phase 1 Report and WaterCAD® Hydraulic Model** evaluated existing system and identified population growth projections and associated water storage requirements.
- ✓ **Alternative Solutions Concepts** developed and reviewed against an evaluation matrix.
- ✓ Preliminary assessment of **Costing** for each alternative solution.
- ✓ **Public Consultation** with general public, stakeholder agencies and Township staff.

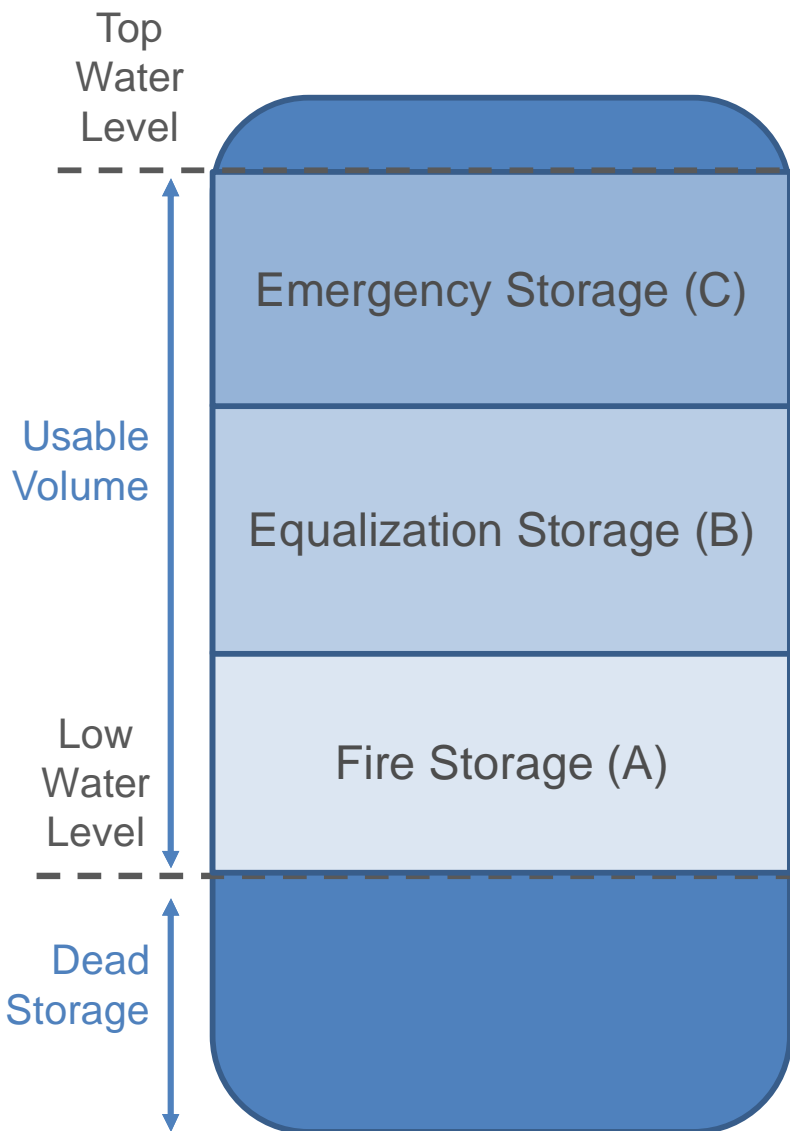
# Existing Village of Norwood Water System



- The existing water supply system consists of four(4) groundwater wells, a chlorine disinfection treatment plant, one (1) municipal water tower (standpipe) and a dedicated distribution system.
- Existing water system services approximately 2,100 people in the Village.
- The existing standpipe is 7.6m in diameter, and 27.4m in height and was originally constructed in 1993.



# Existing Water Storage

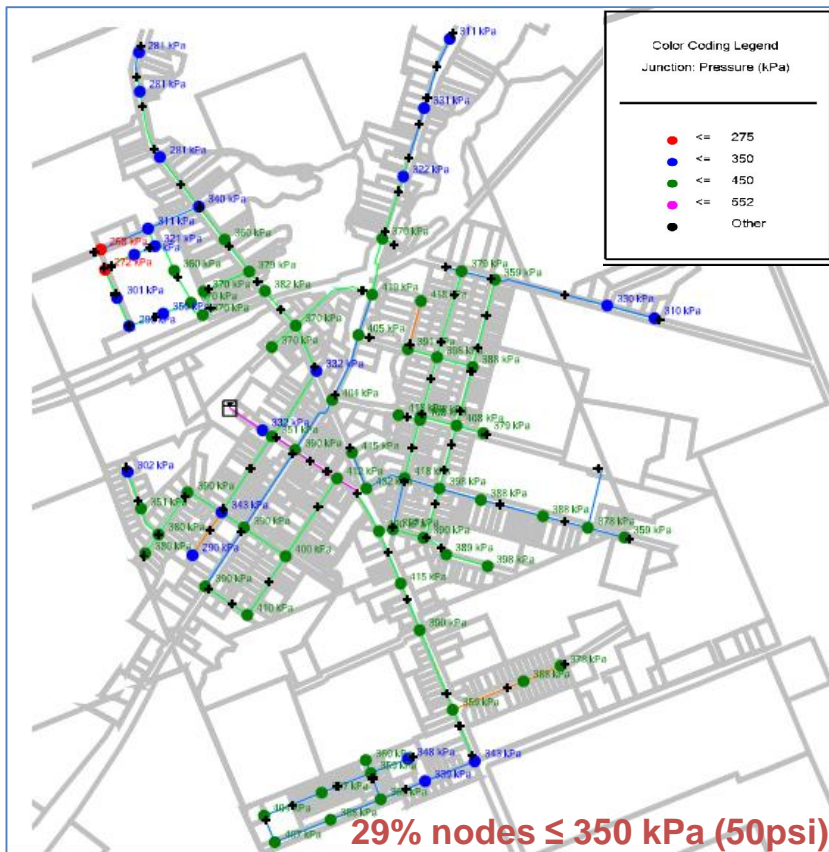


Parameter	Existing
A – Fire Storage (m <sup>3</sup> )	563
B – Equalization Storage (m <sup>3</sup> )	278
C – Emergency Storage (m <sup>3</sup> )	210
<b>Total Usable Storage Recommended (m<sup>3</sup>)</b>	<b>1,051</b>
<b>Existing Usable Storage</b>	<b>885</b>
<b>Deficit (m<sup>3</sup>)</b>	<b>166</b>

