

Township of Huron-Kinloss

Stormwater Servicing Master Plan

Northern Point Clark

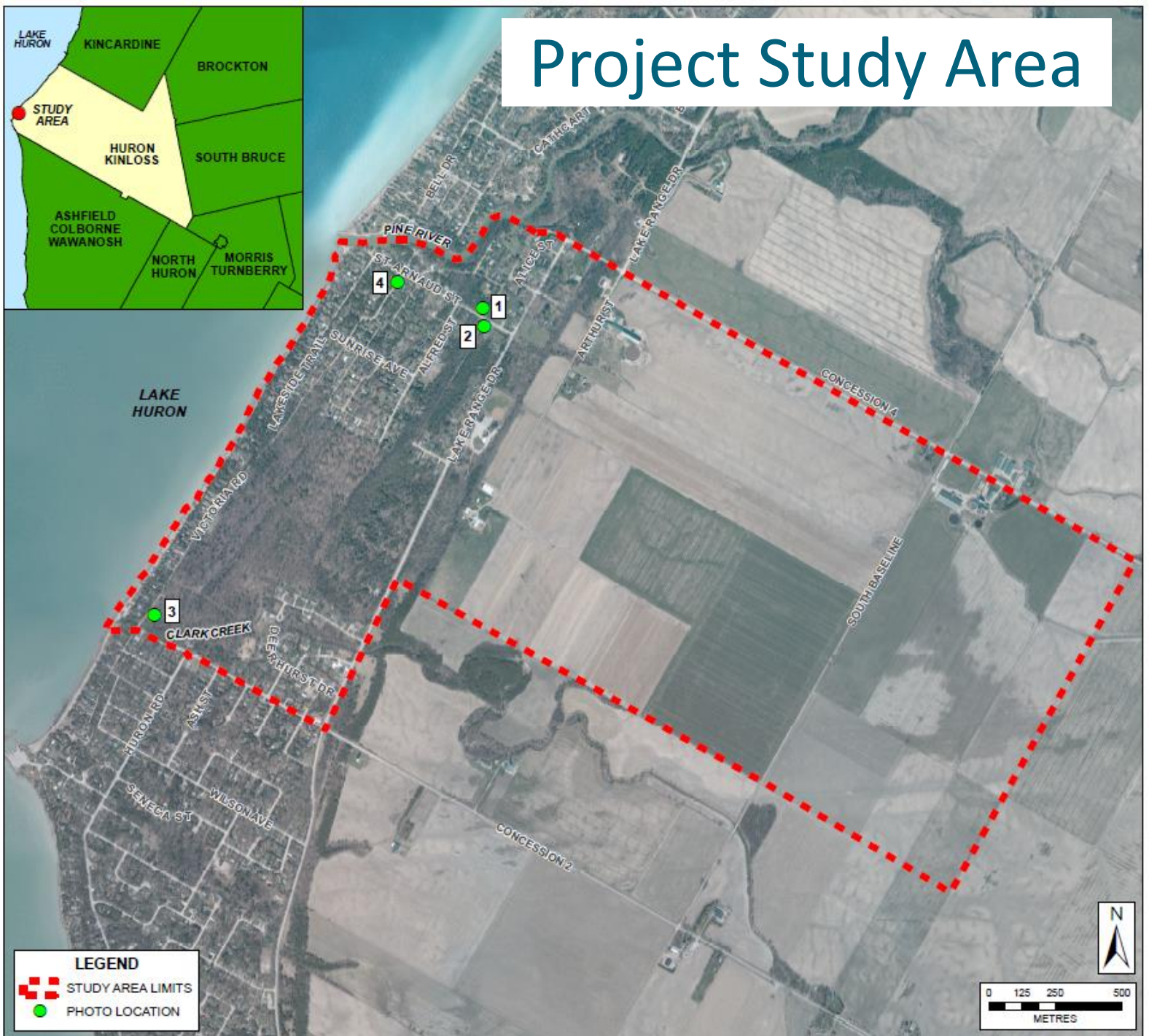
Council Presentation
October 21, 2024





Agenda


- Project Scope
- Study Area Limits
- Problem Drainage Areas
- Study Investigations
- Master Plan Alternatives
- Preliminary Recommendations
- Feedback from Residents
- Next Steps

Project Study Area



LEGEND

-  STUDY AREA LIMITS
-  PHOTO LOCATION


0 125 250 500
METRES

Master Plan Study Scope

- Examine existing municipal drainage facilities within the study area and assess their function and capacity
- Evaluate existing drainage problem areas within the urban portion of the study area and consider potential solutions
- Focus of study is on Township-owned lands including municipal road allowances
- Identify and assess existing and required drainage outlets to the Pine River and Lake Huron needed to accommodate drainage
- Identify potential solutions to existing drainage problems and develop a phased approach to implementation of same
- Consult with local residents, Indigenous Communities and regulatory review agencies
- Prepare a report documenting the Master Plan process and study recommendations

