

Welcome

Six Mile Creek Flooding
Municipal Class Environmental
Assessment

Public Information Centre No. 3

Crystal Ridge Library

May 6, 2025

5:00 p.m. to 7:00 p.m.

Please sign in and take a comment sheet.



Public Information Center No. 3

We want to hear from you!

This PIC provides an opportunity for the public to see what we've been up to since the last PIC and provide input.



Why are we holding this PIC?

- Provide an update on the Class EA process since the last PIC and summarize:
 - Existing environmental characteristics impacting the selection of a preferred flooding mitigation alternative;
 - Hydraulic and hydrologic conditions in Six Mike Creek impacting the level of service provided by alternatives; and,
 - The results of the preliminary evaluation of alternative solutions and next steps in the EA process.

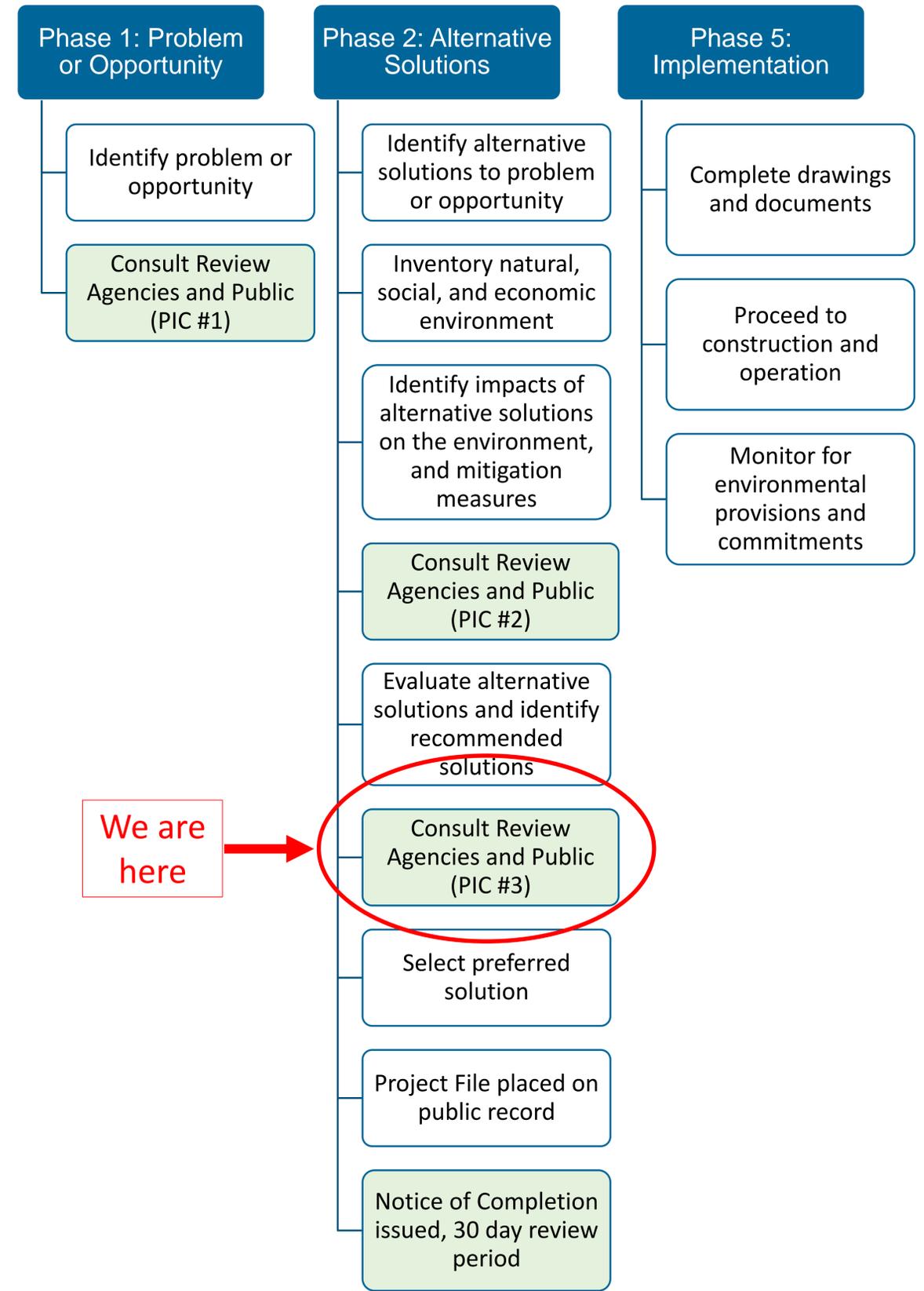


Municipal Class Environmental Assessment Process

The Municipal Class Environmental Assessment (EA) provides a comprehensive decision-making framework to ensure that all relevant engineering, environmental and cultural heritage features are considered when developing improvement alternatives. The process requires public and agency involvement throughout.

Problem and Opportunity Statement

There are flood vulnerable areas along Six Mile Creek within the Community of Thunder Bay. This EA is being undertaken to define a flood risk reduction solution that addresses coastal and riverine flooding currently affecting private property and improves the level of service of municipal infrastructure.



Six Mile Creek Study Area



The Six Mile Creek study area encompasses a significant portion of the community of Thunder Bay.

Residents of the area have identified chronic flooding, and the Town of Fort Erie has initiated this study to investigate the cause and recommend improvement works.

For decades, the area has experienced several major storms leading to localized flooding along Six Mile Creek. Related concerns persist, with significant dwelling and yard/street flooding occurring as recently as December 2022.

Assessments completed for this project, with input from the public/agencies/stakeholders, have indicated that the main source of flooding is lake induced storm surge, not river flows. Seasonal riverine flooding potential remains throughout the watershed.

Target Level of Service for Flood Protection

5-year Level of Service

Based on discussions with agencies and stakeholders a 5-year Level of Service was selected to facilitate the Alternative Solutions evaluation process.

All Alternative Solutions presented achieve a reduction in flood risk within the 5-year storm surge contour (shown in figure) and achieves protection of residential dwelling structures but does not eliminate property flooding.