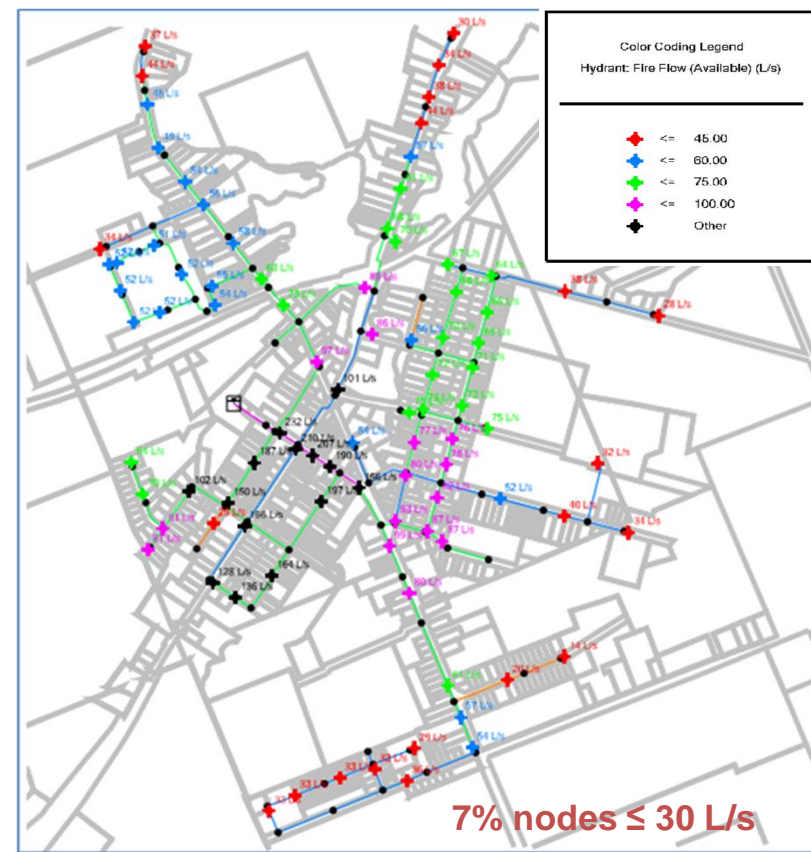
- The existing water storage capacity is insufficient for the existing population within the Village.

# Existing Conditions

- A hydraulic water model was completed to assess the existing conditions. Overall, the existing water pressure and fire flow appears to be generally consistent with guidelines; however there are some areas (northwest corner of Village) that could be improved.



Peak Hour Flow



Maximum Day + Fire Flow

# Summary of Existing Water System Constraints

Constraint	Description
1. Available Potable Water Storage	<ul style="list-style-type: none"> <li>There is <b>insufficient</b> water storage available to the system as per the Ministry of the Environment, Parks and Conservation (MECP) guidelines.</li> </ul>
2. Standpipe Condition	<ul style="list-style-type: none"> <li>The exterior and interior condition of the standpipe is good and fair, respectively.</li> <li>An action plan from the 2018 inspection report calls for <b>interior rehabilitation</b> in the near future.</li> </ul>
3. Pressure Constraints	<ul style="list-style-type: none"> <li>29% of the nodes are <b>below</b> operating range under peak hourly flow, as per MECP.</li> <li>Two (2) junction nodes on Albine Street and Millpond Lane are <b>below</b> recommended operating range under peak hour flow, as per MECP. <i>(Note: The hydraulic model output is indicative of the pressure distribution and may not be exactly the same as the field conditions observed, e.g., fire flow testing.)</i></li> </ul>
4. Fire Flow Constraints	<ul style="list-style-type: none"> <li>The simulated fire flows range is <b>below</b> the Ontario Building Code targets at various locations in the Village.</li> </ul>



# Phase 1 - Problem/Opportunity Statement

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## Problem

The existing drinking water system in the Village of Norwood is facing a number of constraints, including insufficient treated water storage capacity, deteriorated standpipe conditions, low pressure concerns and fire flow issues in certain areas of the distribution system.

## Opportunity

To ensure the Township has a solution that will address the current water storage constraints in the potable water supply system both now and in the future.