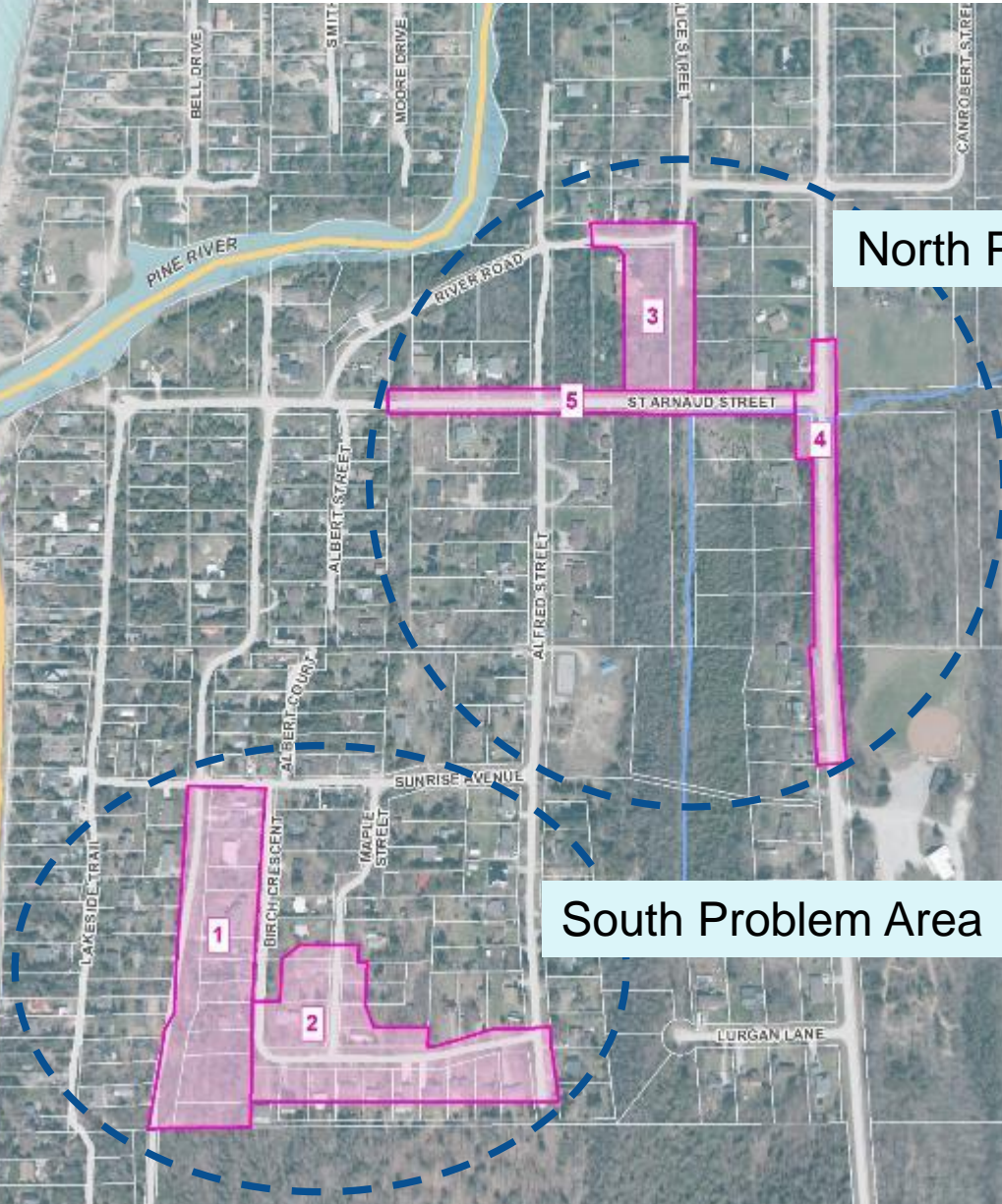
Master Plan Timelines

- Initial Topographic Survey Summer/Fall 2022
- Preliminary Engineering Review Winter 2022
- Initial Notice Published May 2023
- Review of Input from Residents June/July 2023
- Test Pit Installation/Piezometers August 2023
- First Public Meeting October 2023
- Additional Agency/FN Consultation Fall 2023
- Additional Engineering Review Spring 2024
- Second Public Meeting August 24, 2024

Physiography of Point Clark

- Described as the 'Huron Fringe' by Chapman & Putnam (1984), The Physiography of Southern Ontario
- Lake Algonquin shore cliff defines the Point Clark urban area to the east (glacial lake feature)
- Gravel ridges and sand dunes were formed on the terrace below the shore cliff
- Dune/gravel ridges run parallel to the shoreline with elevations generally dropping from the shore cliff towards the lake
- Water collects between the ridges and generally flows from north to south

Problem Areas



North Problem Area

South Problem Area

CONCESSION 4

PIKE RIVER

RIVER ROAD

ST ARNAUD STREET

SUNRISE AVENUE

LURGAN LANE

LAKE HURON

Problem Areas

- Based on Feedback from Residents and Staff Knowledge
- North Problem Area
 - Runoff from lands to the east causing flooding
 - Lack of capacity in roadside ditches
 - Existing drainage infrastructure undersized
- South Problem Area
 - New development aggravating existing drainage issues and impacting functioning of septic systems
 - Lack of roadside ditches and overall drainage plan for area
 - No outlet for low lying areas that flood regularly following rainfall events and in spring

STUDY INVESTIGATIONS

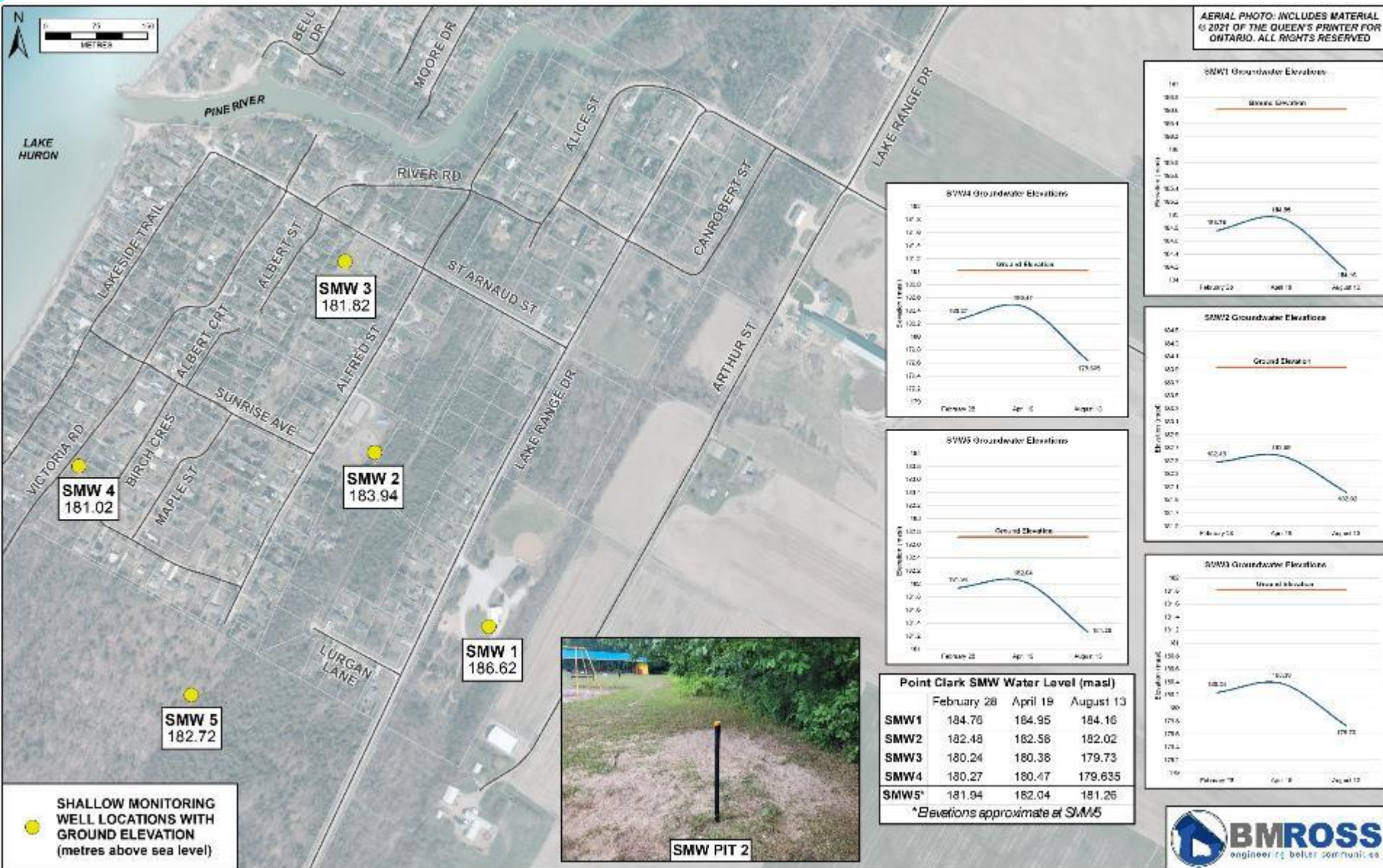
Groundwater Investigation

- Five test pits excavated throughout study area
- Test pits excavated to understand soil composition and groundwater levels
- Determine potential for infiltration as storm drainage outlet
- Excavations supervised by a local hydrogeologist with knowledge of the area
- Piezometers installed within each test pit so groundwater levels can be monitored to document seasonal changes
- Each site was surveyed to record a geodetic reference

