Niagara Irrigation Initiative Project

December 3, 2025

Feasibility, Costing, and Preliminary Design Study Workshop for Growers, Producers, Greenhouse Operators, and Agricultural Landowners

Agenda

- Welcome and Introductions
- Land Acknowledgement
- Goals and Objectives
- Improving Irrigation in Niagara – A History
- Study Overview
- Problem and Opportunity Statement
- Water Demand
    - Pre-Workshop Survey Results
- Source Water Options
- Source Water Evaluation Criteria
- Constraints and Opportunities
- Alignment Options
- Timeline and Next Steps

Project Team

Introduction from:
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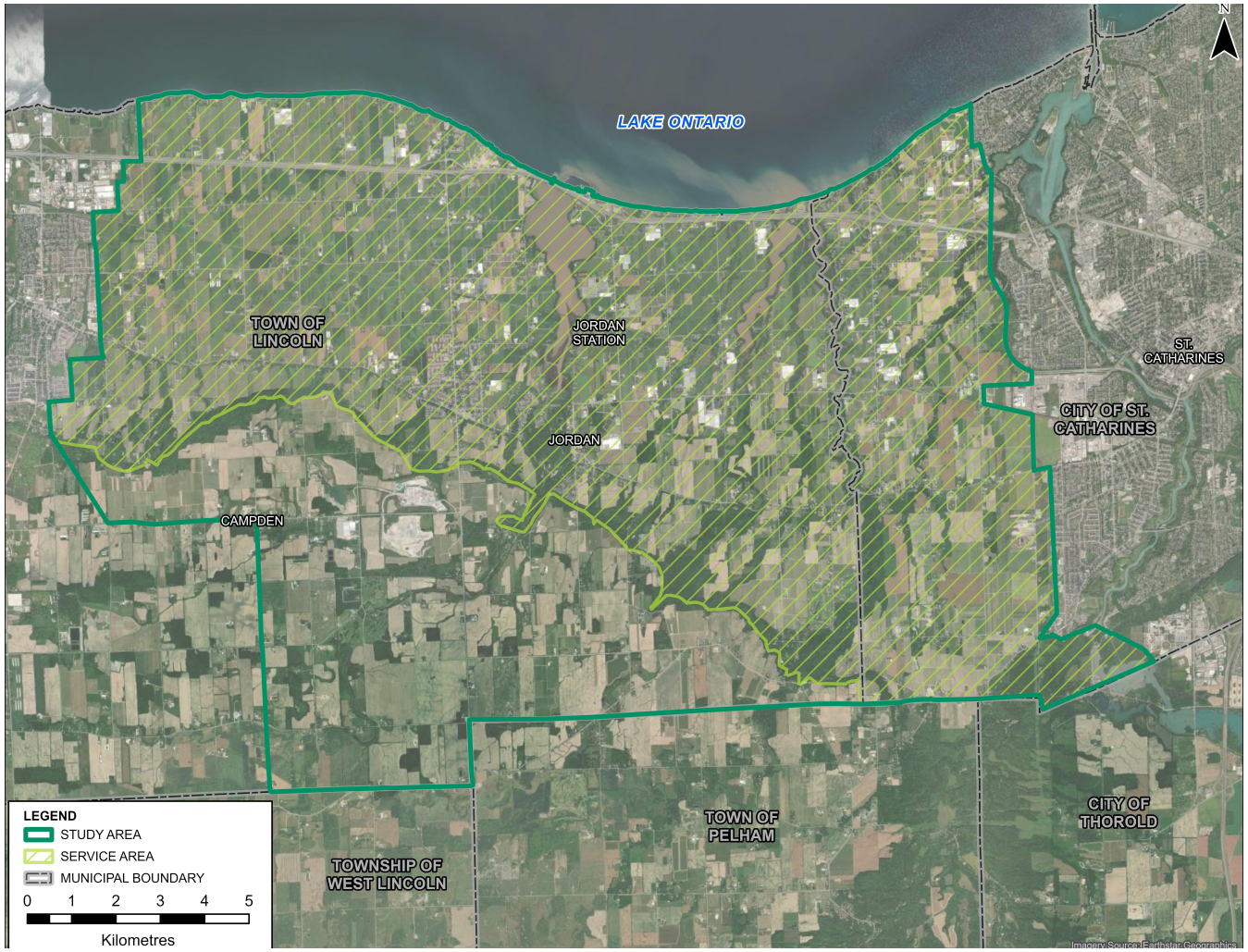
Land Acknowledgement

Niagara Region is situated on treaty land. This land is steeped in the rich history of the First Nations such as the Hatiwendaronk, the Haudenosaunee, and the Anishinaabe, including the Mississaugas of the Credit First Nation. There are many First Nations, Métis, and Inuit from across Turtle Island that live and work in Niagara today. The Regional Municipality of Niagara stands with all Indigenous peoples, past and present, in promoting the wise stewardship of the lands on which we live.