## Phase 2 - Identification of Alternative Solutions

### Approach

Do Nothing

Construct New  
Storage

### Location

At Existing  
Water  
Treatment  
Plant

At the  
Entrance of  
Landfill Site

At Public  
Works  
Building (on  
Top of Esker)

County Road  
42 and  
Asphodel 10<sup>th</sup>  
Line

### Configuration

Below Grade  
Reservoir and  
Pumping  
Station

At Grade  
Reservoir and  
Pumping  
Station

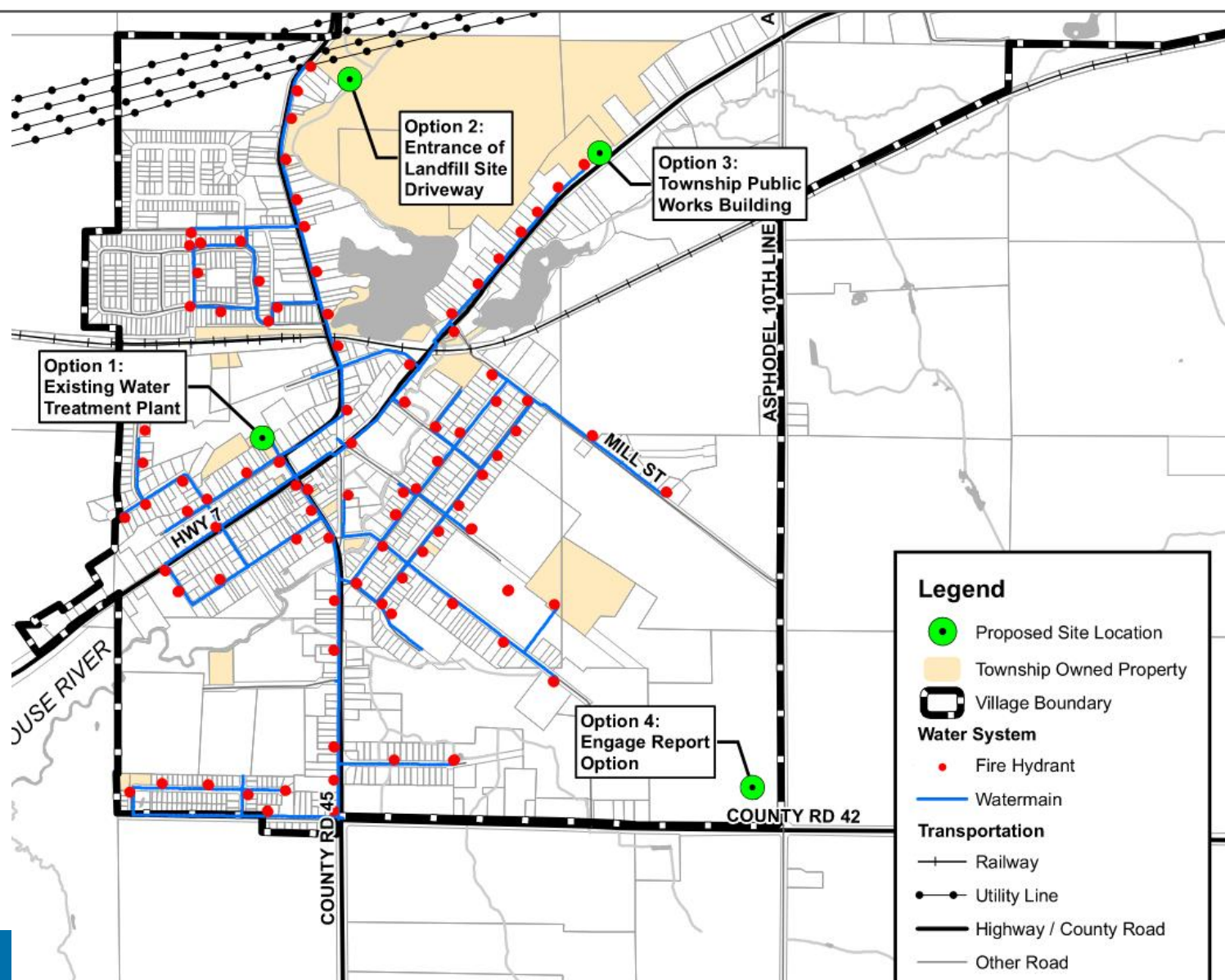
Elevated  
Composite  
Tank

Standpipe

## Screening of Approaches

	Advantages	Disadvantages	Carried Forward?
Approach 1 Do Nothing	<ul style="list-style-type: none"> <li>In accordance with the Class EA process, this option is generally carried forward to detailed evaluation for comparison</li> </ul>	<ul style="list-style-type: none"> <li>Does not address potable water storage requirements</li> <li>Does not address pressure deficiency</li> <li>Does not address fire flow deficiency</li> <li>Does not address future need</li> </ul>	Yes ✓
Approach 2 Construct New Storage	<ul style="list-style-type: none"> <li>Addresses potable water storage requirements.</li> <li>Addresses the pressure deficiency</li> <li>Addresses the fire flow deficiency</li> </ul>	<ul style="list-style-type: none"> <li>Higher capital cost</li> </ul>	Yes ✓

# Potential Locations for Future Storage





## Screening of Locations



	Advantages	Disadvantages	Carried Forward?
Option 1 Water Treatment Plant	<ul style="list-style-type: none"> <li>Limited distribution system upgrade requirements</li> <li>Met minimum screening requirements</li> <li>Ideally located in Institution Zone</li> </ul>	<ul style="list-style-type: none"> <li>No “showstoppers” identified</li> </ul>	Yes ✓
Option 2 Entrance of Landfill Site Driveway	<ul style="list-style-type: none"> <li>Ideally located close to the new development area and area currently experiencing low pressure</li> </ul>	<ul style="list-style-type: none"> <li>Cost prohibitive</li> <li>Close distance to Hydro One infrastructure</li> <li>Located within the floodplain and not in compliance with permitted use identified in the Otonabee Region Conservation Authority Special Policy Area</li> </ul>	No ✗
Option 3 Public Works Building (on Top of Esker)	<ul style="list-style-type: none"> <li>Met minimum screening requirements</li> <li>Higher elevation at this location</li> </ul>	<ul style="list-style-type: none"> <li>No “showstoppers” identified</li> </ul>	Yes ✓
Option 4 County Road 42 and Asphodel 10 <sup>th</sup> Line	<ul style="list-style-type: none"> <li>Higher elevation</li> </ul>	<ul style="list-style-type: none"> <li>The Township does not own the land</li> <li>No adjacent watermain</li> </ul>	No ✗



