Haldimand County

November 19, 2024

# Caledonia Wastewater Treatment Plant Municipal Class Environmental Assessment

CANADA BEST MANAGED COMPANIES | Platinum member

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

Image source: Trip Advisor

# Land Acknowledgement

We humbly acknowledge that Haldimand County sits on the ancestral land of many generations of Indigenous nations, who have been here since time immemorial.

Today, this land continues to be home to many Indigenous peoples, including the Six Nations of the Grand River and the Mississaugas of the Credit First Nation, as well as non-Indigenous settlers from a variety of backgrounds. As a community, we have a shared responsibility for stewardship of the land on which we live and work. We are grateful for the opportunity to work together and to share the land we all call home.

Acknowledging reminds us that our living conditions are directly related to the abundant resources of the Indigenous peoples. We commit to continue learning, reflecting on our past, and working in allyship with Indigenous communities, toward respective community goals and objectives, in peace, respect and friendship.

Image source: Tourism Haldimand

# Meeting Purpose

- Update on planning for the new wastewater treatment plant in Caledonia.
- Collect and document feedback from neighbours, stakeholders, and the public.
- Discuss any questions or concerns.

# Problem and Opportunity Statement


The existing wastewater treatment plant provides **treatment and disinfection of wastewater** from **north and south Caledonia** before it is discharged into the Grand River.

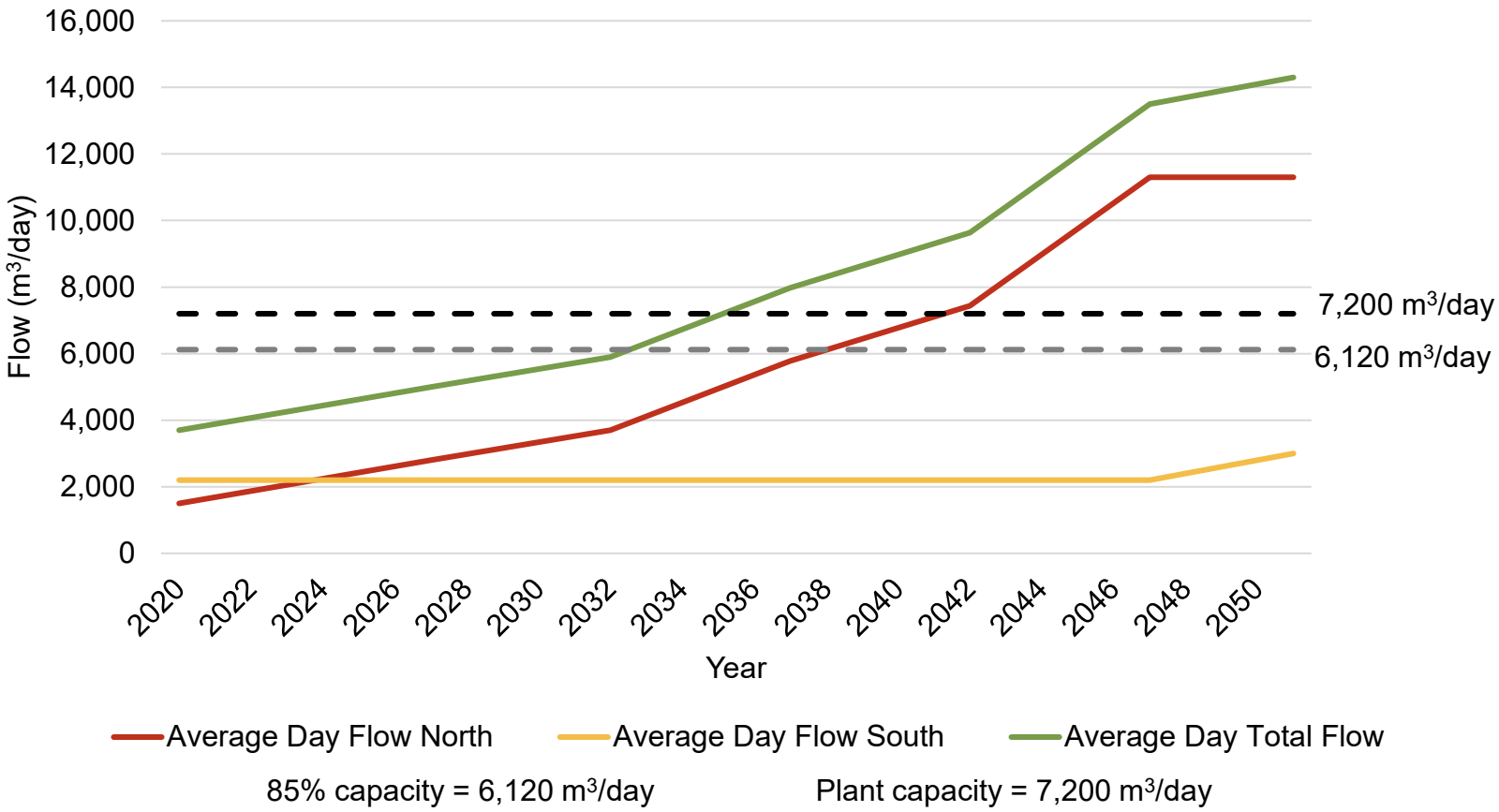
Growth within Caledonia has been steady and the County has planned to **accommodate future growth** in this community over the long term.

It is important to select a wastewater treatment alternative that will support **sustainable growth and development** within the community over the long term.

To achieve this, this Study is being conducted in accordance with Phases 1 through 4 of the **Municipal Class Environmental Assessment** (MCEA) process to fulfill the requirements for Schedule C Projects.

Image source: Haldimand County

# Future Treatment Flows for Caledonia WWTP




## Key Takeaways

To provide for uninterrupted growth, typically additional wastewater treatment capacity is constructed when the **average daily flow** reaches 85% of rated capacity.

