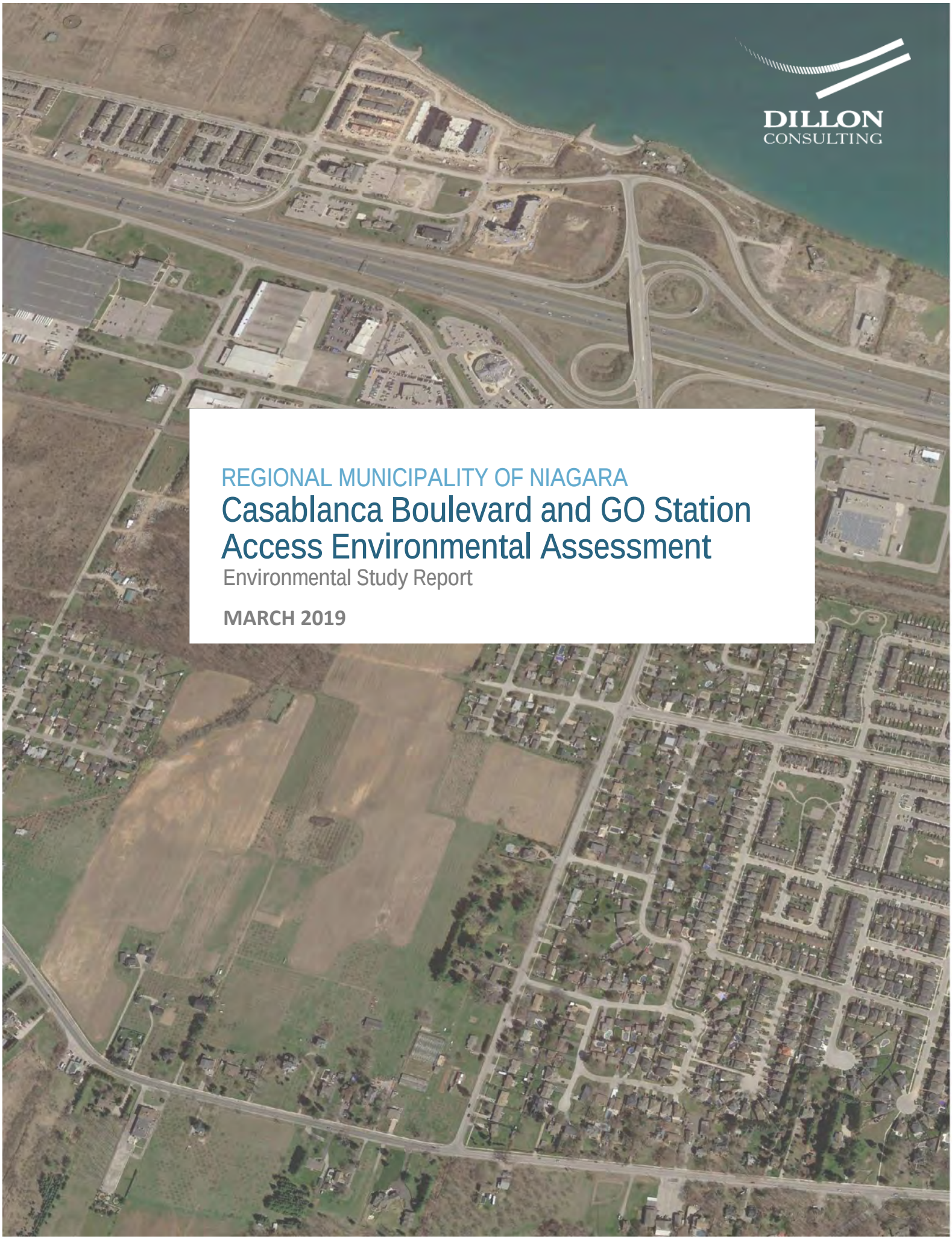

DILLON CONSULTING

REGIONAL MUNICIPALITY OF NIAGARA

Casablanca Boulevard and GO Station Access Environmental Assessment

Environmental Study Report

MARCH 2019

18-7650

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Executive Summary

The Regional Municipality of Niagara (the Region) retained Dillon Consulting Limited (Dillon) in 2018 to complete an Environmental Assessment (EA) Study for proposed improvements to Casablanca Boulevard (from the North Service Road to Main Street West) and other adjacent roadways (the North Service Road, South Service Road, and Livingston Avenue) to support the projected population and employment growth targeted for 2041 in the vicinity of the aforementioned road network and to support the planned Grimsby GO Transit Station, scheduled for opening day in 2021. The scope of the EA Study (hereafter referred to as the Study) also includes a review of proposed improvements to the Casablanca Boulevard/QEW interchange.

The Study Area is shown on Figure ES-1. A number of background studies were undertaken that pertained to the Study Area, as well as for the Focused Study Area. These included:

- Transportation Assessment;
- Stormwater and Drainage;
- Natural Heritage Assessment;
- Noise Assessment;
- Socio-Economic Assessment;
- Cultural Assessment; and
- Archaeological Assessment.

The purpose of this Study is to address the transportation needs of the surrounding area to 2041, with a view to providing adequate operations to support population growth and access to the QEW and the planned Grimsby GO Transit Station.

In response to this study purpose, an EA was undertaken to:

- Assess the need and justification for the proposed project or undertaking;
- Assess the environmental effects of the alternatives;
- Identify a preferred solution and design; and
- Recommend measures to mitigate any potential adverse effects.

