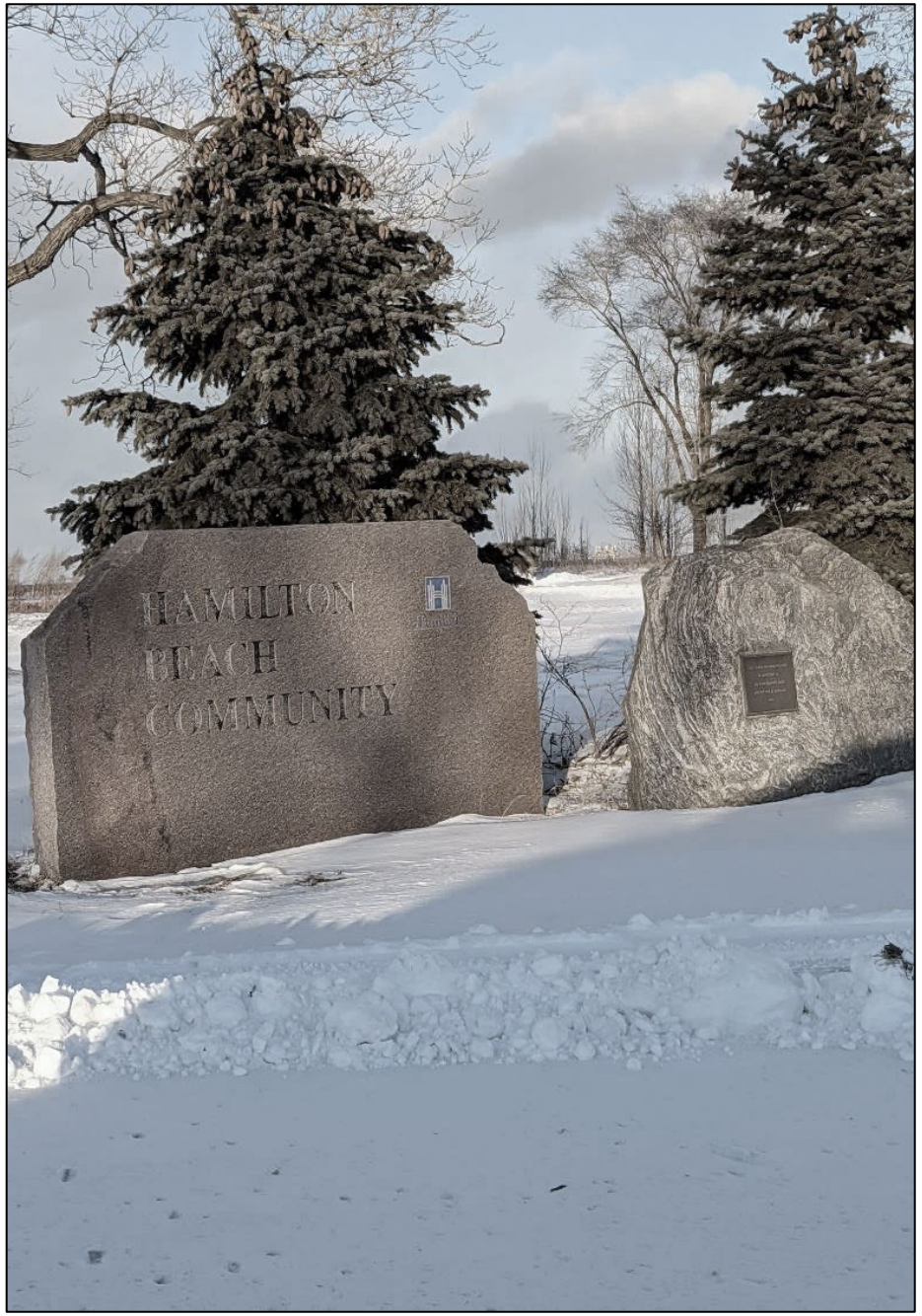

Hamilton

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Flood Remediation Study for Beach Boulevard Community, Hamilton, Ontario

Public Information Centre #2

June 21, 2023 – July 7, 2023

Purpose of this Public Information Centre

- The City of Hamilton is undertaking an environmental assessment study to investigate the causes of flooding in the Beach Boulevard Community and identify solutions to address the flooding problem.
- Public Information Centre #1 was hosted from May 16, 2022, to May 31, 2022, to introduce the Class EA Study. The purpose of this second and final Public Information Centre is to share:

Overview of the Study (Study Area, Study Process, and Problem Statement)

Technical Studies Completed to Date

Results of Modelling (identifying deficiencies in the existing drainage system and flooding areas)