Based on current flow estimates, the existing WWTP will **reach 85% of its rated capacity by 2032.**

# MCEA Process Overview

**Phase 1:**
**Problem / Opportunity**

- Data collection and review
- Identify problems and opportunities to address

**Phase 2:**
**Alternative Solutions**

- Identify and evaluate alternative solutions to problem/opportunity
- Consult with Council and the general public
- Address public and stakeholder comments

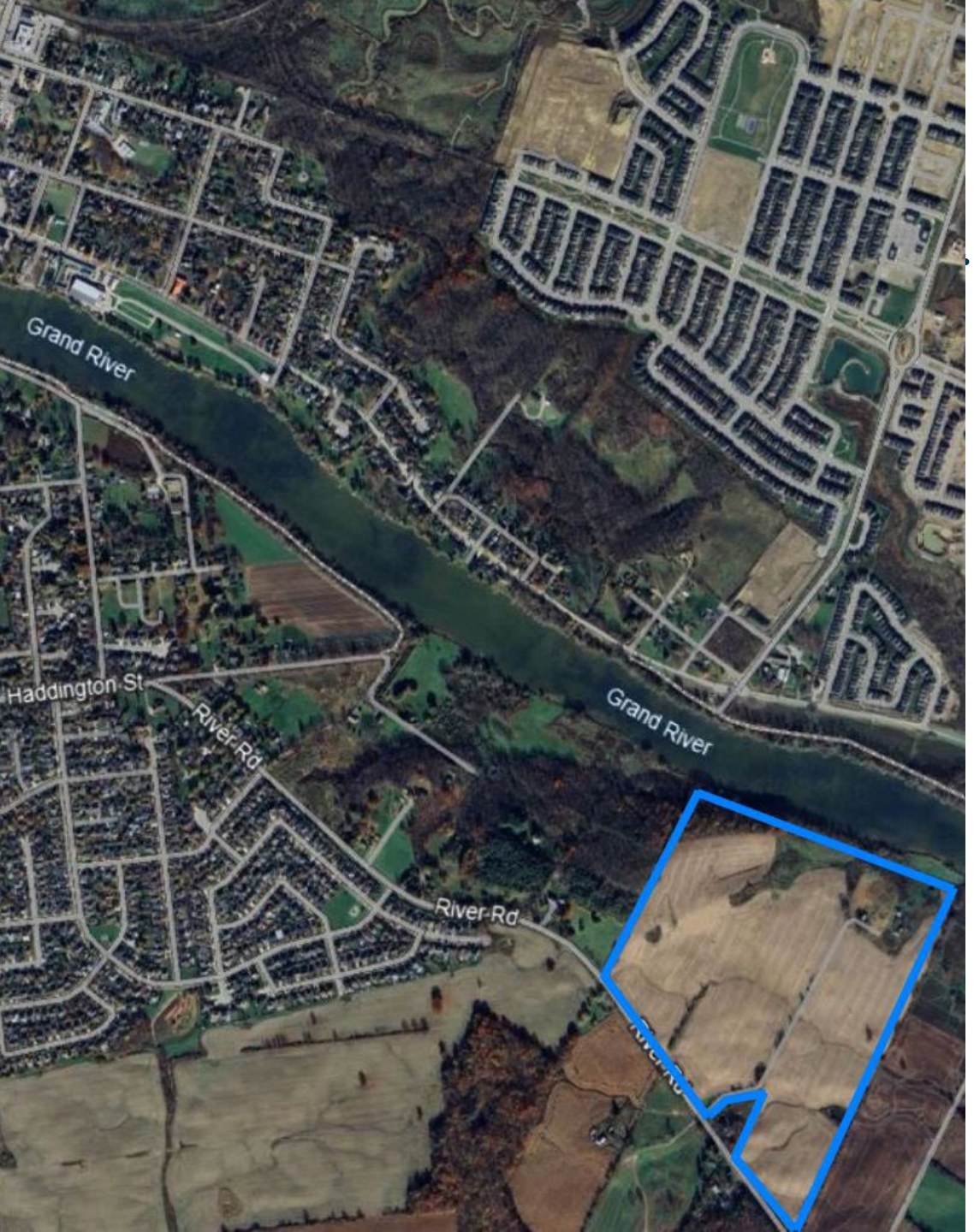
**Phase 3:**
**Alternative Design Concepts**

- Identify alternative design concepts
- Prepare EA document for comment and review
- **Consult with Council, agencies, and the public**
- Finalize preliminary preferred design

We are here!

**Phase 4:**
**Environmental Report**

- Complete Environmental Study Report
- Issue Notice of Completion




# Project History

**Master Servicing Plan Update (December 2020)**
Identified the need for additional wastewater capacity and Schedule C EA to confirm preferred alternative solution.

**Re-evaluation of Treatment Alternatives**
The Master Servicing Plan was updated to incorporate an expanded Urban Boundary and new planning projections for Caledonia. A new alternative of pumping flows to Nanticoke was evaluated.

**Assimilative Capacity Study**
Hutchinson Environmental Services Limited completed an Assimilative Capacity Study for the Grand River to determine effluent criteria.

**Phase 3 and 4 MCEA**
The MCEA will evaluate treatment options, consult with stakeholders and confirm the preferred alternative. The recommended alternative of a new WWTP was presented to the public at the first open house held on December 6, 2023.