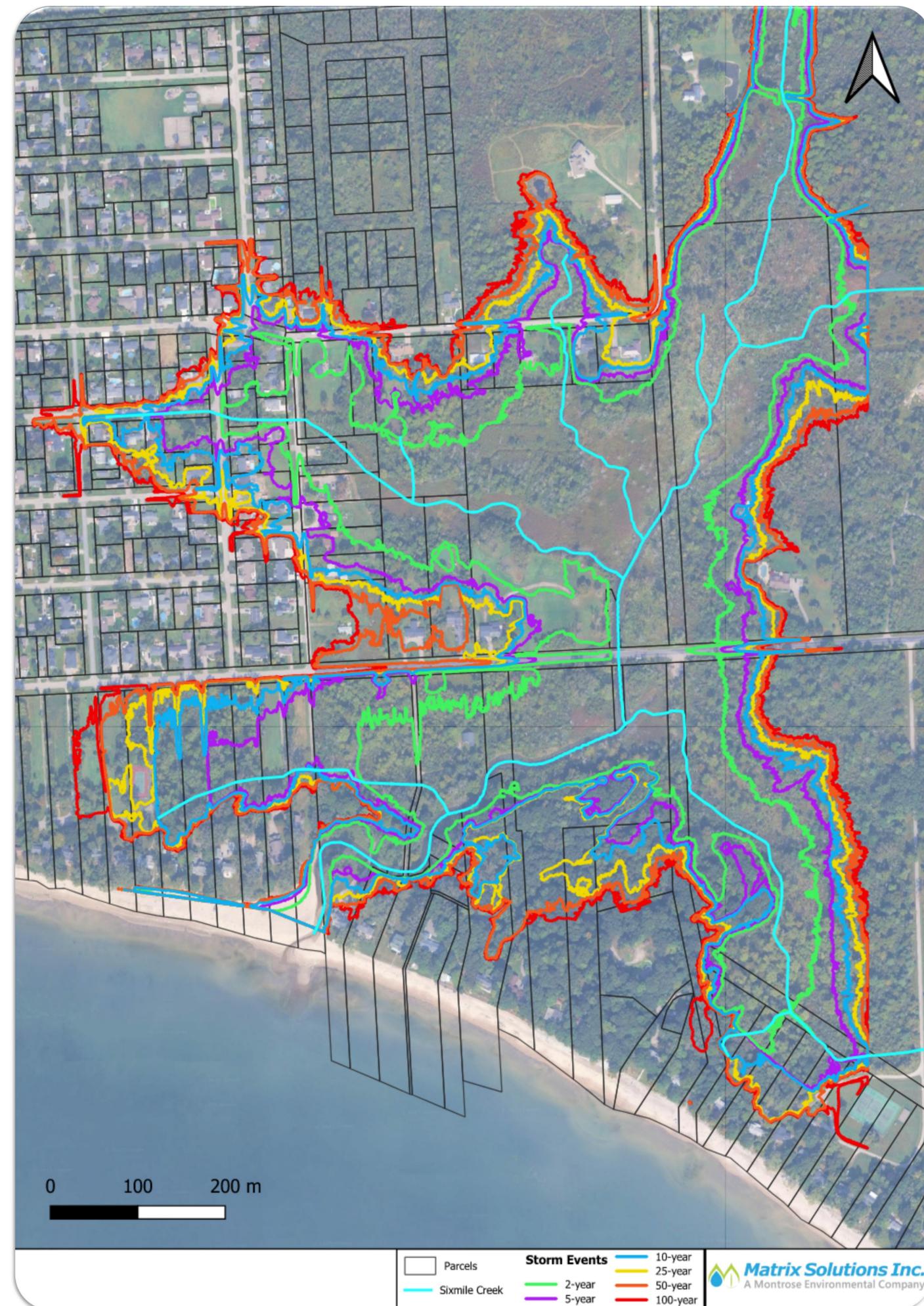
This design criteria aligns with Town's design standards while addressing:

- Properties experiencing frequent surge induced flooding; and,
- Environmental impacts and cost effectiveness.

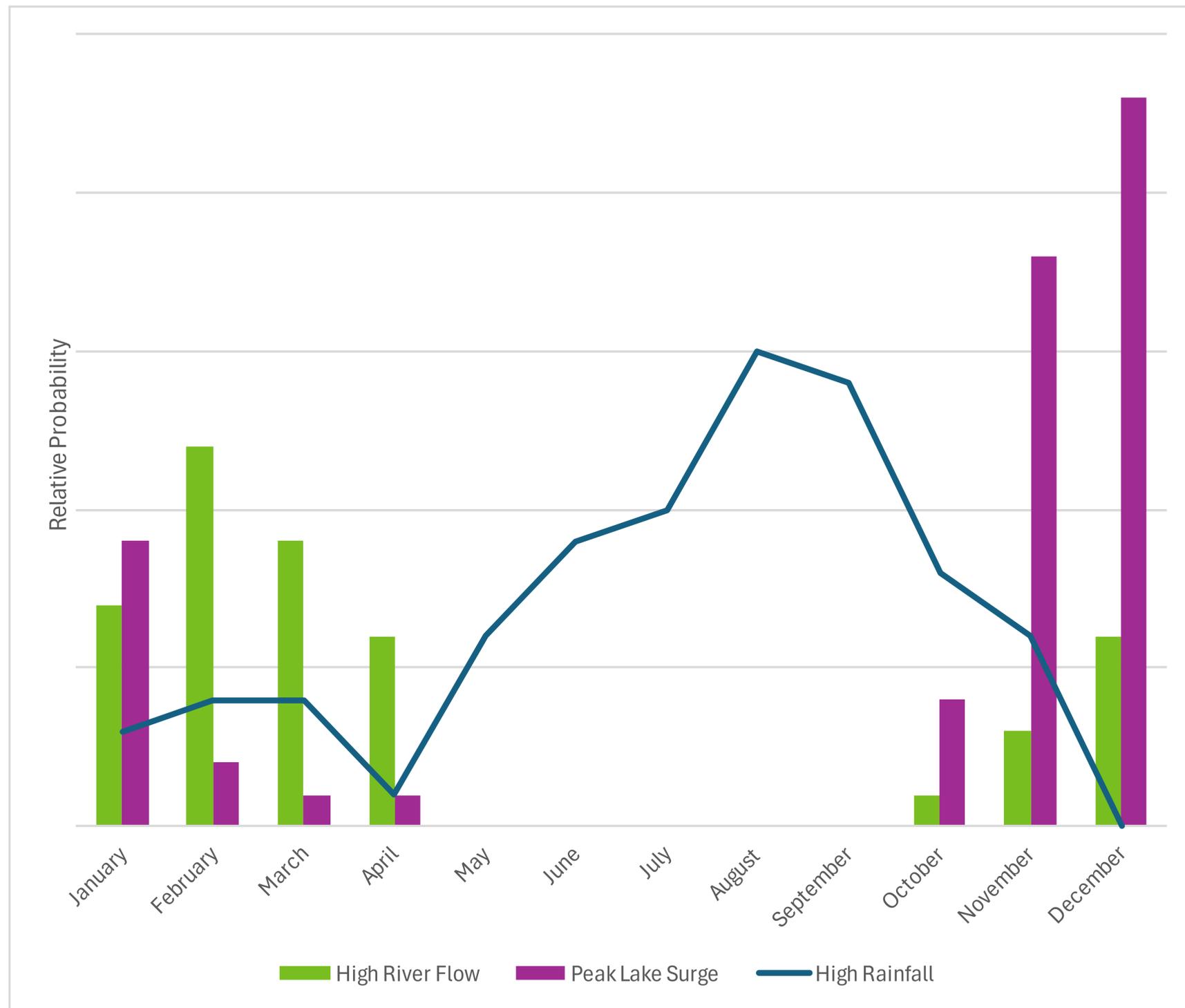
Town's storm drainage design guidelines:

The design of storm sewers and ditches shall be the runoff from the 5-year storm event with minimal inconvenience to activities of property owners and damage to properties.