In completing the above steps, consultation with stakeholders, regulatory agencies, Indigenous Communities, and the general public was undertaken. The EA was completed to meet the Municipal Engineers Association (MEA) *Ontario Municipal Class EA* Schedule C project requirements. In addition, as improvements are also proposed at the Casablanca Boulevard/QEW Interchange, the project was completed to meet the Ministry of Transportation (MTO)'s Class EA for Group B Projects.

The study area (shown on **Figure ES-1**) includes the following segments:

- Approximately 1.7 kilometres (km) of the Casablanca Boulevard corridor, extending from the North Service Road to Main Street West and including the QEW Interchange bridge;
- The South Service Road from Casablanca Boulevard west to Industrial Drive, and approximately 100 metres (m) east of Casablanca Boulevard; and
- Livingston Avenue from Casablanca Boulevard to west of Emily Street.

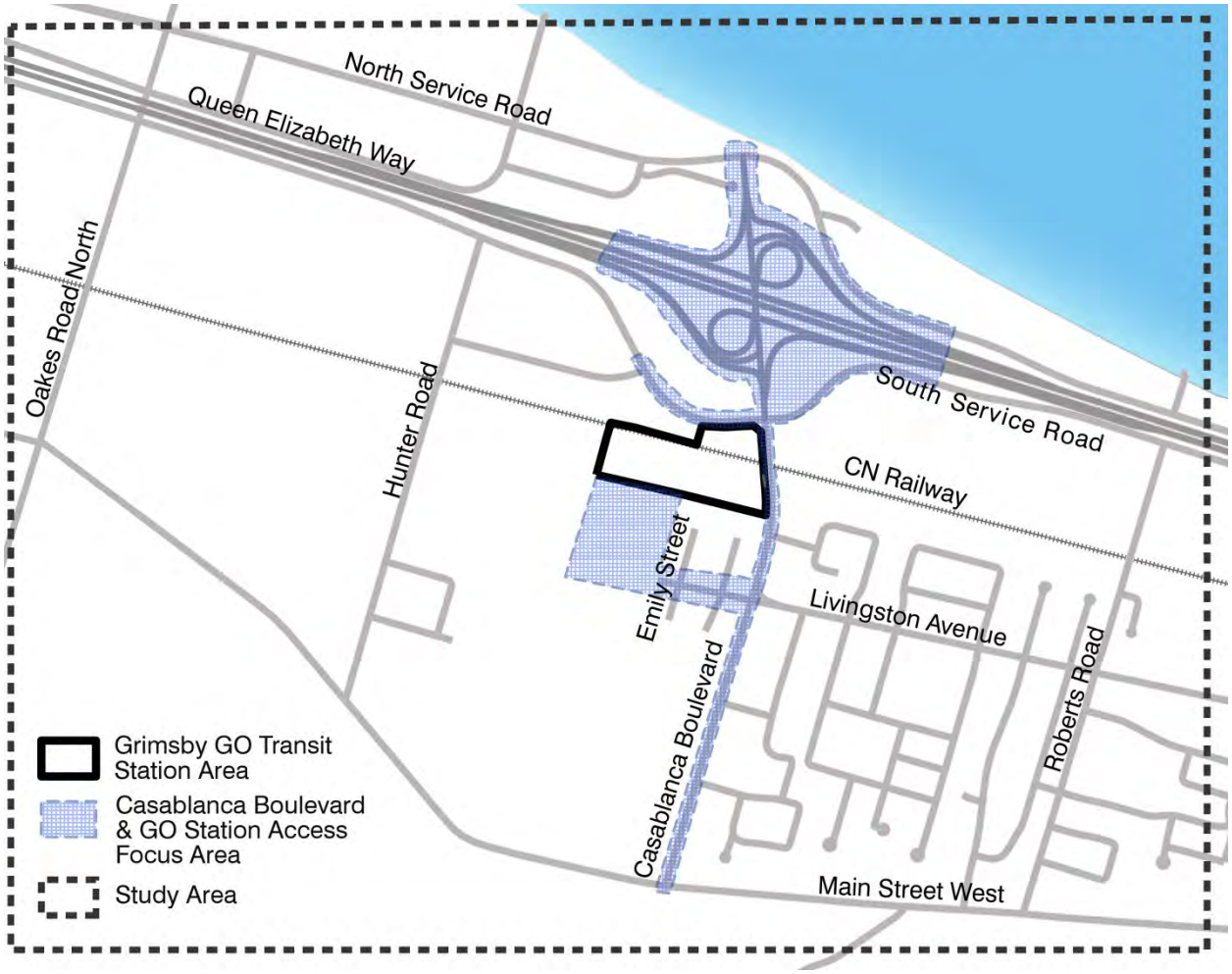


Figure ES-1 EA Study Area

Consultation and Communications

Indigenous Community, public and agency consultation was an integral component of this Study. The primary purpose of the consultation program was to involve the local community, Indigenous Communities, government agencies and potentially affected stakeholders in project

planning and decision-making. Specifically, the overall objectives of the consultation program were to:

- Create general awareness of the project to as many potentially interested stakeholders as possible; and
- Generate an open and interactive approach to the planning process by creating opportunities for the public, Indigenous Communities, government agencies and interest groups to provide project comments and suggestions.