**Land Acquisition**
Haldimand County has acquired the site at 4300 River Road in Caledonia for the future WWTP.

# Where Are We Now?

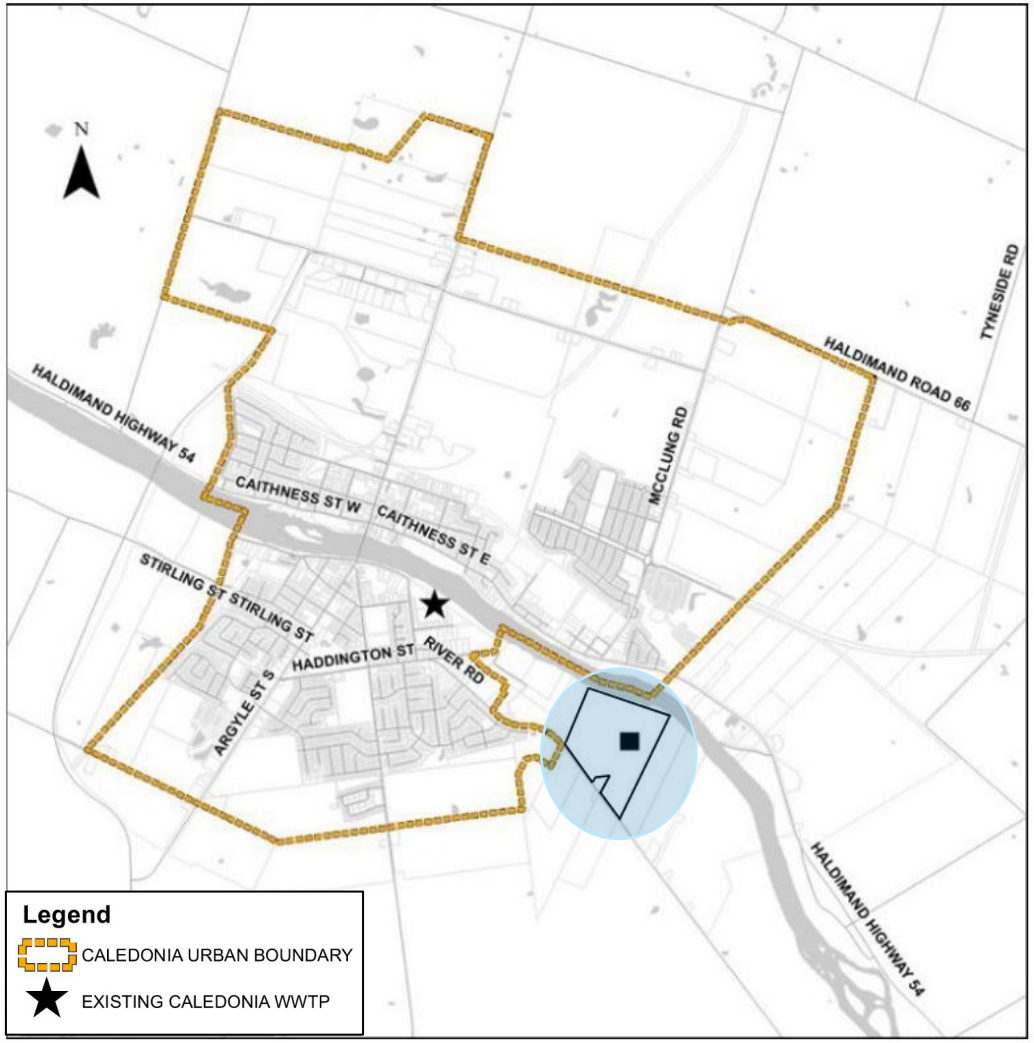
Seeking public input on recommended alternatives:

- Treatment options
- Project phasing
- Conveyance routing alternatives

Offering an opportunity for residents, business owners, and other stakeholders to voice any questions, comments or concerns.

Image source: Microsoft Office

# Site Selection Update




The property at **4300 River Road** was selected based on a detailed evaluation of site suitability. Haldimand County acquired this property for the purpose of construction of a new WWTP.

**Less constrained** than surrounding parcels and lands to the north of the Grand River.

In a **good location** to receive flows from the collection system.

**Close to the Grand River** which is the receiver of treated water from the WWTP.

Large enough to **accommodate future growth**.

Able to provide **ample buffer** to neighbouring properties.

# Water Quality in the Grand River

- Haldimand County has completed an Assimilative Capacity Study (ACS) to determine appropriate effluent criteria, with the MECP, for the new WWTP that will protect aquatic life, habitat and biota.
- The Grand River is a “Policy 2 Receiver” for certain parameters, meaning that no additional nutrient loading can be added.

Overall nutrient loading to the Grand River will be **reduced** by incorporating **advanced treatment** at the new wastewater treatment plant and **reducing permitted effluent criteria** downstream at the Cayuga wastewater treatment plant.

Image: Assimilative Capacity Dye Tracer Study, August 2021

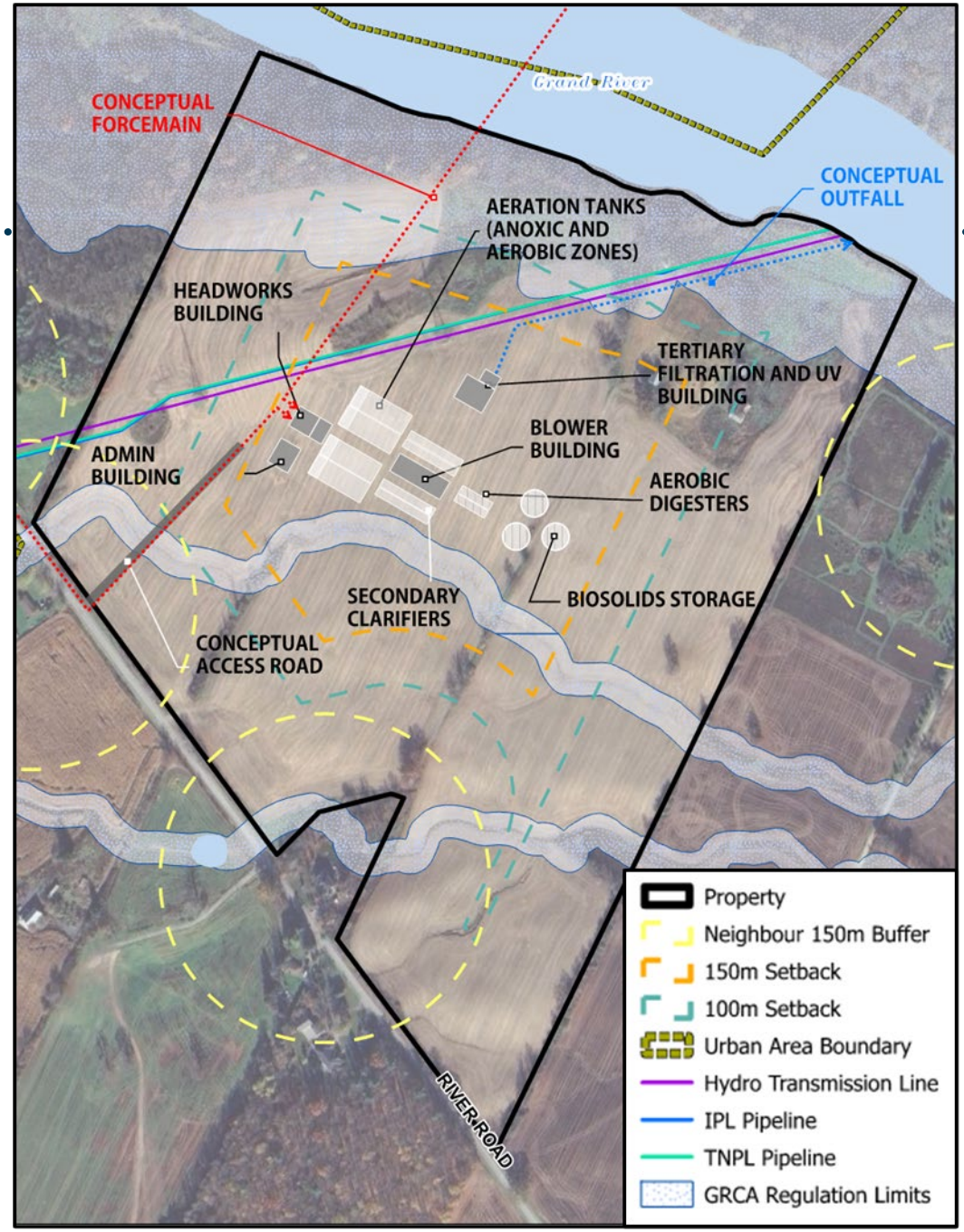
# Wastewater Treatment Alternatives Evaluation