Identification and Evaluation of Alternative Solutions

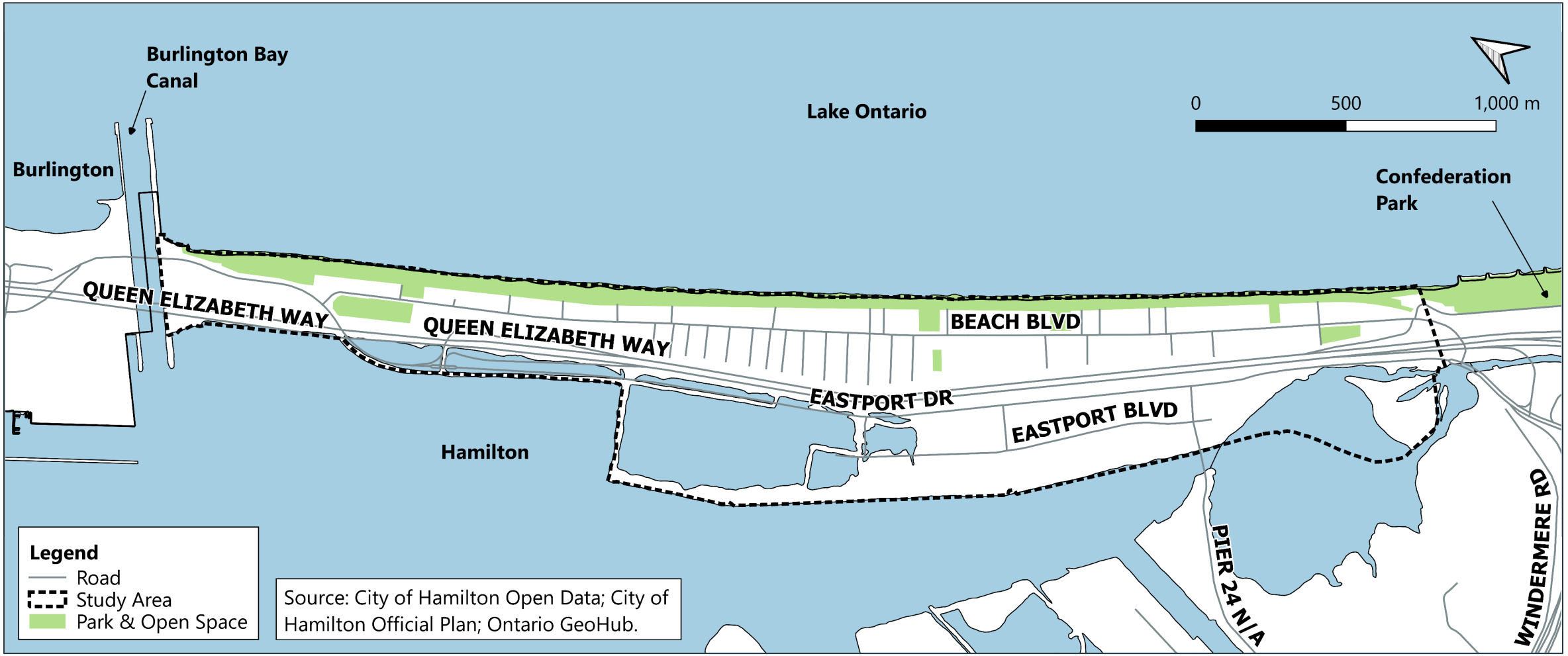
Preliminary Recommended Solutions to address the flooding problem in the Beach Blvd Community

Next Steps in the Project

We encourage you to review information in this presentation and provide feedback through the project webpage: https://www.hamilton.ca/beach-boulevard-community-flood-remediation-study

Study Area Overview

The Beach Boulevard Community is a waterfront community in City of Hamilton. It is bounded by Lake Ontario to the east, Hamilton Harbour to the west, Burlington Canal Lift Bridge to the north and Confederation Park to the south. **The focus of this study is primarily on the residential area on the east side of the QEW.**



Study Process

Municipalities in Ontario are required to follow the Municipal Class Environmental Assessment (Class EA) process when planning for infrastructure, such as sewers, roads, etc. The Class EA process is an approved process under Ontario's Environmental Assessment Act, 1990.

This environmental assessment study is being carried out in accordance with the **Municipal Class EA process for Master Plans (Approach #2)**. This approach will allow the City of Hamilton to identify a set of works which can be implemented over an extended period of time. This study will address Phases 1 and 2 of the Class EA process. This will be a sufficient level of detail to allow projects to proceed to design and construction.

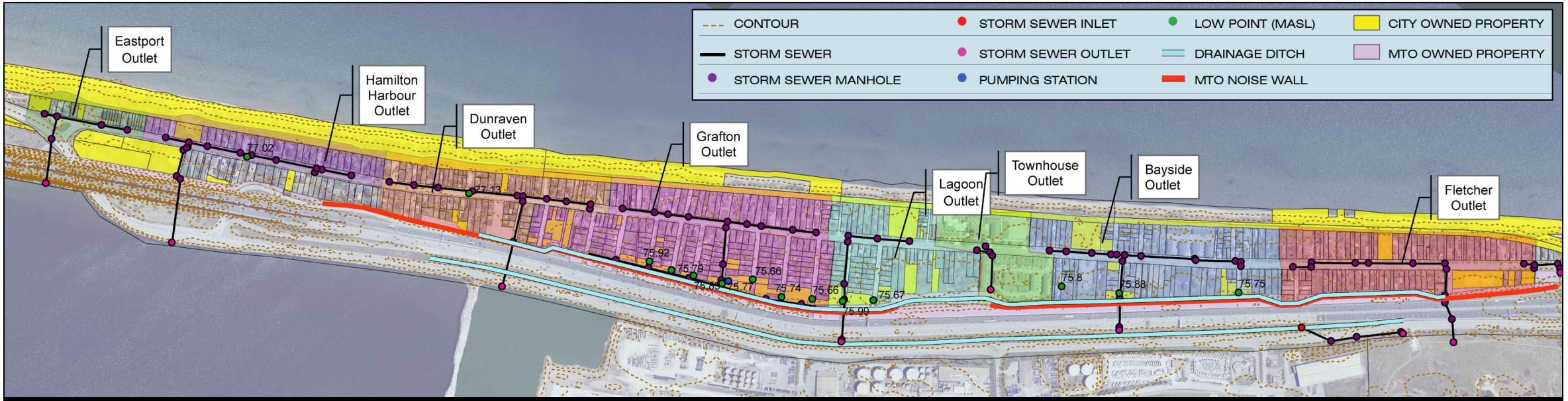
Phase 1 - Problem or Opportunity	Phase 2 - Alternative Solutions
Identify Problem or Opportunity	Identify Alternative Solutions to Problem or Opportunity
Discretionary Public Consultation to Review Problem or Opportunity	Inventory Natural, Social, Economic Environment
	Identify Impact of Alternative Solutions on the Environment and Mitigating Measures
	Evaluate Alternative Solutions. Identify Recommended Solutions
We Are Here	Consult Review Agencies and Public Re: Problem or Opportunity and Alternative Solutions

