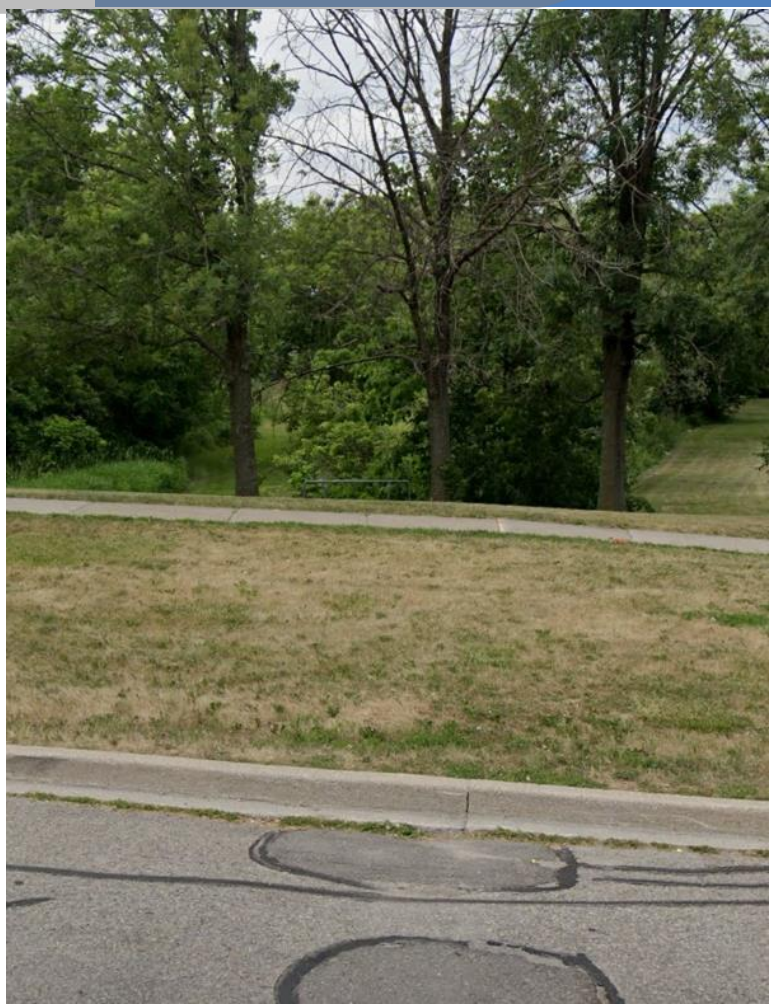
Prepared for:

Town of Oakville

REPORT PREPARED FOR:

SAVILLE AREA – STORMWATER SYSTEM IMPROVEMENTS MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT AND CONCEPTUAL DESIGN



A draft report submitted by:

Aquafor Beech Ltd.

July 19, 2024

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EXECUTIVE SUMMARY

INTRODUCTION

Aquafor Beech Limited has been retained by the Town of Oakville (the Town) to undertake a Class Environmental Assessment for improvements to the stormwater system in the Saville Area. Recommendations for improvements to the major and minor storm drainage system within the Saville Area were originally identified in the Town's Stormwater Master Plan (2020); this Class EA Study is intended as a follow-up study to the Stormwater Master Plan, specifically in Networks 17 and 18. The Study Area is located in the Town of Oakville and was originally constructed in the mid to late 1950's. The existing drainage system is comprised of a mixture of ditches and subsurface storm sewer systems located within the municipal right-of-way and within private properties. Recently, residential properties in the Saville Area have been redeveloping into larger homes with a higher proportion of impervious areas vs. pervious areas when compared to existing conditions.

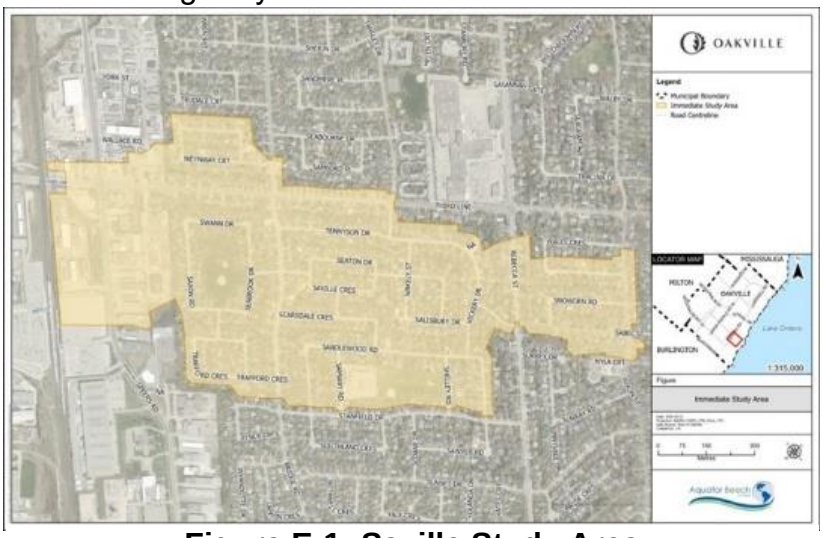


Figure E-1: Saville Study Area

Halton Region (the Region) completed a basement flooding investigation in 2022 and determined that the causes of the reported basement flooding are attributed to sanitary sewer surcharging as a result of excessive rainwater-induced inflow and infiltration (I/I) as well as various private side issues, including water use while backwater valves are closed, stormwater entering basement drains while sump-pump backwater valves are closed, and sump pump failure/sump pit overflow. As a result of these findings, the Region of Halton will be undertaking a water and wastewater system improvement project starting in 2025 to address the basement flooding issues in the Study Area. To coordinate with the Region's water and wastewater system improvements, the Town has carried out this Class EA Schedule B study to:

- Reduce or eliminate nuisance flooding and to improve the drainage capability of the Saville Area stormwater infrastructure;
- Provide and evaluate stormwater management alternatives including:
    - Storm sewer upgrades
    - Culvert and ditch upgrades
    - Stormwater detention implementation
    - Low Impact Development (LID) & Green Infrastructure (GI) practices

STUDY PURPOSE

The overall objective of this Class EA is to identify drainage deficiencies and potential opportunities for stormwater system improvements in the Saville Area and to evaluate alternative solutions that mitigate flooding.

Additional objectives include assisting the Region of Halton with the reduction of inflow and infiltration to the Region's sanitary sewers and to reduce downstream storm sewer capacity issues, if feasible. The project is intended to coincide with the Region's proposed sanitary and watermain upgrades which represents an opportunity to upgrade and construct new stormwater infrastructure at the same time to reduce project costs and minimize construction related disruptions in the community.

