

# **Schedule 'C' Class Environmental Assessment Study Palgrave 4 Supply Well Capacity Upgrades**

## **Virtual Public Information Centre No. 1**

Monday, February 14, 2022

to

Friday March 4, 2022

# Why Are We Here?

- The Region of Peel is undertaking a **Municipal Class Environmental Assessment Study** to identify infrastructure upgrades required to the existing Palgrave – Caledon East Drinking Water System.
- The objectives of this **Virtual Public Information Centre** are:



**Introduce the project and the reasons why it is being undertaken**



**Present the decision-making process and preliminary options**



**Provide an opportunity for the public to get involved in the project**

# We Need Your Feedback!

**Your feedback  
is important to  
this Class  
Environmental  
Assessment  
Study!**



Please review all materials on the webpage to learn about the process, the activities completed to date, and the **Preliminary Solution recommended** for further examination.

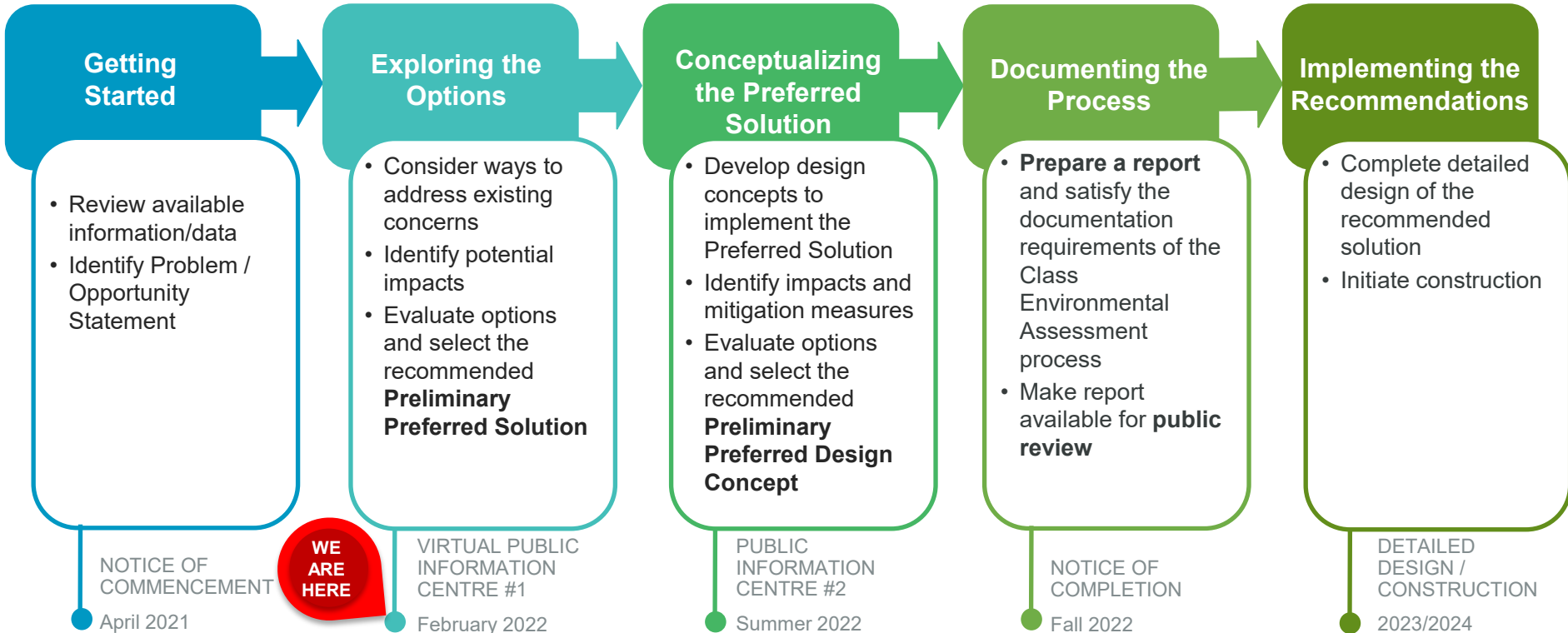


**Your opinion is very important** to us! Members of the project team are available to answer questions via email or telephone.