A number of consultation activities were undertaken for this project including:

- Development of a stakeholder contact list, including federal departments, provincial ministries/agencies, the Niagara Peninsula Conservation Authority, various departments of Niagara Region, and the Town of Grimsby;
- Confirmation of project interest with identified Indigenous Communities;
- Development of a project page on the Niagara Region website which was updated throughout the Study;
- Distribution of project notices, including publishing in the local newspapers and mailings/emails;
- Holding two Public Information Centres (PICs);
- Two online surveys hosted on the Region's website;
- Holding a Workshop with directly affected property owners;
- Additional meetings with key stakeholders, including affected property owners and elected officials;
- Holding a workshop with utility companies with assets in the Study Area;
- Communication with Indigenous Communities;
- Presentation at Niagara Region Council; and
- Public release of the Environmental Study Report (ESR).

Comments received from various interested persons throughout the study were considered in the decision making process and are summarized in this ESR.

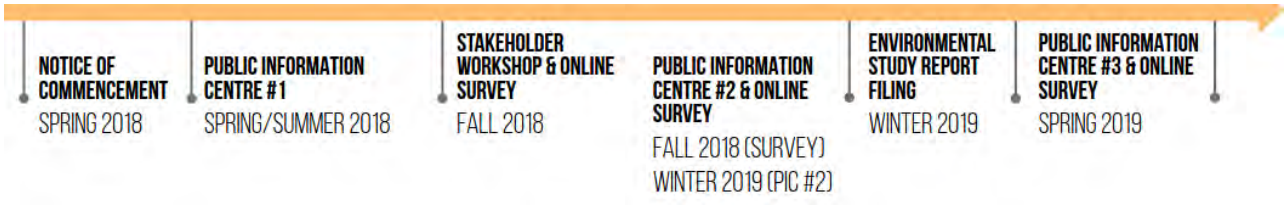


Figure ES-2 Study Process and Public Consultation Channels

PIC #1 was held on June 20th, 2018 at the Casablanca Winery Inn and Spa in Grimsby. The PIC included a formal presentation from the Region and Dillon team, followed by an informal open house with display boards set up around the room, along with aerial plots of the Study

Area and sample road cross-sections for each segment of the Study Area. Information provided at the PIC included: project overview, study purpose, study area context, problems/opportunities, and draft alternative solutions.

A Workshop was held on September 27th, 2018, with affected property owners. The workshop included a brief presentation from Region staff followed by a drop-in style event with the alternative designs for each segment of the Focused Study Area presented for feedback.

PIC #2 was held on January 16th, 2019 at the Casablanca Winery Inn and Spa in Grimsby. As with PIC #1, this PIC included a formal presentation followed by an open house with display boards and large plots of Study Area and preferred alternative. In total, 49 people signed the Record of Attendance. Information presented at this PIC focused on the evaluation criteria and process, results of background studies, and alternative designs including the preferred design.

Two online surveys were also conducted. Survey #1 was run from September-October 2018, and collected feedback to confirm the key issues and opportunities in the Focused Study Area. Survey #2 presented the Alternative Designs and collected feedback on the perception of safety/comfort of each of the alternatives from the perspective of motorists, cyclists, and pedestrians.

Letters were sent to Indigenous Communities at each stage of the project process. Additional follow up was conducted with the Mississaugas of the New Credit First Nation per a request for information received regarding the Stage 1 Archaeological Assessment conducted for the Study.

Key Issues Identified

The key issues identified for the Regional Road corridors in the Study Area to the year 2041 are summarized below by road segment.

- QEW Interchange/Bridge (**Figure ES-3**):
  - North and Southbound traffic conditions are forecast to be at/over capacity
- South Service Road (**Figure ES-3**):
  - Existing roadway capacity will be inadequate to support future growth in activity associated with both area development and the future GO Transit Station at a reasonable level of service; and
  - Increased traffic flow could potentially result in significant conflicts between roadway users.