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA) PROCESS

The current study has been classified as a Schedule 'B' project and follows Phases 1 and 2 of the planning and design process with Phase 5 to follow at a subsequent stage. This report outlines Phases 1 and 2 of the EA process.

PHASE 1 – PROBLEM AND OPPORTUNITY DEFINITION

The Saville Crescent/Seaton Drive neighborhood is serviced by a roadside ditch network that provides local drainage for storm flows within the neighborhood. Over time, the ditches have been filled with sediment, overgrown with vegetation and driveway cross culverts have deteriorated or have become blocked, creating flow impediments within the system. In addition to these local conveyance issues, external major system flows enter the neighborhood under larger storm events (5-year event and greater). The flooding issue within the Saville Crescent/Seaton Drive neighborhood is further exacerbated by downstream sewers with limited capacity to remove water from the area due to surcharging during the 5-year event. The Broader Study Area is serviced by a combination of a roadside ditch network as well as a network of storm sewers. The storm sewers and ditches within the Broader Study Area provide conveyance of the minor system runoff (5-year event and less) while the road network provides conveyance of major system runoff. There is a sewershed divide within the Broader Study Area with the eastern portion of the storm sewer network contributing to the trunk storm sewer on Rebecca Street and conveying runoff to Fourteen Mile Creek. The western portion of the storm sewer network is conveyed to the Sabel Street/Hixon trunk storm sewer which outlets directly to Lake Ontario. Conveyance issues within the ditch drainage system of the Broader Study Area also exist and therefore alternative solutions will need to address ditch conveyance issues within the Broader Study Area as well.

The 2020 Master Plan identified the surcharging condition of the downstream sewers, and recommended the implementation of subsurface stormwater detention within the Rebecca Gardens Park to alleviate downstream surcharging. The 2020 Master Plan also identified upsizing of the sewers on the Sabel Street/Hixon trunk sewer network to alleviate downstream surcharging.

The Study Area is located within an upstream portion of the sewershed as defined in the Town 2020 Stormwater Master Plan. The portion of the sewershed south of Rebecca Street was identified as having restricted capacity in the 2020 Master Plan. As such, any improvements to the upstream drainage area must be demonstrated to not exacerbate the existing capacity limitations south of Rebecca Street and, if possible, improve downstream conveyance capacity.

PHASE 2 - EVALUATION OF ALTERNATIVE SOLUTIONS

Definition of Existing Conditions

A variety of information was collected and reviewed in order to define existing conditions. In addition to collecting and reviewing existing information, fieldwork was undertaken in order to better define existing conditions.

A summary of the existing conditions is provided below.

Natural Environment

A desktop review of geotechnical and soils conditions was completed by Aquafor Beech at the outset of the project. No well records were identified in the immediate Saville Crescent and Seaton Drive Study Area. The Ontario Soil Survey Complex and the 1971 Soils of Halton County Soil Survey Report both classified the Study Area as lying within a the designated ‘Urban Area’, and thus no soil data could be referenced from this mapping.

A desktop environmental evaluation was completed by Aquafor Beech in 2022 for the Study Area. Natural features in the Study Area are limited to two parks that serve the community (Seabrook Park and Rebecca Gardens Park) which contain mostly mown grass and sports amenities. A small number of trees are also noted on residential lawns, street boulevards, and rear lot lines. A review of past and potential Species at Risk (SAR) records for the area did not result in the identification of any SAR that could make use of the limited habitat features in the Study Area, with the exception of one or more bat species which could feasibly roost in treed areas providing suitable features (e.g., large old trees, cavity trees, dead/dying snags, trees with cracks or sloughing bark).

Socio-Economic Environment

The Saville Area is comprised of a residential neighborhood within the community of Oakville (designated RL2-0 land-use). Single-family dwelling properties is the primary development within the area, with a small portion of industrial lands located at the northern boundary. There are two parks (designated O1 land-use) that lie within the Study Area; Seabrook Park and Rebecca Gardens Park. The Gladys Speers Public School (designated CU land-use) also lies within the Study Area.

The area is primarily bounded by the Canadian National (CN) railroad tracks to the north, Third Line to the east, Rebecca Street to the south, and Stanfield Drive to the west. Industrial development abuts the northern limit of the area, and additional

residential development abuts the east, south, and west limits of the area. Single-family residential properties abut the western and northern limit of the Study Area.

Third Line is a major north-south arterial that extends through the area in Oakville, and includes ramp access to the Queen Elizabeth Way (QEW) north of the Study Area. Therefore, it acts as a significant access point for the surrounding residential neighborhood.

The Bronte GO Station is located north of the Study Area providing public transit access to the Lakeshore West rail line.

Aquafor Beech completed the Ministry of Tourism, Culture, and Sport's Archaeological Resources, Built Heritage, and Cultural Heritage Landscapes criteria evaluation form. The screening form results yielded low archaeological potential for the Study Area.

Technical Environment

The Town-wide PCSWMM model of the Town's minor and major drainage system was obtained by Aquafor Beech and expanded upon. Background reviews, site visits, surveys, and infrastructure assessments were completed to supplement the original model that was obtained to better represent in-field conditions and to increase the accuracy of output data.

Additionally, ditch and culvert assessments were completed for both the Saville Crescent Area and the extended Immediate Study Area to inform on the condition of City-owned infrastructure throughout the Study Area (driveway culverts in Oakville are privately owned).

The key findings from the PCSWMM model are summarized as follows:

- In areas where ditches are shallow, where ditch grading does not allow for proper drainage, or where blockages within the ditches exist, adequate conveyance is not provided and overtopping is expected to occur (i.e flooding);
- A significant portion of the flow at the intersection of Bridge Road and Seaton Drive is conveyed southward, and externally contributes to the local ditch system on Saville Crescent/Seaton Drive;
- Surcharging occurs under the 5-year storm within the storm sewers downstream of the Saville Crescent/Seaton Drive neighborhood and there is no capacity in the system at these locations to convey additional flows;
- The main trunk sewers located at the outlet points for the Immediate Study Area appear to be functioning normally, providing conveyance of the majority of flow within the storm sewers under the 5-year storm; and
- Surcharging of the main trunk sewers does occur under the 100-year storm.

EVALUATION OF ALTERNATIVES

Eight alternative solutions were initially developed to address the problem and associated issues as noted above. The eight alternatives are described briefly below.