Problem Statement

The following Problem Statement was presented at the Public Information Centre #1 (May 16 - May 31, 2022):

The Beach Boulevard Community is a waterfront community in the City of Hamilton, that is bounded by Lake Ontario to the east and Hamilton Harbour to the west. Due to its proximity to Lake Ontario, low-lying flat topography, permeable geology (sandy soils), deficient storm drainage infrastructure, residential building form and drainage connections, and impacts of the QEW, the Beach Boulevard Community is prone to flooding.

The City of Hamilton is undertaking this study to investigate problems in detail and recommend solution(s) and develop a comprehensive plan for implementation.



Map showing existing storm network. Source: Beach Boulevard Community Stormwater Ponding Study, 2019 (City of Hamilton)

Baseline Inventory Report

A number of technical studies have been completed to:

- Develop an understanding of existing conditions within the study area; and,
- Identify constraints and opportunities to inform the evaluation of alternative solutions process.

These studies are:

- **Socio-Economic Review**
- **Hydrogeological (Groundwater) Review**
- **Stage 1 Archaeological Assessment**
- **Hydrologic and Hydraulic Assessment**
- **Cultural Heritage Assessment**
- **Lake Levels Review**
- **Natural Environment Assessment**
- **Infrastructure Review**

A Baseline Inventory Report (with input from the above studies) was made available on the project webpage for public viewing as part of the Public Information Centre #1. Information from these studies helped inform the identification of the preliminary recommended solution.

Assessing the Capacity of Existing Infrastructure

- A hydrologic (flows) and hydraulic (water levels) model was developed to assess the capacity of existing infrastructure and to determine the requirements for potential improvements.
- The modelling considered a combination of 5-year and 100-year storm return periods, and existing infrastructure, such as, storm sewers and culverts, and obstructions caused by buildings and noise walls.

Terminology:

Return period refers to the average probability of occurrence of a storm each year.

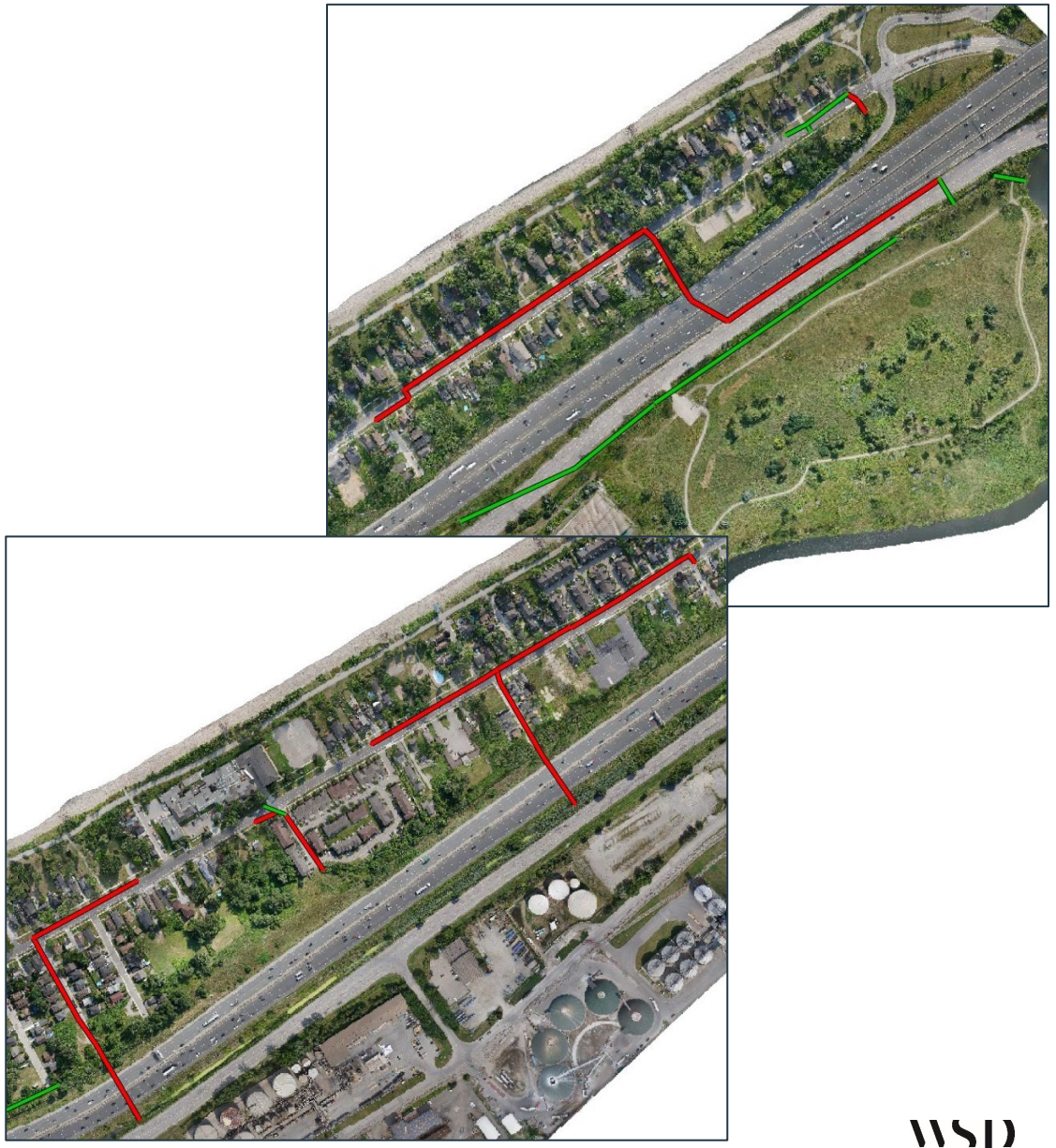
A ***minor system*** conveys urban drainage from relatively "minor" storms, typically having a frequency (return period) of up to a 5-year event. The minor system typically consists of storm sewers, inlet systems, catchbasins, etc.