(Town of Fort Erie Subdivision Control Guidelines for Development of New Subdivisions 2021)



Six Mile Creek Riverine and Coastal Flooding Potential



Hydrologic investigation:

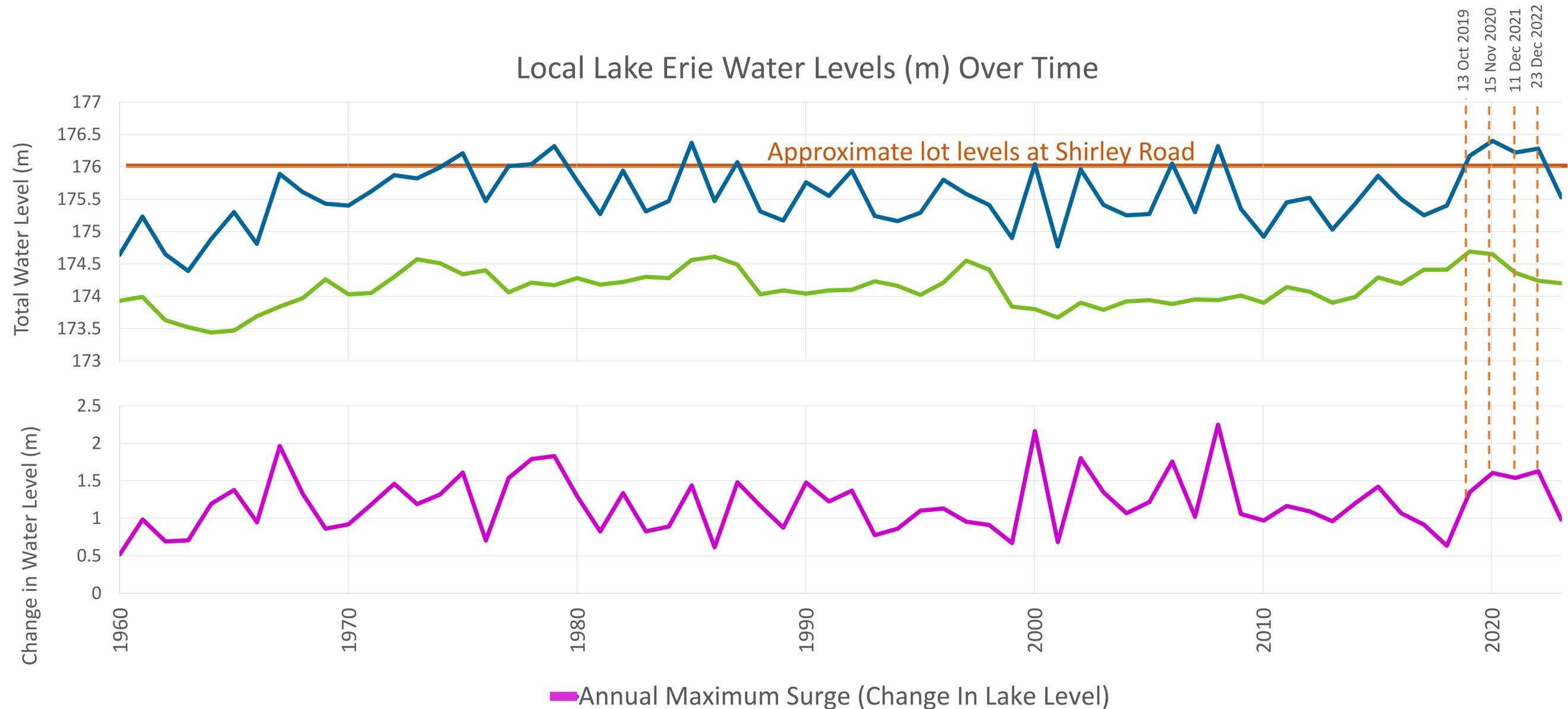
The graph shows the long-term averages of high river flows, peak lake surges and high rainfalls for each month

What do these results mean?

- Large summer rainfalls do not correlate to flooding occurrences from riverine flows or coastal surge.
- Coastal flooding is most prominent in November to January.
- Riverine flooding occurs as a result of rainfall/snowmelt events from January to April.
- There is potential for both high river flow to coincide with high surge levels, but studies show that this potential is low.

Lake Erie Water Level Investigation

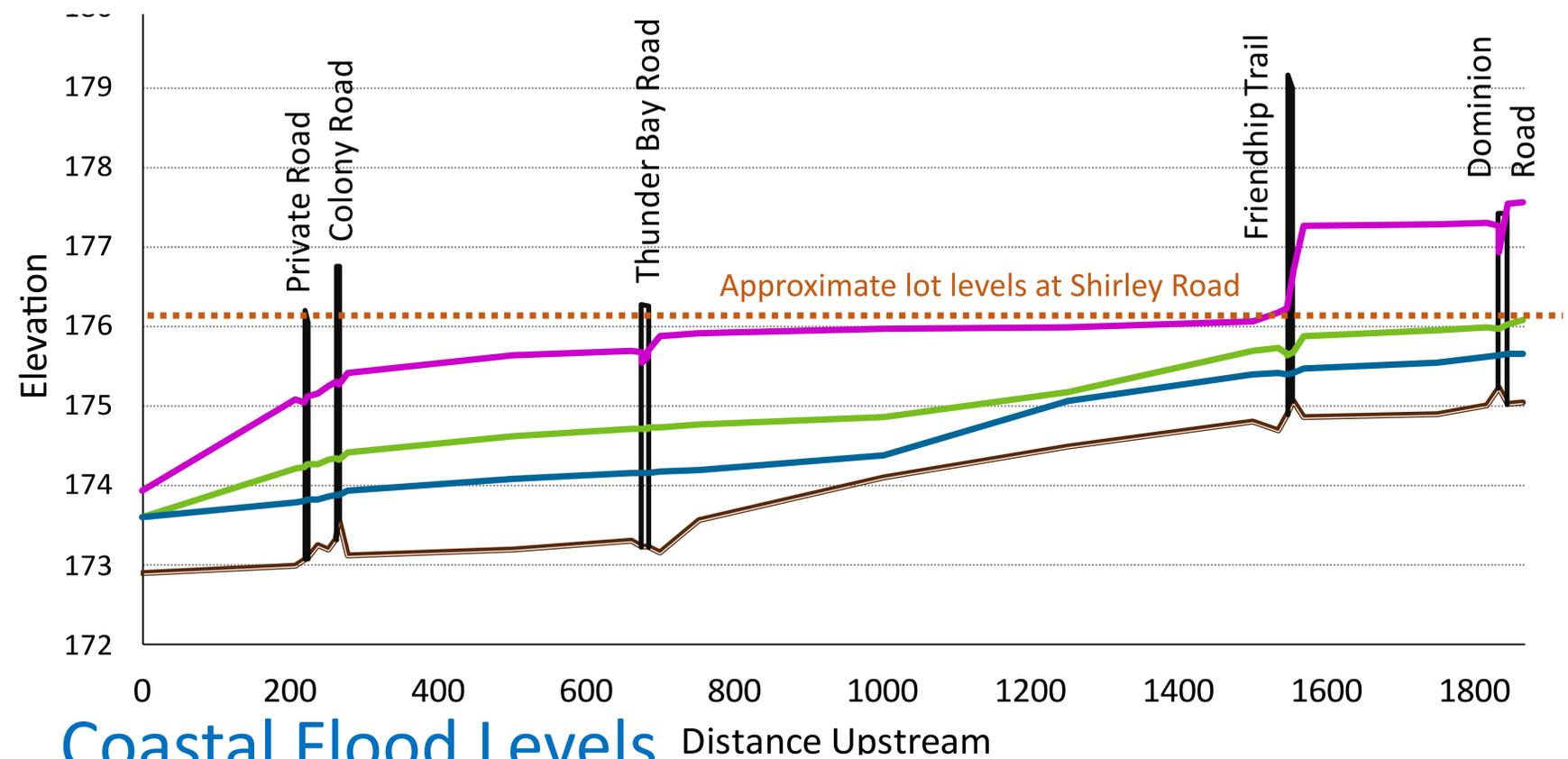
- Historically, local lake levels above 176 m have occurred 2-3 times per decade.
- Local lake levels above 176 m have occurred 4 times in the past 5 years.