Workshop Goals and Objectives



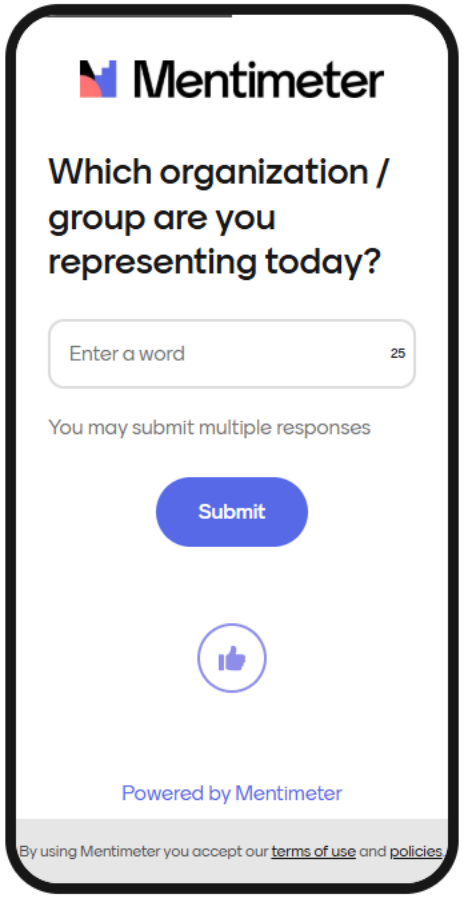
Provide an update on technical work completed since the Project Kick-off session on July 23, 2025.

Present and seek input on the problem and opportunity statement, evaluation criteria and the high-level list of options under consideration.

Icebreaker

Let’s practice using Mentimeter on your phone!

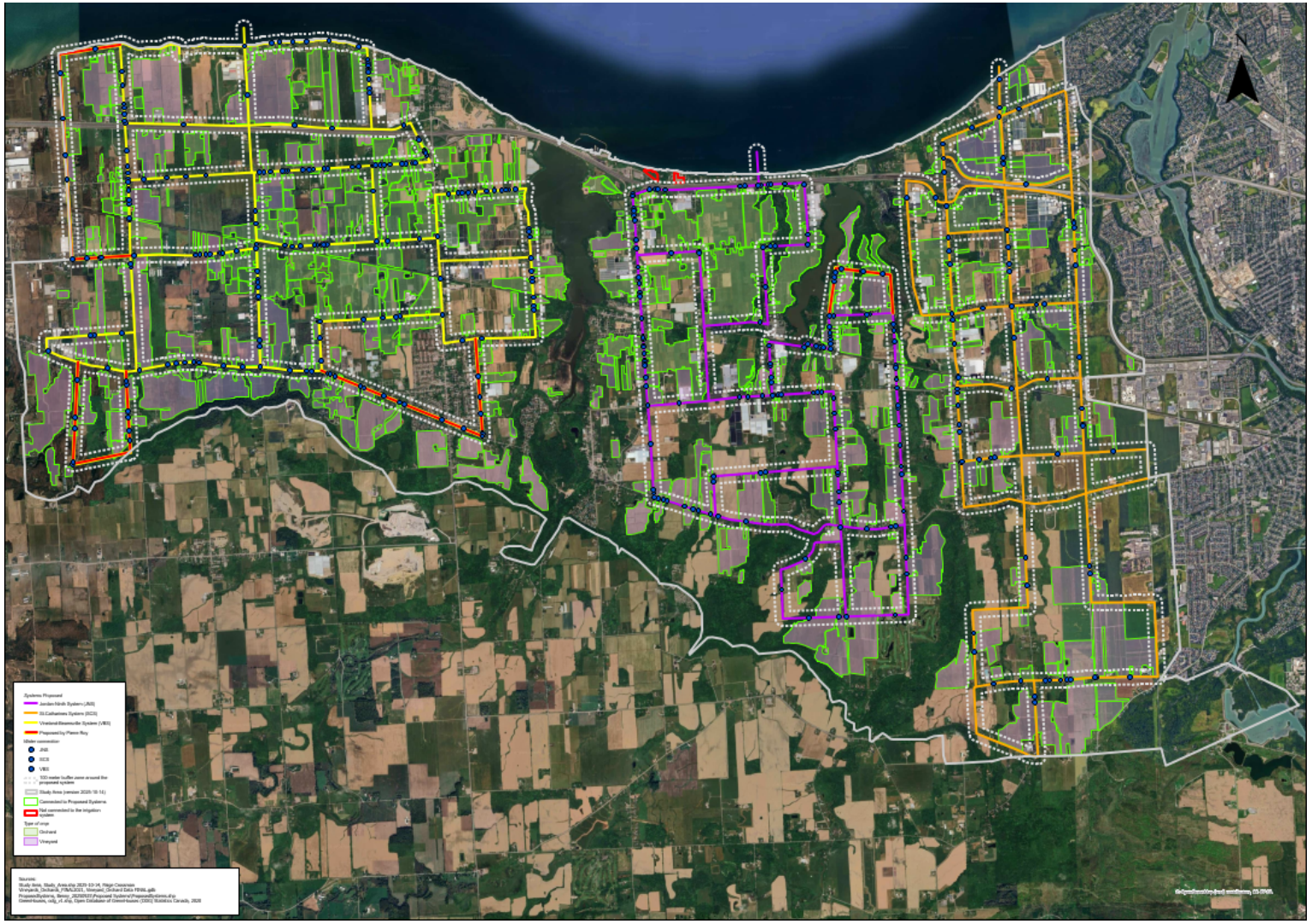
- Which company / organization are you from?
- What kind of crops do you grow?
- What are you looking forward to discussing today?