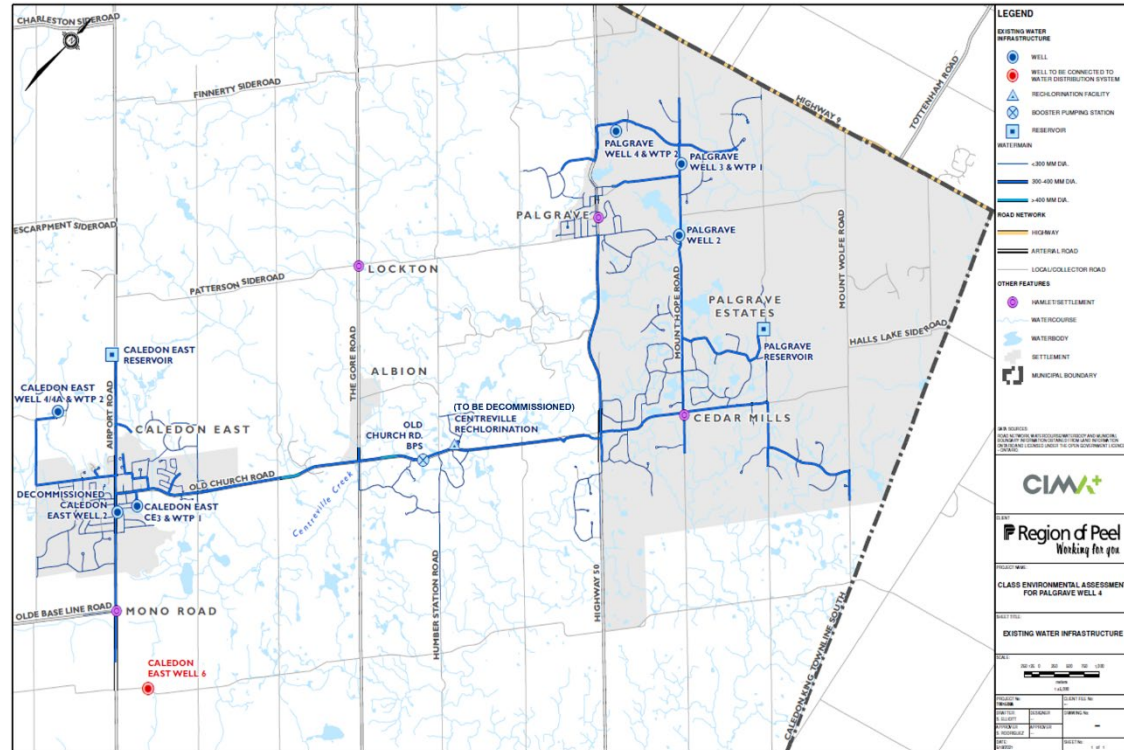
Please complete the **Online Comment Form** after reviewing the materials.

# Overview of Municipal Class EA Process and Consultation







# Overview of Palgrave – Caledon East Drinking Water System

- A **groundwater-based** system owned and operated by the Region.
- It supplies drinking water to the communities of Caledon East, Palgrave, Palgrave Estates, Mono Road, Albion, Centreville, and Cedar Mills.
- Major components:
  - 6 municipal groundwater wells (3 in Caledon East, 3 in Palgrave)
  - 4 treatment plants (2 in Caledon East, 2 in Palgrave)
  - 2 water storage facilities and 2 booster pumping stations
  - An interconnected watermain allowing conveyance of treated water from Caledon East to Palgrave and vice versa.



# System Capacity and Water Demands

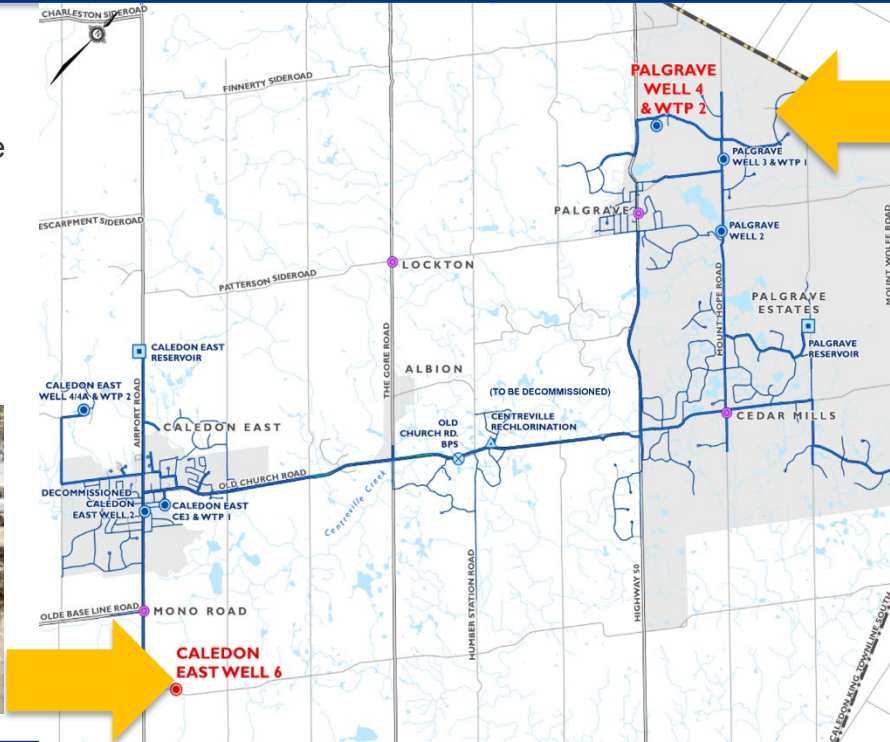
Serviced Population and Water Demands		Existing	Future
	People	~12,000	~18,000
	Max. Day Demands (L/s)	105	~200

Well Supply Capacity - All 6 wells from Palgrave and Caledon East		Existing
	Total Capacity (L/s)	204
	Available Capacity (L/s) (assumes 15% reserve capacity)	173

- The total available supply capacity of the **existing wells cannot satisfy the future system demands.**
- A few municipal wells **have experienced a decline in efficiency** due to changes in aquifer pressure.
- There is a **need to increase the system supply capacity and improve the security of supply** to meet the long-term needs.