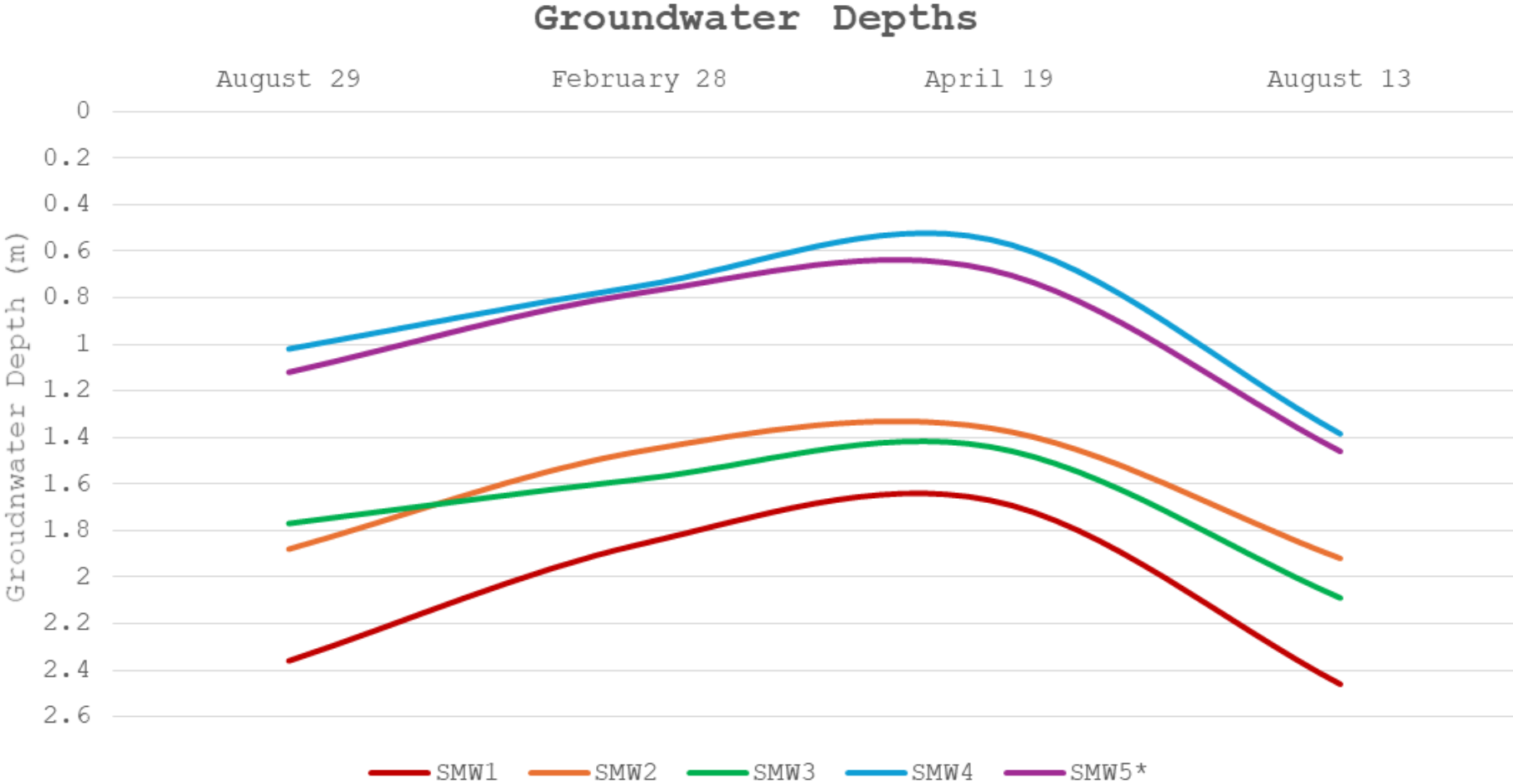
Groundwater Investigation - Results

- Groundwater levels recorded at the 5 monitoring locations during different seasons
- Top of piezometers surveyed so that water level information could be recorded in reference to top
- Groundwater level changes then recorded
- Data shows that groundwater levels are elevated much of the year and don't allow enough freeboard to discharge stormwater runoff into the ground
- MECP guidelines require that the bottom of stormwater infiltration facilities be a minimum of 1 metre above average groundwater elevations

Groundwater Investigation



Groundwater Depths



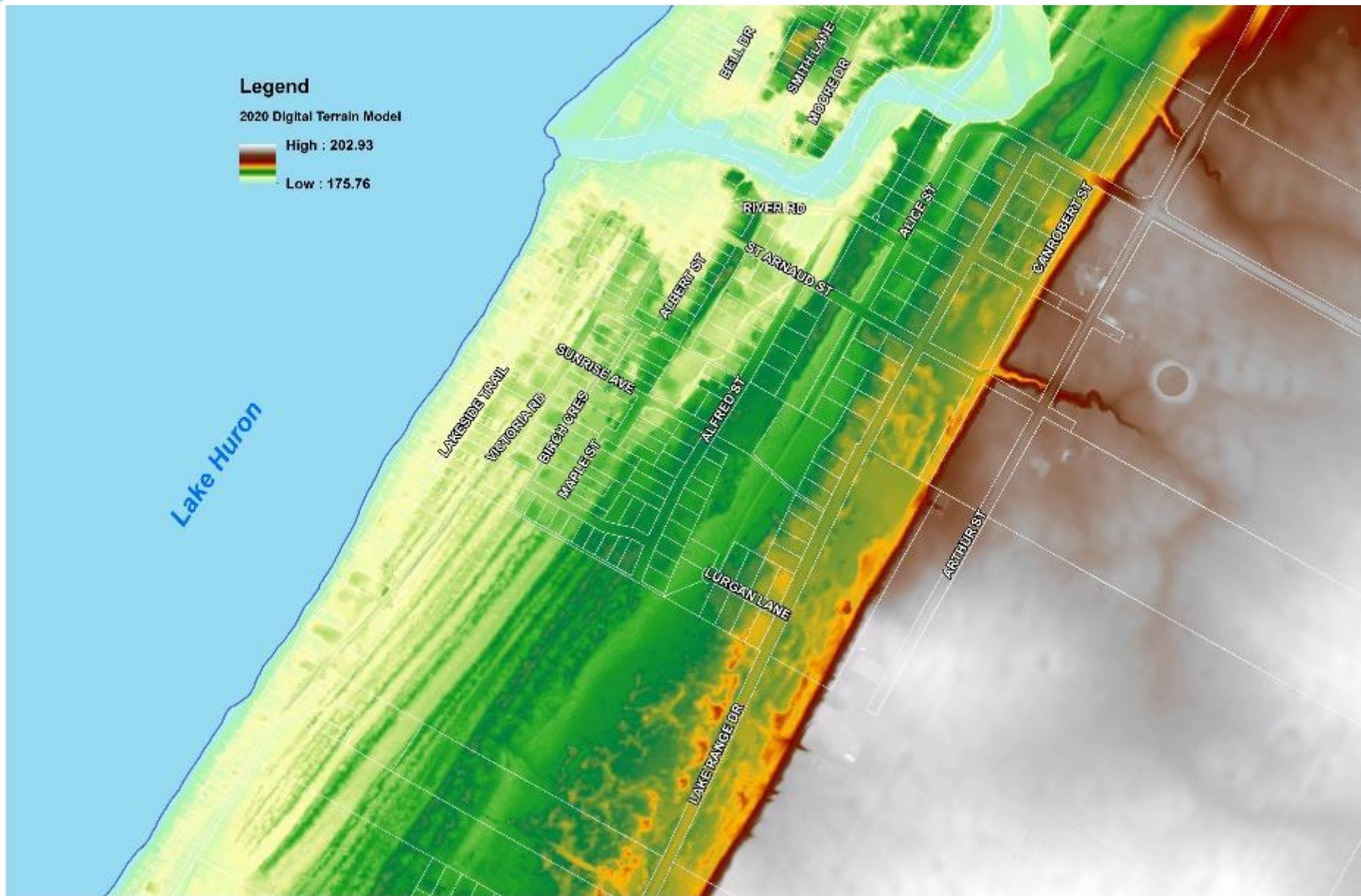
Inventory of Existing Facilities

- Collection and review of existing infrastructure details from Township staff
- Infrastructure survey to confirm details of existing facilities
 - Pipe Inverts and size
 - Ditch gradients and current condition
 - Location and condition of existing outlets
- Review of digital elevation information and drainage reports to determine drainage catchments
- Site observation to confirm desktop review
- Provincial LiDAR Data