Improving Irrigation in Niagara – A History

- **Early 2000's** – Raw Water for Agricultural Purposes Study identified feasible options for suppling raw water to Niagara's agricultural community
- **2016** – Niagara Irrigation Strategic Action Plan addressed water security needs for Niagara growers and developed a strategic framework for irrigation infrastructure
- **2020** – Irrigation Committee of the Whole Formed
- **2020 – 2023** – Visioning and Scoping Project
- **2021** – Review of Possible Governance Models
- **2020 – 2024** – Over 100 interviews were conducted with growers in the study area to understand grower needs and preferences for a communal irrigation system method
- **Current** – Niagara Irrigation Initiative Project: Feasibility, Costing, and Preliminary Design Study

Study Overview



Feasibility, Costing, and Preliminary Design Study for a new piped irrigation system in Lincoln/St. Catharines below the escarpment, including:

- Evaluation of source water and alignment options;
- Preliminary (10%) engineering design of the preferred communal piped irrigation system;
- Cost estimates for capital, design, lifecycle, and the operation of the proposed system;
- A comprehensive consultation and engagement program; and
- Recommendations for next steps and implementation.

Detailed design, permitting, and construction are not part of the Study. Decisions on ownership, operation, and governance are also not part of the Study.

Problem and Opportunity Statement

Problem

Niagara is one of only a few areas in Canada with climate and soil conditions suitable for high value crops such as grapes and tender fruit. However, the impacts of climate change, including drought conditions, have highlighted the need for improved irrigation infrastructure across Niagara. Previous studies have identified that there is significant room for increased yields of high value crops throughout the region. However, difficulties in accessing irrigation water and capital funding to build water delivery systems is preventing expansions.

Opportunity

This Study will advance previous irrigation work, recommend the most efficient, environmentally sound, and cost-effective design of a piped, communal irrigation system between Beamsville and St. Catharines below the escarpment, and provide the foundational technical, financial and engagement work needed to move toward detailed design and implementation.

Do you have any changes to the draft problem and opportunity statement?

Water Demand Analysis

Water Demand 101 - What Is It and How it's Estimated

Water demand refers to the amount of water needed to meet crop water requirements through irrigation. It helps us figure out:

- How much water is needed each day, with a focus on the peak dry period (July)
- How long the irrigation season may last
- What size of infrastructure (pipes, pumps, reservoirs) is required

We use a few key assumptions:

- The Background Study (RFP) estimated 6000 gallons per minute x 3 districts (100 million Litres/day), each with 240 taps at 25 gallons per minute
- Irrigation Area: 2,900 hectares of farmland in the service area
- Crop Water Needs: Based on crop types, climate, and historical drought scenarios
- Peak Demand: Total peak need is up to 110 million Litres/day (averaged over 90 days)
- Permit Limits: Intake permits typically allow 19 million Litres/day (averaged over 90 days)
- Scheduling: Water may need to be rotated across farms to stay within limits and control costs

Review of Pre-Workshop Survey Results

About the Survey

- The pre-workshop survey requested input from growers, producers, greenhouse operators, and agricultural landowners to:
  - Help inform our assessment of the current water demand work and
  - Properly account for future possibilities.
- **Number of respondents:** Total of 41 responses were received
- **Why we asked these questions:**
  ✓ Understand irrigation needs
  ✓ Help determine size, and preliminary design of the irrigation system
  ✓ Inform water demand strategies
- **How results could support the Study:** responses could shape preliminary design assumptions, management approach, scheduling, and costing.