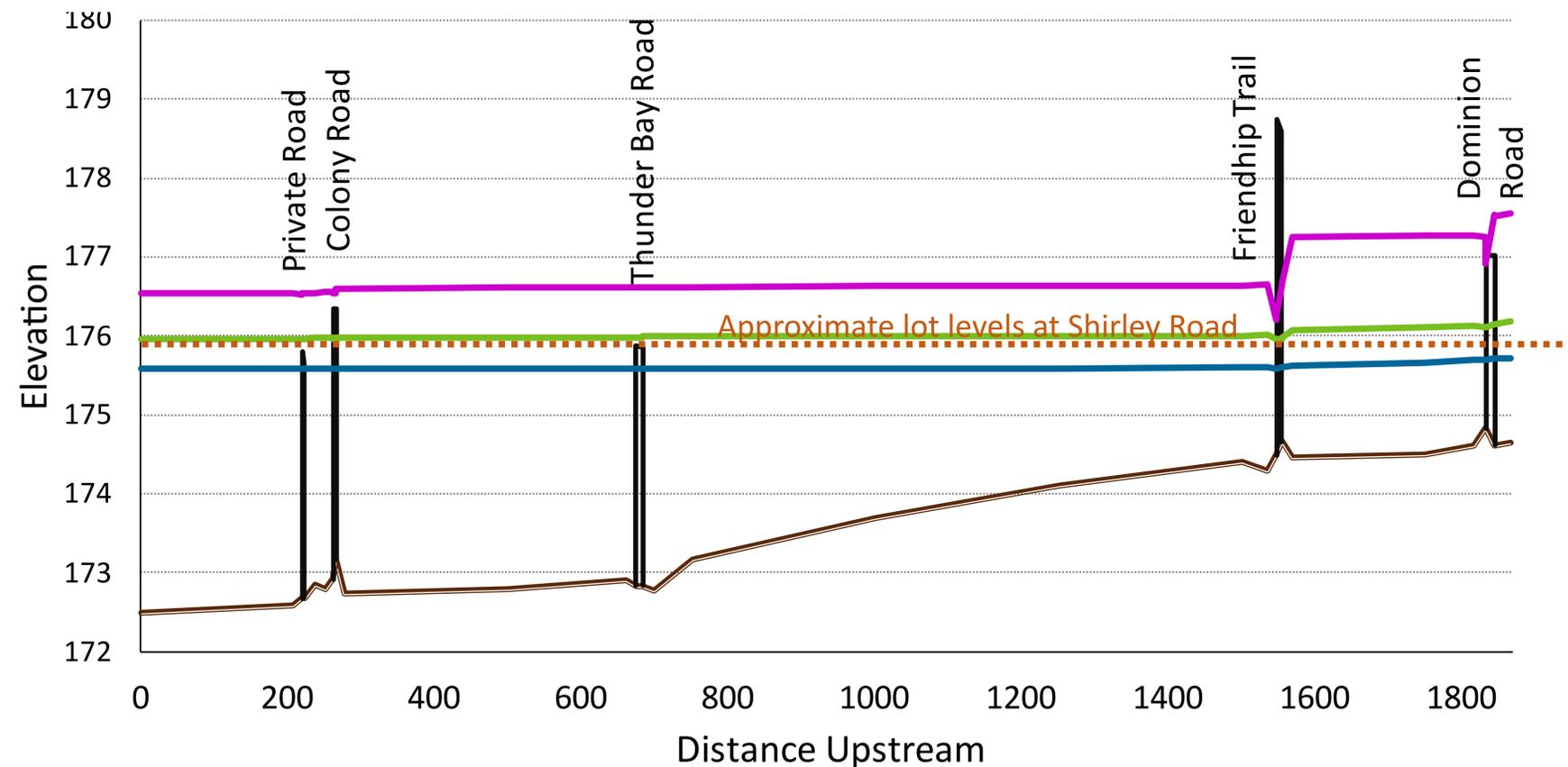
Six Mile Creek Hydraulic Investigation

- Hydraulic analysis of the study area was performed using an updated HEC-RAS model with data from riverine flows and lake water levels.
- Shirley Road properties are at approximately the 100-year riverine flood level. Therefore, they would flood from river flows once per 100-years on average.
- Coastal flood levels (lake surges - caused by wind and air pressure) are higher than the equivalent frequency riverine flood levels.
- Shirley Road properties are at approximately the 5-year coastal flood level. Therefore, they would flood from lake levels once per 5-years on average.
- Colony Road properties (except for one) are above the 5-year coastal flood level.

Riverine Flood Levels



Coastal Flood Levels



Ground Bridge 5-Year 2-Year 100-Year

Summary of Environmental, Archeological, Cultural Heritage and Hydrogeological Study Findings

Terrestrial Environment:

- Provincially Significant Wetland – Six Mile PSW
- Environmentally Sensitive Area (ESA) – Wavecrest Bush
- Potential for rare plant community along Lake Erie shoreline (BO1-1 Sea Rocket Sand Open Beach Type)
- Locally Significant Natural Area (SNA) – South of Thunder Bay Rd
- Woodlands > 2 ha
- Species recorded within the study area include 27 Species at Risk, 24 Species of Special concern and potential for regulated habitat for 4 SAR

Aquatic Environment:

- Waterbody – Lake Erie
- Watercourse – Six Mile Creek
- Critical Stream Fish Habitat – Six Mile Creek
- Fish records within study area include 10 Species at Risk fish and 6 Species of Special Concern

Groundwater Resources (NPSP Authority, 2013):

- Estimated 50-100 mm/year of Groundwater Recharge
- No Highly Vulnerable Areas (HVAs) in Study Area
- Some Significant Groundwater Recharge Areas

Archeologic Potential:

- Historic and extant watercourses (Six Mile Creek)
- Mapped 19th-century thoroughfares (Thunder Bay Road and Centralia Avenue North);
- Mapped 19th-century transportation routes (Grand Trunk Railway)
- Mapped 19th-century structures (numerous homesteads within and immediately adjacent to the study area)
- Town of Fort Erie's Archaeological Master Plan identifies the study area as having archaeological potential.
- Stage 2 Investigations required for areas with confirmed potential that are not characterized as previously disturbed, steep slopes, and low and permanently wet conditions.

Cultural Heritage Resources:

- 7 potential built heritage resources (4 houses, 3 bridges).
- 2 or more potential cultural heritage landscapes.
- OHT, MCM, and Town of Fort Erie have confirmed there are no specific heritage concerns within the study area.

Do Nothing Alternative

Alternative Description

- The 'do nothing' alternative must be considered as part of the EA process.
- No new infrastructure
- No changes or improvements to existing infrastructure
- No changes in flood risk to public and private properties

Notes/Comments

- The 'do nothing' alternative provides a baseline for comparison of other Alternatives.