## Screening of Configurations

	Advantages	Disadvantages	Carried Forward?
<p>Configuration 1 Below-Grade Reservoir and Pumping Station</p> 	<ul style="list-style-type: none"> <li>• Low visibility of the reservoir</li> <li>• Less potential to impact the public</li> <li>• Operational flexibility to isolate separate cells for maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• Not typical for a small distribution system</li> <li>• Largest footprint</li> <li>• High energy consumption</li> <li>• High capital cost</li> <li>• High operating and maintenance requirements</li> </ul>	<p>No ✗</p>
<p>Configuration 2 At-Grade Reservoir and Pumping Station</p> 	<ul style="list-style-type: none"> <li>• Moderate visibility</li> <li>• Operational flexibility to isolate separate storage tanks for maintenance or upset</li> </ul>	<ul style="list-style-type: none"> <li>• Not typical for a small distribution system</li> <li>• Medium footprint</li> <li>• High energy consumption</li> <li>• High capital cost</li> <li>• High operating and maintenance requirements</li> </ul>	<p>No ✗</p>

## Screening of Configurations

	Advantages	Disadvantages	Carried Forward?
<p>Configuration 3 Composite Elevated Tank</p> 	<ul style="list-style-type: none"> <li>Least complex operation</li> <li>Consistent with current system operating configuration (i.e., fill/drain from standpipe)</li> </ul>	<ul style="list-style-type: none"> <li>High visibility</li> <li>Storage no longer available during maintenance or inspection</li> <li>Significant capital investment</li> </ul>	<p>No</p> <p>✗</p>
<p>Configuration 4 Standpipe</p> 	<ul style="list-style-type: none"> <li>Smallest footprint</li> <li>Least complex operation</li> <li>Lowest energy, operating and maintenance costs</li> <li>Least capital costs</li> <li>Consistent with current system operating configuration (i.e., fill/drain from standpipe)</li> </ul>	<ul style="list-style-type: none"> <li>High visibility</li> <li>Storage no longer available during maintenance or inspection</li> </ul>	<p>Yes</p> <p>✓</p>

## Phase 2 - Screening Results

Approach	Do Nothing	Construct New Storage
	✓	✓

Location	At Existing Water Treatment Plant	At the Entrance of Landfill Site	At Public Works Building (on Top of Esker)	County Road 42 and Asphodel 10 <sup>th</sup> Line
	✓		✓	

Configuration	Below Grade Reservoir and Pumping Station	At Grade Reservoir and Pumping Station	Elevated Composite Tank	Standpipe
				✓

Carried Forward ✓

# Servicing Solutions

	Description	Combination
No.1	Do Nothing	<u>Approach 1</u> – Do Nothing
No.2	Construct New Standpipe at Existing WTP	<u>Approach 2</u> - Construct New Storage <u>Location 1</u> - Existing Water Treatment Plant <u>Configuration 4</u> - Standpipe
No.3	Construct New Standpipe at Public Works Building on Top of Esker	<u>Approach 2</u> - Construct New Storage <u>Location 2</u> - Township Public Works Building (on Top of the Esker) <u>Configuration 4</u> - Standpipe