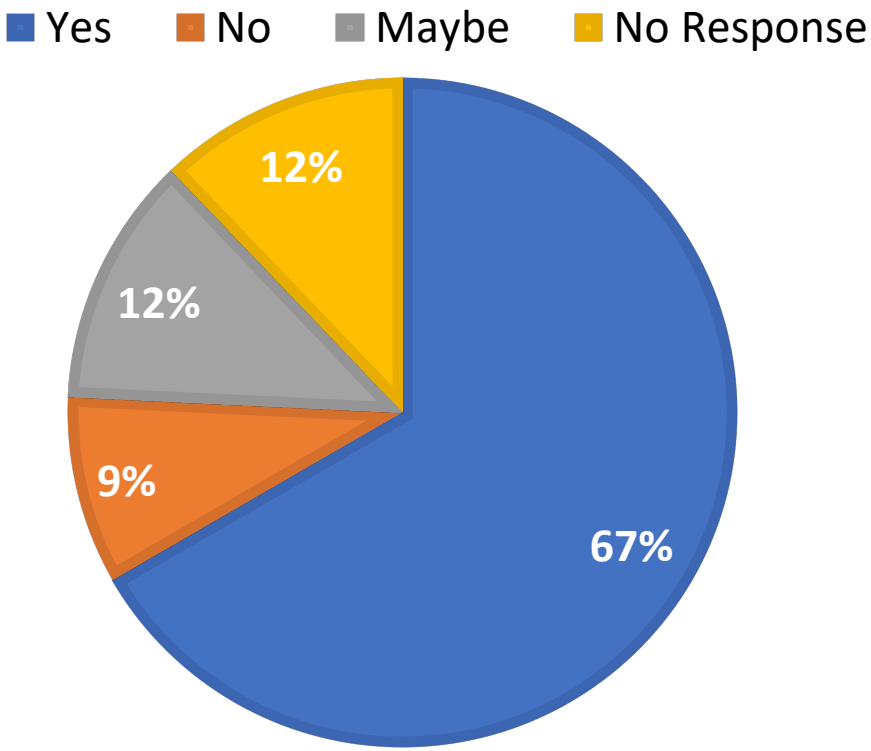
Survey Results

Key Findings

- Tender fruit and grapes are the dominant irrigated crops, representing more than 50% of all answers.
- More than 65% stated that improved water availability through this Study would not influence or change the crops they currently grow.
- Respondents reported that irrigation demand is highest during the peak summer months (July–August).
- Most respondents prefer irrigating during daytime hours, though some are open to more flexible schedules.
- More than 90% are familiar with irrigation scheduling/cycling as a method to reduce peak demand on the overall system.
- Drip irrigation is the primary method used by the majority of respondents.
- More than 65% indicated they would irrigate outside their preferred hours if it helped reduce costs.

Survey Results

Would you be willing to irrigate crops at different times of day or only certain days of the week to help reduce peak demands?



Water Demand Analysis – Key Assumptions

Background Study Estimate (RFP): The RFP estimated 6000 gallons per minute x 3 districts, each with 240 taps at 25 gallons per minute

Irrigation Area: 2,900 hectares of crop land – assuming all agricultural properties in the study area will use the irrigation system

Is this likely?

Peak Demand: The **total peak demand is 110 million litres/day**. This is the “worst case scenario” (all agricultural land wants irrigation during a drought).

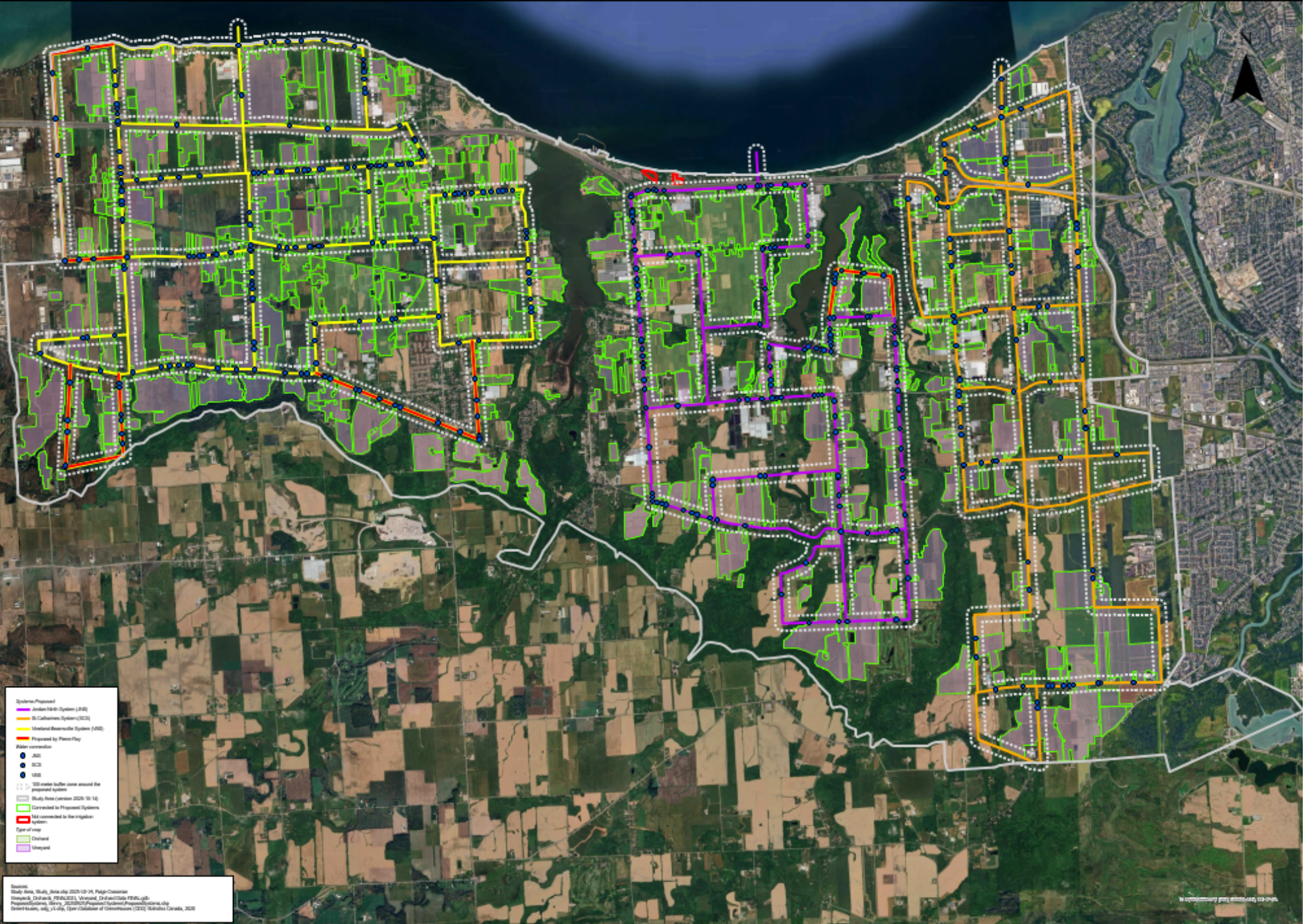
Permit To Take Water Limits: Maximum of **19 million litres/day**, averaged over 90 days.