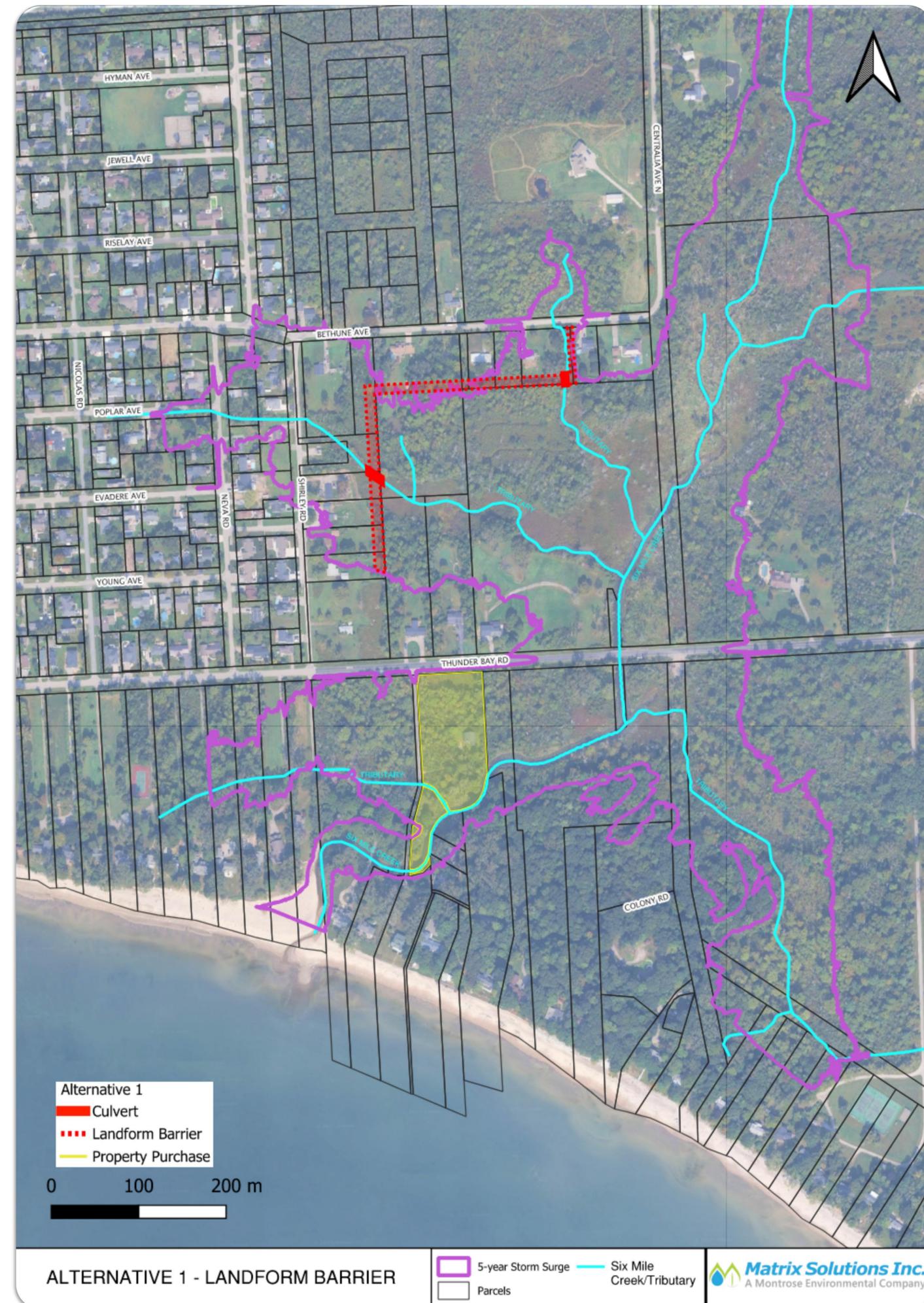
Alternative 1 – Landform Barrier

Alternative Description

- Alternative 1 creates a landform barrier (or dyke) along rear property lines adjacent to the wetland protecting residents along Shirley Road and Bethune Ave from lake surge induced flooding up to the desired level of service.
- One property falling within the 5-year storm surge area, south of Thunder Bay Road, would be purchased to eliminate flood risk.

Notes/Comments

- Culverts with backflow prevention are required at each tributary
- Proposed land elevation equal to 5-year lake surge level (plus freeboard – additional height for resiliency).
- This alternative has the highest potential impacts to the natural environment through habitat displacement and impacts on the hydrologic function of floodplain.



Alternative 2 – Road Right-Of-Way Barrier with Property Purchase

Alternative Description

- Alternative 2 creates a landform barrier by raising the elevation of sections of municipal roadway protecting residents on the west side of Shirley Road and north of Bethune Ave from lake surge induced flooding up to the desired level of service.
- Properties falling within the 5-year storm surge area, east of Shirley Road and south of Bethune Ave, would be purchased to eliminate flood risk.
- One property falling within the 5-year storm surge area, south of Thunder Bay Road, would be purchased to eliminate flood risk.

Notes/Comments

- Culverts with backflow prevention will be required at each tributary
- Proposed municipal road elevation equal to 5-year lake surge level (plus freeboard).
- This alternative makes use of existing municipal infrastructure.



Alternative 3 – Property Purchase

Alternative Description

- Alternative 3 involves the purchase of all properties falling within the 5-year storm surge area to eliminate lake surge induced flood risk up to the desired level of service.
- Property purchase values have been individually assessed by an independent property evaluation service provider.

Notes/Comments

- Individual residents could accept flooding risk thereby negating the need for property purchase (similar to a do-nothing scenario).



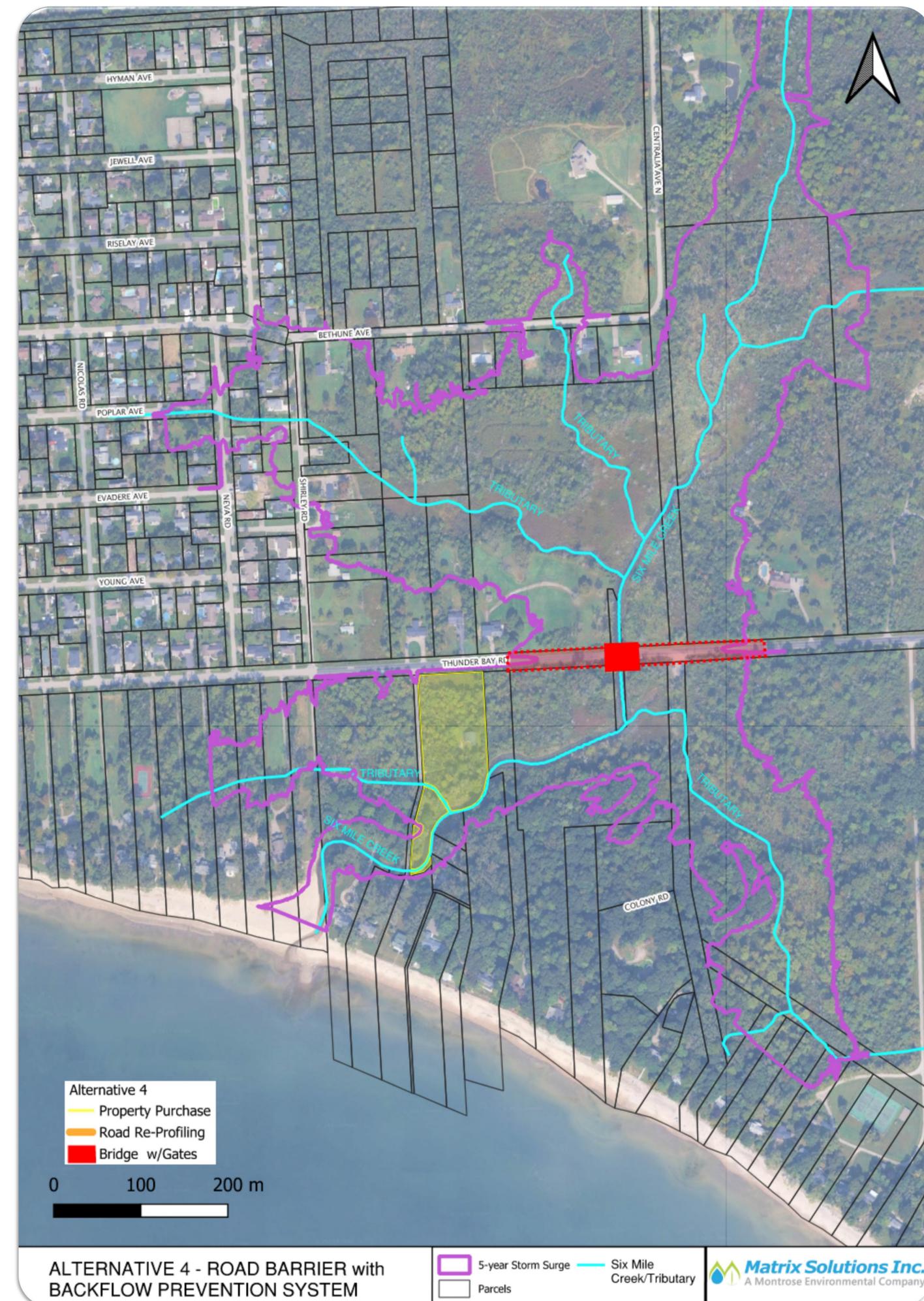
Alternative 4 – Thunder Bay Road Barrier and Backflow Prevention System