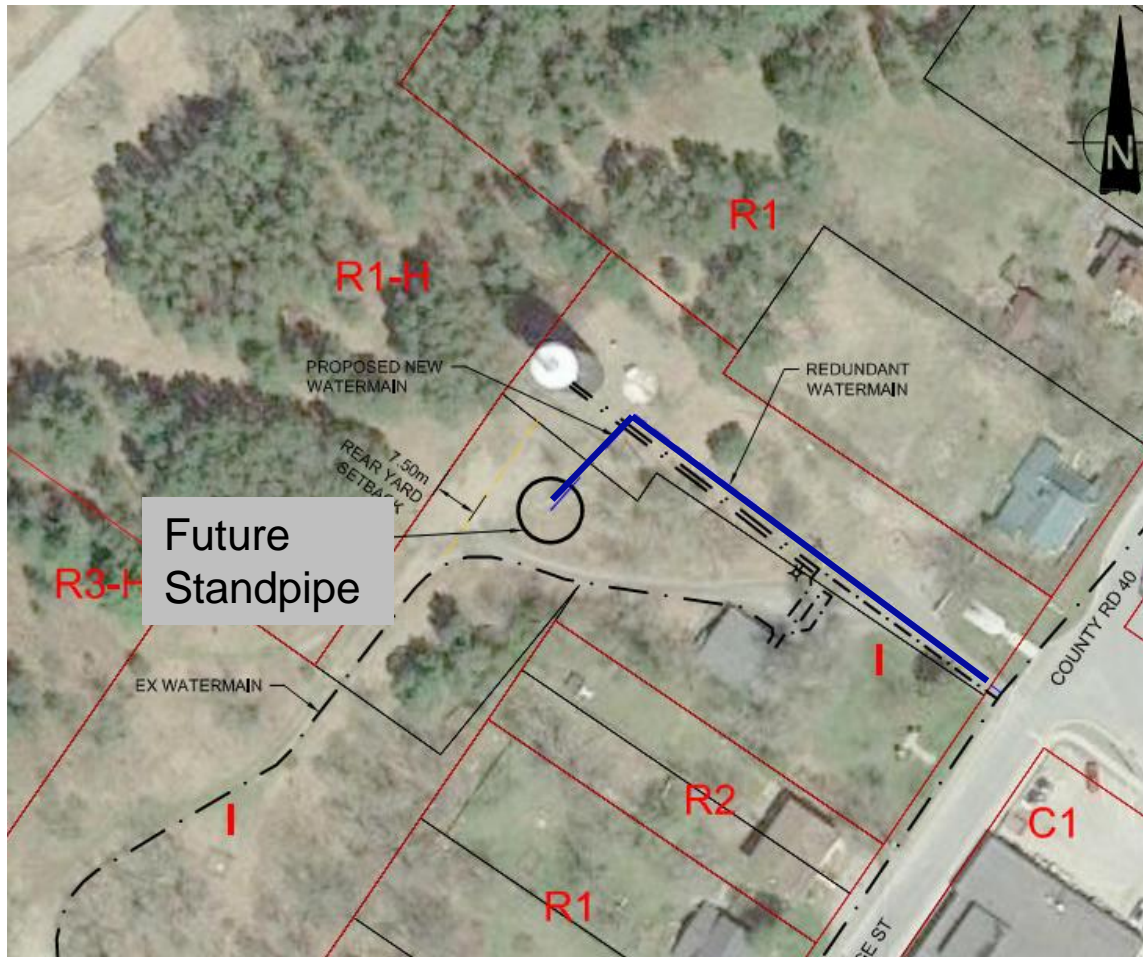
# Servicing Solution No.1 – Do Nothing

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- The 'Do Nothing' alternative is generally equivalent to the status quo and typically carried forward as a baseline for review of other alternatives.
- 2018 Capital Asset Management plan noted that, every 10 years, the interior and exterior of the standpipe would require inspection. A cathodic protection system would need to be installed immediately for the standpipe to remain in service.
- This servicing solution does not address the storage, pressure, fire flow and condition issues.
- It is not being considered further.

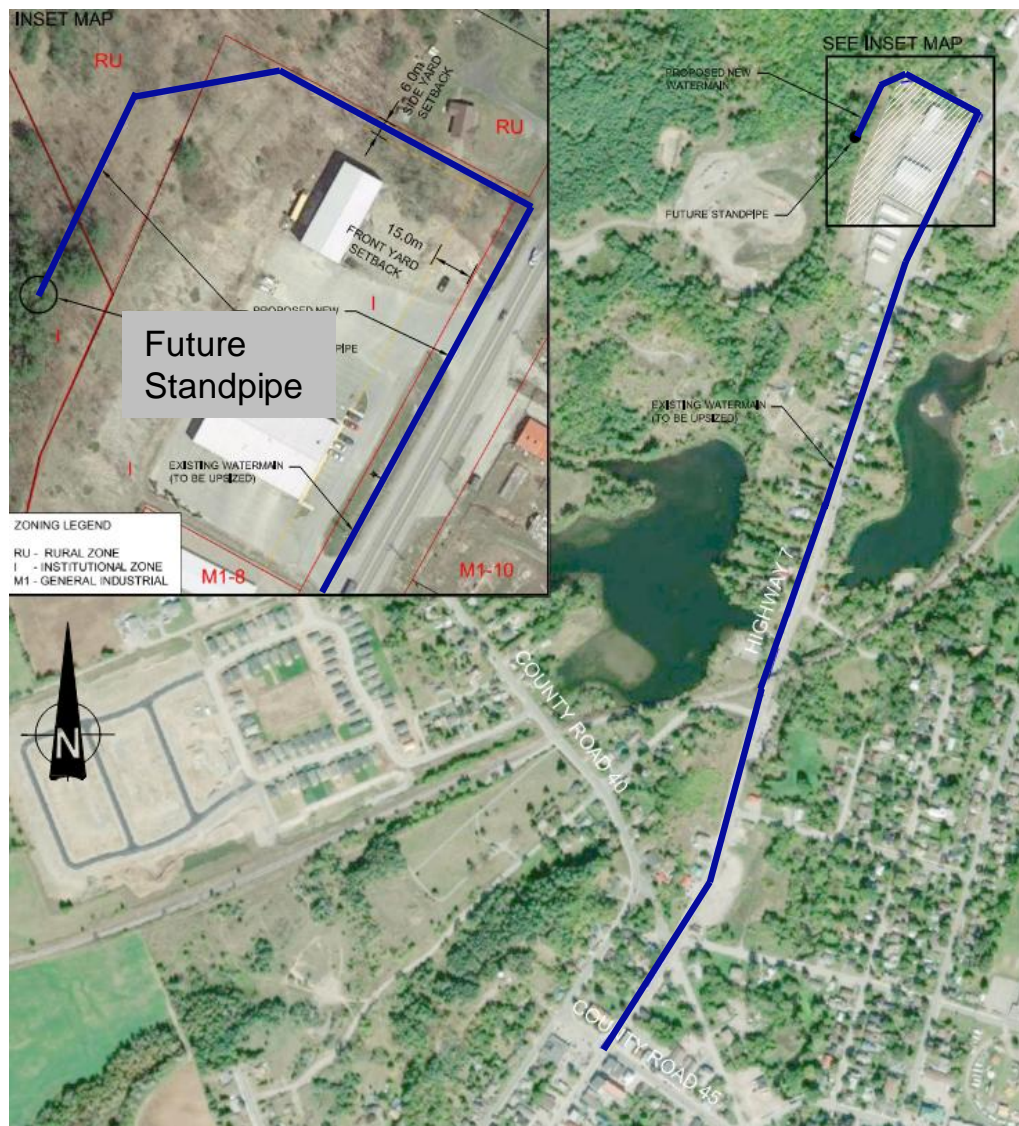


## Servicing Solution No. 2 – Existing WTP



- The existing site is already developed.
- Minimal impact is anticipated to the natural environment.
- Redundant watermain.
- Active mixer in the standpipe.