# Enhancing Security of Supply in the System

- A new groundwater source was identified in 2019 in the Caledon East area.
- The new groundwater source was converted into a production well in 2020.
- A separate Class EA for the connection of the new **Caledon East Well #6** is ongoing.



- In 2020, a hydrogeological investigation identified an opportunity to increase the capacity of the existing Palgrave Well #4.
- Palgrave Well #4 capacity could be **increased from 30 L/s to 60 L/s**.

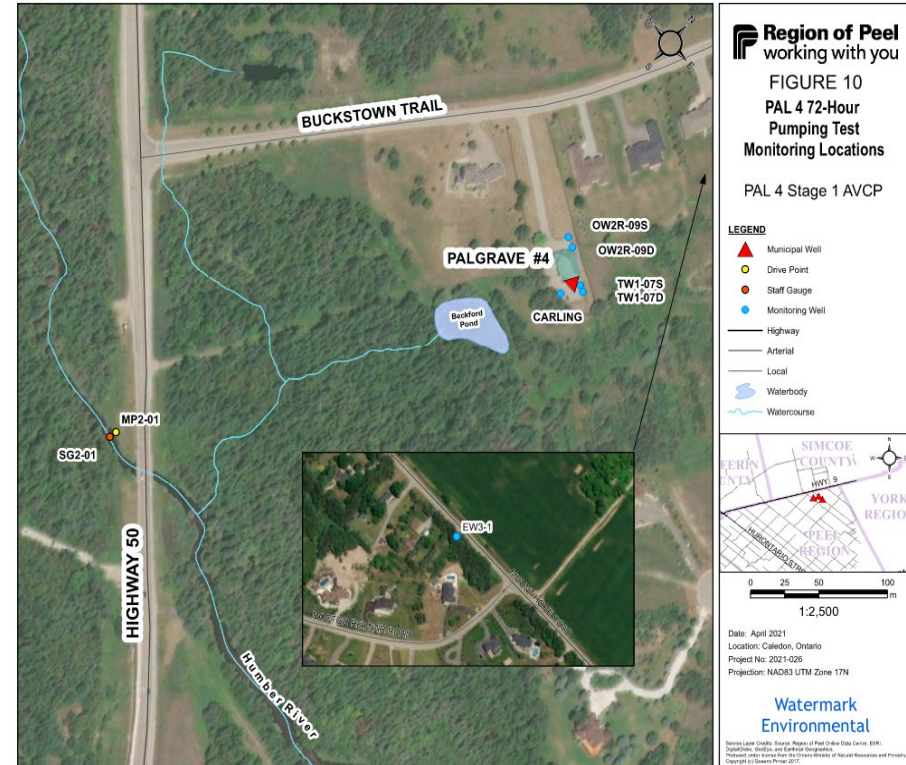


# Hydrogeological Investigation – Findings

A hydrogeological and pumping test evaluation of the Palgrave Well 4 system was completed in 2021 to support a potential increase in water taking to 60 L/s.