A ***major system*** consists of above ground conveyance routes that transport stormwater in excess of the capacity of the minor system. Overland flow is typically to watercourses. The major system is typically designed to a 100-year event. The major system consists of consists of curbs, gutters, and swales.

Capacity of Existing Infrastructure

Modelling indicated that for a simulated 5-year storm event:

- **During average lake level conditions,** 49 out of 115 storm sewers surcharged, indicating approximately **41% deficiency (red lines in figures)**.
  - Sewers north of Grafton Pumping Station generally remained un-surcharged, except for the last sections at Dunraven Avenue and Harbour.
  - Storm sewers south of Lagoon Avenue consistently remained as surcharged.
- **During high lake level conditions,** 77 out of 115 pipes surcharged, indicating approximately **64% deficiency (red lines in figures)**.
  - All areas generally affected other than the Grafton Pumping Station and larger CSP along Eastport Drive



Areas with Flooding

- Modelling identified the following areas of higher depth surface ponding (greater than 0.30 m) during the simulated 100-year storm event:

1. Jimmy Lomax Park and QEW area
2. All channels and ditches
3. Area west of Sierra Lane
4. Area between Towers Drive and Bayside Avenue
5. Area between Kirk Road and Fletcher Avenue

Red *indicates ponding (>0.3m depth) during* ***average lake levels*** *and* ***purple*** *indicates ponding (>0.3m depth) during* ***high lake levels***

Identifying the Solution

To address the flooding issue in the Beach Boulevard Community, potential solutions were identified and evaluated to identify recommended solutions. This process followed the following three step approach:

Step 1	Step 2	Step 3
Identification of Long List of Potential Solutions	**Short-listing of Potential Solutions**	**Identification and Evaluation of Locations for a Pumping Station**
17 potential solutions were identified	Long list of potential solutions was reviewed to screen out solutions, based on their feasibility. Various works were recommended to be carried forward. One (1) solution (Pumping Station) carried forward for further evaluation.	Four (4) alternative locations for a Stormwater Pumping Station were identified and evaluated to identify a recommended location.

Step 1 (Long List of Potential Solutions)

The following long-list of potential solutions was identified:

1. Do Nothing

Capital Works

2. Upgrades to gravity storm sewers (including diversions and new lateral connections)
3. Improvements to inlet capacity (more catch basins)
4. Implementation of Storage systems
5. Stormwater pumping station
6. Surface grading modifications
7. Flood control barriers
8. Groundwater control systems (i.e., pumping) or barriers
9. Property Acquisitions

Operation and Maintenance

10. Inspection and condition assessment of existing infrastructure
11. Rehabilitation of existing drainage channels along the QEW and Eastport Drive

Policy

12. Prohibit basements though policy development and implementation
13. Consider a “basement filling” program
14. Establish building floodproofing standards
15. Confirm no increase in runoff from new developments
16. Backflow valve and sump pump subsidy programs

Additional Investigations

17. Investigate and reduce the potential entry of groundwater and stormwater into the sanitary sewer system (called inflow and infiltration).

Step 2 (Short-listing of Potential Solutions)

Potential Solution	Feasibility Assessment	Short-listed?
1: Do Nothing	No change; continued risk for future flooding.	**No**
2: Upgrades to Gravity Storm Sewers	Increasing size of storm sewers will allow more flow in pipes and will help reduce ponding and flooding of roads, ditches, and private properties. Consider implementing private lateral connections for residential sump pump connections.	**Yes**
3: Improvements to Inlet Capacity	Installing more catch basins or installing Inlet Control Devices in catch basins can be an effective approach to reducing the inflow to the minor system, therefore preventing surcharging of the minor system.	**Yes**
4: Implementation of Storage Systems	This solution would require significant amount of space on public and/or private property to provide on-line/off-line storage areas.	**No**
5: Stormwater Pumping Station	Stormwater Pumping Station is an effective way to manage stormwater. There is public space available to install pumping station. Pumping station option would require storm sewer to collect flow for the pumping station.	**Yes. Further Evaluation Required.**
6: Modifications to Grading within Road Right-of-Way	Raising the roadway profile can either reduce or eliminate potential flooding from roadways on private or public property.	**Yes**
7: Flood Control Barriers	Temporary flood control barriers are more appropriate for emergency flood conditions. Permanent flood control barriers, such as, dykes, berms, etc., would not be feasible for Study Area.	**No**
8: Groundwater Control Systems (i.e., pumping) or Barriers	These are complicated measures, and not a feasible option for Study Area.	**No**