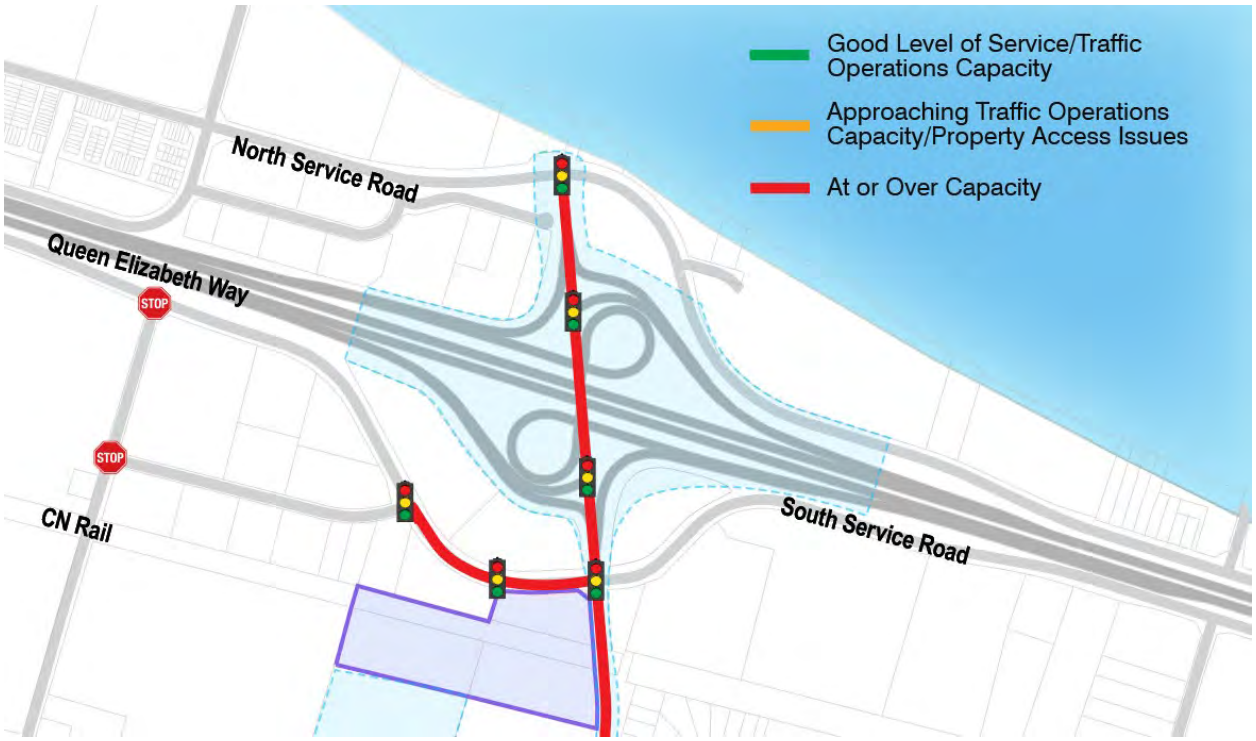


Figure ES-3 Roadway Problems (2041) Identified: QEW and the South Service Road

- Casablanca Boulevard between the South Service Road and Livingston Avenue (**Figure ES-4**):
  - Lack of dedicated pedestrian and cyclist facilities;
  - Need for improved capacity at the at-grade rail crossing, including a long-term need for a grade separated rail crossing;
  - Lack of future roadway capacity to support the forecast growth in activity associated with both area development and the future GO Transit Station at a reasonable level of service;
  - Increased traffic flow resulting in significant potential conflicts between roadway users.; and
  - Impact on increased activity on ability of local residents to safely access roadway.
- Casablanca Boulevard between Livingston Avenue and Main Street West (**Figure 5-2**):
  - Lack of dedicated pedestrian and cyclist facilities; and
  - Impact on increased activity on ability of local residents to safely access roadway.
- Livingston Avenue west of Emily Street (**Figure ES-4**):

  Need for access to Region-owned lands, intended for the Regional Multi-Modal Transportation hub and potential GO Transit Station south parking lot.

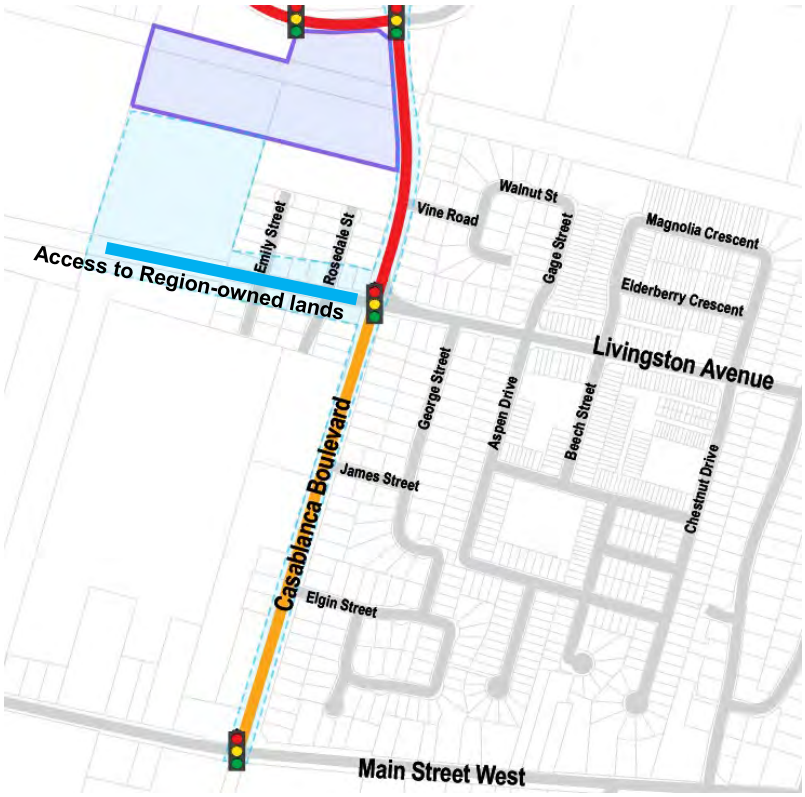


Figure ES-4 Roadway Problems Identified: Casablanca Boulevard

Opportunities Identified

The key opportunities identified for improvements to the Regional Road corridors in the Study Area include opportunities to:

- Implement the policies and direction of the relevant plans and studies for the Study Area road corridors (as identified in Section 3.0);
- Improve the character of the roadway through improved design;
- Improve active transportation opportunities by providing dedicated space for all users;
- Allow safe access to driveways along corridor; and
- Improve safety along the corridor.

Considering the above, the problem/opportunity statement for the project is identified as follows:

Improvements to the Casablanca Boulevard corridor are needed to address traffic operations, access, and capacity issues related to development activity in the Town of Grimsby and specifically in the Study Area, in addition to providing access to the planned new GO Transit Station. The improved transportation corridor will serve the

needs of the transportation system for the surrounding area, support area growth to 2041, and support the planned GO Transit Station. The project also provides an opportunity to implement the Region's active transportation objectives through the provision of pedestrian and cycling facilities.