## Key findings:

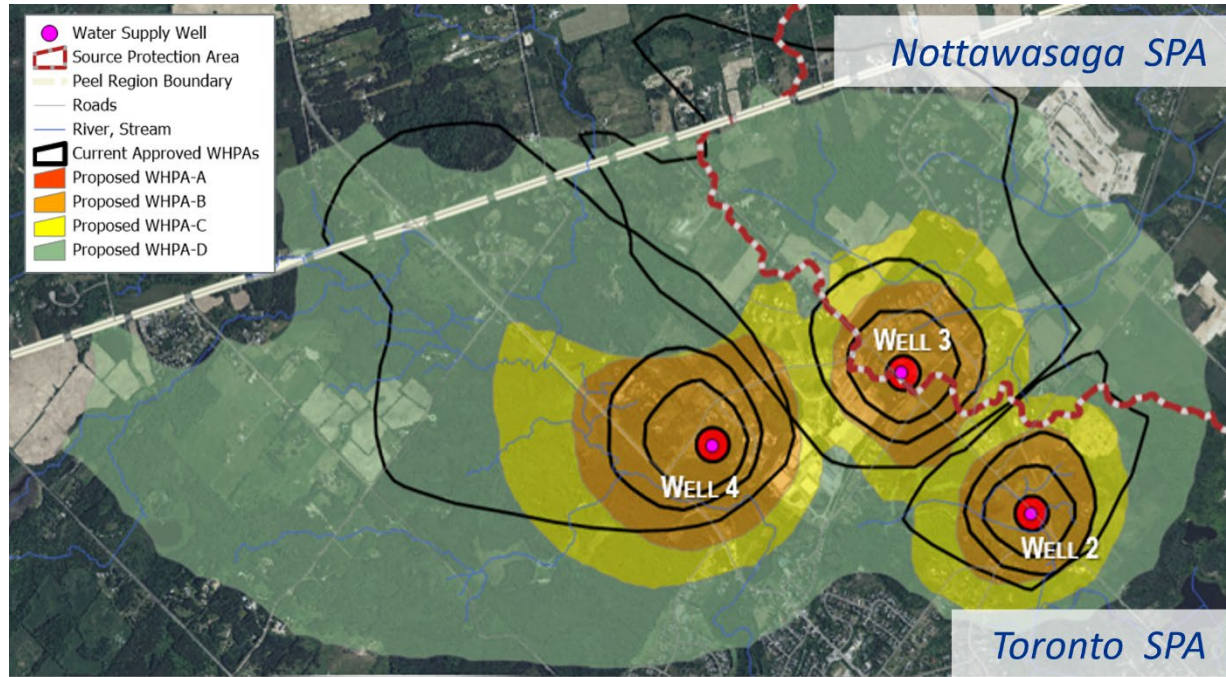
- A capacity increase to 60 L/s will not result in changes to groundwater quality.
- Palgrave #4 will continue to be a true **G**roundwater source, not **U**nder the **D**irect **I**nfluence of surface water (Non-GUDI).
- Treatment requirements for an increased water taking to 60 L/s will remain the same.
- There is no hydraulic connection between the production aquifer and shallow groundwater systems in the area, including surface waterbodies.
- Further inspection and sampling to be completed to confirm E.Coli and Total Coliforms. This will provide an indication of the chlorine demand.
- Assessment of the current well casing condition should be completed – Anticipated to take place in 2022.



*Palgrave Assessment of Vulnerability to Contamination by Protozoa.*  
*Source: Watermark Environmental, 2021.*



# Source Water Protection / Wellhead Protection Areas



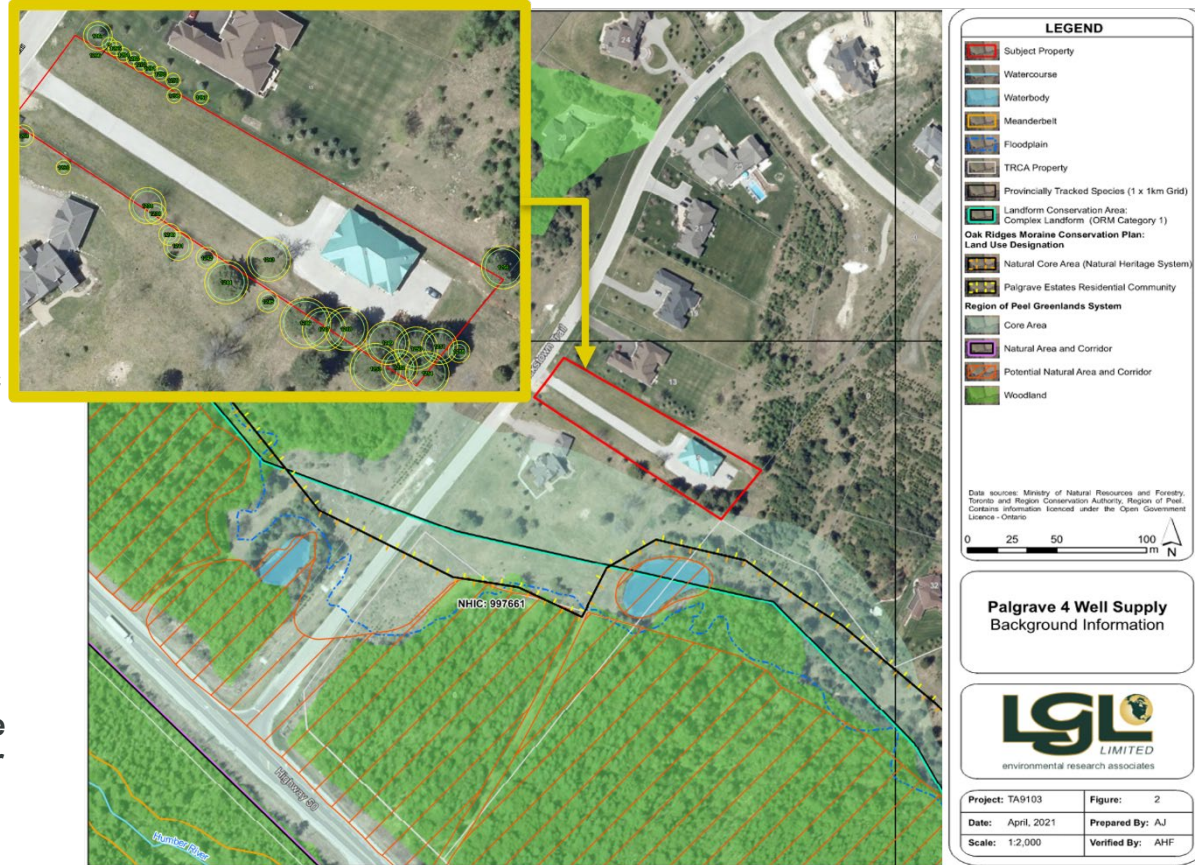
*Palgrave Production Wells – Limits of existing WHPAs for current approved (30 L/s) and DRAFT Limits of WHPAs for proposed (60 L/s). Source: Aqua Insight Inc., 2022*