Rotation Schedule: Water demand could be reduced by using irrigation scheduling among growers.

This could reduce the system size and cost significantly – but would growers agree to it?

Design Considerations

- System will need to balance **efficiency and fairness**, allowing equitable access across grower clusters.
- **Rotational schedule approach** may be required to share limited water pumping capacity and optimize cost.
- There may be a **limited number of taps** - this needs to be estimated during the design stage.
- **Why this matters:** This demand estimate drives design for:
  - **Pump size**
  - **Pipe network**
  - **Reservoirs**
- All of which affect **COST**, efficiency, and fairness.



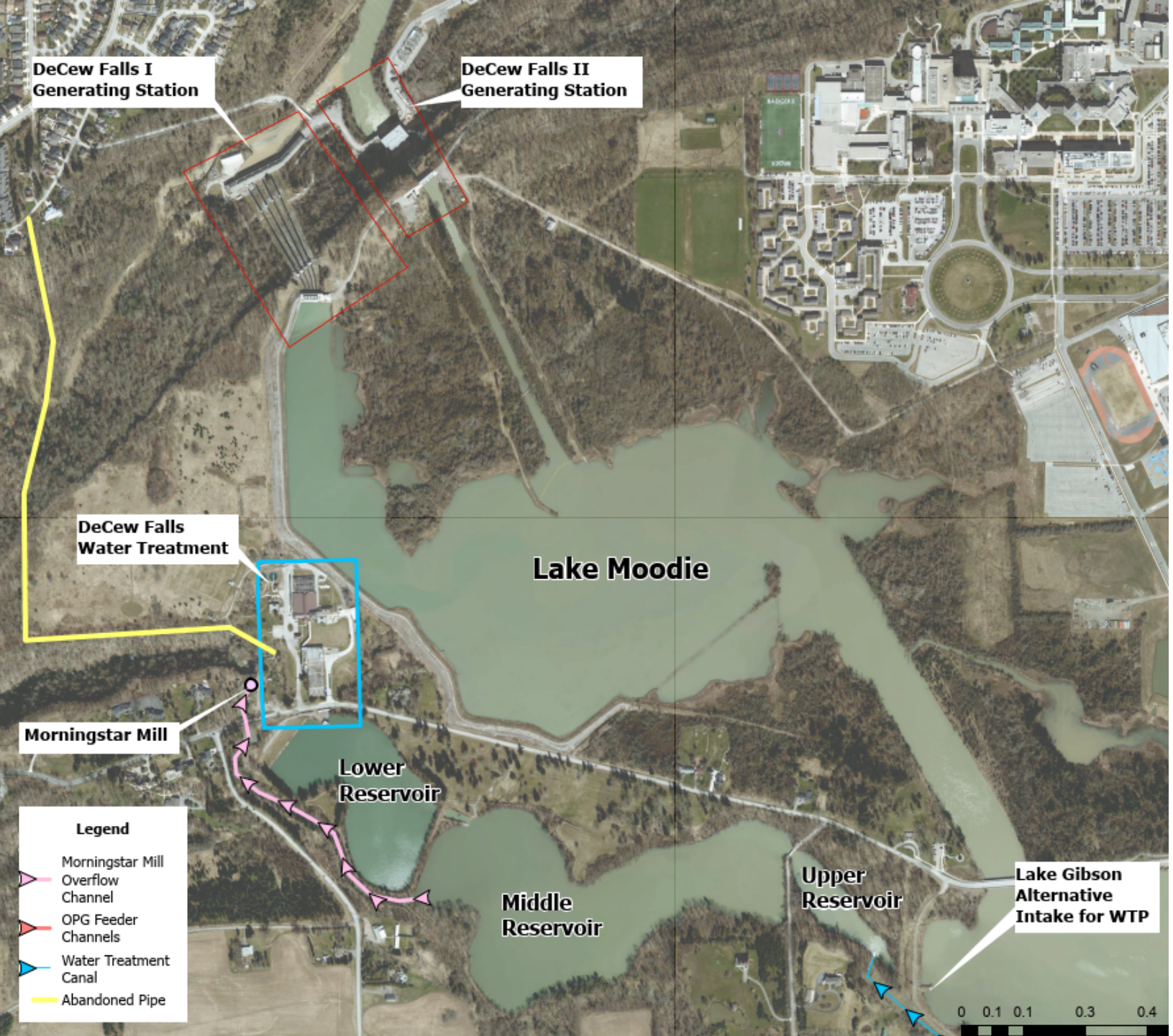
Water Demand Figure Showing Buffer

Water Demand – Break Out Session

To further refine the water demand evaluation please consider the following questions:

- From your understanding of the area and its agricultural community, what percentage do you think would use the communal irrigation system?
- What is the primary method of irrigation in use?
- What type of future growth should we plan for?
- Do you use irrigation water throughout the summer? Or would you only need it during a drought?
- How often do you irrigate during the dry season, what kind of irrigation schedule do you follow?
- Would you be willing to irrigate crops at different times of day or only certain days of the week to help reduce peak demands?
- Are there any times of day or days of the week you would not be willing to irrigate?