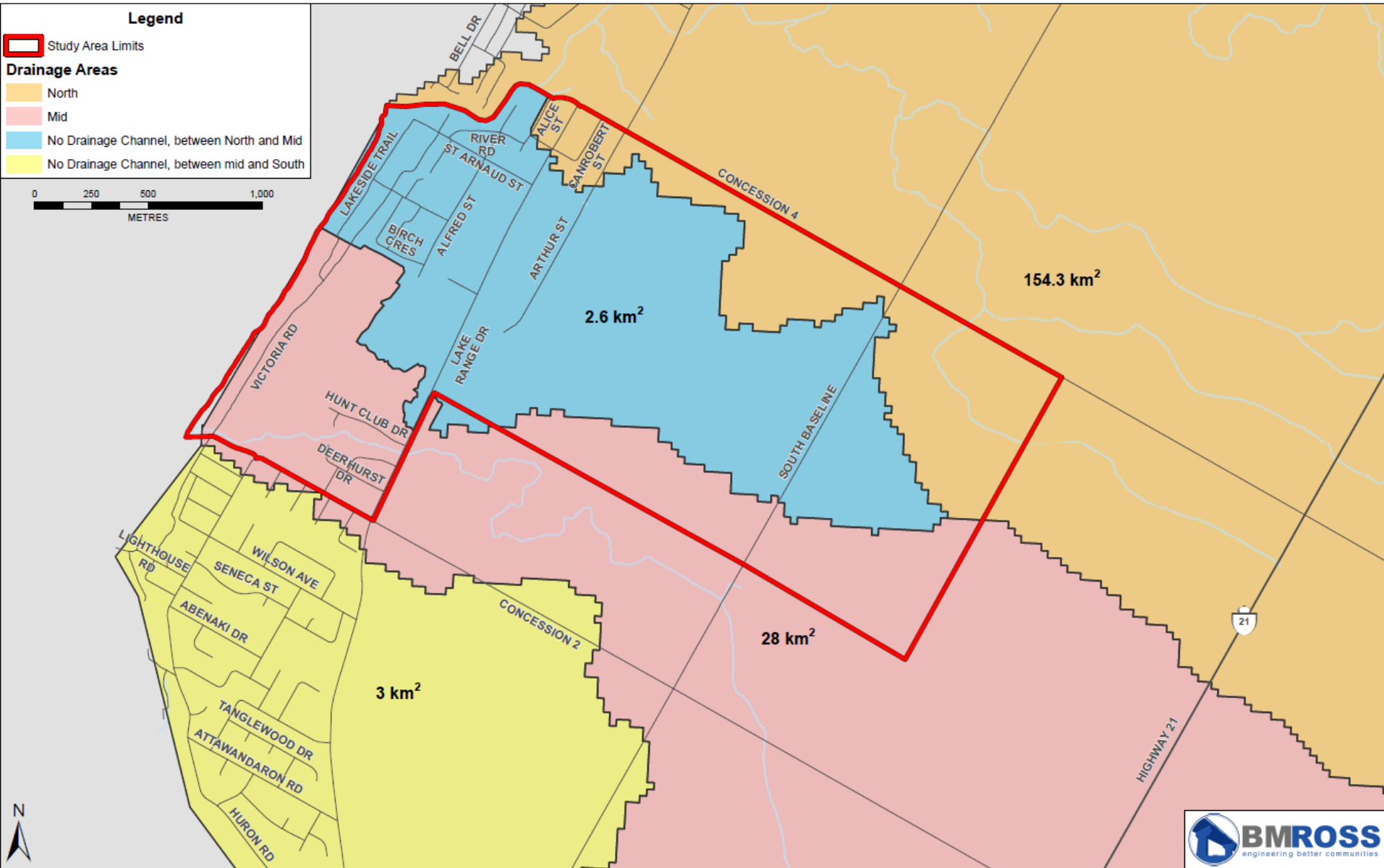
LiDAR Data

- LiDAR is a remote sensing technique that uses lasers to measure features on the ground
- LiDAR data is superior to other remote sensing methods because it can collect surface features present below forested areas and other vegetated landscapes
- LiDAR data was recently released by the Province of Ontario for Bruce County
- Elevations are represented by different colours to show variations in topography
- Spot elevations are also provided to assist with modeling and engineering designs

View of LiDAR Data

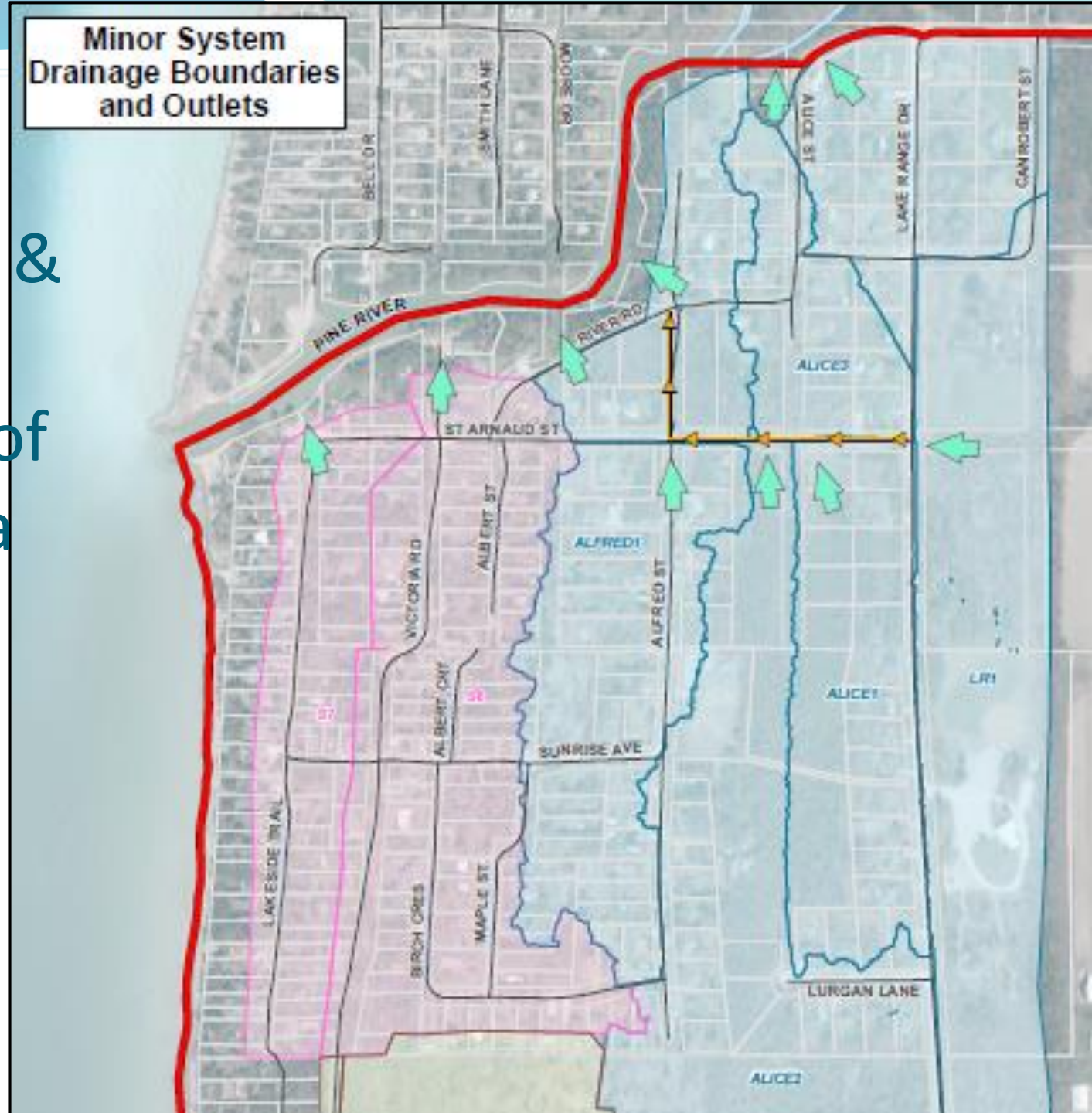
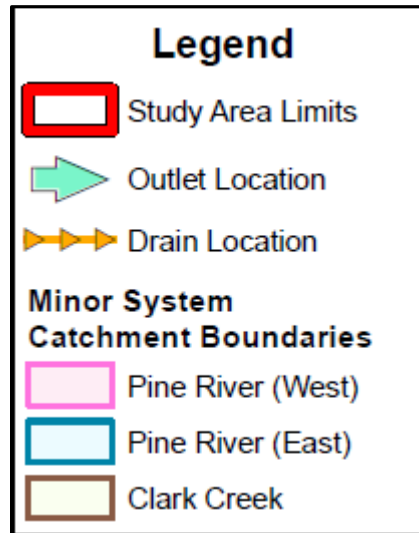