Alternative #1 – Do Nothing

This alternative is required under the Environmental Assessment process to be carried forward as a benchmark alternative. This would involve maintaining the existing conditions within the Study Area, including both the internal drainage characteristics of the ditch, sewer, and culvert system as well as the external drainage characteristics that introduce additional flows from outside of the Study Area.

No conveyance or capacity improvements would be undertaken as part of this alternative.

Alternative #2 – Capture Alternative

This alternative involves analysis of catch basin sizing, spacing, configuration, inlet control devices and optimization of on-grade and sag locations, including culvert inlet conditions (projecting, mitered, headwalls to address peak flows and reduce flooding.

Upon technical evaluation, it was found that this alternative could not meet the goal of the study to mitigate flooding. It was therefore eliminated and not carried forward to the evaluation process.

Alternative #3 – Ditch Drainage System Improvements

This alternative involves upgrading the existing local ditch network that services select areas including the Saville Crescent and Seaton Drive Area. This alternative was split into two sub-alternatives to assess with and without Low Impact Development (LID) features. The extent of works would involve:

- Re-grading ditches to provide positive drainage;
- Cleaning out existing culverts that are blocked with sediment/debris;
- Replacing culverts that are undersized/underperforming;
- Re-directing local (minor) flows to outlets that can adequately convey flows downstream; and
- Incorporating LID measures where feasible.

Alternative #4 – Storm Sewer System Improvements

This alternative involves upgrading and/or replacing deficient subsurface pipe networks (minor system) in the Broader Study Area, including new or upgraded pipes to capture drainage from external areas under higher intensity storms. This alternative was split into two sub-alternatives to assess with and without Low Impact Development (LID) features. This alternative would also include:

- Re-directing flows south and west of the Saville Area to the downstream outlet;
- The evaluation of oversize pipe storage (inline storage/superpipes) within the right-of-way, and
- Incorporating LID measures where feasible.