The following sections provide more detail on the technical work and analysis that informed the identification of the problems/needs/opportunity and the development of the above problem statement.

Alternative Solutions

Considering the problem and opportunity statement, the following set of Alternative Solutions were identified, presented to the public at PIC #1, and subsequently assessed/evaluated:

- Alternative #1: Do Nothing/Status Quo, with no improvements made to the Regional Roads in the Study Area;
- Alternative #2: Transportation Demand Management, involving improvements that would broaden the range of opportunities for a range of travel modes;
- Alternative #3: Improve Other Road Corridors, which looks at whether improvements to other roads in the Study Area might satisfy the problem/opportunity;
- Alternative #4: Roadway Operational Improvements, focusing on improving intersection operations to move traffic through the Study Area more efficiently; and
- Alternative #5: Additional Roadway Lanes, with a view to improving traffic capacity on Casablanca Boulevard and the South Service Road through widening to add travel and turning lanes.

The evaluation of the Alternative Solutions concluded that Alternative #1 (Do Nothing) would not address the problem/opportunity, and would not be carried forward for further development. Alternative #3 could reduce some but not all of the traffic issues in the Study Area, but would not aid in addressing the need specific to Casablanca Boulevard. This alternative would also not be carried forward. Alternatives #2, #4, and #5 all had the potential to contribute to a partial satisfaction of the problem/opportunity, and could therefore be combined to work in tandem.

Evaluation of Alternative Designs and the Preferred Design

Alternative Designs were developed for each key road corridor segment of the Focused Study Area considering a range of factors, including: the identified problems and opportunities, baseline conditions in the Study Area, design issues and constraints associated with the preferred alternative solution, and public and stakeholder feedback received during the consultation process. Alternative Designs were developed for each of the following project components:

- Casablanca Boulevard/QEW interchange;
- Casablanca Boulevard – Intersections;

- South Service Road Improvements;
- Casablanca Boulevard – Roadway Widening and Drainage;
- Livingston Avenue West of Casablanca Boulevard;
- Casablanca Boulevard – Stormwater Management; and
- Casablanca Boulevard – CN Rail Crossing Treatment.

Once developed, the design alternatives were assessed and compared on the basis of a comprehensive set of evaluation criteria organized on the basis of the following criteria groups:

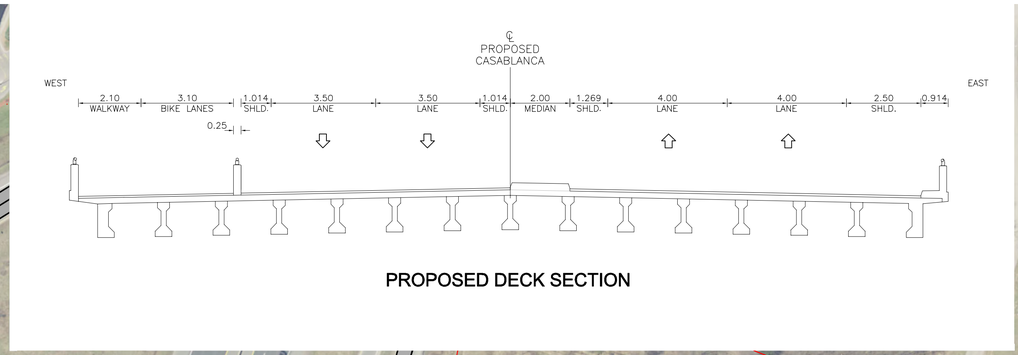
- Transportation;
- Engineering;
- Cultural Environment;
- Socio-economic Environment;
- Natural Environment; and
- Cost.

The following are the design alternatives evaluated for each of these project components, with the alternative in **blue bolded font** identifying the preferred alternative that was determined based on the results of the detailed evaluation.

Casablanca Boulevard/QEW interchange

- Base Plus Active Transportation (A/T) Facilities
- **Improved Parclo A4 Interchange**
- Diverging Diamond Interchange (DDI)
- Straight Diamond

A layout of the preferred QEW Interchange treatment showing the Improved Parclo A4 concept is provided in **Figure ES-5**. In order to support cycling and pedestrian traffic across the interchange, a multi-use path was designed on the west side of the bridge over the QEW. This path will be separated from vehicle traffic and provide connectivity from the North Service Road to the South Service Road.



PROPOSED DECK SECTION

CASABLANCA INTERCHANGE

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DESIGN	SMP
CHECKED BY	DPM
APPROVED BY	PAM

Niagara Region
PUBLIC WORKS

PREFERRED DESIGN

CASABLANCA/QEW INTERCHANGE

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DATE	2019-02-22
SCALE	AS SHOWN
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Casablanca Boulevard – Intersections

The four major intersections along Casablanca Boulevard were evaluated in terms of potential to provide a roundabout or add/improve signals at the intersection. These were:

- North Service Road;
- South service Road;
- Livingston Ave; and
- Main Street West.