Alternative Description

- Alternative 4 creates a landform barrier by raising the elevation of a section of Thunder Bay Road and incorporating a backflow prevention system into the municipal roadway/bridge protecting residents north of Thunder Bay Road from lake storm surge induced flooding up to the desired level of service.
- One property falling within the 5-year storm surge area, south of Thunder Bay Road, would be purchased to eliminate flood risk.

Notes/Comments

- Proposed municipal road elevation equal to 5-year lake surge level (plus freeboard).
- This alternative makes use of existing municipal infrastructure but would require the existing bridge to be replaced or retrofitted.
- A pump station has been added to this alternative to relieve upland flooding potential during concurrent storm surge and rainfall events.



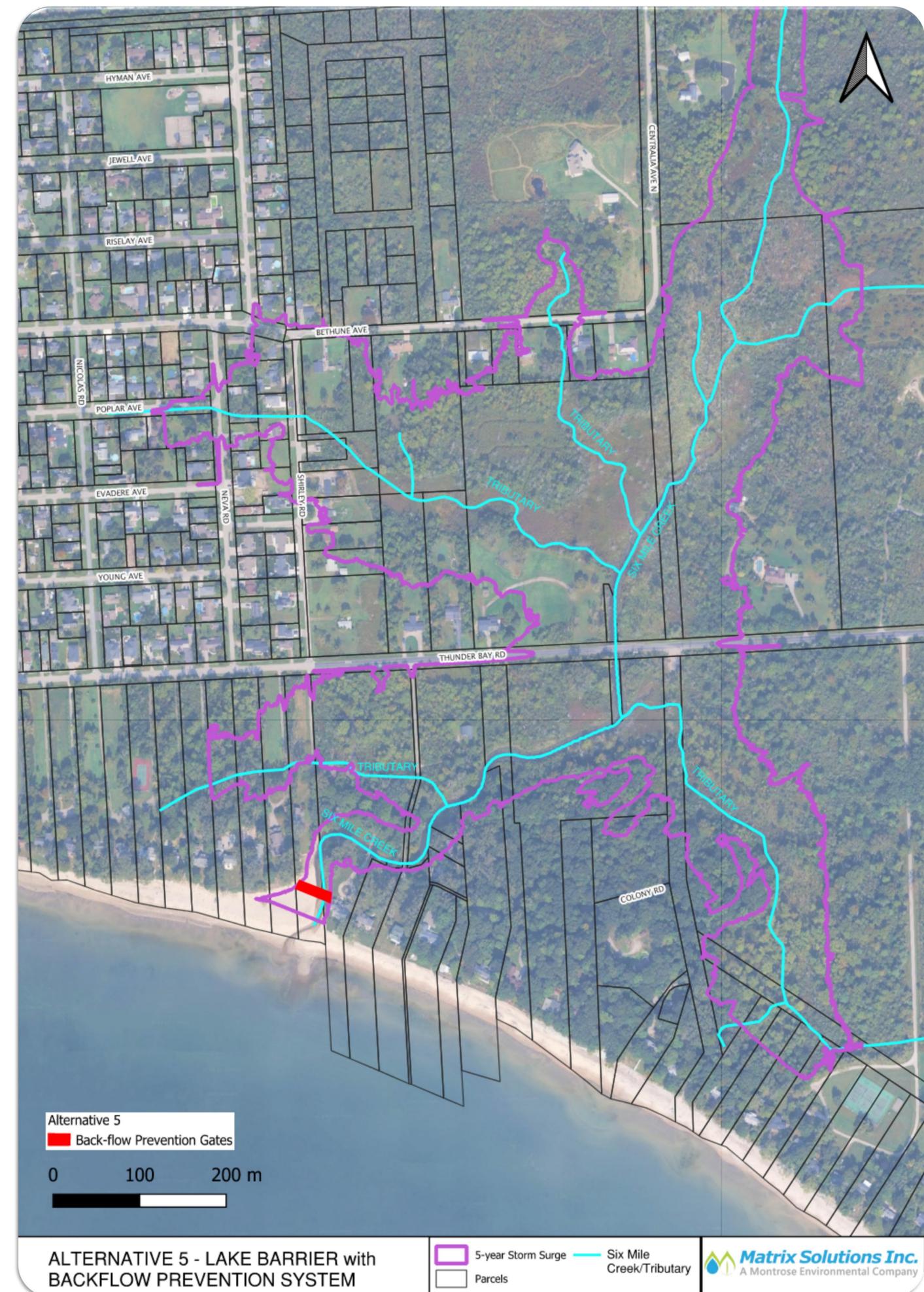
Alternative 5 – Lake Front Barrier and Backflow Prevention System

Alternative Description

- Alternative 5 creates a lake front barrier and backflow prevention system along the Lake Erie shoreline protecting residents along Six Mile Creek from lake storm surge induced flooding up to the desired level of service.

Notes/Comments

- Proposed landform barrier elevation equal to 5-year lake surge level (plus freeboard).
- This alternative impacts property owners adjacent to the proposed works and would require road access for maintenance/operations.
- A pump station has been added to this alternative to relieve upland flooding potential during concurrent storm surge and rainfall events.