- An increase in water taking from Palgrave Well 4 will result in new Wellhead Protection Areas (WHPAs).
- WHPAs allow the Region to protect the short and long term quality of the drinking water sources.
- WHPAs are created using a mathematical model that predicts the movement of groundwater from its source area to a municipal drinking water well.
- WHPA shape changes as new subsurface data (e.g., thickness and continuity of sand aquifers) are collected, or as the future municipal pumping rates or municipal wells change.
- DRAFT limits of WHPAs have been delineated (as shown in the map) to reflect the proposed water taking increase.

# Natural Environmental Features

Existing natural heritage and hydrological features have been inventoried. Key findings:

- 32 trees planted within and in the immediate vicinity of the site, as amenity features
- Area comprises a highly urban influenced section of the Humber River
- The Humber River and its main tributary near the study areas not reported to support aquatic species at risk
- No creeks flowing within 120m of the study area
- No Environmentally Significant Areas (ESAs)
- All existing vegetation communities in the area are widespread and common in Ontario
- **Minimal impacts to existing features are anticipated from works contained within the site. This is reflected in the weighting factor assigned to Natural Environmental Criteria (shown in Slide 21).**



# How is Palgrave Well #4 Water Treated?

## Source – Palgrave Well #4

- Well drilled in 2001
- Permitted water taking capacity = 30.3 L/s
- Groundwater is pumped directly to treatment



## Treatment

- Treatment plant built in 2008 and commissioned in 2009
- Treatment capacity = 33.3 L/s
- Raw water is filtered through greensand filters for iron removal
- Filtered water is chlorinated for disinfection