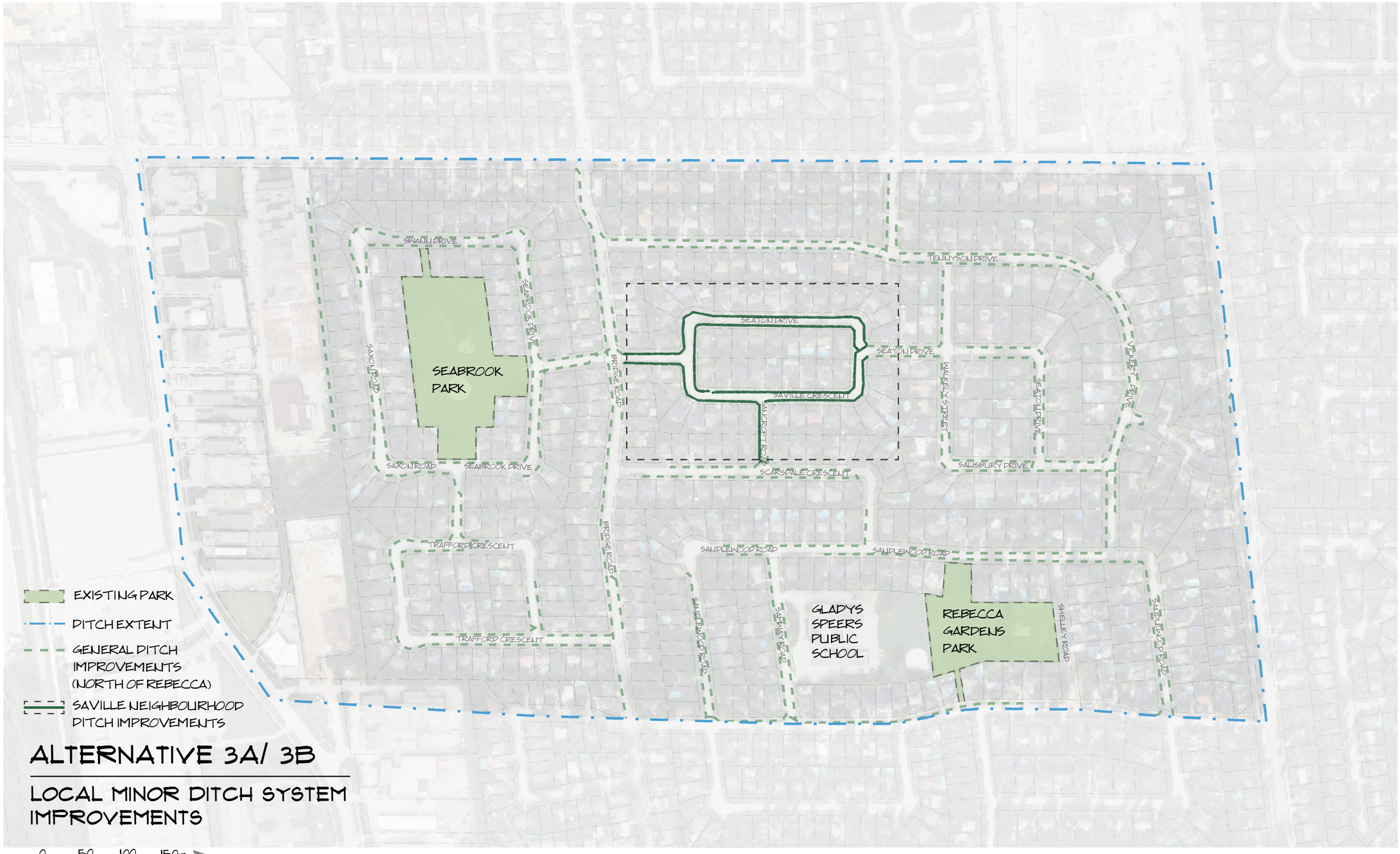


Figure E-2: Alternative 3A/3B - Ditch Drainage System Improvements

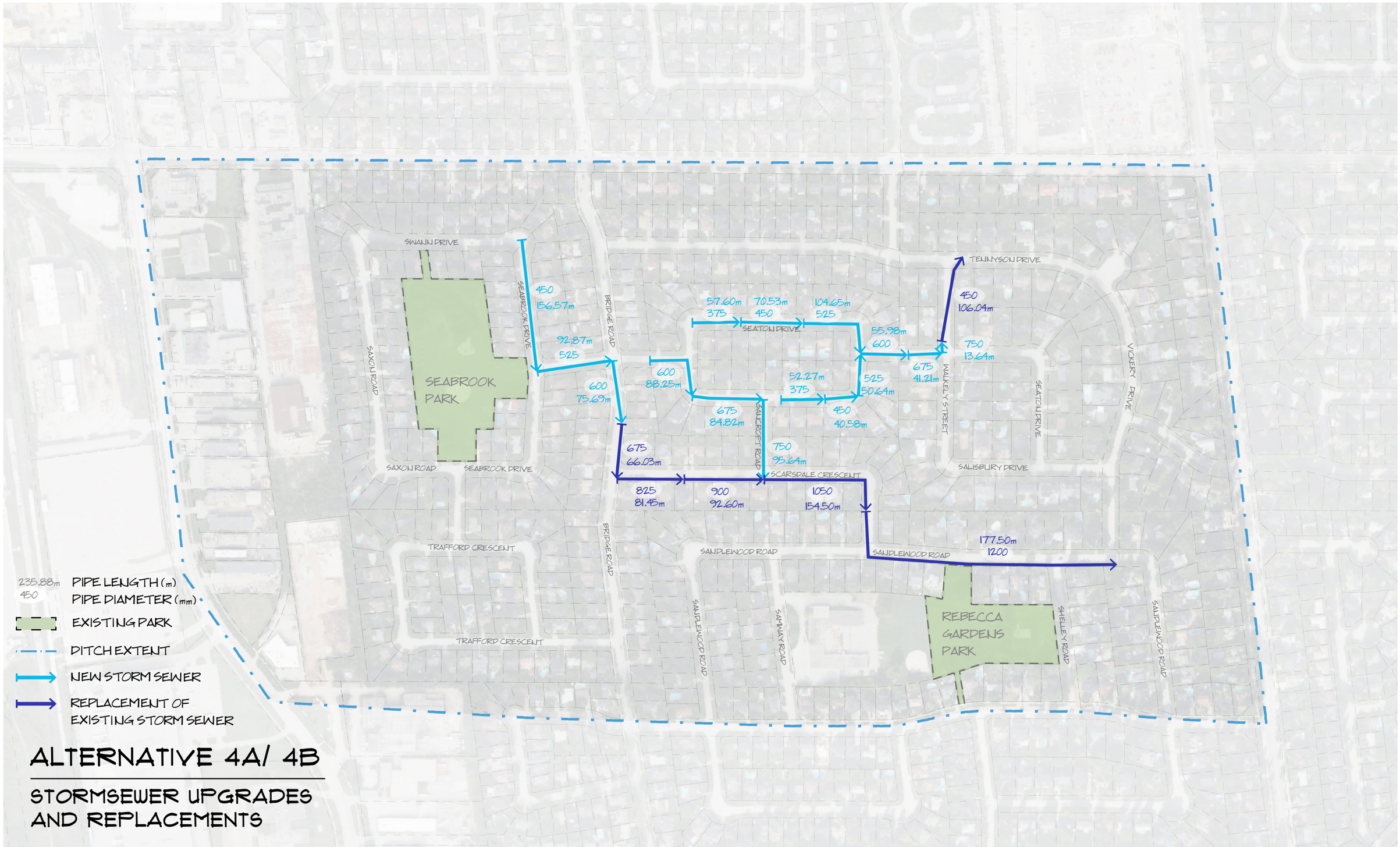


Figure E-3: Alternative 4A/4B - Storm Sewer System Improvements

Alternative #5 – Stormwater Detention Options at Seabrook Park

Under various storm events, flows from external drainage areas are introduced into the major/minor drainage system causing capacity issues in the downstream network. This alternative involves intercepting flows in the headwaters of the drainage system, and providing quantity control measures within the Seabrook Park area to alleviate downstream capacity issues and reduce flooding. Three sub-alternatives were assessed:

- Surface stormwater detention
- Subsurface stormwater detention
- Subsurface stormwater detention with LID features

Alternative #6 – Stormwater Detention Options at Rebecca Gardens Park

This alternative involves the implementation of stormwater detention within Rebecca Gardens, as per the preferred recommendation of the Town of Oakville Stormwater Master Plan (2020). This alternative involves intercepting flows generated from the headwaters of the drainage system and providing quantity control measures downstream at the Rebecca Gardens Park. Three sub-alternatives were assessed:

- Surface stormwater detention
- Subsurface stormwater detention
- Subsurface stormwater detention with LID features

Alternative #7 – Flow Diversion at Sabel Street/Hixon Street

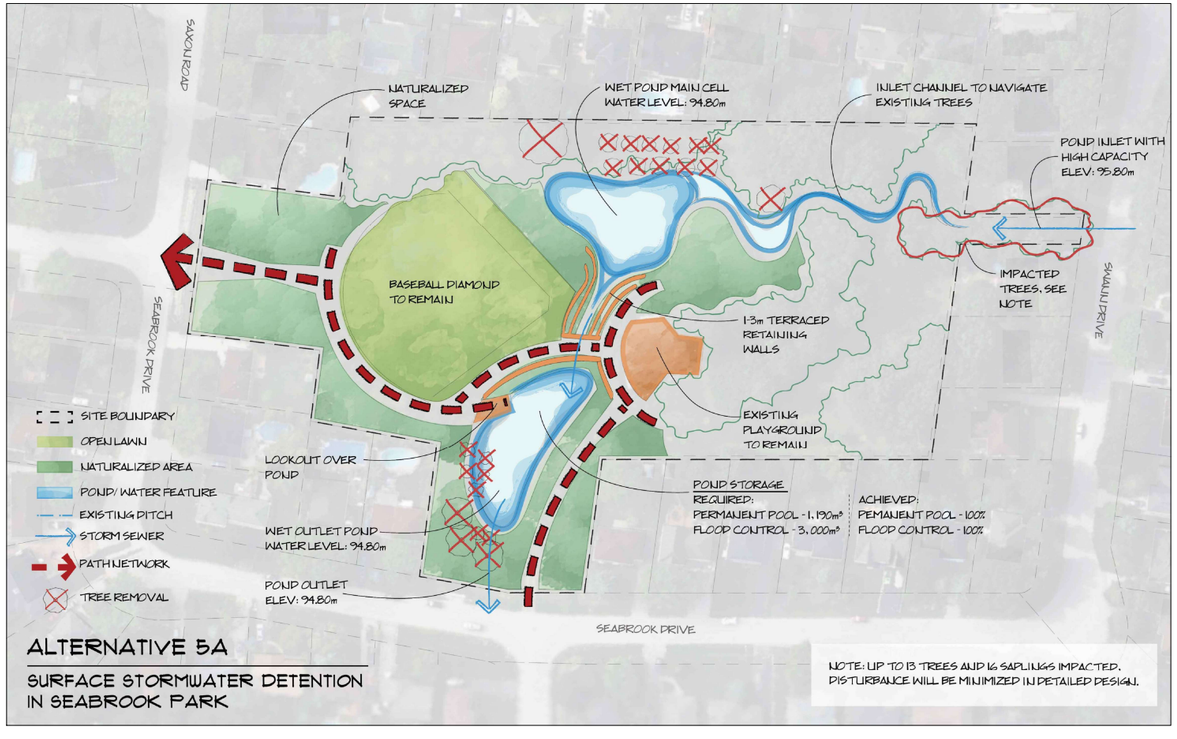
This alternative involves assessing Minor/Major flow diversion within the Study Area, including east of Sabel Street at Hixon Street as identified within the Town of Oakville Stormwater Master Plan (2020).