Overall Drainage Catchments

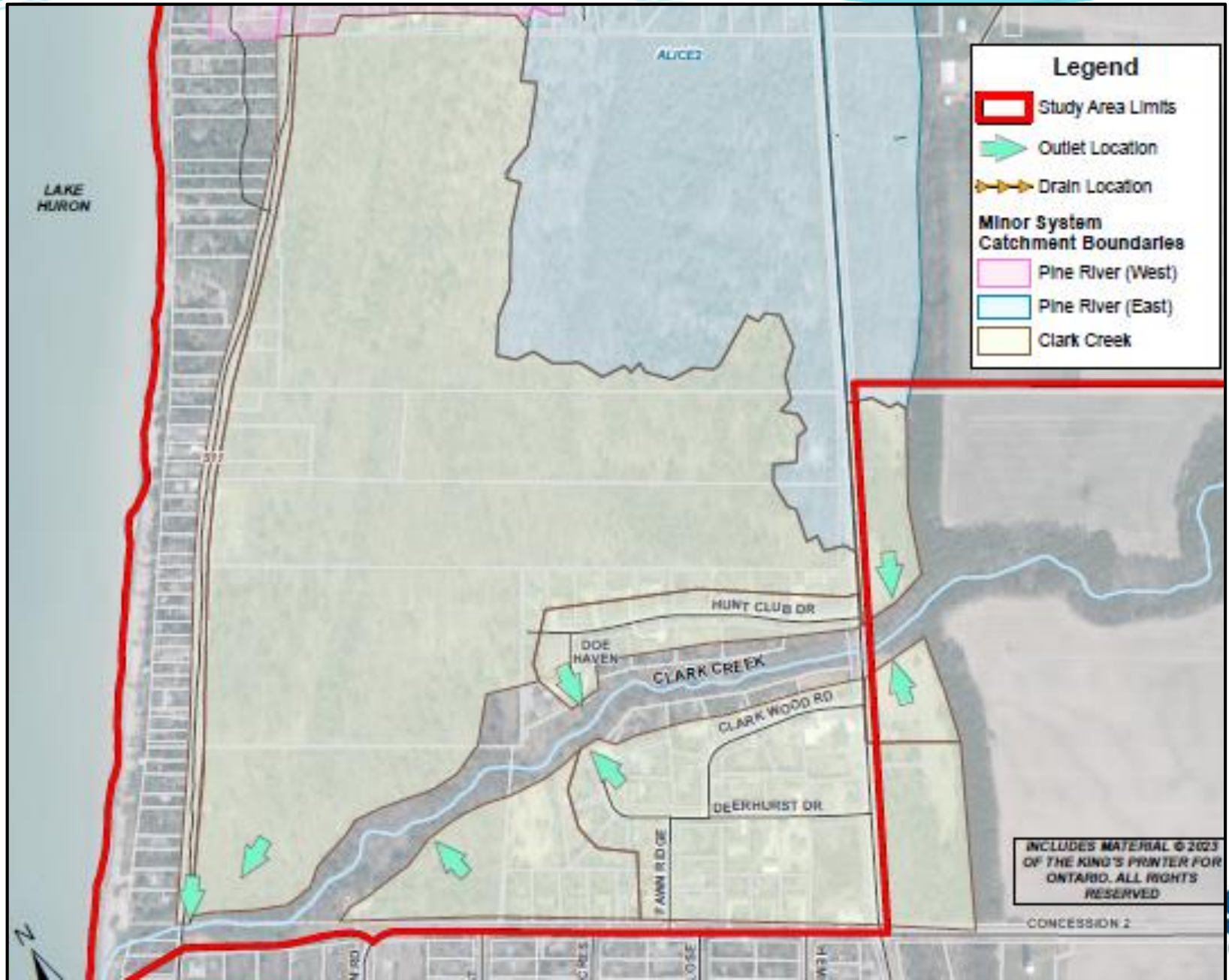


Drainage Catchments & Outlets: North Part of Study Area

Minor System
Drainage Boundaries
and Outlets



South Part of Study Area



Master Plan Alternatives – North Problem Area

Problem Statement: Existing drainage infrastructure is insufficient, in size and capacity, to accommodate existing and expected development and impacts related to climate change

Alternative 1 – Increase capacity of storm sewer in St. Arnaud R/A outletting to Pine River

Alternative 2 – Investigate storage opportunities east of Lake Range Drive – Berm/pond facility

Alternative 3 – Investigate ditch improvements to provide additional storage capacity