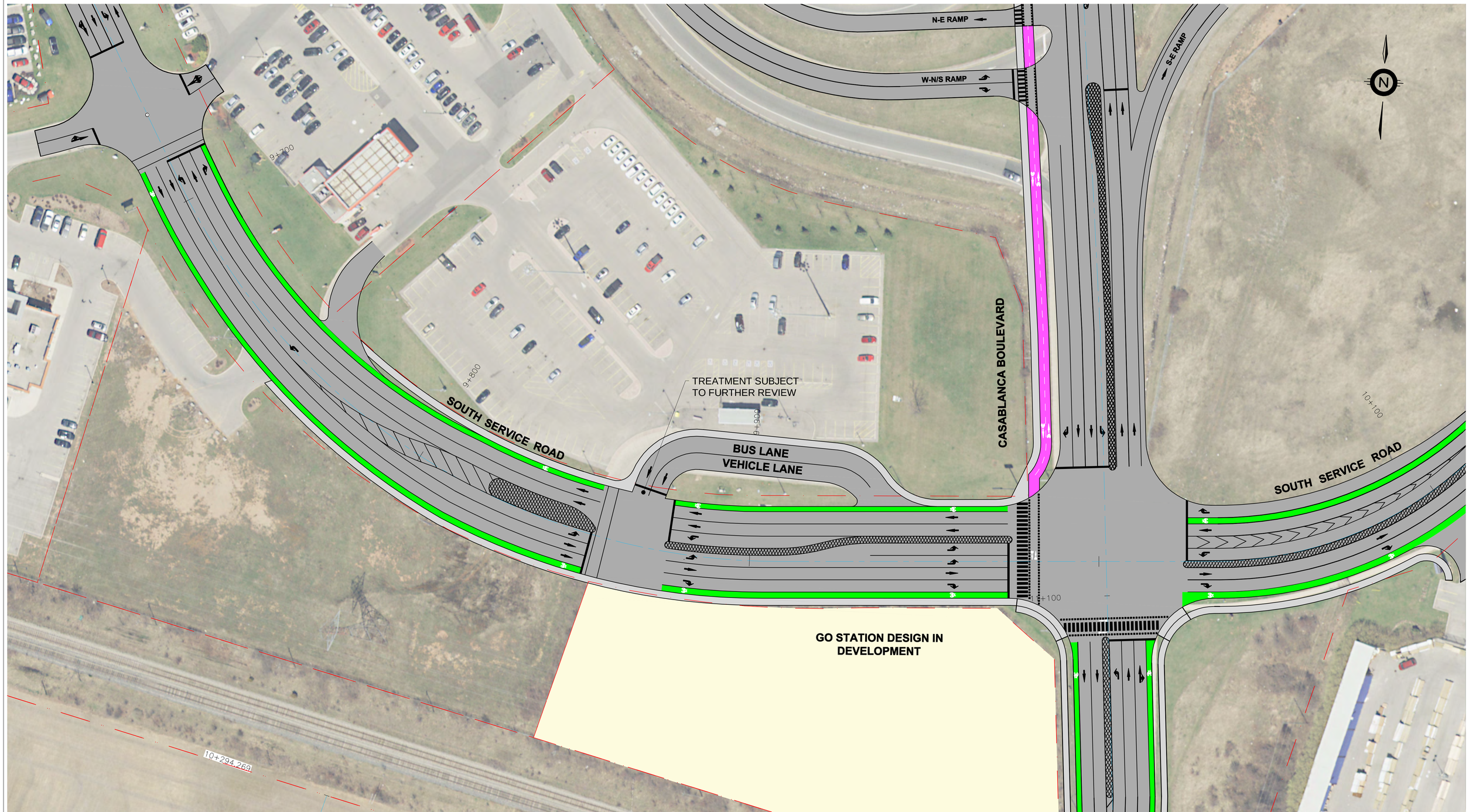
The assessment indicated that a roundabout would not be suited to any of the intersections, due to property impact or topographic constraints. Signalization therefore emerged as the preferred solution, which would involve new signals at the intersection of Casablanca Boulevard with Livingston Avenue and with Main Street West. The existing signals at the South Service Road and the North Service Road would need to be modified to support roadway and turning lane improvements.

South Service Road Improvements

Two main alternatives were considered for improvements to the South Service Road to provide access to the GO Transit Station and improve traffic flow between Industrial Drive and Casablanca Boulevard:

- **Alternative A – Intersection with Loop Road Access,** which includes development of a vehicle access road integrated with the existing GO Bus loop on the north side of the South Service Road, opposite the site of the planned GO Transit Station. This would allow for accommodation of more vehicles turning into the GO Transit Station.
- **Alternative B – Intersection with Left-turn Lane**, which includes a conventional west-bound left-turn lane, and would provide for more immediate/short term access needs to the GO Transit Station.

Alternative A for the South Service Road Improvements shown on **Figure ES-6** is considered to be the preferred design due to the greater potential to accommodate vehicles turning into the GO Transit Station; however Alternative B could be implemented as a first stage, short-term alternative, avoiding the need for modifications to the existing bus loop.