Step 2 (Short-listing of Potential Solutions)

Potential Solution	Feasibility Assessment	Short-listed?
9: Property Acquisitions	No properties of sufficient concern identified to warrant acquisition for flood remediation only. May be considered if necessary as part of other works; to be confirmed as part of those solutions.	**No**
10: Inspection and Condition Assessment of Existing Infrastructure	Inspection of infrastructure (such as, storm sewers) in flooding areas can help identify deficiencies in the infrastructure and better inform the need for future remedial works (or not, if condition is acceptable).	**Yes**
11: Rehabilitation of Existing Drainage Channels	Rehabilitation of drainage channels would include sediment and vegetation removal, re-grading, etc. This will help improve flow of water through the drainage channels.	**Yes**
12: Prohibit Basements though Policy Development and Implementation	A by-law (99-169) prohibiting basements is already in place but only for west side of Beach Blvd. It is suggested that by-law is expanded to also include the area on the east side of Beach Blvd.	**Yes**
13: Basement Filling Program	Was suggested in a previous study; however unlikely to receive much public uptake.	**No**
14: Establish Building Floodproofing Standards	Expand existing by-law to include full area; recommend that any re-builds in the area use 76.0 m or are required to validate floodproofing against information in the current study.	**Yes**
15: Confirm No Increase in Runoff from New Developments	Require that all new developments control runoff where enforceable (i.e., subject to site plan control or other allowable mechanisms).	**Yes**
16: Backflow Valve and Sump Pump Subsidy Programs	Existing programs are in place (City-Wide). No specific program recommended for this area.	**No**
17: Inflow and Infiltration Investigation	Inflow and Infiltration Investigation will help identify and reduce any potential entry of groundwater and stormwater into the sanitary sewer system, which could cause water to back up into basements.	**Yes**

Step 2 (Preliminary Recommended Solutions)

The following are carried forward as **preliminary recommended solutions** to address deficiencies in the Study Area:

Recommended Works	Location / Limits
Storm Sewer Inspection	1. Eastport Outlet – QEW crossing 2. Lagoon Outlet – QEW crossing 3. Trunk storm sewer between Eastport Channel and Windemere Basin Park
Storm Sewer Replacement	4. Harbour Outlet – QEW crossing (twin or larger replacement) 5. Dunraven Outlet – QEW crossing (twin or larger replacement)
New Storm Sewer Installation	6. Wark Outlet – QEW crossing for proposed pumping station 7. Connection from Eastport Ditch to Harbour opposite Dunraven

Notes:
The recommended solutions may be refined (added or excluded following consultation with the public, government agencies, Indigenous Nations, and key stakeholders.

MTO is planning to rehabilitate (clean out and re-grade) the ditch on the east side of QEW. Ditch is proposed to be restored by the City following storm sewer installation works.

Step 2 (Preliminary Recommended Solutions)

The following are carried forward as **preliminary recommended solutions** to address deficiencies in the Study Area:

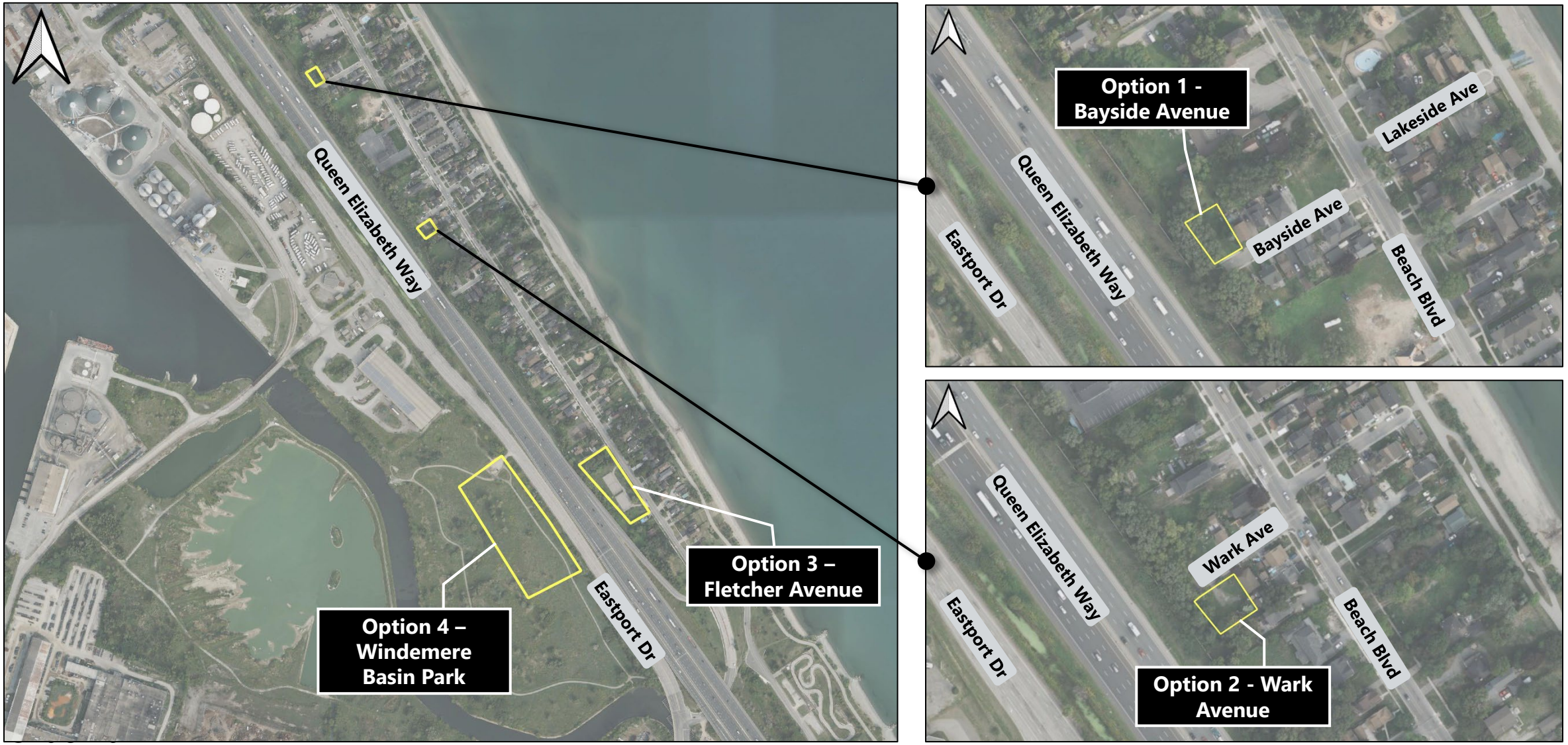
Recommended Works	Location / Limits
New Storm Sewer Installation and Ditch Restoration	8. On the east side of QEW from Towers Dr to Van Wagners Drive (to support pumping station construction)
Ditch Rehabilitation	9. Ditch between Eastport Drive and the QEW 10. Ditch between Windemere Basin Park and Red Hill Creek
Modifications to Road Grading	11. On Eastport Dr at Beach Blvd intersection (sag point)