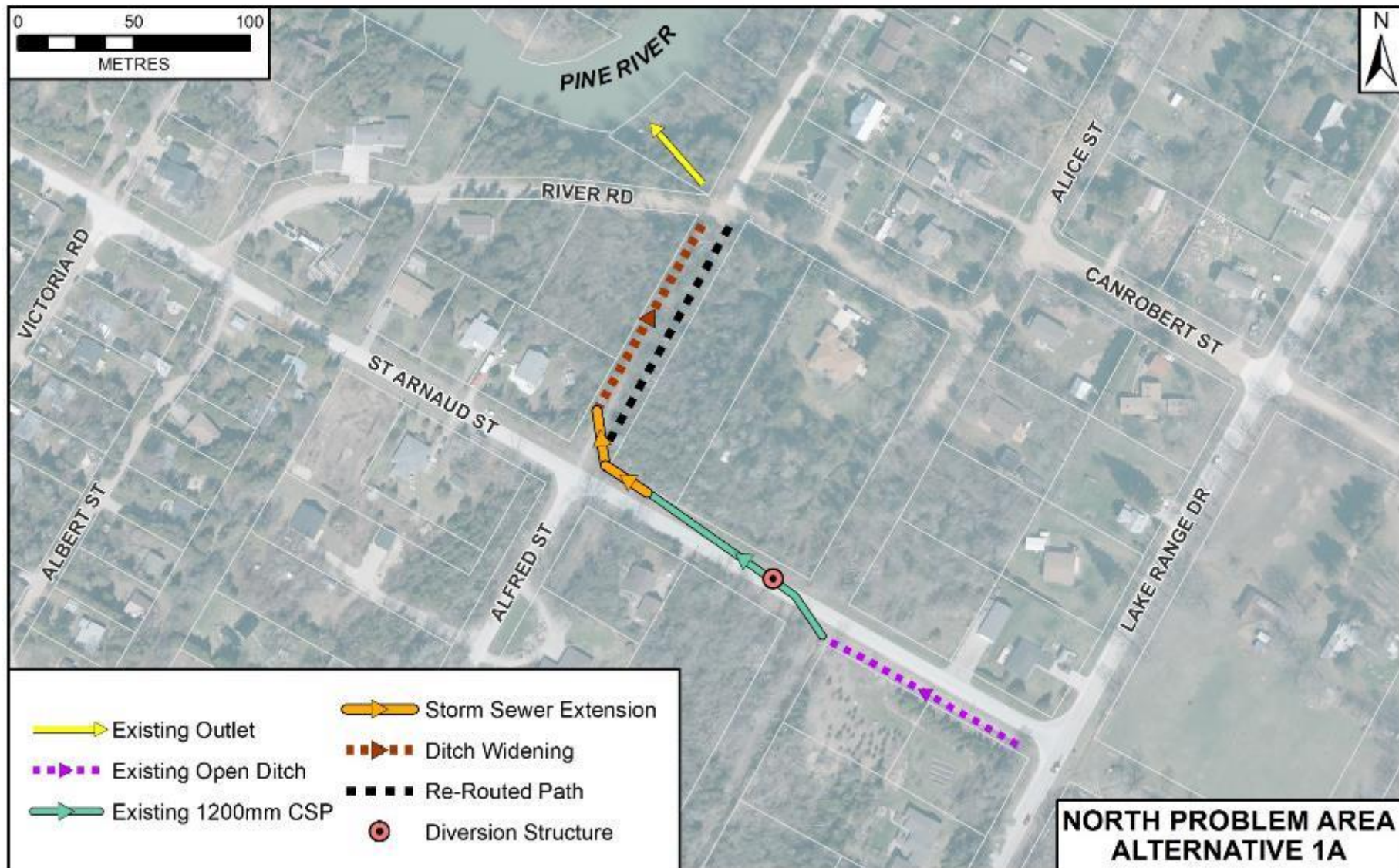
Alternative 4 – Do Nothing

Alternative 1 – St. Arnauld Storm Sewer

- Alt. 1A – Modify control structure/ improve ditch on Alfred
- Alt. 1B – Modify control structure/ install piping downstream
- Alt. 1C – Modify control structure/ install piping from Lake Range to control structure
- Alt. 1D – Complete 1A and 1C

Alternative 1A Mapping

- Modify control structure/improve ditch on Alfred



Alternative 1B Mapping

- Modify control structure/install piping downstream



Alternative 1C Mapping

- Modify control structure/install piping from Lake Range to control structure



Alternative 1D Mapping

- Modify structure/improve ditch on Alfred/add pipe from Lake Range



Alternative 2 – Storage East of Lake Range

- Alt. 2A – Create berm on agricultural lands (3500m³ of storage required east of Lake Range)
- Alt. 2B – Create storage in gully upstream of Arthur St.
- Alt. 2C – Complete all upgrades above

Alternative 3 – Storage within roadside ditches

- Insufficient storage is available within roadside ditches to minimize flooding at Lake Range and St. Arnaud

Alternative 2 – Storage (berm)



Preliminary Cost Estimates

Cost Estimates: Based on recent construction estimates (no HST)

Alternative 1 – St. Arnaud Storm Sewer Upgrades

- Alt 1A – control structure and deeper ditch on Alfred - \$ 426,000
- Alt 1B – control structure and piping on Alfred - \$ 516,000
- Alt 1C – control structure and pipe from Lake Range - \$ 636,000
- Alt 1D – complete both 1A and 1C \$ 946,000

Alternative 2 – Storage facility

- Alt 2A – berm on agricultural lands - \$ 100,000 - \$ 200,000
- Alt 2B – limited storage in ravine - \$ 25,000
- Alt 2C – berm and ravine storage - \$ 125,000 - \$ 225,000

Alternative 3 – Ditch Improvements – Insufficient

Alternative 4 – Do Nothing

Evaluation Considerations

- **Alternative 1 – Larger Capacity Storm sewer on St. Arnaud**
 - Will not address flooding at Lake Range intersection without larger pipe from intersection to control structure
 - Need to improve drainage on Alfred to minimize downstream effects
- **Alternative 2 – Storage East of Lake Range**
 - Will minimize flooding at Lake Range intersection
 - Will require works to occur on private lands
- **Alternative 3 – Ditch improvements**
 - Insufficient capacity to address the flooding problem at intersection
- **Alternative 4 – Do Nothing**
 - Does not address the problem

Recommendations – North Problem Area

Select Alternative 1A & 2C – \$ 426,000 + (\$125,000 - \$225,000)

- Modify flow control structure in existing St. Arnaud storm sewer to increase capacity
- Increase ditch capacity along Alfred Street to improve outlet to Pine River
- Create berm on agricultural lands to create storage and minimize peak flows
- Modify culvert at Arthur Street to create storage in ravine

Alternative 1A Mapping

- Modify control structure/improve ditch on Alfred



Master Plan Alternatives – South Problem Area

Problem Statement: Existing road and drainage infrastructure is insufficient, in size and capacity, to accommodate existing and expected development and impacts related to climate change

Alternative 1 – Install storm sewer along Birch Crescent and then north, outletting to Pine River

Alternative 2 – Install storm sewer along Birch Crescent and Sunrise Ave., outletting to Lake Huron through a new outlet

Alternative 3 – Construct a storm drainage pumping station to pump stormwater to a suitable outlet

Alternative 4 - Subsurface disposal of stormwater (infiltration)

Alternative 5 - Do Nothing

Alternative 1 – Storm to River Outlet

- Alt 1A – Storm on Birch and Victoria to Pine River
- Alt 1B – Storm on Birch and Lakeside Trail to Pine River
- Alt 1C – Storm on Victoria south to Clark Creek