Image source: Claire W

# Treatment Evaluation Summary

| | 1 Conventional Activated Sludge with Post Anoxic Filter | 2 Modified Ludzack-Ettzinger (MLE) Activated Sludge | 3 Multi-Stage Activated Sludge |
|---|---|---|---|
| **Financial** | | | |
| Capital Cost | Negative | High Positive | Positive |
| Operation and Maintenance Costs | Negative | Positive | Positive |
| **Technical and Environmental** | | | |
| Phasing Flexibility | Neutral | Neutral | Neutral |
| Climate Change Adaptation and Mitigation | Negative | Positive | Positive |
| Robustness | Positive | Positive | Neutral |
| Footprint | Negative | Neutral | Neutral |
| **Operations** | | | |
| Availability of Technical Support | Positive | Neutral | Neutral |
| Process Complexity | Neutral | Positive | Negative |
| **Social Community and Well Being** | | | |
| Potential for Traffic and Odour impacts | Negative | Neutral | Neutral |

# Recommended Design Alternative




**Option 2:**

Modified Ludzack-Ettzinger (MLE) Activated Sludge

**Minimized operational complexity**, involving technology the County is familiar with.

**Lowest capital cost** compared with other alternatives.

**Lowest energy consumption** compared to other design alternatives.

**Fewer chemical delivery trucks** than existing Caledonia WWTP.

**Smallest plant footprint** compared to other alternatives.

# Recommended WWTP Capacity Phasing

## Phase 1 in Service 2028

- New WWTP receiving flows of less than 5,800m$^3$/d from McClung pump station via a river crossing.
- Existing WWTP will continue operation.

## Phase 2 in Service 2045

- Expansion of new WWTP to 7,300m$^3$/d.
- Upgrades to Nairne Sewage Pump Station.
- Conveyance upgrades to divert additional flow to new WWTP.

## Phase 3 in Service Beyond 2052

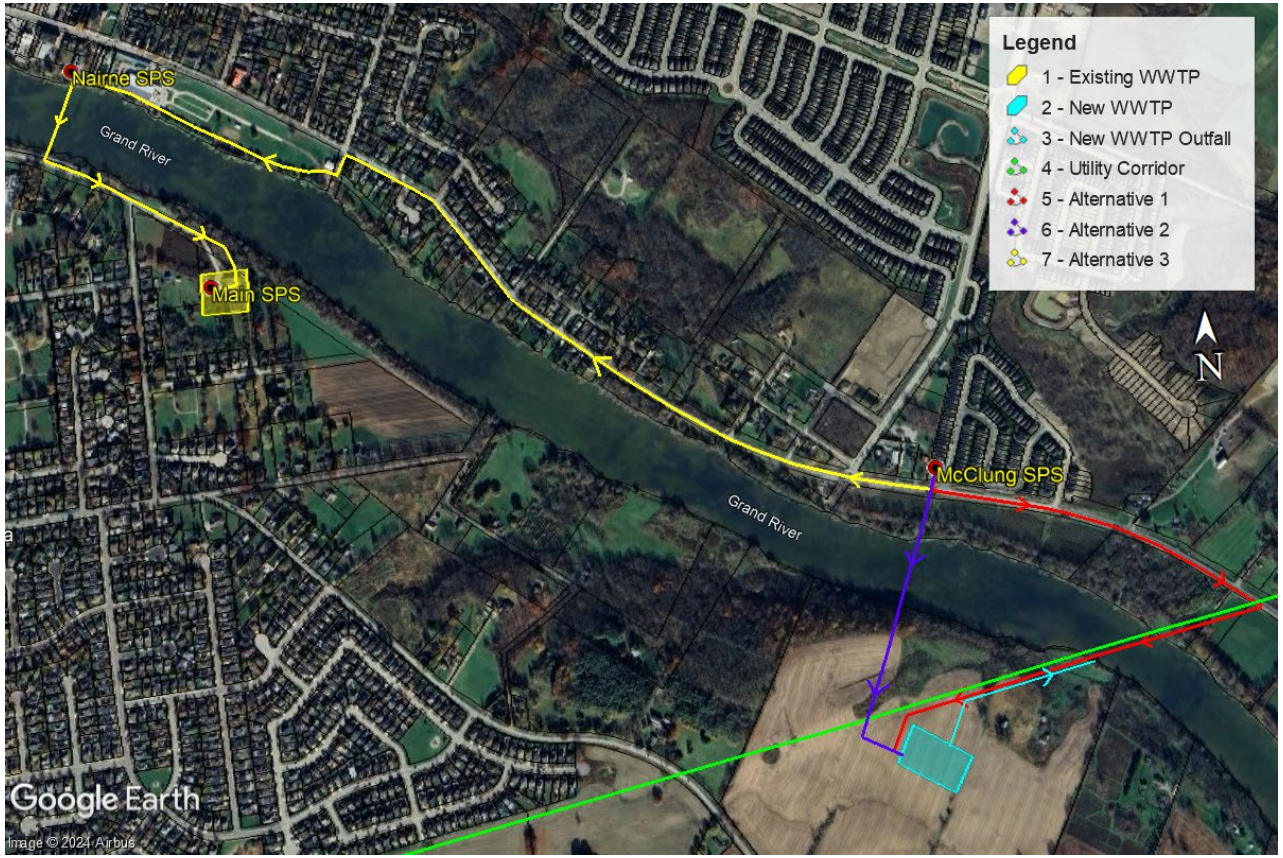
- Decommissioning of existing WWTP.
- All sanitary flows directed to new WWTP with ultimate capacity of 14,200m$^3$/d.