Notes:
The recommended solutions may be refined (added or excluded following consultation with the public, government agencies, Indigenous Nations, and key stakeholders.

MTO is planning to rehabilitate (clean out and re-grading) the ditch on the east side of QEW. Ditch is proposed to be restored by the City following storm sewer installation works.

Step 3 (Identification and Evaluation of Locations for a Pumping Station)

Pumping Station Option was further evaluated. The following four locations were identified and evaluated for a stormwater pumping station:



Step 3 (Identification and Evaluation of Pumping Station Locations)

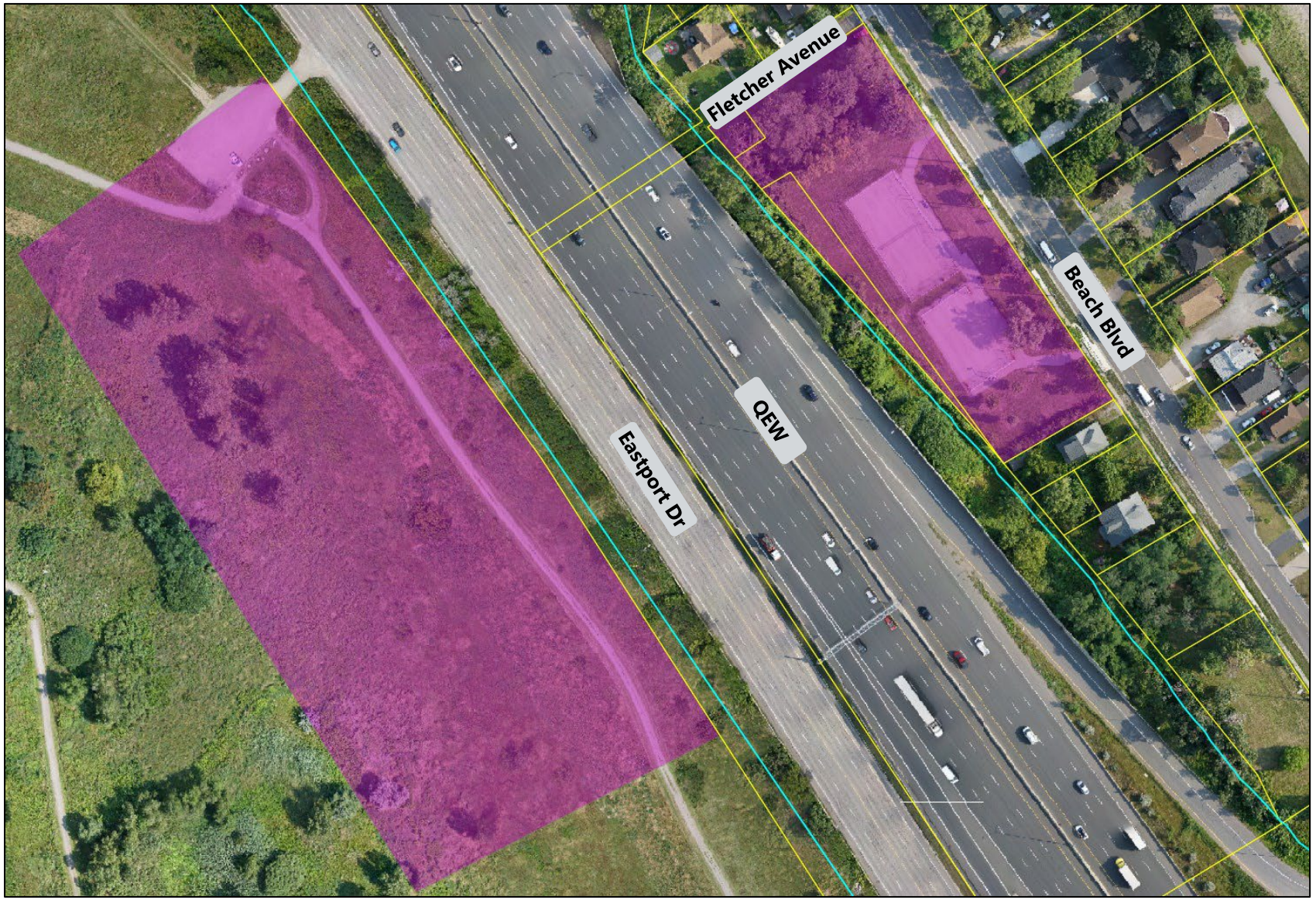
Location Option 1: Bayside Avenue

Step 3 (Identification and Evaluation of Pumping Station Locations)