SOUTH SERVICE ROAD/CASABLANCA BOULEVARD INTERSECTION

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APPROVED BY	PAM

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CASABLANCA BOULEVARD (SOUTH OF QEW TO SOUTH OF SOUTH SERVICE ROAD) AND SOUTH SERVICE ROAD

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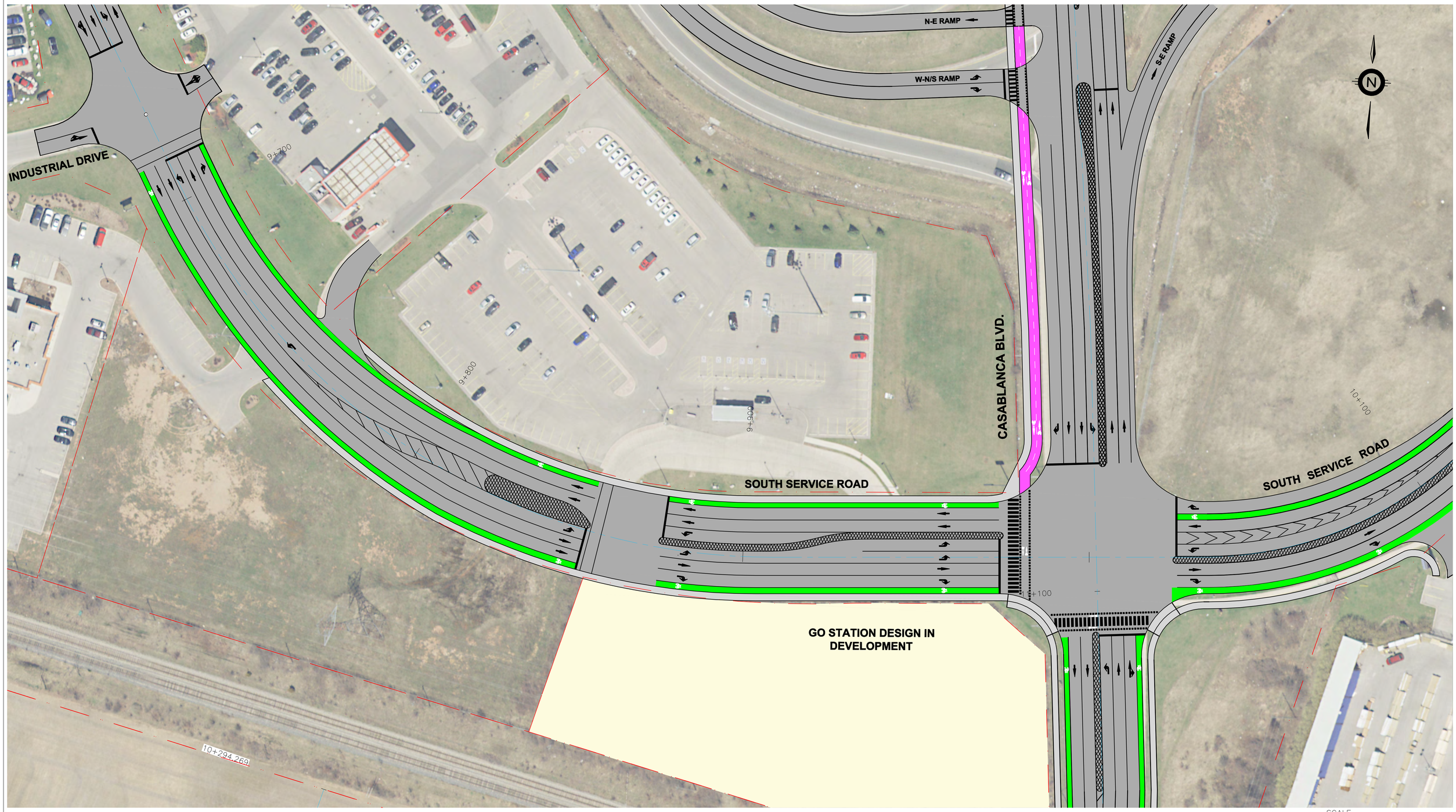