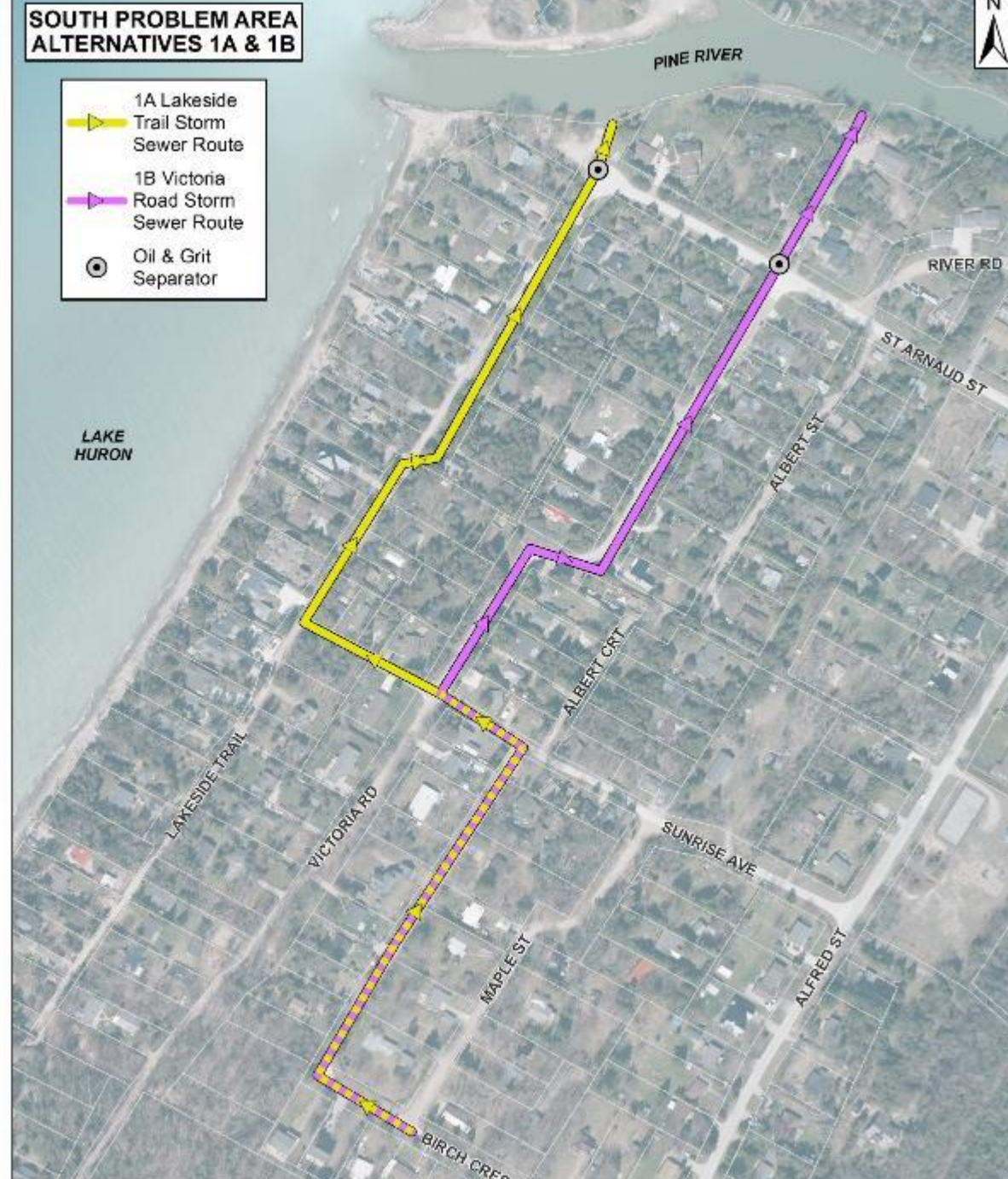
*All options would have sufficient capacity to allow for private drain connections (PDC's).

**Road restoration would include returning road to current condition

Alternative 1A & 1B – Storm Sewer Outletting to Pine River

SOUTH PROBLEM AREA ALTERNATIVES 1A & 1B

- 1A Lakeside Trail Storm Sewer Route
- 1B Victoria Road Storm Sewer Route
- Oil & Grit Separator



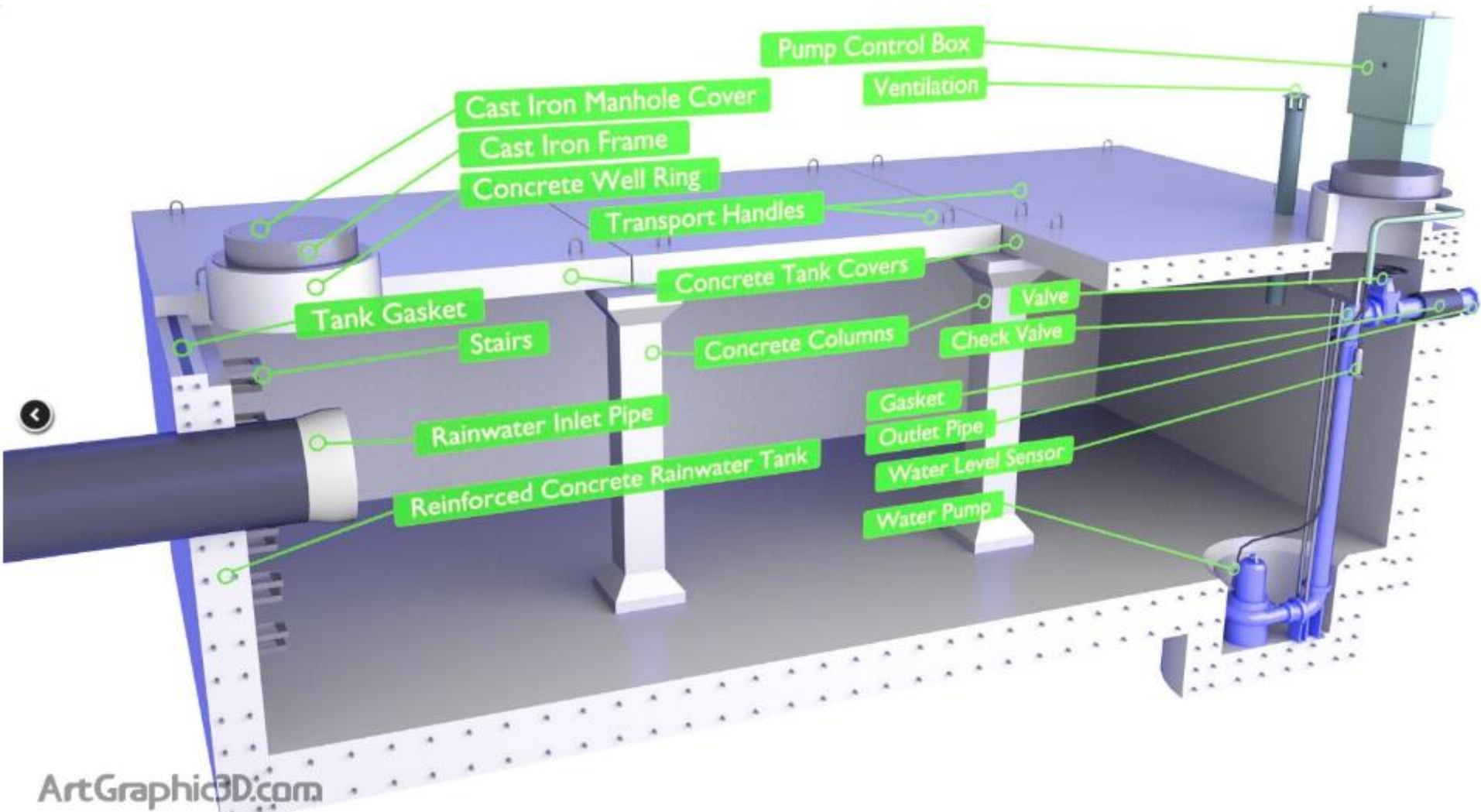
Alternative 1C – Storm Sewer Outletting to Clark Creek