Location Option 2: Wark Avenue

Step 3 (Identification and Evaluation of Pumping Station Locations)

Location Options 3 and 4: Fletcher Avenue and Windemere Basin Park



Step 3 (Evaluation Criteria)

Technical Evaluation of Pumping Station Locations

Thorough due diligence was completed in determining a preferred location for the stormwater pumping station. Existing stormwater model was used to assess expected stormwater flows for pumping station options. For this exercise, the expected flows were generally comparable to the flows for the existing Grafton Pumping Station. Similar assumptions were made for the Grafton Pumping Station, i.e.:

- New gravity storm sewers would be required along QEW ditch with regular inlets to direct flows to pumping station
- Improved grading of ditch to the extent possible to promote positive overland flow

Additional considerations included preliminary sizing for storm sewers; minimum pipe slopes considering flat terrain; potential utility crossings\conflicts, and requirements for new sewer crossing under QEW was considered for pump station discharge.

Apart from the above considerations, the preferred location for the stormwater pumping station was identified based on the evaluation of impacts on the following:

Technical Considerations

Economic Environment

Climate Change

Social Environment

Cultural Environment

Natural Environment

Step 3 (Evaluation of Location Options for the Pumping Station)

- Location options were assigned scores ranging from 1 (highest effects or least benefits) to 5 (least effect or highest benefits), depending on their effects/benefits.
- Each criterion was assigned a weighted score. Score for each option was converted into weighted score of the evaluation criteria.
- **Location Option 2 – Wark Avenue** received the highest score and was recommended as **preferred location for the Stormwater Pumping Station**.

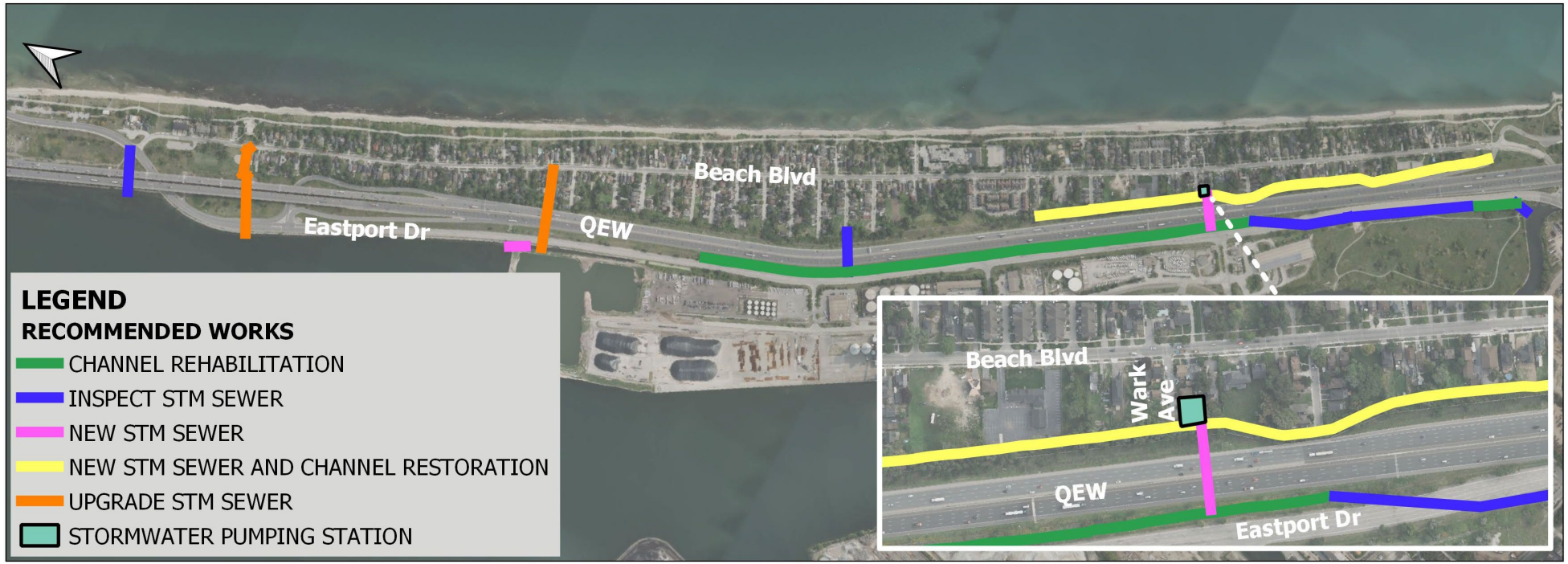
Criteria	Weight	Location 1 - Bayside Avenue		Location 2 - Wark Avenue		Location 3 - Fletcher Avenue		Location 4 - Windermere Basin Park	
		Score (1 to 5)	Weighted Score	Score (1 to 5)	Weighted Score	Score (1 to 5)	Weighted Score	Score (1 to 5)	Weighted Score
Technical Considerations	27.5%	13	20.5%	20	27.5%	18	25.5%	17	24.5%
Social Environment	32.5%	14	23.5%	19	31.5%	14	26.5%	14	26.5%
Economic Environment	10.0%	7	7.0%	10	10.0%	9	9.0%	8	8.0%
Cultural Environment	10.0%	9	9.0%	9	9.0%	9	9.0%	10	10.0%
Natural Environment	10.0%	8	8.0%	9	9.0%	9	9.0%	9	9.0%
Climate Change	10.0%	9	9.0%	9	9.0%	9	9.0%	9	9.0%
Total	**100.0%**	**60**	**77.0%**	**76**	**96.0%**	**68**	**88.0%**	**67**	**87.0%**