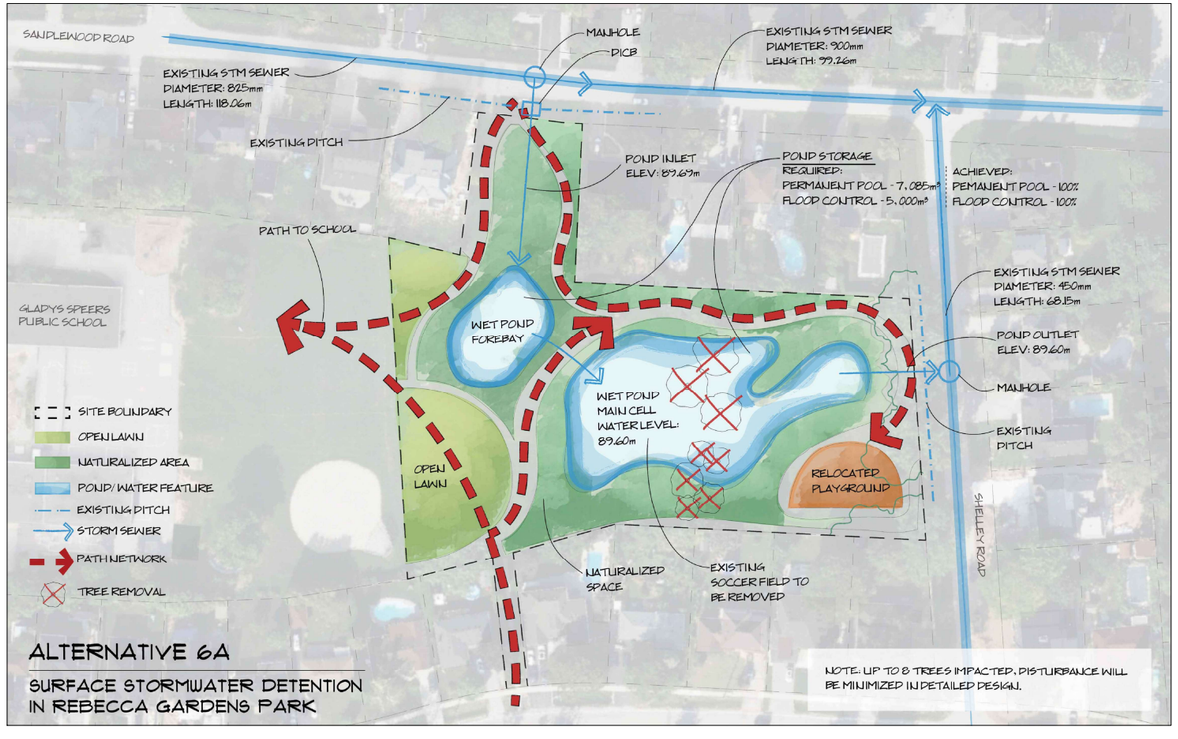
Upon technical evaluation, it was found that this alternative could not meet the goal of the study to mitigate flooding in the Saville Area. It was therefore eliminated and not carried forward to the evaluation process.

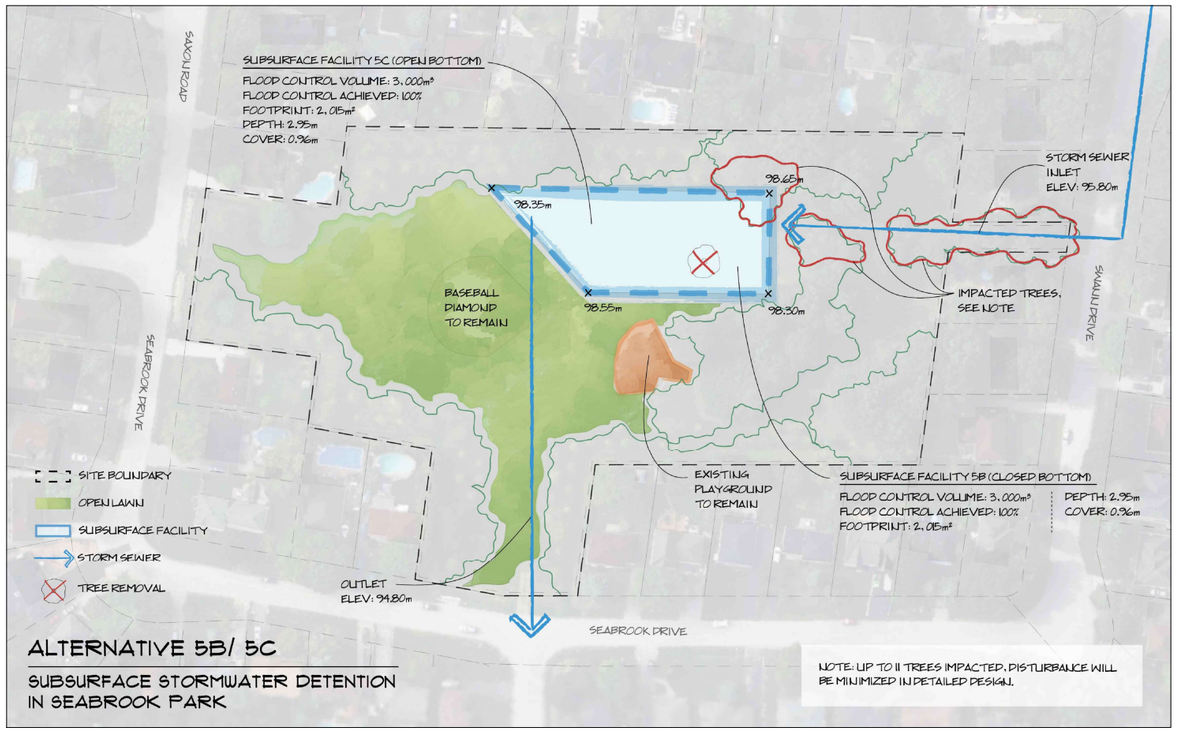
Alternative #8 – Combination of Alternatives 3 to 6