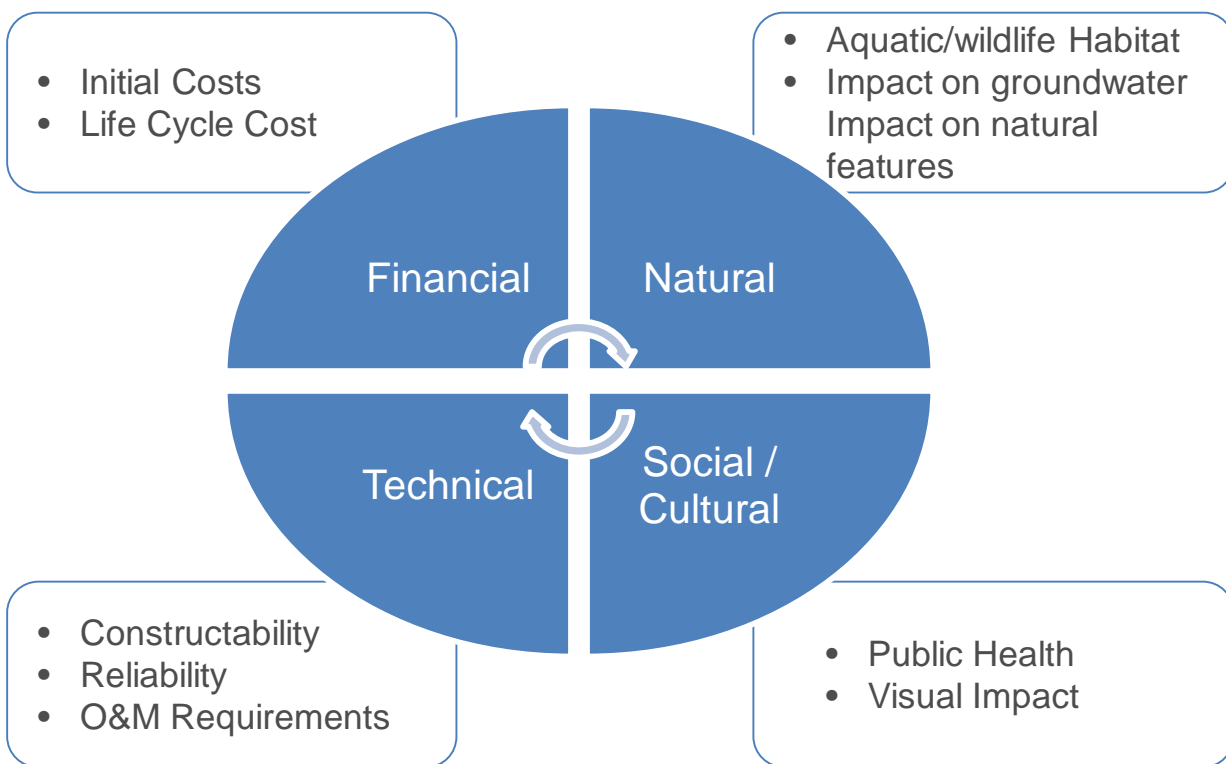
# Servicing Solution No. 3A – Public Works Building



- New storage tank is located on the Esker.
- New watermain construction around existing site.
- Extensive watermain upgrades from WTP to the site along HWY 7.

Note: An alternate watermain route (along County Rd 40 and around landfill) was reviewed and it was determined the illustrated route was the best overall option.

# Evaluation of Servicing Solutions



- All servicing solutions were evaluated against their impact to the natural, social/cultural environments, technical feasibility, and financial considerations.

Impact Level	Color	Relative Impact
Strong Positive Impact	Green	Preferred
Minor Impact	Yellow	Less Preferred
Strong Negative Impact	Red	Least Preferred

- The relative impact for each criterion relative to each potential solution was assessed based on a qualitative evaluation system.



# Evaluation of Servicing Solutions

	Servicing Solution No.2 – Existing Water Treatment Plant	Servicing Solution No.3 – Public Works Building (on top of the Esker)
<b>Natural Environment</b>	<ul style="list-style-type: none"> <li>Existing Water Storage Site</li> <li>No Esker Impact anticipated</li> <li>No rare or at-risk wildlife</li> <li>No waterway adjacent to the site</li> </ul>	<ul style="list-style-type: none"> <li>No Esker Impact anticipated</li> <li>Some impacts anticipated due to site clearing for new standpipe and required watermain construction</li> <li>No waterway adjacent to the site</li> <li>No rare or at-risk wildlife.</li> </ul>
<b>Evaluation</b>	Preferred	Preferred
<b>Social and Cultural Environment</b>	<ul style="list-style-type: none"> <li>New standpipe visible to nearby community</li> <li>Located within the Wellhead Protection Area</li> <li>Minimal impact anticipated due to above-grade design</li> <li>Noise, increased traffic and reduced air quality during construction</li> </ul>	<ul style="list-style-type: none"> <li>New standpipe visible to nearby community</li> <li>Major disruption to highway traffic anticipated due to watermain replacement</li> <li>Noise, increased traffic and reduced air quality is anticipated during construction</li> </ul>
<b>Evaluation</b>	Less Preferred	Less Preferred