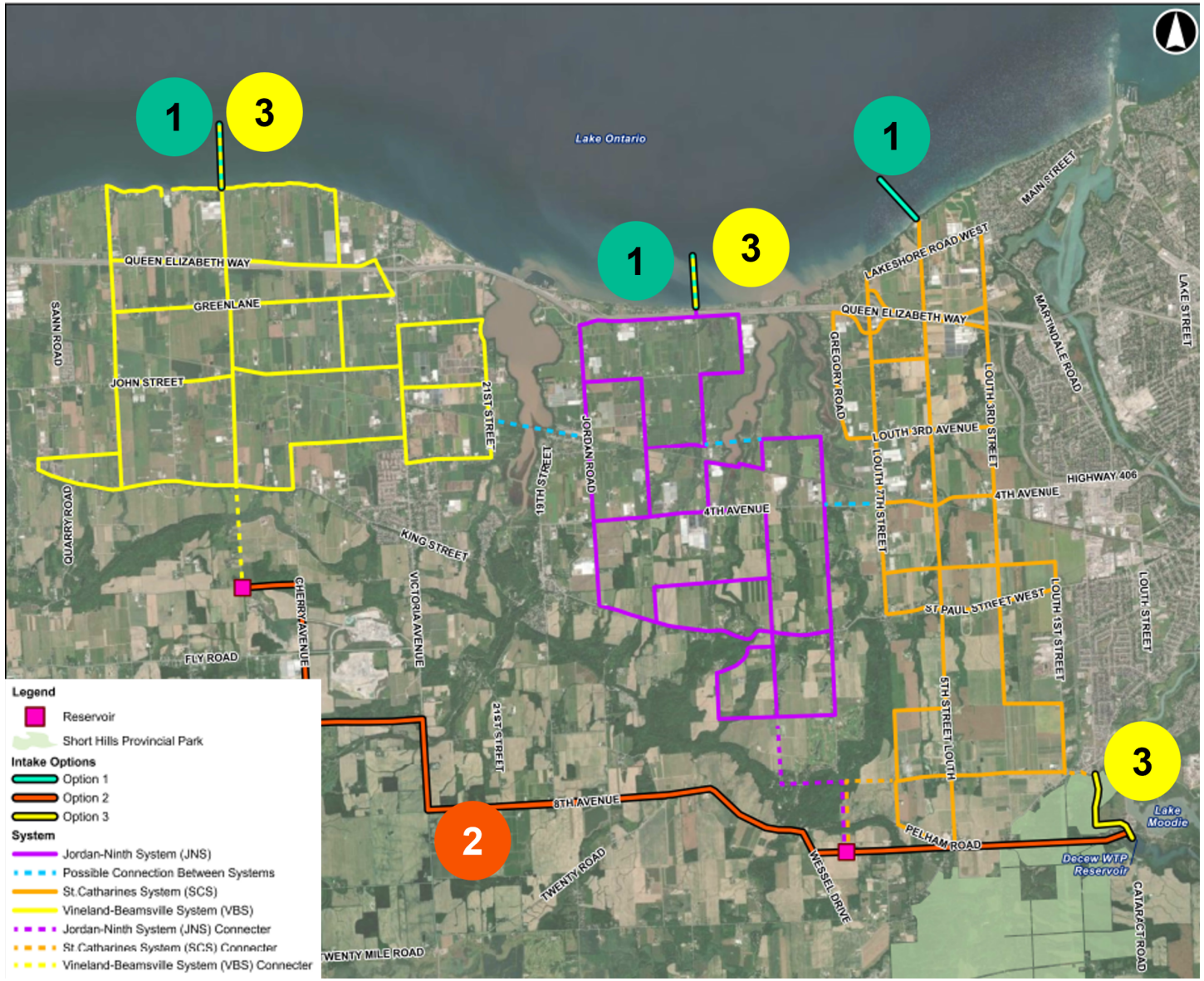
Source Water Options



Source Water Intake Options

- Most local watercourses are intermittent in nature, especially during a drought – so these are NOT being considered.
- Through discussions with Ontario Power Generation, it was determined the water quality in Lake Moodie is not suitable for irrigation purposes – so it is NOT being considered.
- Discussions with the Region Staff at Decew Water Treatment Plant revealed the existence of an abandoned raw water supply pipe (shown in yellow here) that brings water from the Lower Reservoir across 5 Mile Creek and down the escarpment. The Lower Reservoir is being considered as a source for water in Options 2 and 3 (see next slide).
- However, the excess available capacity is still unknown currently.

Source Water Intake Options Under Evaluation



There are three main source water intake options being evaluated:

Option 1. Three pumping stations from Lake Ontario directly to each of the three irrigation areas.

Option 2. Raw water intake at WTP + long feeder main and reservoirs above the escarpment to service all the irrigation areas.

Option 3. Hybrid Two intakes from Lake Ontario + Raw water intake at WTP with rehabilitation of existing feeder main to St Cathrines area.

Evaluation Criteria – Source Water (Intakes)

Each source water options will be assessed against the following proposed evaluation criteria:

- **Capital Cost:** Initial construction cost for pumps, intakes, mains, storage, etc.
- **Operational Cost (length of system, # of pumps):** Long-term energy, labour, and maintenance costs
- **Ability to Meet Water Demand:** Ability to provide Peak 90-day rolling average = 110MLD
- **Constructability / Technical Risk:** Challenges related to topography, access, and utility conflicts
- **Ease of implementation:** Construction duration and ease of permitting
- **Permit-To-Take-Water Considerations:** Compatibility with ownership, operation, and permitting models
- **Water Quality / Algae / Sediment / Ice resistant:** Susceptibility of intake to algae, mussels, frazzle ice and sediment buildup