Final Environmental Assessment Evaluation Criteria

Climate Change

- **Resilience to severe weather (flooding)**
- Known climate change contributors

Aquatic Environment

- Surface water quality / quantity
- Groundwater quality / quantity
- Fish and fish habitat

Terrestrial Environment

- Wetland ecology
- Wildlife/habitat
- Vegetation
- Trees or landscape

Approvability

- Agency and utility permits
- Municipal planning policies
- Existing/future designated land use

Constructability/Feasibility

- Construction duration
- Channel functionality during construction
- Soil conditions
- Groundwater control

Cultural Environment

- Archaeological impacts
- Built heritage
- Cultural landscapes / features

Social Environment

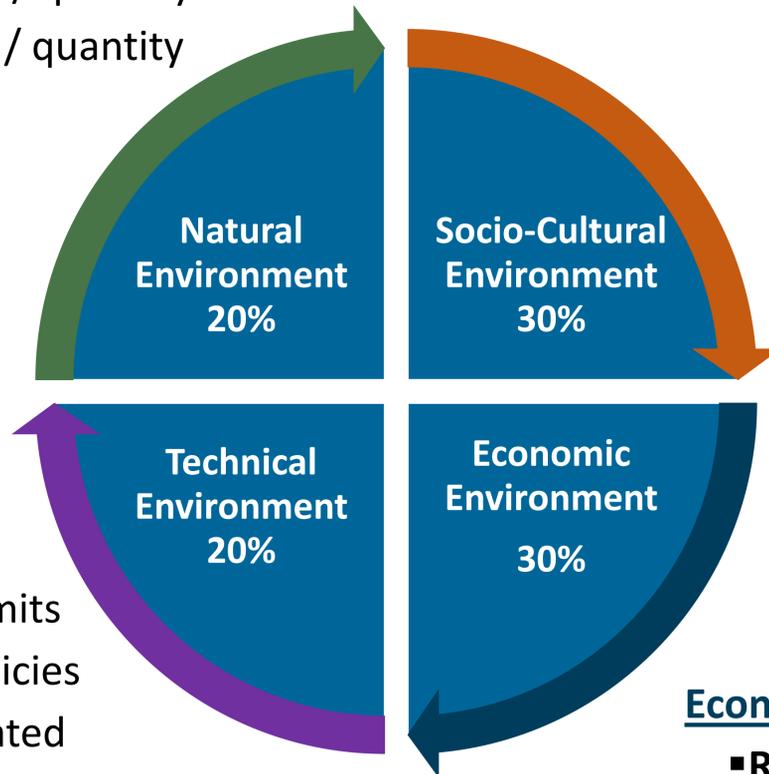
- Property impacts
- Recreational opportunities
- Maintaining / improving greenspace
- Safety of pedestrians, cyclists, and trail users
- Disruption to traffic, businesses, residents during/post-construction
- Noise to sensitive areas

Economic Environment

- **Relative capital costs**
- **Operation and maintenance costs**
- Internal / External funding sources
- **Cost of flood damages**
- Property impacts

Functionality

- Flood risk
- Erosion risk
- Flexibility for future needs



Criteria Weighting

- The alternatives will be evaluated using these categories of criteria.
- The chart shows our criterial weightings for this project.
- Given the project purpose and local considerations, the Socio-Cultural and Economic weighted more heavily.
- An evaluation criteria bias, highlighting the importance of flood protection, has been applied.

Funding Considerations

- The Town does not currently have funding in place to implement the preferred alternative.
- Potential municipal/provincial funding opportunities:
 - Canada Community-Building Fund, Disaster Mitigation and Adaptation Fund, Ontario Municipal Partnership Fund
- There is potential that the implementation of the preferred alternative will need to be resident/user funded with financing provided by the Town.

Bold values indicate evaluation criteria with importance bias applied.

Preliminary Alternative Evaluation and Alternative Ranking

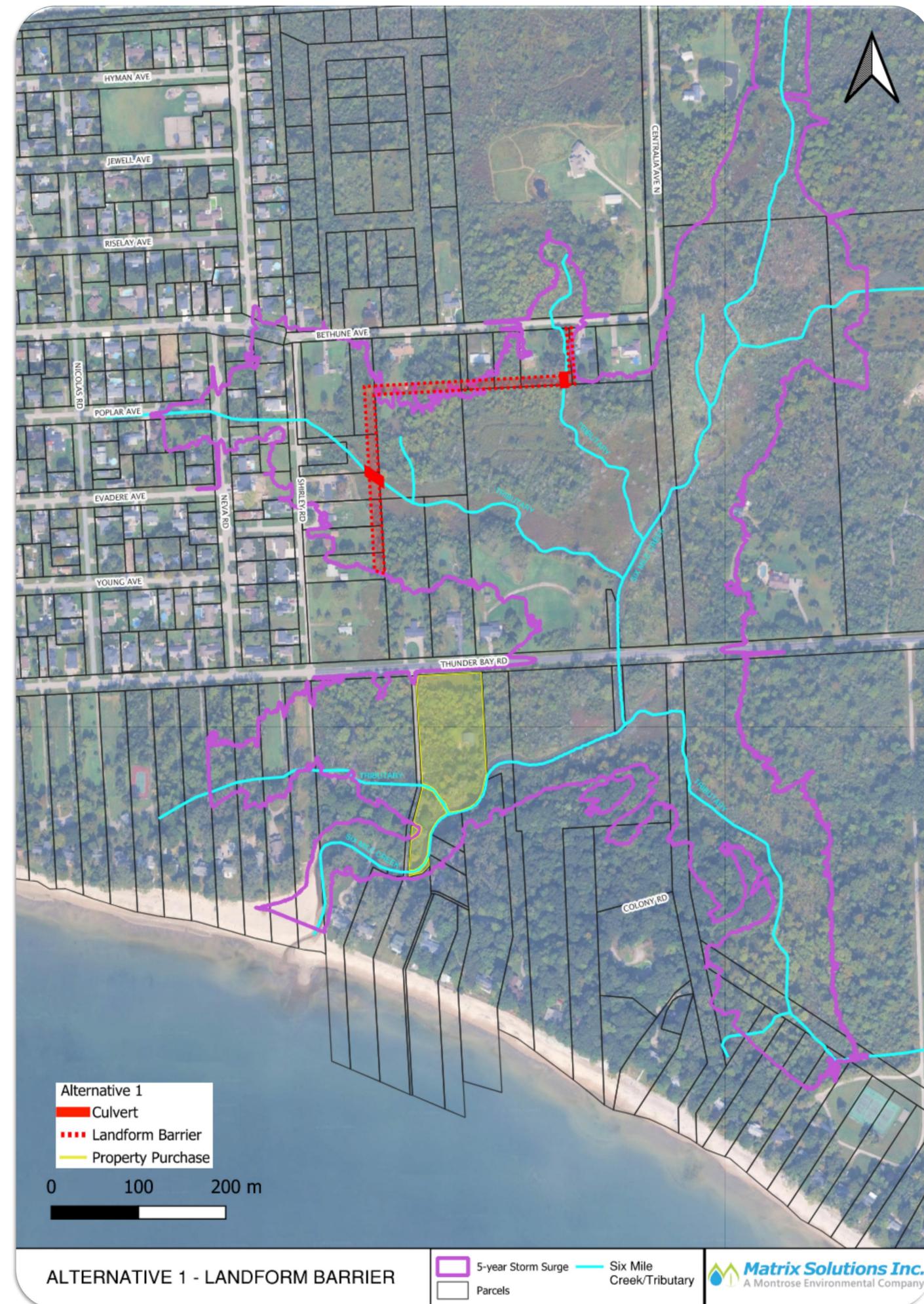
	Do Nothing Alternative	Alternative 1: Floodplain Landform Flood Barrier	Alternative 2: Road ROW Flood Barrier with Property Purchase	Alternative 3: Property Purchase	Alternative 4: Thunder Bay Road Flood Barrier with Backflow Prevention	Alternative 5: Lakefront Flood Barrier with Backflow Prevention
Natural Environment						
Socio-economic and Cultural Environment						
Economic Environment						
Technical Environment						
Weighted Evaluation Ranking	6	1	2	3	4	5