A combination of elements from Alternatives 3 to 6 were considered to provide the maximum benefit for stormwater detention and additional water quality, water balance and erosion control treatment, while mitigating the impacts to the park areas and surrounding community. This alternative assessed all of the feasible alternatives together to determine the overall benefits including:

- Select drainage system approvements (Alternative #3)
- Storm sewer improvements (Alternative #4 minus Saville Crescent/Seaton Drive pipes)
- External drainage improvements at Seabrook Park (Alternative #5)
- External drainage improvements at Rebecca Gardens Park (Alternative #6)







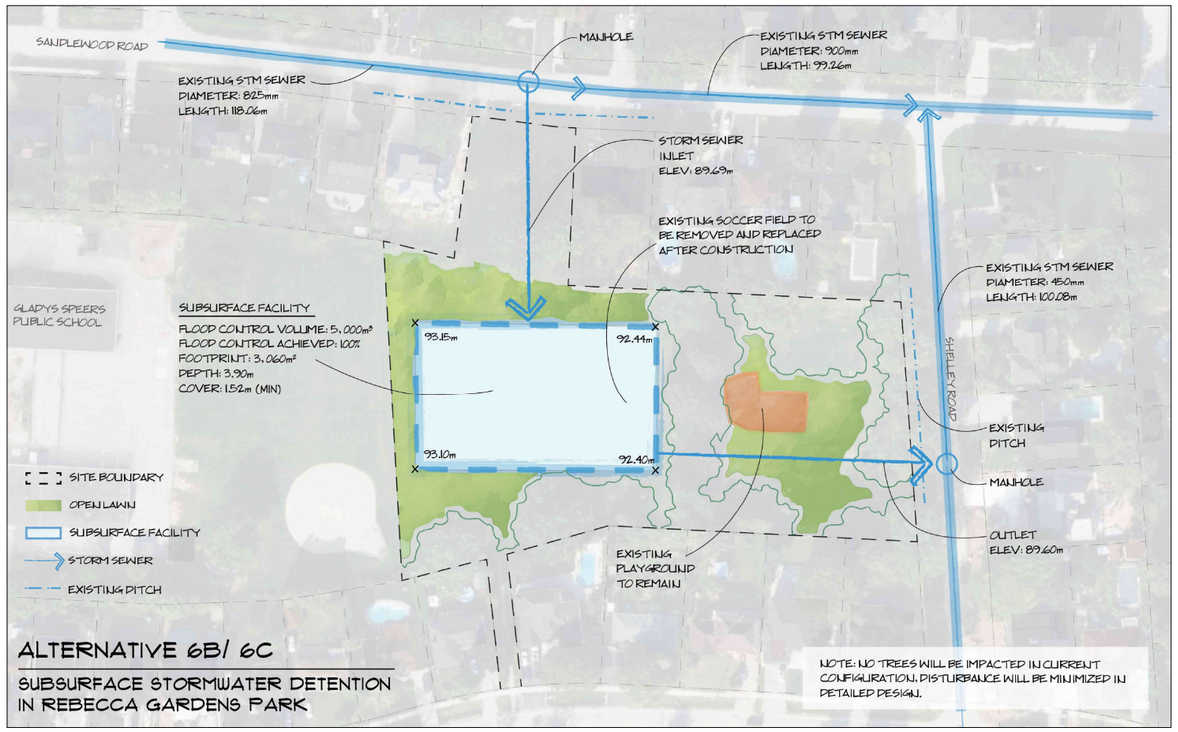


Figure E-4: Alternative 5A, 5B/5C, 6A and 6B/6C Stormwater Detention Conceptual Options