## Distribution

High lift pumps convey treated water from the plant into the distribution system

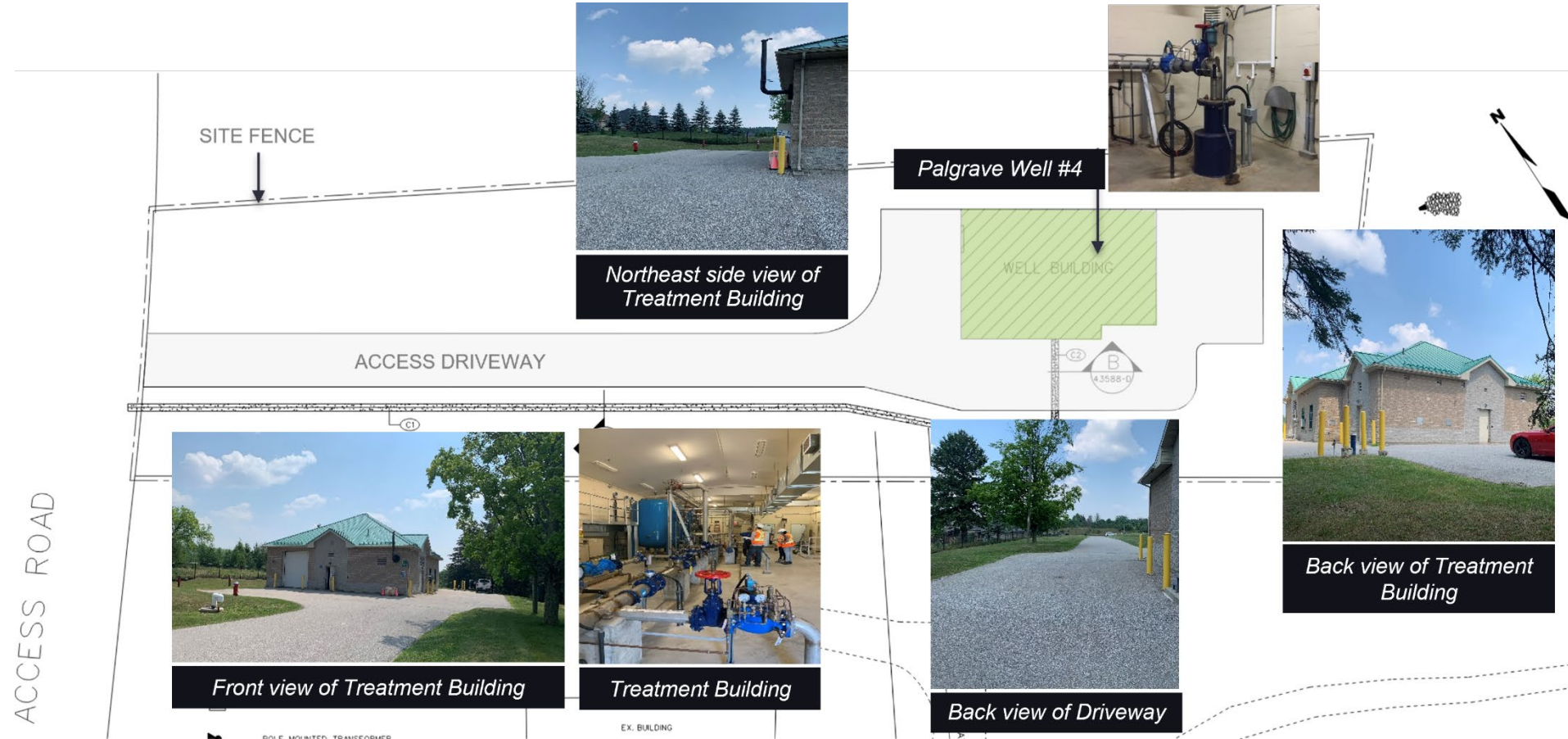


## Wastewater Management

Process wastewater/sludge is hauled away from site



# Existing Layout of Palgrave 4 and its Plant



# Summary of Current Conditions



## Service Water Needs

Additional water supply is needed to meet the desired levels of service and long-term water needs of the Palgrave / Caledon East Drinking Water System.



## Impact on Water Quality and Aquifers

The water taking of Palgrave Well 4 could potentially be increased to 60 L/s with no significant impact to raw water quality, production aquifers and surrounding surface or groundwater features.



## Water Treatment

The required level of treatment for a water taking of 60 L/s from Palgrave Well 4 will remain unchanged. Treatment infrastructure will need to be retrofitted to accommodate a water taking increase.

## What's Next?



The Region is undertaking this Class EA study to evaluate alternatives and select the preferred solution.

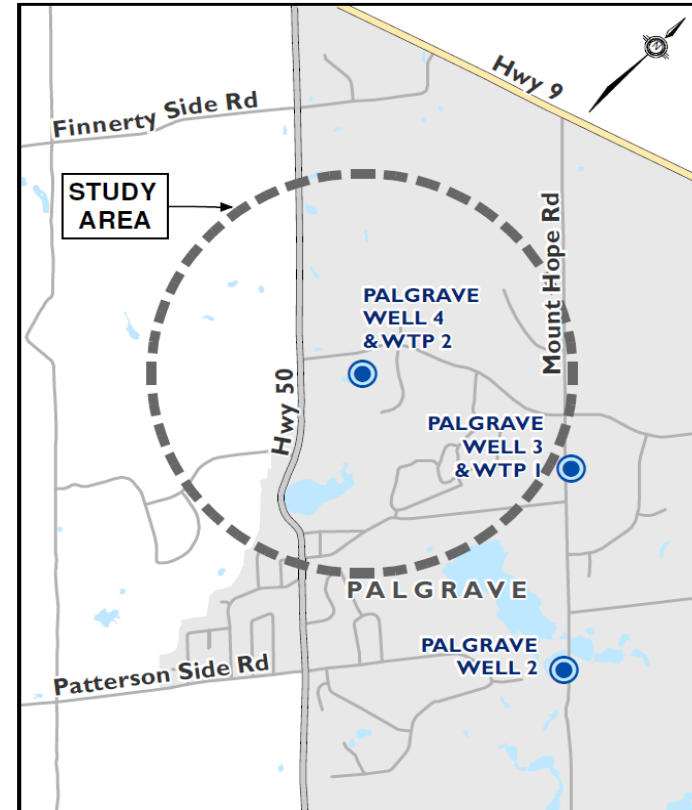
Infrastructure improvements to the Palgrave – Caledon East Drinking Water System are required to:

- Increase the well supply capacity and enhance the security of water supply
- Minimize potential risks associated with declined well efficiency
- Provide an appropriate level of service while meeting the long-term water needs of the serviced area