# Evaluation of Servicing Solutions

	Servicing Solution No.2 – Existing Water Treatment Plant	Servicing Solution No.3 – Township Public Works Building (on top of the Esker)
<b>Technical Feasibility</b>	<ul style="list-style-type: none"> <li>The new standpipe will provide required treatment prior to distribution</li> <li>Minimal watermain upsizing and extension required</li> <li>Minor site electrical service is required</li> </ul>	<ul style="list-style-type: none"> <li>Highest ground elevation of all alternatives (i.e. shortest tank)</li> <li>Additional piping required at the WTP to provide required treatment</li> <li>Extensive watermain upsizing required from the WTP</li> <li>Significant watermain extension required to connection to system</li> <li>New electrical service required</li> </ul>
<b>Evaluation</b>	Preferred	Least Preferred
<b>Financial Considerations</b>	<ul style="list-style-type: none"> <li>Moderate cost for the new standpipe</li> <li>Least cost for watermain extension</li> <li>Least cost for site services</li> <li>No cost to add CT piping</li> </ul>	<ul style="list-style-type: none"> <li>Lowest cost for the new standpipe.</li> <li>Highest additional cost for watermain extension and upsizing</li> <li>Additional piping at WTP required</li> </ul>
<b>Evaluation</b>	Preferred	Least Preferred



# Evaluation of Servicing Solutions

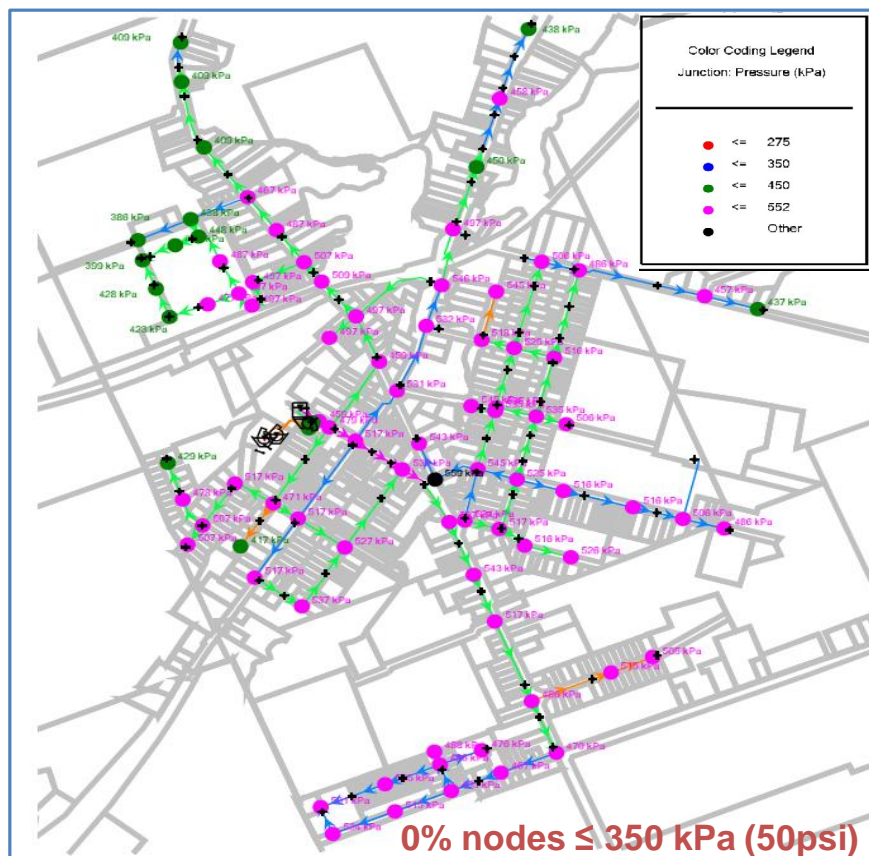
	Servicing Solution No.2 – Existing Water Treatment Plant	Servicing Solution No.3 – Public Works Building (on top of the Esker)
Natural Environment	Preferred	Preferred
Social and Cultural Environment	Less Preferred	Less Preferred
Technical Feasibility	Preferred	Least Preferred
Financial Considerations	Preferred	Least Preferred
<b>Overall</b>	<b>Preferred</b>	<b>Less Preferred</b>

Based on the Evaluation, the preferred alternative is **Servicing Solution No.2 – Construct a new standpipe at the existing water treatment plant.**

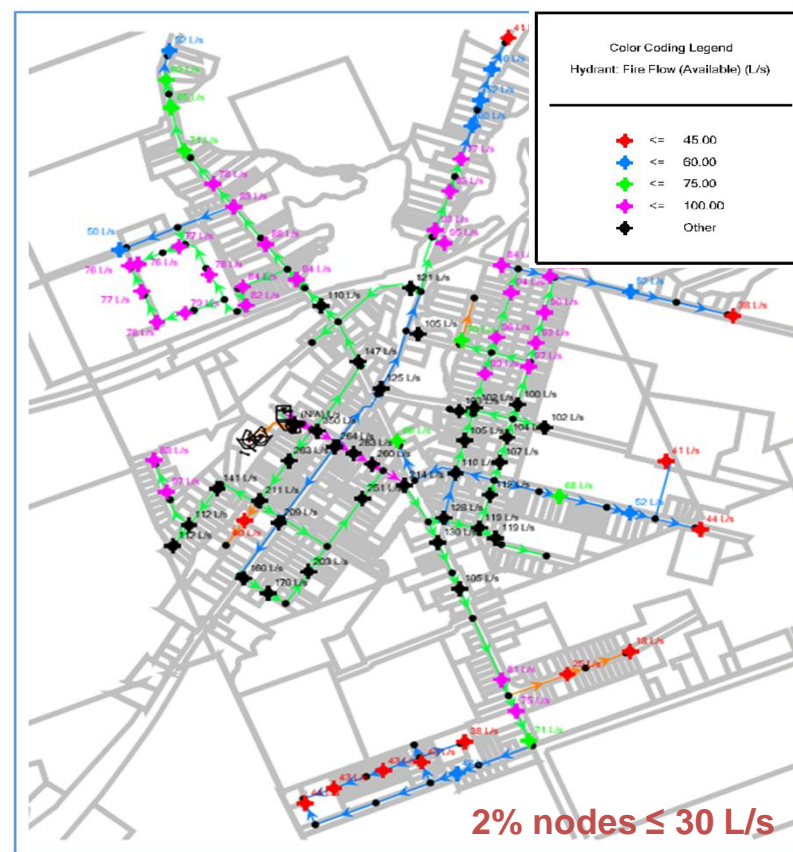
It is estimated that the cost to construct a new standpipe at the existing water treatment plant is approximately \$2,900,000 (incl. engineering, contingency and project management)

# Preferred Solution

- Using the hydraulic water model the existing potable water system was assessed with a new water storage standpipe.