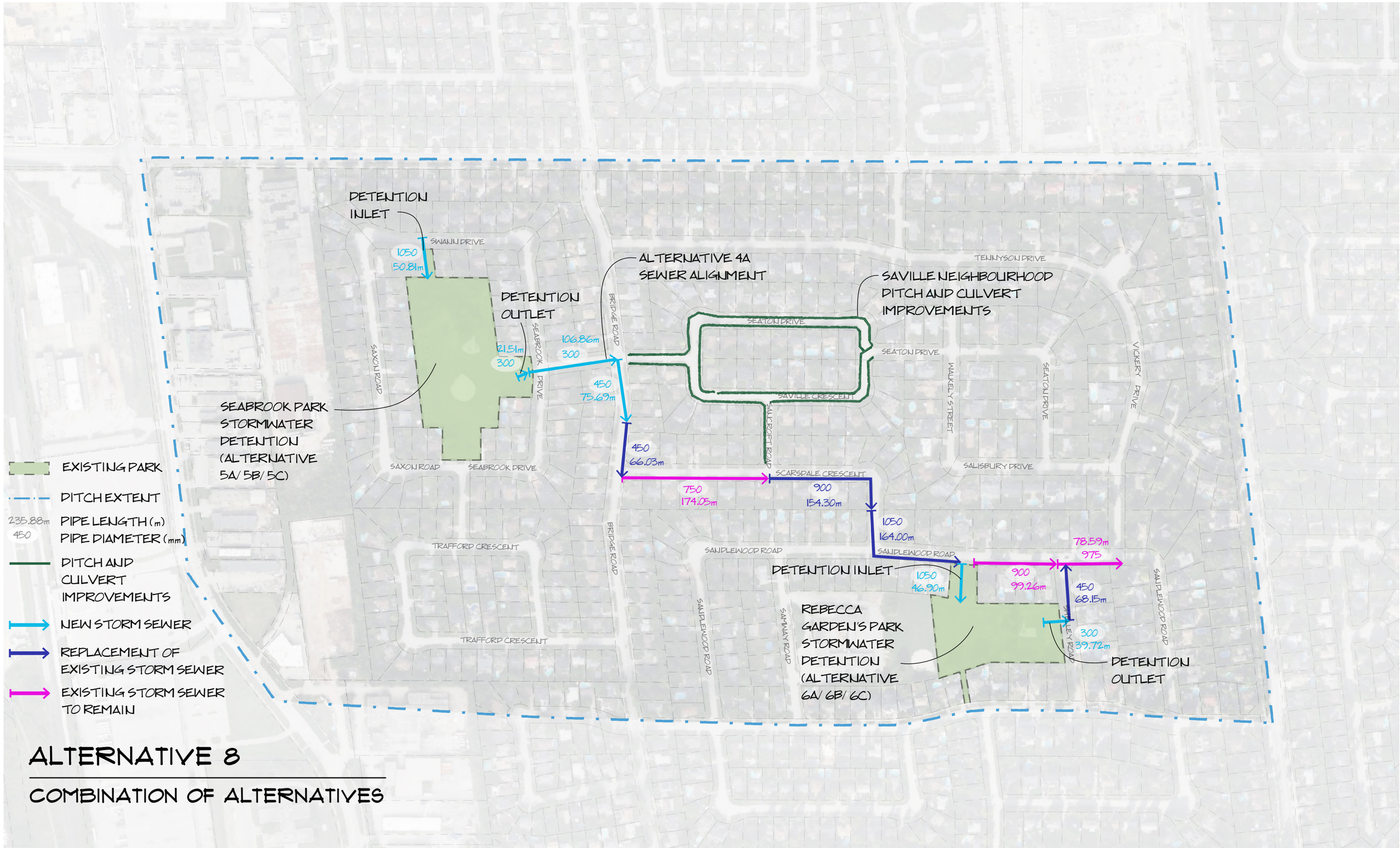


Figure E-5: Alternative 8 – Combination of Alternatives 3A, 4A, 5A/5B/5C, 6A/6B/6C

Evaluation

As part of the Municipal Class Environmental process, each alternative has been evaluated based on a set of Physical/Natural Environment criteria, Social/Cultural criteria and Economic criteria. Technical criteria have also been included as an additional category as part of this assessment. The set of criteria that was evaluated for each alternative is summarized in Table E-1.

Table E-1: Summary of Alternative Evaluation Criteria

Environmental Assessment Categories	Criteria
Study-Specific Flood Mitigation	• Potential impact on building/property risks (Major System) • Potential impact on building/property risks (Minor System) • Potential to improve conveyance capacity (Major System) • Potential to improve conveyance capacity (Minor System) • Potential impact to I/I
Physical/Natural Environment	• Potential Impact/Benefit on Aquatic Systems, Aquatic Life and Vegetation (Fish Passage) • Potential to Reduce Downstream Erosion & Flooding • Potential Impact/Benefit on existing terrestrial systems (vegetation, trees, wildlife) • Integration with the existing natural environment
Social/Cultural Environment	• Aesthetic/Recreation Benefits • Compatibility with Adjacent Land-use • Potential Community Disruption • Potential to provide Health & Safety Objectives
Economic/Financial	• Capital Construction Costs • City Liability • Operation/Maintenance Costs
Technical/Engineering Environment	• Technical Feasibility • Agency Acceptance • Lifespan of Works • Integration with existing infrastructure • Protection of new/existing infrastructure • Policy/by-law requirements

For each of the comparative criteria, a rating was applied specific to the particular solution being evaluated, where a quarter circle represents the worst condition and a full circle represents the best condition for satisfying the relevant criteria. The resulting ratings were combined to provide an overall rating which is presented in Table E-2.

Table E-2: Evaluation Matrix – Overall Ratings

Alternative #1	Alternative #3A	Alternative #3B	Alternative #4A	Alternative #4B	Alternative #5A	Alternative #5B	Alternative #5C	Alternative #6A	Alternative #6B	Alternative #6C	Alternative #8
Do Nothing	Ditch Drainage System Improvements	Ditch Drainage System Improvements with LID Features	Storm Sewer System Improvements	Storm Sewer System Improvements with LID Features	Seabrook Surface Detention	Seabrook Subsurface Detention	Seabrook Subsurface Detention with LID Features	Rebecca Gardens Surface Detention	Rebecca Gardens Subsurface Detention	Rebecca Gardens Subsurface Detention with LID Features	Combination Solution
Flood Mitigation Criteria											
											
Natural Environment											
											
Economic Criteria											
											
Social/Cultural Environment											
											
Technical/Engineering Consideration											
Total											
Capital Cost: $0 -No community disruption -No reduction to flood risk -No I/I reduction potential -Infrastructure not protected	Capital Cost: $200-400k (Add'l $2.0-2.5M for entire neighboorhood) -Minor community disruption -No reduction to flood risk -Minor I/I reduction potential -Some protection to infrastructure	Capital Cost: $400-800k (Add'l $4.0-5.0M for entire neighboorhood) -Minor community disruption -No reduction to flood risk -No I/I reduction potential -Some protection to infrastructure	Capital Cost: $6.5-7.3M -Signifcant community disruption -Improvement to flood risk -High I/I reduction potential -Good protection to infrastructure	Capital Cost: $6.5-7.3M -Signifcant community disruption -Improvement to flood risk -Minor I/I reduction potential -Good protection to infrastructure	Capital Cost: $1.9-2.7M -Minor community disruption -Improvement to flood risk -High I/I reduction potential -Some protection to infrastructure	Capital Cost: $3.0-3.8M -Minor community disruption -Improvement to flood risk -High I/I reduction potential -Some protection to infrastructure	Capital Cost: $3.0-3.8M -Minor community disruption -Improvement to flood risk -High I/I reduction potential -Some protection to infrastructure	Capital Cost: $3.2-3.7M -Signifcant community disruption -Improvement to downstream flood risk -High I/I reduction potential -Some protection to infrastructure	Capital Cost: $4.0-4.8M -Signifcant community disruption -Improvement to downstream flood risk -High I/I reduction potential -Some protection to infrastructure	Capital Cost: $4.0-4.8M -Signifcant community disruption -Improvement to downstream flood risk -Minor I/I reduction potential -Some protection to infrastructure	Capital Cost: $6.3-9.2M -Highest community disruption -Highest reduction in flood risk -High I/I reduction potential -Highest protection to infrastructure

SELECTION OF THE PREFERRED ALTERNATIVE

Based on the results of the alternative evaluation and in consultation with the Town and the public, Alternative #8 [Combination of Alternatives 3a), 4a), 5a)/5b)/5c), and 6a)/6b)/6c)] was selected as the preferred alternative. The preferred alternative achieves a high rating for the flood mitigation and technical/engineering consideration criteria with moderate ratings for the natural environment and economic criteria while the social/cultural rating is relatively low compared to other alternatives. The combined overall rating for the preferred alternative as shown in Table E-2 shows a moderate benefit compared to the other alternatives. In summary, this alternative has a nominal impact on the natural environment, is preferred with respect to impact on adjacent residents and community, has no requirements from a property acquisition perspective and is technically feasible.