Legend	Most Desirable	Highly Desirable	Moderately Desirable	Less Desirable	Least Desirable

Preliminary Preferred Alternative – Landform Barrier

Landform Barrier Alternative Details:

- Construction of 450m of Berm and 2 culverts with backflow prevention through Six Mile Creek floodplain/wetland area
- Provides flooding protection for 15 properties up to the 5-year lake surge elevation with freeboard for climate change resilience
- Construction on private properties along Shirley Road and Bethune Road
- Top of Berm elevation – 176.6 (5-year lake surge +300mm)
- Berm Height above Ground – Approximately 2.5-2.75m
- Berm Bottom Width – Approximately 10-15m
- 50-year Design life span of infrastructure
- Source of Funding to be Determined



Protecting Your Property - Lot Level Floodproofing

Lot Grading Improvements

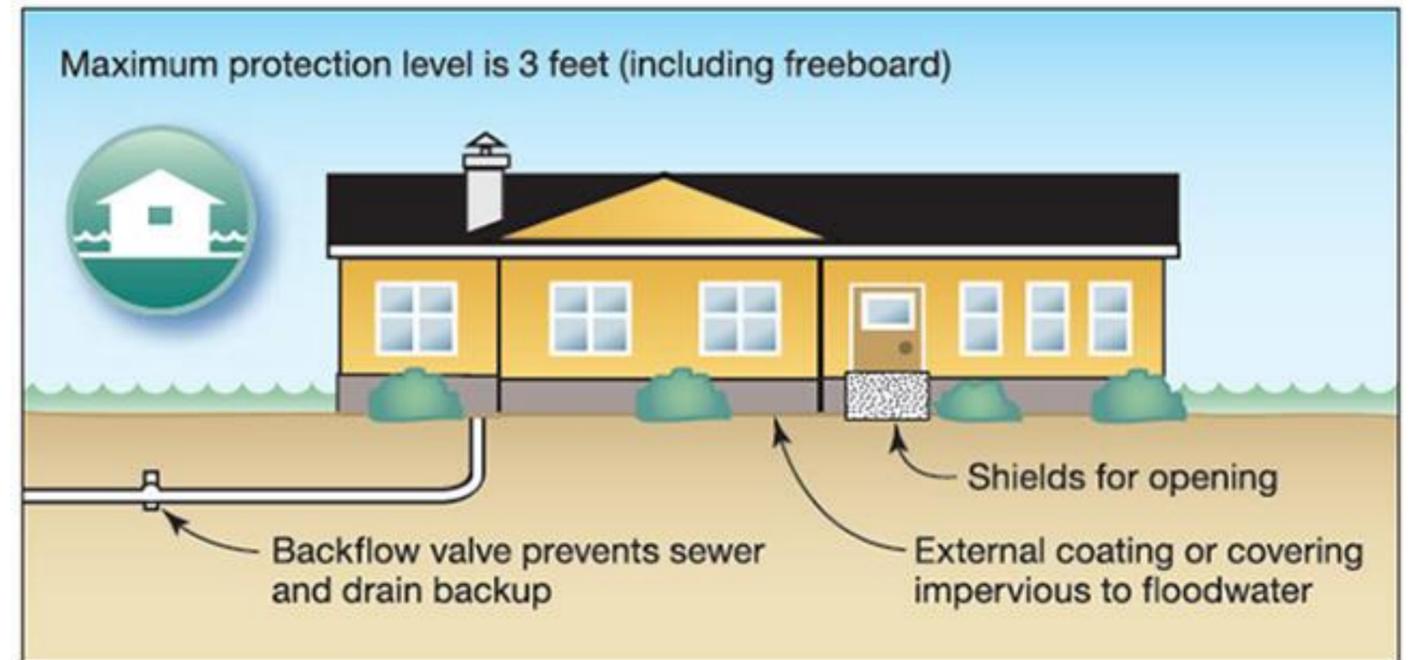
- Check for slope away from basement walls
- Check for settling around perimeter of foundation
- Look for cracks in driveways, walkways and patios next to foundation walls and seal where needed.
- Adjust window wells to be at least 300mm below the bottom of the basement windowsills and fill with loose gravel.
- Consider purchasing deployable flood barriers (shown below)

Sump Pump/Foundation Drainage

- Regularly check that sump pump functions and has power. Consider a backup power for your sump pump.
- Check the outside discharge pipe to confirm water is flowing away from the house.
- Disconnect sump pump extension pipe in winter to avoid freezing the line

Backflow Valve (Sanitary Sewer)

- Consider installation of a backflow valve to protect from sanitary backups.
- Regularly inspect mechanics to make sure it is functioning.



Community Action Planning – Channel Maintenance

Channel Maintenance

- Recent flooding events, experienced during a period of low Lake Erie water levels, highlights the need for ongoing monitoring and maintenance of Six Mile Creek, including monitoring of outlet conditions along the lakeshore, removing fallen trees and debris blocking the channel and culverts, and identifying beaver activity along the watercourse that might increase flooding risk.
- Niagara Peninsula Conservation Authority is committed to working with municipal partners and landowners to address flooding concerns but does not own or maintain local creeks and rivers on private property.
- Potential for local landowners to coordinate maintenance activities to improve the conveyance capacity of Six Mile Creek and reduce flooding potential, particularly along Lake Erie's dynamic beach (photos illustrate free flowing versus restricted outlet to lake).

Notes/Comments

- Proactive maintenance may be less costly than other flood protection alternatives.



Next Steps

Select Preferred Alternative based on Public and Stakeholder Input

- Finalize the selection of the preferred alternative based on feedback received at this PIC and subsequent stakeholder input.
- Prepare EA documentation and seek Agency, Indigenous Communities, and stakeholder approval.

Future Work

- Place EA document on public record.
- Issue a 'Notice of Completion' and facilitate 30-day review period.
- Initiate Implementation phase upon identification of funding mechanisms and complete enhanced preliminary design tasks.



Project Schedule

Project Initiation and Initial Consultation Process (PIC No. 1)	Fall 2023	✓
Study Area Investigations	Winter 2024 into Spring 2024	✓
Development of Mitigation Alternatives and Public Information Centre (PIC No. 2)	Spring 2024	✓
Evaluation of Alternatives & Preliminary Preferred Alternative and Public Information Centre (PIC No. 3)	Spring 2025	⏪
Completion of EA Process and Enhanced Conceptual Design	Fall 2025	
Implementation of the EA Recommendation	Stay tuned for the recommendations of the study!	

Tell Us Your Thoughts!

No final decisions have been made on preferred solution(s). This is your opportunity to provide input to this decision.

Please provide feedback on the evaluation of alternatives. Your feedback is essential!

Please take a copy of the survey and fill it out. Or fill out the online version at <https://letstalk.forterie.ca>

Our project team is here to answer any questions you might have!

Further study information is available at:
<https://letstalk.forterie.ca/>.

Comments from this evening's PIC will be received until June 6, 2025.

For additional information, please contact:

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Thank you for attending!