Preliminary Recommended Location for Stormwater Pumping Station

Location 2 (Wark Avenue) is preferred location, due to:

- Construction of pumping station at this location is expected to be straightforward (fewer complexities) compared to other assessed locations; storm sewers are shallower.
- No private property purchase will be required; ample public land on both sides which will also help construction staging.
- Installation of pumping station at this location would primarily be in areas that have been anthropogenically influenced, including cultural vegetation communities and manicured areas. Minor vegetation/tree removal will be required to install pumping station at this location. Effects to the terrestrial ecosystem associated with storm sewer installation are anticipated to be minor as majority of the vegetation and tree removal would already have been completed as part of MTO's ditch rehabilitation works. Ditch will be restored following installation of the storm sewer.
- Direct effects to built heritage resources or cultural heritage landscapes are not anticipated. Stage 2 archaeological assessment (and any subsequent assessment, if recommended) would be required prior to any ground disturbance activities.

Summary of All Preliminary Recommended Solutions



RECOMMENDED WORKS	LOCATION / LIMITS
Storm Sewer Inspection	1. Eastport Outlet – QEW crossing 2. Lagoon Outlet – QEW crossing 3. Trunk storm sewer between Eastport Channel and Windemere Basin Park
Storm Sewer Replacement	4. Harbour Outlet – QEW crossing (twin or larger replacement) 5. Dunraven Outlet – QEW crossing (twin or larger replacement)
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New Storm Sewer Installation and Ditch Restoration	8. On the east side of QEW from Towers Dr to Van Wagners Drive (to support pumping station construction)
Ditch Rehabilitation	9. Ditch between Eastport Drive and the QEW 10. Ditch between Windemere Basin Park and Red Hill Creek
Modifications to Road Grading	11. On Eastport Dr at Beach Blvd intersection (sag point)
Stormwater Pumping Station	12. Stormwater Pumping Station on Wark Avenue

Advantages of the Recommended Solutions

- It is expected that the recommended solutions will collectively help reduce flooding on roads, public and private properties, in ditches, etc. within the Beach Boulevard Community.
- Installing new storm sewers and increasing the size of existing storm sewers will allow more water flow in pipes.
- Rehabilitation of ditches will provide additional conveyance capacity within the ditches.
- Modifications to road grading on Eastport Drive at Beach Boulevard intersection (sag point) will help improve flow conveyance and prevent localized flooding.
- The proposed Wark Ave Stormwater Pumping Station will help pump water away from the residential area to the Eastport Drive ditch.

Storm Sewer Installation

Existing Eastport Ditch

Existing Grafton Pumping Station

Additional Recommended Measures

In addition to the primary preferred solutions, the following additional recommendations have been generated through this study assessment:

1. Inspect and assess condition of key storm sewer infrastructure and determine need for rehabilitation or reconstruction works.
2. Consider increased storm sewer inlet capacity where feasible.
3. Undertake an investigation to assess and reduce the potential entry of groundwater and storm water (inflow and infiltration) into the sanitary sewer system.
4. Prohibit construction of new basements in the entire area through policy development and implementation.
5. Establish consistent building floodproofing standards throughout the entire study area.
6. Ensure that all new developments do no result in any increase in runoff to existing drainage systems. Existing by-law is implemented through Site Plan Approval process.

Potential Environmental Effects and Environmental Protection Measures

- Following this Public Information Centre, a Project File Report (Master Plan) will be developed. This document will outline the planning and consultation process for this Class EA Study.
- The Master Plan document will also discuss the potential effects of the various recommended solutions on the environment, required environmental protection measures, and any commitments for further technical studies for the following:

Technical Environment: Potential effects on public and private infrastructure (i.e., utilities), required protection measures and future consultation/coordination with the utility comments.

Social Environment: Potential effects on the community, recreational areas (parks, etc.), traffic, air quality, noise, etc., and required protection measures.

Cultural Environment: Potential effects on lands identified to retain archaeological potential and built heritage resources and cultural heritage landscapes and required protection measures. For example, the proposed pumping station will be designed to be visually compatible, subordinate to, and distinct from surrounding heritage resources.

Natural Environment: Potential effects on terrestrial ecosystem and aquatic ecosystem and required protection measures.

In addition to above, the Master Plan will also identify any required permits and approvals that will be required prior to starting the construction activities.

Next Steps

- Review comments received as part of this Public Information Centre
- Confirm the Recommended Solution
- Prepare and Issue Master Plan Report for Public Review (Anticipated for Summer / Fall 2023)

Thank you for your participation!

Thank you for taking the time to review this information. We encourage you to complete the **electronic comment form** by **July 7, 2023,** to provide feedback on the preliminary recommended solution.

Alternatively, you can send your comments to:

Hanna Daniels
Manager, Water and Wastewater Systems Planning
Hamilton Water, City of Hamilton
Hanna.Daniels@hamilton.ca