Flows and timelines are estimates. The rate of growth and development will impact timing and phasing for the new WWTP.


# Grand River Crossing Evaluation

# Evaluation of River Crossing Alternatives

In the first phase of construction, the new WWTP will receive flows from McClung Sewage Pump Station, which will require a **crossing over the Grand River** to connect to the site at 4300 River Road.




**Three river crossing alternatives were considered, including:**

1. River crossing within the existing easement for Hydro One utilities.
2. River crossing at existing McClung Sewage Pump Station.
3. Leveraging the existing river crossing from Nairne Sewage Pump Station.

# Recommended River Crossing Alternative

**Crossing the Grand River at the McClung Sewage Pump Station (Option 2) is recommended.**


Key considerations include:

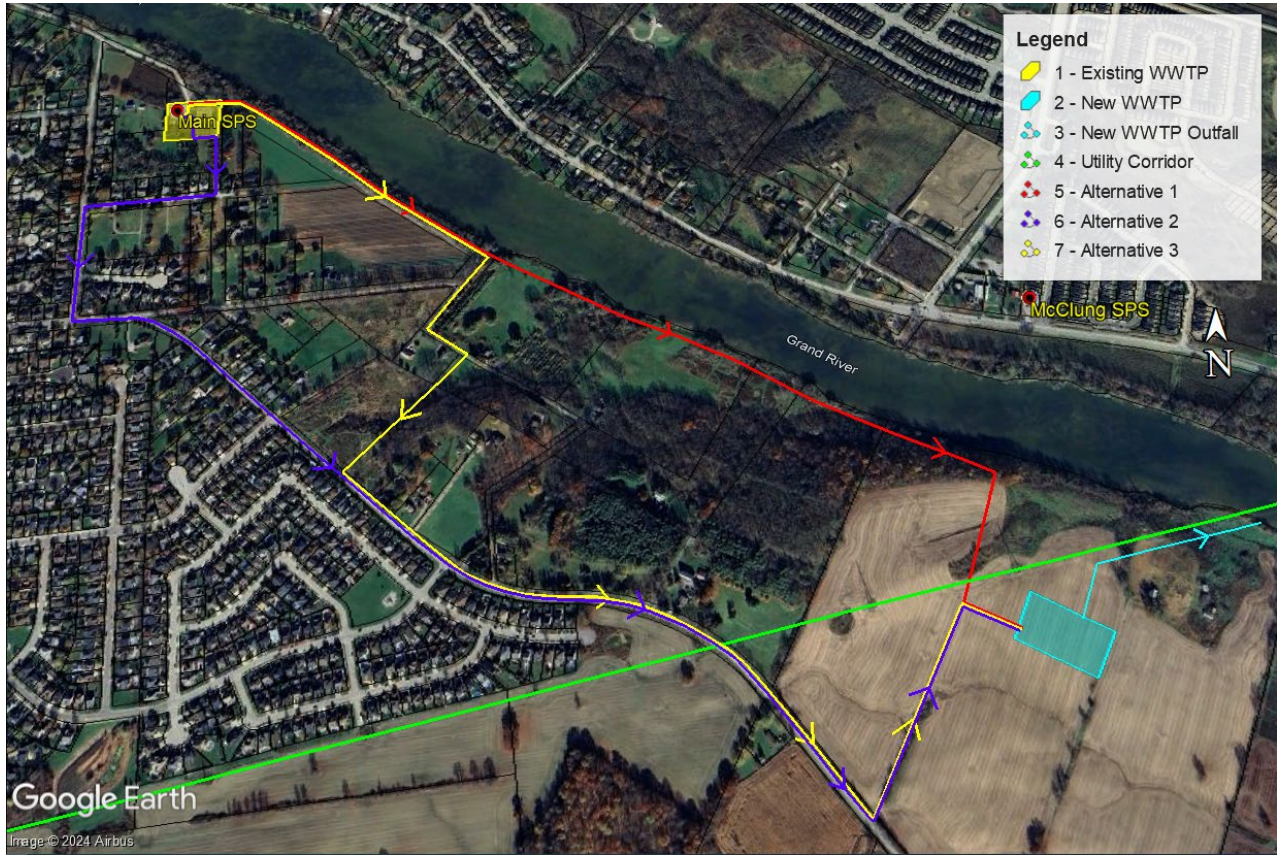
- Lowest capital cost
- Least linear and pumping station infrastructure required
- Good flexibility for project phasing
- Minimizes approvals within the utility corridor servicing Hydro One
- Least complex construction and minimal road disturbance

Infrastructure is expected to be in service by 2028.


# Southern Conveyance to New WWTP

# Evaluation of Conveyance Alternatives

In the second phase of construction, the new WWTP will receive flows from Caledonia South and the Nairne Sewage Pumping Station, which will require conveyance infrastructure to connect to the new WWTP.