# Class EA Objective and Study Area

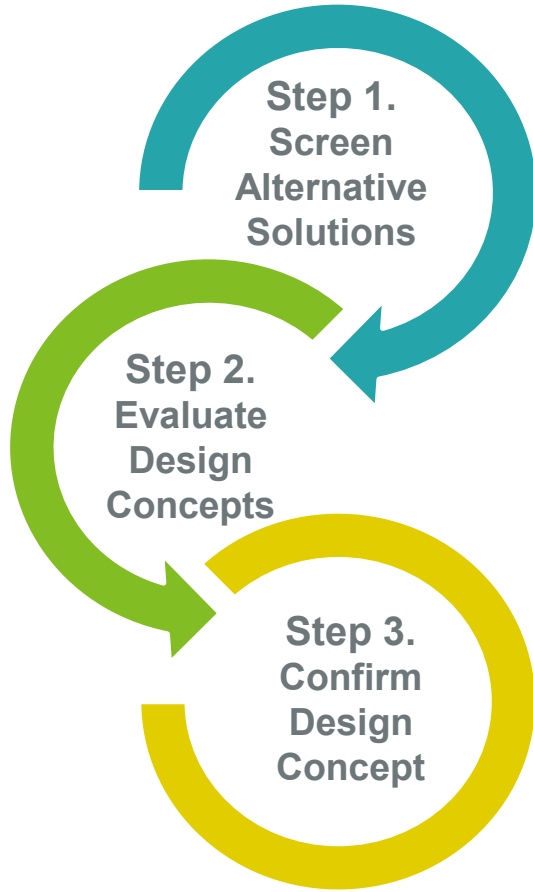
To evaluate and identify the necessary upgrades/modifications needed to accommodate an increase in water taking of the existing municipal production well, Palgrave Well #4.



*Study Area Location Plan*

\* Study area limits may not coincide with WHPAs limits

# Selecting the Preferred Solution – The Process



## 1. Identify and Screen Alternative Solutions

- Alternatives to address the Problem/Opportunity Statement were identified and screened against “must-meet criteria”:
  - ✓ Potential contribution to a water supply increase
  - ✓ Ability to meet Provincial treated water quality standards/objectives and guidelines
  - ✓ Compatibility with existing infrastructure/processes
  - ✓ Ability to balance benefits and costs relative to other options
- Alternatives that did not meet “must-meet” criteria have been eliminated – Results from Step 1 are shown in the next panels.

## 2. Identify and Evaluate Design Concepts

- Alternatives that met “must-meet criteria” will be developed into Design Concepts and evaluated against a broad range of criteria to maximize benefit or minimize impact to:
  - ✓ Technical / Natural Environment
  - ✓ Community / Social
  - ✓ Costs

## 3. Confirm Preferred Design Concept

- A Preferred Design Concept will be selected through a detailed evaluation process.
- Steps 2 and 3 will be completed in the next stages of the Class EA study. The results will be presented at a second PIC.

# Alternative Solutions – Screening Results

#	Alternative Solutions	Screening and Recommendation
1.	Do Nothing	<ul style="list-style-type: none"> <li>• Status Quo – No changes to existing system</li> <li>• <b>Eliminated – Did not address the limitations with water supply</b></li> </ul>
2.	Limit Community Growth	<ul style="list-style-type: none"> <li>• Future growth limited to the capacity provided through existing facilities and infrastructure</li> <li>• <b>Eliminated – Did not address the limitations with water supply</b></li> </ul>
3.	Reduce Water Demands	<ul style="list-style-type: none"> <li>• Implementation of water conservation and water efficiency measures</li> <li>• <b>Eliminated – Did not address the limitations with water supply</b></li> </ul>
4.	Improve Operation and Maintenance of Existing Wells	<ul style="list-style-type: none"> <li>• A Regional Production Well Management Program is in place to review efficiency and sustainability of the municipal supply wells, on a continuous basis</li> <li>• Option cannot fully address on its own the long-term supply limitations</li> <li>• <b>Not recommended as a stand-alone solution. To be considered in combination with the preferred alternative solution.</b></li> </ul>
5.	Obtain Additional Supply Capacity from a New Source	<ul style="list-style-type: none"> <li>• Connection of new production well, Caledon East Well 6, to the Caledon East System.</li> <li>• <b>Recommended but is being reviewed as part of a separate Class EA Study.</b></li> </ul>
6.	Expand / Retrofit PAL 4 Water Treatment Plant	<ul style="list-style-type: none"> <li>• Retrofit existing Palgrave Well #4 treatment plant to accommodate a water taking increase from 30 L/s to 60.6 L/s.</li> <li>• <b>Recommended</b></li> </ul>
7.	Establish / Develop a New Water Treatment Plant	<ul style="list-style-type: none"> <li>• Build a new treatment plant to accommodate a water taking increase from 30 L/s to 60.6 L/s, either at existing Palgrave Well #4 site or a new site.</li> <li>• <b>Eliminated – Technically and financially prohibitive</b></li> </ul>

# Summary of Screening Results

## The following Alternative Solutions met the “must-meet criteria” and have been short-listed for further consideration:

- ✓ Option 4 – Improve Operation and Maintenance of Existing Supply Wells
  - The Region will continue with implementation of activities under its Regional Production Well Management Program.
  