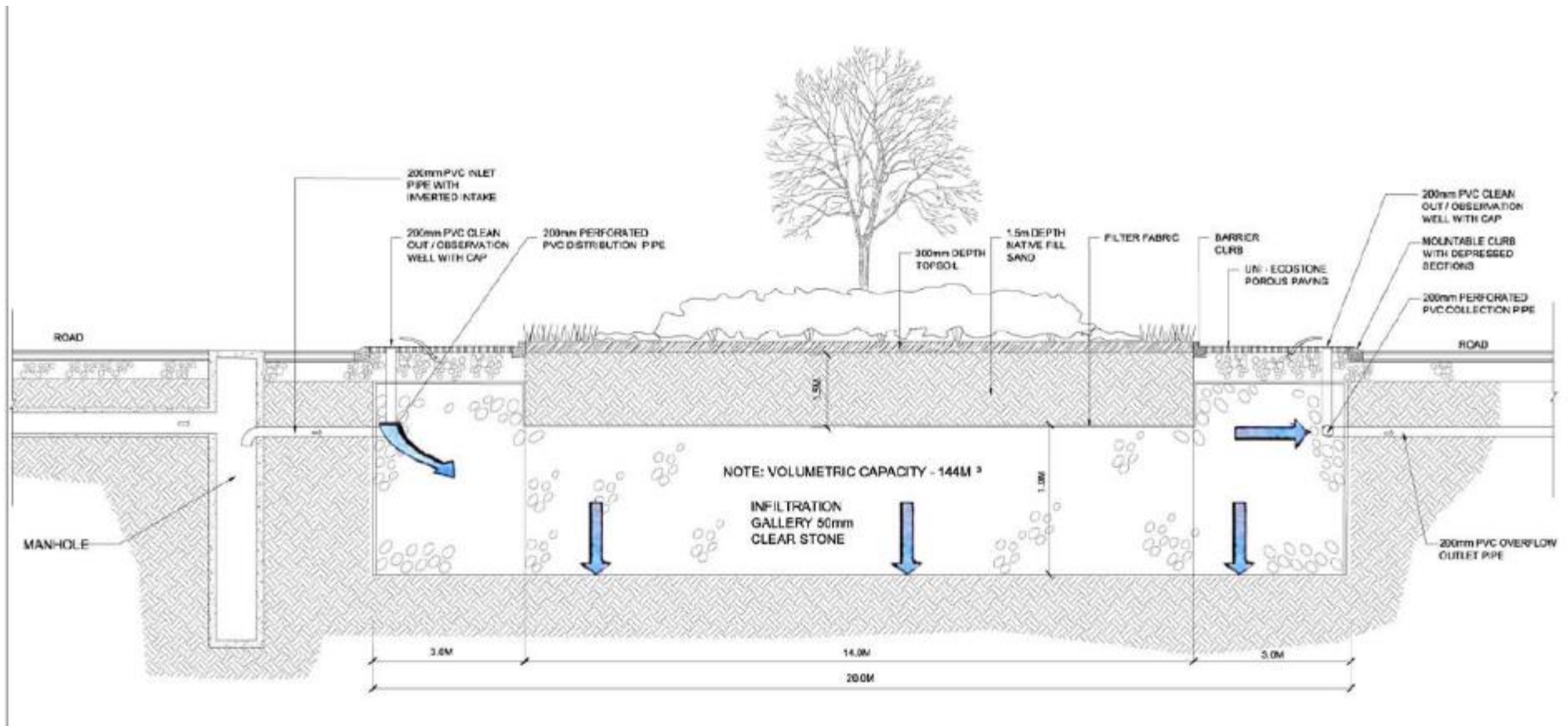
Alternative 2 – Outlet to Lake



Alt. 3 - Stormwater Pumping Station



Alt. 4 – Infiltration Chamber



Preliminary Cost Estimates

Cost Estimates: Based on recent construction estimates (no HST)

Alternative 1 – Storm to River Outlet (Pine River of Clark Creek)

- Alt 1A – Storm on Birch and Victoria - \$ 3,100,000
- Alt 1B – Storm on Birch and Lakeside Trail - \$ 3,100,000
- Alt 1C – Storm on Victoria to Clark Creek – Insufficient grade

Alternative 2 – Storm Sewer to Lake

- Alt 2 – Storm sewer and outlet to lake \$ 2,600,000

Alternative 3 – Storm Drainage Pumping Station

- Alt 3 – Storm drainage PS - \$ 8,000,000 +

Alternative 4 – Infiltration – Not feasible

Alternative 5 – Do Nothing

Evaluation Considerations

- **Alternative 1 – Storm sewer to River Outlet**
 - Pipe is very large due to flat grades but is feasible to Pine River outlet
 - Provides storm outlet along entire route
- **Alternative 2 – Storm sewer on Victoria Road to Lake Huron**
 - Will require construction of a new outlet at Lake Huron
 - Property issues may be present/directional bore at outlet is challenging
- **Alternative 3 – Storm Drainage Pumping Station (PS)**
 - Very expensive/Requires property purchase to construct PS
- **Alternative 4 – Infiltration**
 - May be feasible in summer but insufficient when needed in spring/winter
 - Bottom of infiltration basin must be >1m above water table
- **Alternative 5 – Do Nothing**
 - Does not address the problem

Recommendations – South Problem Area

Select Alternative 1A – Install storm sewer on Birch and then Victoria to outlet at Pine River - \$3,100,000.00

- Initiate phased installation of storm drainage infrastructure beginning at Pine River and working southward toward Birch Crescent
- Continue Grading Plan Requirements for Infill Development



Preliminary Phasing Plan

Initial Phase

- 1) Modify control structure in St. Arnaud Sewer
- 2) Increase ditch capacity along Alfred to outlet at Pine River
- 3) Finalize location for storage facility (berm) to east

Subsequent Phase

- 1) Initiate design of storm sewer on Victoria to Pine River
- 2) Replace culvert in Arthur Street at ravine
- 3) Construct storage facility (berm) to the east

Financing Options

Options for financing of new storm drainage systems within established community areas:

- Grant Programs
 - Subject to availability of grants & success obtaining the funding
- Municipality Pays
 - Tax dollars used to fund the project
- Development Charges
 - Municipality pays upfront (more suited for new development).
- Developer Cost Sharing Agreement
 - Project Costs Shared with Development Community
- Drainage Act
 - Not intended for Urban Areas but feasible
- Area Rating
 - Benefitting landowners pay

Input from SVCA

- BMROSS & H-K staff met with SVCA staff prior to the Public Meeting to review the recommendations
- Generally they were supportive of the proposed approaches but noted that a permit would be required from SVCA prior to implementation and they would want to review engineering design as part of the permit process.
- At the request of SVCA, BMROSS staff reviewed floodplain modeling completed recently in Point Clark to ensure that the proposed stormwater upgrades would not negatively impact flooding levels along the Pine River

Input from SVCA

- Results of the modeling indicated that Hazel flood flows could increase from 738.4 m³/s to 739.9 m³/s during the worst case scenario of the Pine River peaking at the same time as the storm sewer system.
- The resultant water level increase for this scenario is 6 mm.
- For context, based on the SVCA model, the river rises 3.41 m between the 2-year event and the Hazel event.
- The vertical accuracy of the terrain in SVCA's model is 50 mm.

Public Meeting Feedback

- Public Meeting held on August 24, 2024 at Point Clark Community Centre
- Attended by approximately 90 residents

Summary of Feedback

- Concerned that upgrades are being completed to support new development applications
- Residents without drainage problems are not supportive of proceeding with upgrades
- There is a perception that existing stormwater drainage infrastructure is not being maintained properly
- Believe that cleaning out ditches and maintaining infrastructure will remedy flooding issues

Next Steps

- Select a Preferred Alternative for the North and South Problem Areas
- Finalize Master Plan Report
- Publish Notice of Master Plan Completion and Master Plan Report for 30 Day mandatory review period
- Council Adoption of Master Plan
- Finalize Engineering Designs for Initial Phase of implementation
- Obtain Approvals

Summary of Recommendations

- **North Problem Area**

- **Select Alternative 1A & 2C** – \$ 426,000 + \$125,000 - \$225,000
- Modify flow control structure in existing St. Arnaud storm sewer to increase capacity and Increase ditch capacity along Alfred Street to improve outlet to Pine River
- Create berm on agricultural lands to create storage and minimize peak flows and modify culvert at Arthur Street to create storage in ravine

- **South Problem Area**

- **Select Alternative 1A** – Install storm sewer on Birch and then Victoria to outlet at Pine River - \$3,100,000.00

Tentative MP Completion Timeline

- Present Recommendations to Council October 2024
- Completion of Master Plan Report November 2024
- Publish Report & Notice of Completion December 2024
- Detailed Engineering for Phase 1 Projects Winter 2025
- Project Implementation Begins As early as 2025



Questions?