Implementation

The next steps for implementation of the preferred alternative will include:

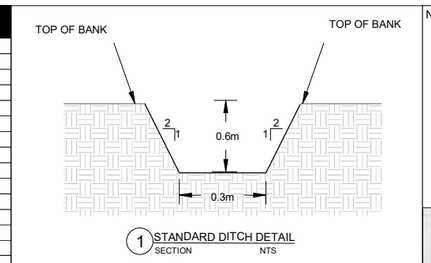
- Issuance of the Notice of Completion;
- Coordination with Region works;
- Public consultation on Seabrook Park and Rebecca Gardens Park stormwater detention: type and configuration to be finalized;
- Detailed design and associated investigations including:
    - Hydrologic and Hydraulic assessment;
    - Hydrogeological assessment;
    - Geotechnical assessment;
    - SAR screening;
    - Vegetation Restoration Plan;
    - Erosion and Sediment Control Plan;
- Approvals;
- Preparation of contract drawings and tender documents;
- Construction; and
- Post-construction monitoring.

The estimated cost to construct the preferred alternative is between $6,300,000 and $9,200,000 which does not include engineering design and contingencies.

Public Consultation

This study has been classified as a Schedule B level of assessment; therefore, a single Public Information Centre (PIC) was held. The PIC described the Study Area, defined problems and opportunities, presented six alternatives and evaluation criteria for rating the alternatives, and identified a preliminary preferred solution.

Culvert No.	Diameter (mm)	Length (m)	UPSTREAM INV (m)	DOWNSTREAM INV (m)	Slope (%)
1	500	6.03	92.53	92.51	0.35%
2	500	7.33	92.62	92.59	0.36%
3	500	7.51	92.68	92.65	0.36%
5	400	6.02	92.94	92.91	0.53%
6	400	5.45	92.98	92.96	0.51%
7	400	5.39	93.06	93.03	0.52%
8	400	6.08	93.16	93.13	0.54%
9	300	5.62	93.40	93.38	0.48%
10	300	2.58	93.17	93.16	0.43%
11	400	10.66	93.29	93.23	0.52%
12	400	10.80	93.50	93.45	0.53%
13	300	5.20	93.60	93.57	0.54%
14	400	12.59	93.82	93.76	0.52%
15	400	13.60	94.02	93.95	0.52%
16	400	5.25	94.08	94.05	0.53%
17	400	7.74	94.16	94.12	0.53%
18	400	5.04	94.74	94.69	1.03%
19	500	6.83	94.91	94.87	0.64%
20	500	5.69	94.81	94.77	0.65%
22	300	5.02	94.27	94.25	0.46%
23	300	5.10	94.03	94.00	0.47%
24	300	10.11	93.86	93.81	0.47%
25	300	5.13	93.75	93.72	0.47%
26	300	5.34	93.65	93.62	0.45%
27	300	5.43	93.55	93.52	0.48%
28	400	6.81	92.43	92.39	0.59%
29	400	9.26	92.58	92.53	0.57%
30	400	6.07	92.94	92.90	0.58%
31	400	6.16	93.00	92.96	0.58%
32	400	6.21	93.11	93.07	0.58%
33	400	6.37	93.19	93.15	0.57%
34	400	15.55	93.34	93.25	0.57%
35	400	7.30	93.54	93.50	0.58%
36	400	5.33	93.64	93.61	0.58%
38	500	7.15	94.06	94.01	0.64%
39	500	7.20	94.12	94.08	0.67%
40	500	7.00	94.30	94.26	0.64%
41	500	6.27	94.35	94.31	0.67%
42	500	5.30	94.47	94.43	0.64%
43	500	5.24	93.60	93.56	0.76%
44	500	5.08	93.45	93.41	0.79%
45	400	6.25	94.23	94.21	0.35%
46	400	5.73	94.08	94.06	0.35%
47	400	5.70	94.00	93.98	0.39%
48	400	7.08	93.93	93.90	0.38%
49	400	5.06	93.84	93.83	0.36%
50	300	5.23	93.69	93.67	0.38%
51	500	6.24	93.64	93.62	0.39%
52	500	5.02	93.57	93.56	0.38%
53	300	7.07	93.45	93.43	0.40%
54	300	6.97	93.24	93.21	0.37%



NOTE 1:
1. MH NUMBERS ARE NOT REPRESENTATIVE OF TOWN NAMING CONVENTION.
2. LENGTH OF PROPOSED PIPES CONNECTED TO PROPOSED STORMWATER FACILITIES WILL BE DEPENDANT ON STORAGE FACILITY OPTION SELECTED IN DETAILED DESIGN.
3. STORM SEWER INVERTS FOR ALTERNATIVE EVALUATION WERE SET TO MATCH EXISTING STORM SEWERS. DETAILED DESIGN TO CONFIRM PIPE SLOPES, INVERTS, AND SIZES TO MEET TOWN GUIDELINES.
4. EXISTING NW PIPES AT MH107 AND MH108 NOT SHOWN ON FIGURE.

Figure E-6: Preferred Alternative

Subsequent to the PIC, the Ward 1 Councillors wished to meet with the residents in the immediate area of Seabrook Park. Accordingly, a meeting was held at Seabrook Park on May 8, 2024 with Town staff, Aquafor staff, and local Councillors in attendance. Approximately 30 residents from the neighborhood surrounding Seabrook Park attended the meeting with the large majority vocally opposed to changes to the park. The meeting identified the historic contamination on Saxon Road from the upstream industrial area on Speers Road as well as identifying the poor performance of the existing swale conveying runoff from the industrial area towards the Seabrook Park neighbourhood. The comments and questions can be summarized as pertaining to:

- Wildlife impacts and concerns about increased nuisance animals;
- Safety impacts;
- Health impacts due to concern about potential for contamination;
- Impacts to the Seabrook Park neighbourhood;
- Impacts to property value;
- Loss of open space; and
- Concerns with the design / process.

The Seabrook Park meeting demonstrated a community preference that alterations to the park impacting current park uses, including open space as well as the amenities, should be minimized. The community preference for the Alternative 5 sub-variations strongly favoured a subsurface detention alternative located within lesser used portions of the park (i.e. southeast of the existing wooded area). Taking these public comments into consideration, the study revisited the ratings for the Seabrook Park and Rebecca Gardens Park alternatives and concluded that all three alternatives should be carried forward to detailed design with additional public consultation to determine the detention option and configuration.

Indigenous Consultation

Indigenous groups including the Métis Nation of Ontario, Haudenosaunee Confederacy Council, Haudenosaunee Development Institute, Six Nations of Grand River Territory, and the Mississaugas of the Credit First Nation were notified about the project along with the issuance of the Notice of Commencement on May 11, 2023 and prior to the date of the PIC. In addition, separate letters were directly sent to the points of contact of the First Nations to notify about the study. No correspondence was received in response to the letters.