- ✓ Option 5 – Obtain Additional Supply Capacity from a New Source
  - The connection of the new municipal production well, Caledon East Well #6, to the existing Caledon East Drinking Water System is being reviewed through a [separate Class EA Study](#).
  
- ✓ Option 6 – Expand / Retrofit Palgrave Well #4 Water Treatment Plant
  - Treatment capacity will need to be increased to accommodate well supply increase to 60 L/s
  - Modifications/replacement/retrofits to the following:
    - Iron removal process
    - Disinfection process
    - Process wastewater management system
    - Emergency power supply
  - Treatment and/or process upgrades to be accommodated within existing plant footprint or through a plant expansion.
  - Options and design concepts will be explored further in the next stages of the study.

# Options to Upgrade the Treatment Processes



## Alternatives for Iron Control/Removal

- ✓ **Physical and chemical filtration** (currently used) – Removal by gravity or pressure filters after oxidation
- ✓ **Biological filtration** – Removal by filtration through media with beneficial bacteria
- ✓ **Sequestration** – Chemical addition to maintain iron in solution and avoid precipitation in the water



## Alternatives for Disinfection

- ✓ **Chlorination** (currently used) – Addition of chlorine to inactivate human pathogens present in water
- ✓ **Ultraviolet (UV) Irradiation** – Physical process that uses UV irradiation to prevent the cellular replication of organisms. UV light is emitted through a series of lamps located in enclosed contactors
- ✓ **Ozonation** – Process that destroys bacteria and other microorganisms present in water through an infusion of ozone, a gas produced by subjecting oxygen molecules to high electrical voltages



## Alternatives for Process/Wastewater Management System

- ✓ Increase draining frequency of existing wastewater settling tank
- ✓ Increase capacity of existing wastewater settling tank

# Options to Upgrade the Emergency Power Supply System

## Option A – Permanent Indoor Genset



- ✓ Requires reconstruction of existing heating, ventilation and air conditioning system
- ✓ Expansion of existing building footprint may be required

## Option B – Permanent Outdoor Genset



- ✓ Outdoor genset in enclosed sound-attenuated and weather-protective enclosure
- ✓ Outdoor system will be in compliance with applicable noise/air limits

## Option C – Temporary (Mobile) Outdoor Genset



- ✓ Provision for a connection to a portable genset to existing building
- ✓ No footprint expansion required



# How will we Evaluate Alternative Design Concepts?

The criteria below and the proposed weighting factors (shown in brackets as %) will be updated based on your input from this Virtual Public Information Centre and used to evaluate the design concepts.



- Short-term disruption during construction
- Long-term disruption during operation (e.g., visual, noise, dust, traffic, air quality)

**Socio-cultural**  
(20%)



- Terrestrial, aquatic species & habitats
- Regulated and protected areas
- Water resources and source water protection areas (surface and groundwater).
- Energy requirements

**Natural Environmental**  
(10%)



- Life cycle costs, including capital and operation and maintenance costs

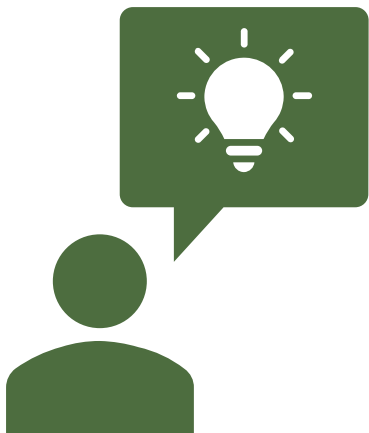
**Economics**  
(30%)



- Ease of construction and integration with existing system
- Length of construction and phasing opportunities
- Scalability
- Ability to maximize existing footprint
- Operational complexity / flexibility

**Technical and Operational**  
(40%)

# What Are We Doing Next?



- ✓ Assess advantages/disadvantages of the options to expand/retrofit the existing systems for:

- Iron control/removal
- Disinfection
- Process wastewater management
- Emergency power supply

Options with sufficient merits will be used to develop design concepts to expand the treatment capacity of the Palgrave Well #4 plant.

- ✓ Detailed comparative evaluation of the Design Concepts based on the criteria and weighting factors shown in Slide 21.
- ✓ Select the Design Concept that achieves the highest score in the evaluation process.

The results of the detailed evaluation process will be presented to the public at a separate Public Information Centre.

# Thank you for Participating!

## After the virtual PIC, the Project Team will:

- Review and consider input received during the virtual Public Information Centre No. 1
- Confirm the recommended **Alternative Solution and options to Expand / Retrofit the Existing Palgrave Well #4 System**
- Continue with the next phases of the Class EA study process.



## Stay Involved!

Please complete the **Online Comment Form** available on the webpage by **Friday, March 4<sup>th</sup>, 2022**



## Project Information

- For more information about this project, please visit our webpage:  
  
<https://www.peelregion.ca/public-works/environmental-assessments/caledon/palgrave-ea-well4.asp>
- Should you have any questions or comments at any time during the project, please contact:

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