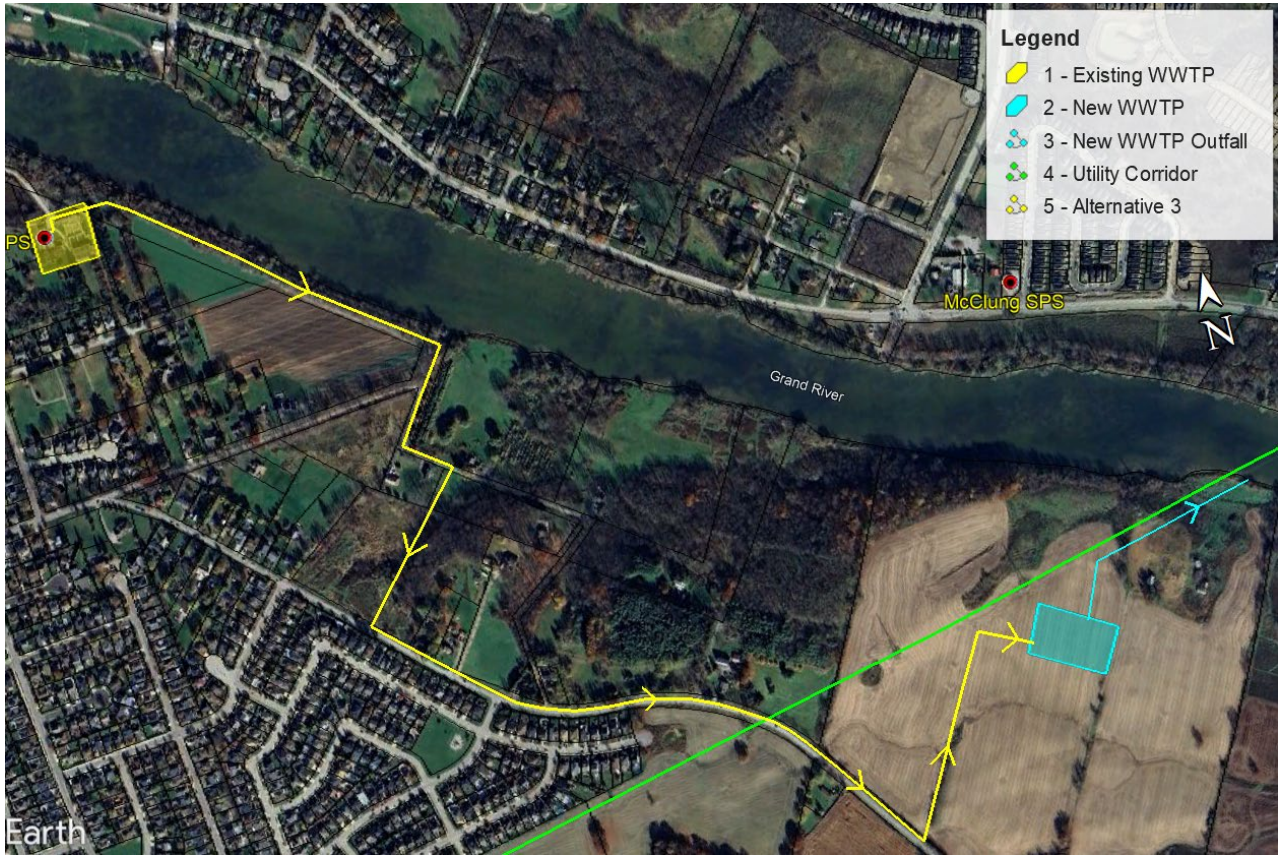



**Three conveyance alternatives were considered, including:**

1. Routing along the southern bank of the Grand River.
2. Routing through the residential area to the southwest and along River Road.
3. Routing along existing servicing easements following the southern bank of the Grand River, Elgin Street, and River Road.

# Recommended Conveyance Alternative

**Routing along existing easements following the southern bank of the Grand River, Elgin Street, and River Road (Option 3) is recommended.**




Key considerations include:

- Moderate capital cost.
- No new easements required.
- Lower ecological impact due to less construction along the riverbank.
- Shorter distance for construction along major roadways.

Infrastructure is expected to be in service between 2038 - 2045.