- **Environmental Impact:** Construction footprint/ method (bore, open cut, lay on riverbed); presence of Species-at-Risk; anticipated permitting complexity
- **Permits / Approvals:** Challenges in obtaining necessary environmental, regulatory, and land use approvals (beyond Permit To Take Water)
- **Climate Change Impact:** Impact to/from climate change
- **Land Use & Property Constraints:** Impact on agricultural operations and property rights
- **Impact to Residents:** Short- & Long-Term impacts

Breakout Discussion Prompts

Source Water Options

- Which of the proposed source water options do you prefer?
- Is there anything missing from the options that you think should be considered?

Source Water Evaluation Criteria

- Rank each criteria from most important to least important (arrange the criteria from 1 to 12).
- Is there anything you would like to add or change?

Alignment Options

Alignment Options

In the next phase of the Study, we will be evaluating different system alignment options. To support this, the team has developed a new hydraulic model.

Key considerations include:

- Looped vs. Branched Networks – comparing system resilience, flow redundancy, operational flexibility, and cost
- Maximizing Agricultural Reach – maximizing the reach of the system to all interested users, where possible
- Providing Adequate Capacity – balancing meeting peak demand under worst-case drought conditions with cost

Alignment Options – Looped vs. Branched

Looped Network

What it is: System where water can circulate through multiple paths

Key Benefits:

- Reliable water supply even if part of the system is shut down
- More stable water pressure
- Easier to isolate for repairs

Best for: Larger or more critical systems needing redundancy

Branched Network

What it is: Single-path system like a tree with branches

Key Benefits:

- Simple and lower cost to build

Limitations:

- No backup paths – if one pipe fails, downstream users are cut off
- Less pressure control at far ends