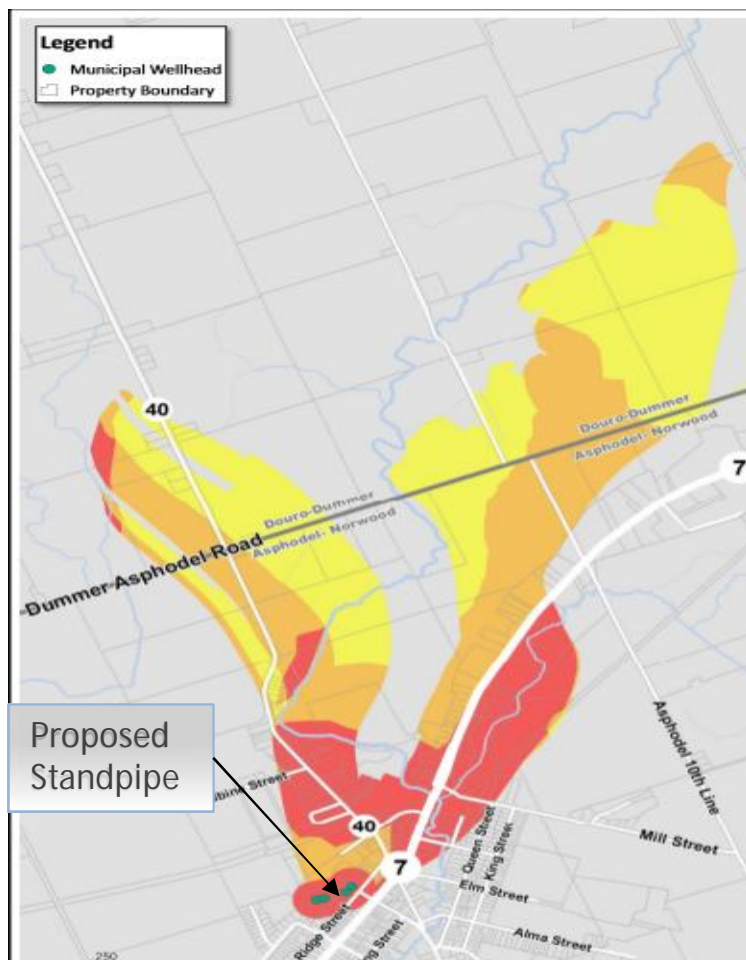


Peak Hour Flow



Maximum Day + Fire Flow

# Source Water Protection



Type of Vulnerable Area	Map Colours and Vulnerability Scores		
Wellhead Protection Area	10	8	WHPA-C (2,4,6)
Intake Protection Zone	10	9	8

- It has been identified that the proposed sites are within Wellhead Protection Area with a Vulnerability Score 10.
- A detailed hydrogeological and geotechnical study will be undertaken in the preliminary design to address this concern.

# Public Consultation Summary

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- Review comments were received from the following stakeholder agencies and addressed in the Class EA Report:
  - Ontario Ministry of the Environment, Conservation and Climate Change
  - Ontario Ministry of Heritage, Sport, Tourism and Culture Industries
  - Otonabee Region Conservation Authority (pre-consultation meeting held on Aug 11, 2021)
  - Hydro One (pre-consultation meeting held on Aug 25, 2021)
- Comments were received from an interested public member on October 4, 2021 and subsequently addressed during the Public Information Centre.

# Project Schedule

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Milestone	Date
Notice of Study Commencement	July 2021
Completion of Phase 1 – Identify Problem / Opportunities	July 2021
Completion of Phase 2 – Evaluation of Alternatives	Sept 2021
Public Information Centre	Oct 2021
Schedule 'B' EA Wrap-Up	Feb 2022

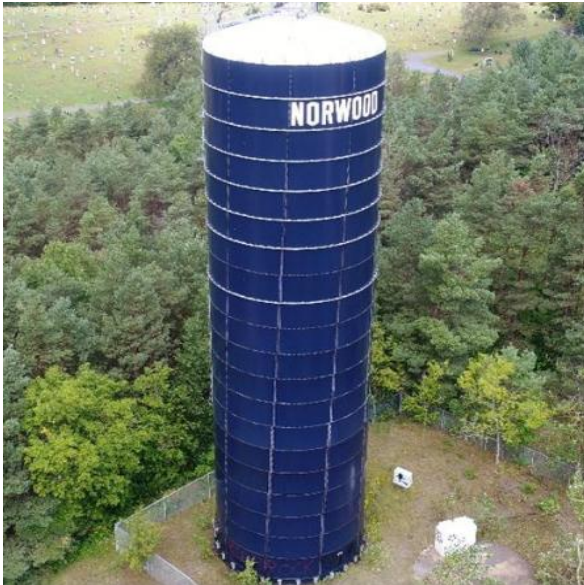


# Next Steps

## General Project Timeline

*\*\*Date to commence not determined*

Preliminary Design:	4 months
Detailed Design:	6 months
Finalize Contract Drawings and Specifications:	1 month
Approvals:	6 to 12 months
Tender and Contract Award:	2 months
Construction:	12-18 months



**THANK YOU!**