# Construction Phasing

# Anticipated Infrastructure In-service Dates

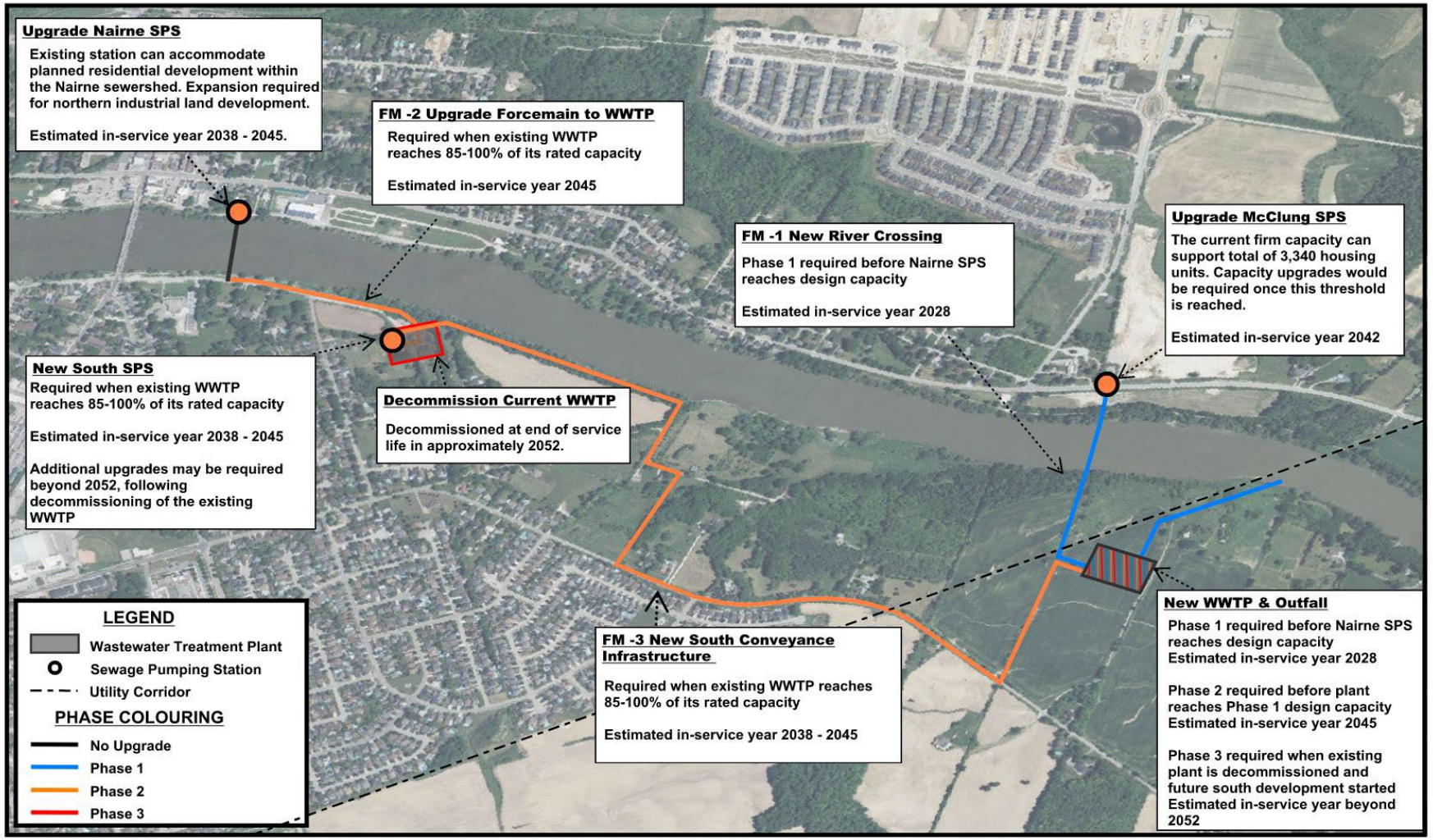
**Phase 1**
**2028**

↓

**Phase 2**
**2045**

↓

**Phase 3**
**Beyond**
**2052**




# Capital Cost Evaluation

# Summary of Capital Costs

*Class 'D' Opinion of Probable Construction Costs developed for this project are expected to be within +/- 30% accuracy

| Item | Description | Cost Estimate (2024$) | Funding | | Estimated Budget Year | Estimated In Service Year | Construction Phasing | EA Schedule | Funding Rationale |
|---|---|---|---|---|---|---|---|---|---|
| | | | County | DC | | | | | |
| **New Wastewater Treatment Plant** | | | | | | | | | |
| Land Acquisition | Land acquisition and design of new Phase 1 WWTP | $8,500,000 | 0% | 100% | 2024 | 2024/25 | Phase 1 | Schedule C | Additional Treatment Capacity |
| Phase 1A | Construction Phase 1A of New WWTP 3,200 m3/day | $32,000,000 | 0% | 100% | 2027 | 2028 | Phase1 | Schedule C | Additional Treatment Capacity |
| Phase 1B | Construction Phase 1B of New WWTP 5,800 m3/day | $25,000,000 | 0% | 100% | 2033 | 2036 | Phase1 | Schedule C | Additional Treatment Capacity |
| Phase 2 | Construction Phase 2 of new WWTP (total 7,300 m3/day) | $15,000,000 | 0% | 100% | 2042 | 2045 | Phase 2 | Schedule C | Additional Treatment Capacity |
| Phase 3 | Decommission existing Caledonia WWTP and construction Phase 3 of New WWTP (total 14,200 m3/day) | $45,000,000 | 88% | 12% | 2052 | Beyond 2052 | Phase 3 | Schedule C | Replacement of Existing Infrastructure & Additional Treatment Capacity |
| **Wastewater Treatment Plant Subtotal** | | **$125,500,000** | **$39,600,000** | **$85,900,000** | | | | | |
| **Conveyance** | | | | | | | | | |
| FM-1 | Construction of New River Crossing from McClung SPS to new WWTP | $6,900,000 | 0% | 100% | 2026 | 2028 | Phase 1 | Schedule B | Downstream Capacity Improvement Servicing Multiple Basins |
| FM-2 | Upgrade Forcemain from Existing River Crossing to Existing WWTP | $2,700,000 | 30% | 70% | 2042 | 2045 | Phase 2 | Exempt | Downstream Capacity Improvement Servicing Multiple Basins & Replacement of Existing Infrastructure |
| FM-3 | New Southern Forcemain from New South Sewage Pump Station to New WWTP | $10,400,000 | 0% | 100% | 2042 | 2045 | Phase 2 | Schedule B | Downstream Capacity Improvement Servicing Multiple Basins |
| **Conveyance Subtotal** | | **$20,000,000** | **$810,000** | **$19,190,000** | | | | | |
| **Pumping Stations** | | | | | | | | | |
| Main SPS | Upgrade Main SPS | $1,400,000 | 0% | 100% | | Already approved and some work completed | | | |
| McClung SPS | Modifications to SPS to Accommodate New River Crossing | $800,000 | 0% | 100% | 2027 | 2028 | Phase 1 | ASP/ Schedule B | Capacity Improvement to SPS Servicing Multiple Basins |
| New South SPS | New South Sewage Pumping Station at Existing WWTP | $6,670,000 | 0% | 100% | 2042 | 2045 | Phase 2 | ASP/ Schedule B | Capacity Improvement to SPS Servicing Multiple Basins |
| McClung SPS | Upgrade McClung SPS - 220 L/s | $1,600,000 | 0% | 100% | 2039 | 2042 | Phase 2 | ASP/ Schedule B | Capacity Improvement to SPS Servicing Multiple Basins |
| Nairne SPS | Upgrade Nairne SPS - 230 L/s | $7,000,000 | 0% | 100% | 2042 | 2045 | Phase 2 | ASP/ Schedule B | Capacity Improvement to SPS Servicing Multiple Basins |
| **Pumping Stations Subtotal** | | **$17,470,000** | **$0** | **$17,470,000** | | | | | |
| **Total Wastewater Cost** | | **$162,970,000** | **$40,410,000** | **$122,560,000** | | | | | |