Best for: Smaller systems with consistent, predictable demand

Alignment Options - Evaluation

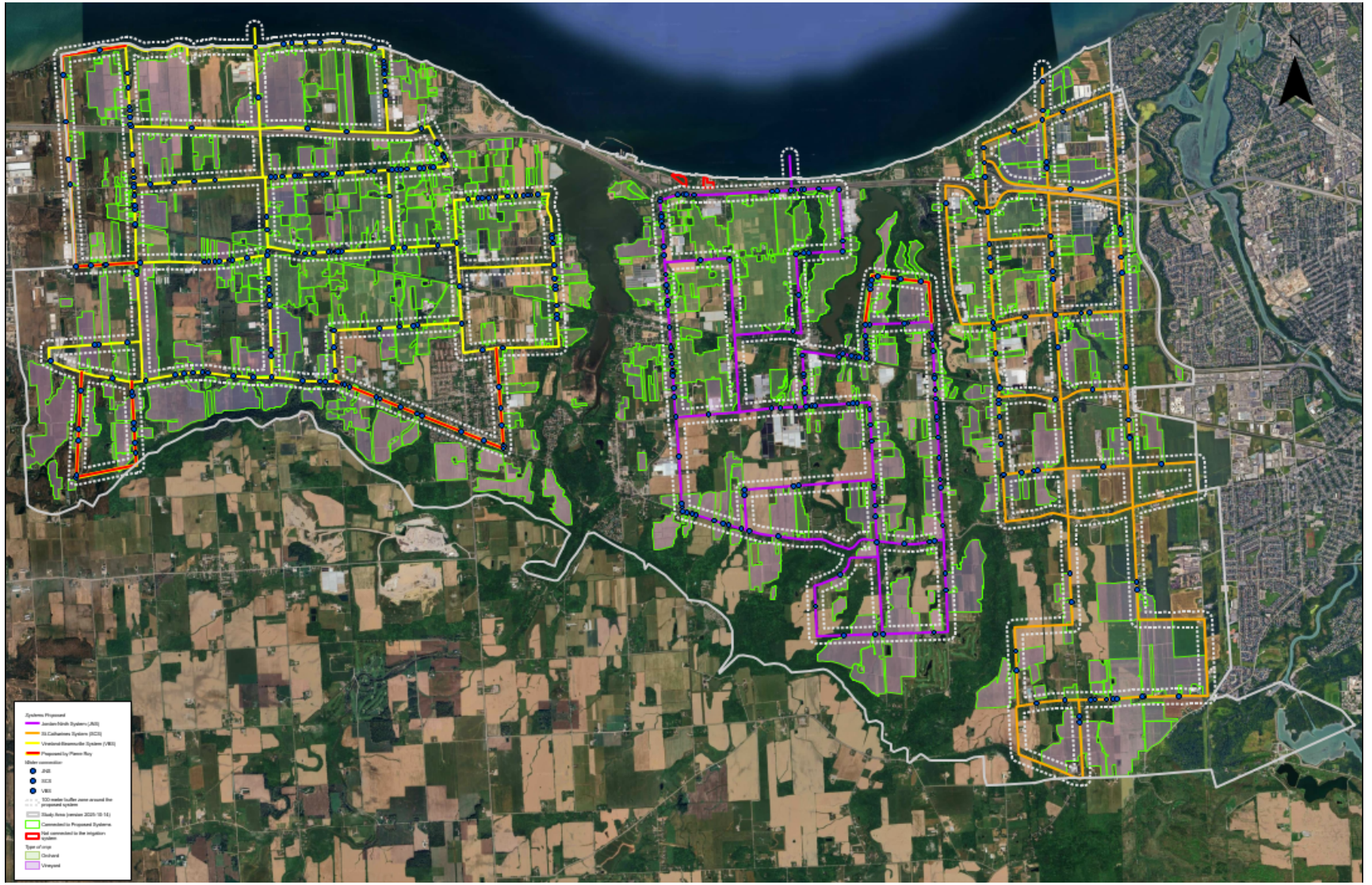
As with the source water options, alignment options will be evaluated using a transparent set of criteria. In addition to permitting, environmental impacts, and cost, we will integrate grower input to reflect the on-the-ground needs.

Preliminary examples of grower-focused evaluation criteria include:

- Network type: Looped vs. Branched (e.g., redundancy and pressure stability)
- Access to all agricultural properties (assume 100% user uptake or define uptake scenarios)
- Sufficient capacity for 7-day/week, 24-hour irrigation during worst-case droughts
- Use of cycling to manage demand and extend system efficiency during dry periods

A draft alignment update (see next slide) was prepared to test whether full agricultural coverage can be achieved.

Alignment Options



Breakout Discussion Prompts

Do you have any concerns or comments related to the preliminary alignment options?

Help shape how we evaluate the system alignment by ranking the criteria below:

- Provide accessibility to ALL agricultural properties in the study area - assume 100% uptake
- Provide sufficient capacity for 7 days/week – 24hr irrigation during worst case scenario drought
- Both options are equally important

Other considerations?

Next Steps

Timeline and Next Steps

- A virtual session for those who couldn't make it today will be scheduled on Thursday, January 8th from 2 to 4 pm
- There is a Public Information Centre tonight from 6:00 p.m. to 8:00 p.m.
- Feasibility, Costing, and Preliminary Design Study to be completed by the end of 2026.
    - Formal and informal consultation and engagement with growers, producers, greenhouse operators, and agricultural landowners will occur throughout the study process.
- Timing for design and construction will be dependent on the outcomes of the Study, completion of a business case, and decisions on governance.
- The next Workshop for Growers, Producers, Greenhouse Operators, and Agricultural Landowners will take place after the evaluation of options is complete and a preferred option (for both source water intake and alignment) has been confirmed.
- Ongoing meetings with approval agencies, as required.
- Attending industry events.
- The study team can be reached via email with any questions or concerns.

Contact us via irrigation@niagararegion.ca to ensure that you are kept up-to-date, and that your input is collected at key points in the process.

For additional information please contact:

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Thank you for your participation today!