# Preliminary Preferred Alternative: Development Charges Funding

**Phase 1 2028**

**Phase 2 2045**

**Phase 3 2052**

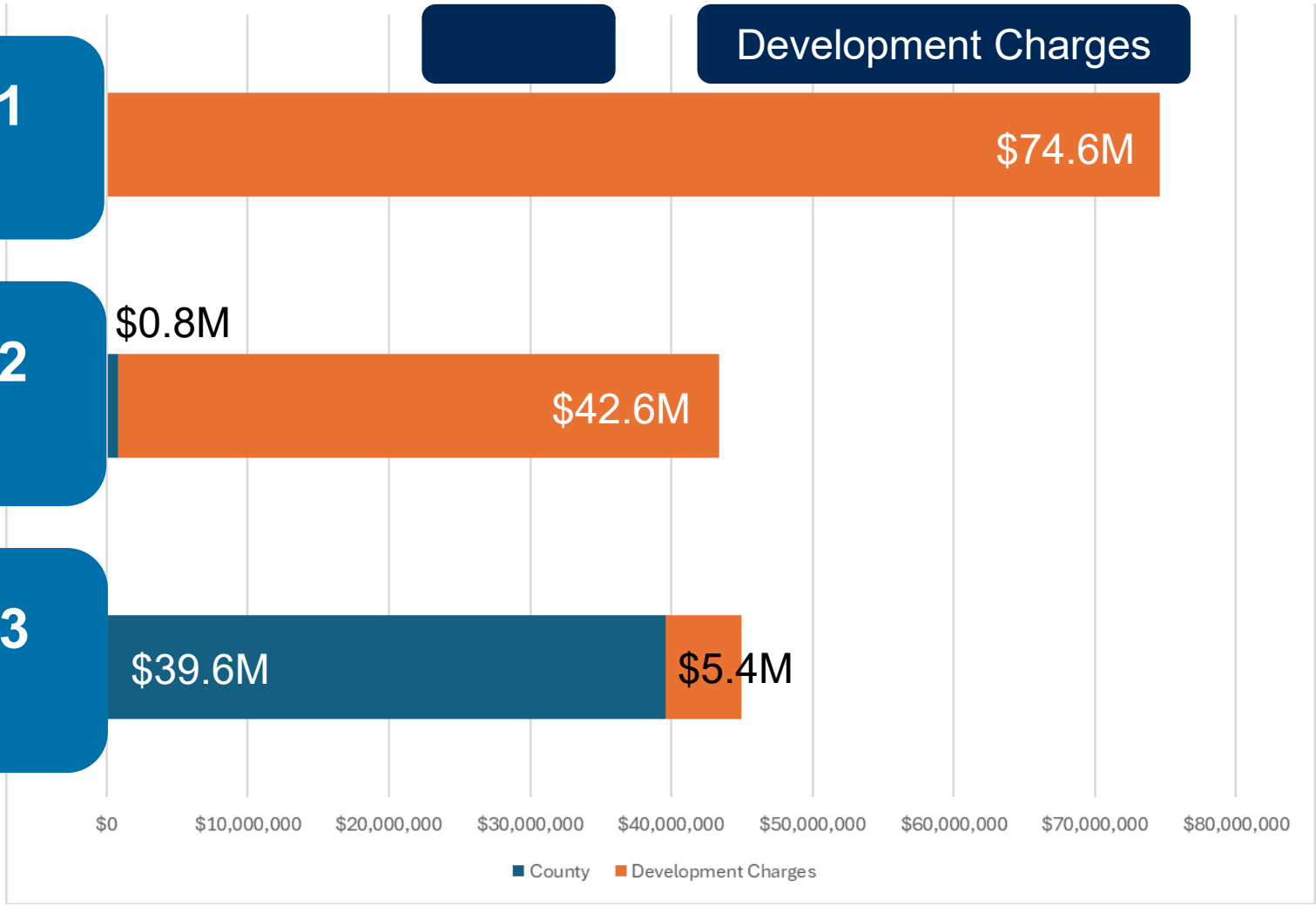



Image source: Rendering of Avalon – Empire Communities

# Incorporating Your Feedback

# Concerns We Heard at First Open House

Potential impacts of odour and noise from the new treatment plant on adjacent properties, and similarly, impacts on property values.

Truck traffic to and from the new treatment plant, noting that River Road (leading to the site) is notorious for speeding infractions.

Water quality and whether the County had engaged with local Indigenous communities.

Desire to be informed and involved.

# Noise, Odour, and Aesthetic Considerations

- Innovative solutions to mitigate noise and odour concerns in treatment plants built close to existing neighbourhoods.
- County will work with professionals and the public to ensure the new plant blends well into the community.

## Key Considerations

Tree planting along property lines.

Minimum 100m buffer distance.

Enhanced architectural elements.

Example of enhanced architectural elements at McClung Sewage Pumping Station

# Traffic Impact and Mitigation Measures

| Daily | Weekly | Monthly | Spring and Fall |
| --- | --- | --- | --- |
| Two to three personal vehicles for employees of the new plant. | One solid waste removal truck. | One chemical delivery truck. | Biosolids removal twice per year, with three to five trucks/day over ove week. |

Relocating the site entrance will be considered during design to improve sight lines and road safety and to provide an increased buffer to the nearest neighbouring property.

Stretch of River Road leading into the site for the proposed WWTP in Caledonia

# Water Quality Mitigation Measures

- Design of the new plant will ensure a robust treatment system, with redundancy to safeguard against overflows and bypasses during extreme wet weather events
- 1-2 chemicals on site, storage infrastructure will include secondary containment to protect against spills
- Options to improve effluent mixing and lessen potential impacts on the Grand River will be considered in:
  - Identifying the discharge location for the new WWTP
  - Incorporating a diffuser to further lessen potential impacts

Ultimately nutrient loading to the Grand River will decrease due to more stringent limits on and advanced treatment of water discharged, **thereby safeguarding water quality.**

Grand River, Seneca Park & Rotary Riverside Trail
(Image source: Flickr)

# Archaeological Studies

Phase 2 archaeological investigations are currently underway on site with participation from local First Nations and Indigenous communities.

Haldimand County continues to consult with local First Nations and Indigenous communities on this project.

Site photo from the marine archaeological assessment in October 2024

# Share your thoughts!

## Next steps in the project include:

- Continue to consult with **local Indigenous communities** and **local First Nations communities** on this project, incorporating their feedback into the final Environmental Study Report.
- Incorporate any **questions**, **comments**, or **concerns** raised in today's session and over the next three weeks into the final Environmental Study Report.
- Finalize Environmental Study Report and **publish the report online** for public review over a 30-day period.
- Incorporate any final feedback into the Environmental Study Report and issue a **Notice of Completion** to stakeholders as per the EA Act.
- Procurement of **design for the river crossing** and **Phase 1 of the new wastewater treatment plant** is anticipated to occur in 2025.

Image source: Microsoft Office

Haldimand County

# Thank you!

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We welcome any questions or comments from attendees. For more information, please contact:


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