SOUTH SERVICE ROAD/CASABLANCA BOULEVARD INTERSECTION

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SOUTH SERVICE ROAD INTERSECTION WITH LEFT ALTTERNATIVE B

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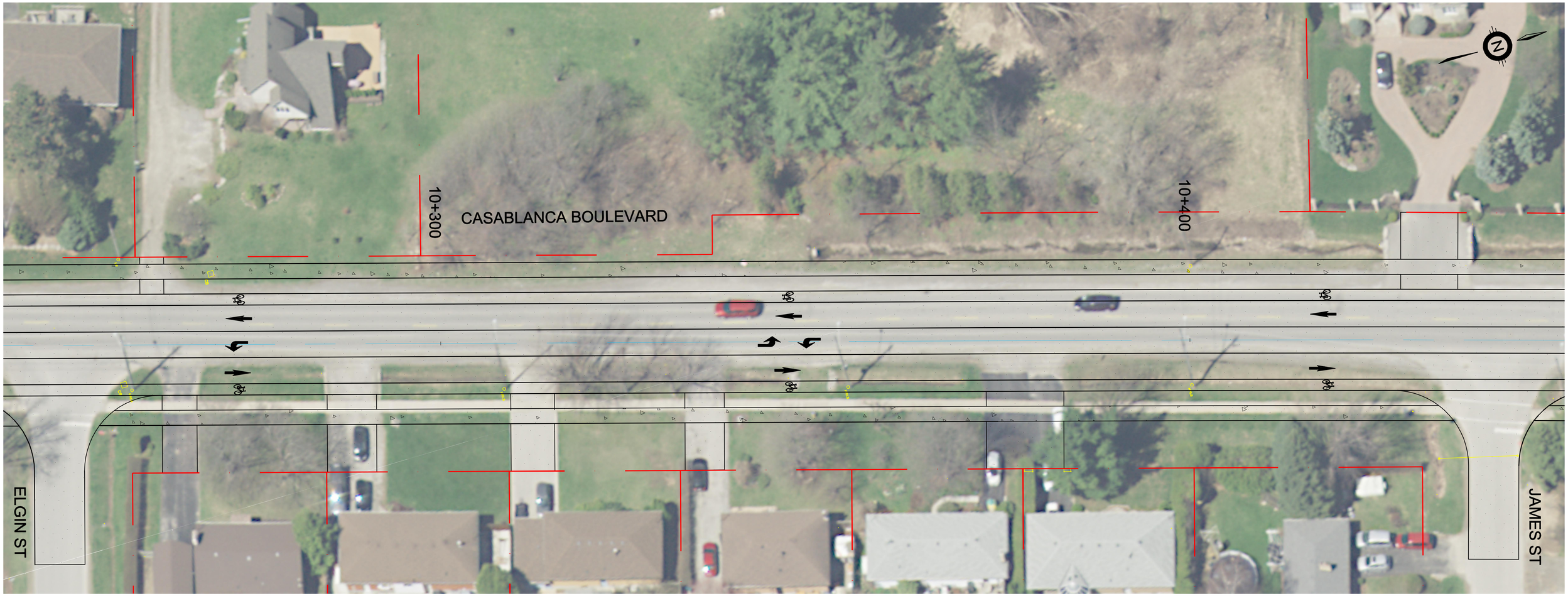
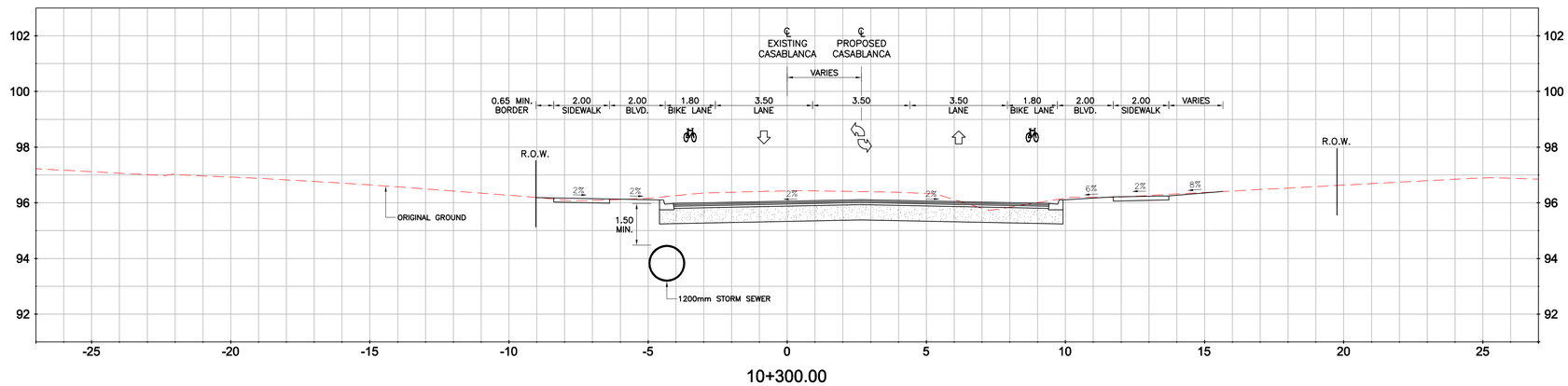
Casablanca Boulevard – Roadway Widening and Drainage

Two main alternatives were explored with respect to improving the roadway and managing stormwater along the road right-of-way of Casablanca Boulevard and along Livingston Avenue from Casablanca Boulevard extending to just west of Emily Street:

- **Alternative A - Urbanized Cross-Section** which would involve the replacement of the existing roadside drainage ditches with a buried storm sewer. With this option the road area along Casablanca Boulevard would be "lowered" and adjacent properties graded so that run-off from adjacent lands would be directed to new roadway catch basins.
- **Alternative B - Maintain Rural Cross-Section** with a road ditch along the west side of the roadway that receives roadway surface flows. Under this design the road surface remains elevated compared to the surrounding lands.

Alternative A was selected as the preferred design due to the ability to improve the road character, effectively manage drainage, and limit property impacts as a result of widening the roadway. Cycling lanes and sidewalks are proposed on both sides of the road, in order to support a complete streets approach, provide improved access for active transportation users to the GO Transit Station, and align with the Region's Complete Streets Guidelines (2017). A layout of the urbanized treatment for Casablanca Boulevard is shown on **Figure ES-8**.





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APPROVED BY	PAM

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DILLON CONSULTING

CASABLANCA BOULEVARD

TOWN OF GRIMSBY
URBAN CROSS SECTION

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The widening of Casablanca Boulevard is segmented into three portions:

- Between the North Service Road and the South Service Road, the improvements are related to the QEW Interchange as described above;
- Between the South Service Road and Livingston Avenue, widening to four travel lanes with a centre turning lane is proposed, in addition to providing sidewalks and cycling lanes on both sides of the road; and
- Between Livingston Avenue and Main Street West, a centre turning lane is proposed, in addition to providing sidewalks and cycling lanes on both sides of the road.

The cross-sections shown on **Figures ES-9** and **ES-10** provide a conceptual layout of the widening and improvements to Casablanca Boulevard. **Figures ES-11** and **ES-12** provide a more detailed layout of each of the segments of Casablanca Boulevard between the South Service Road and Main Street West.

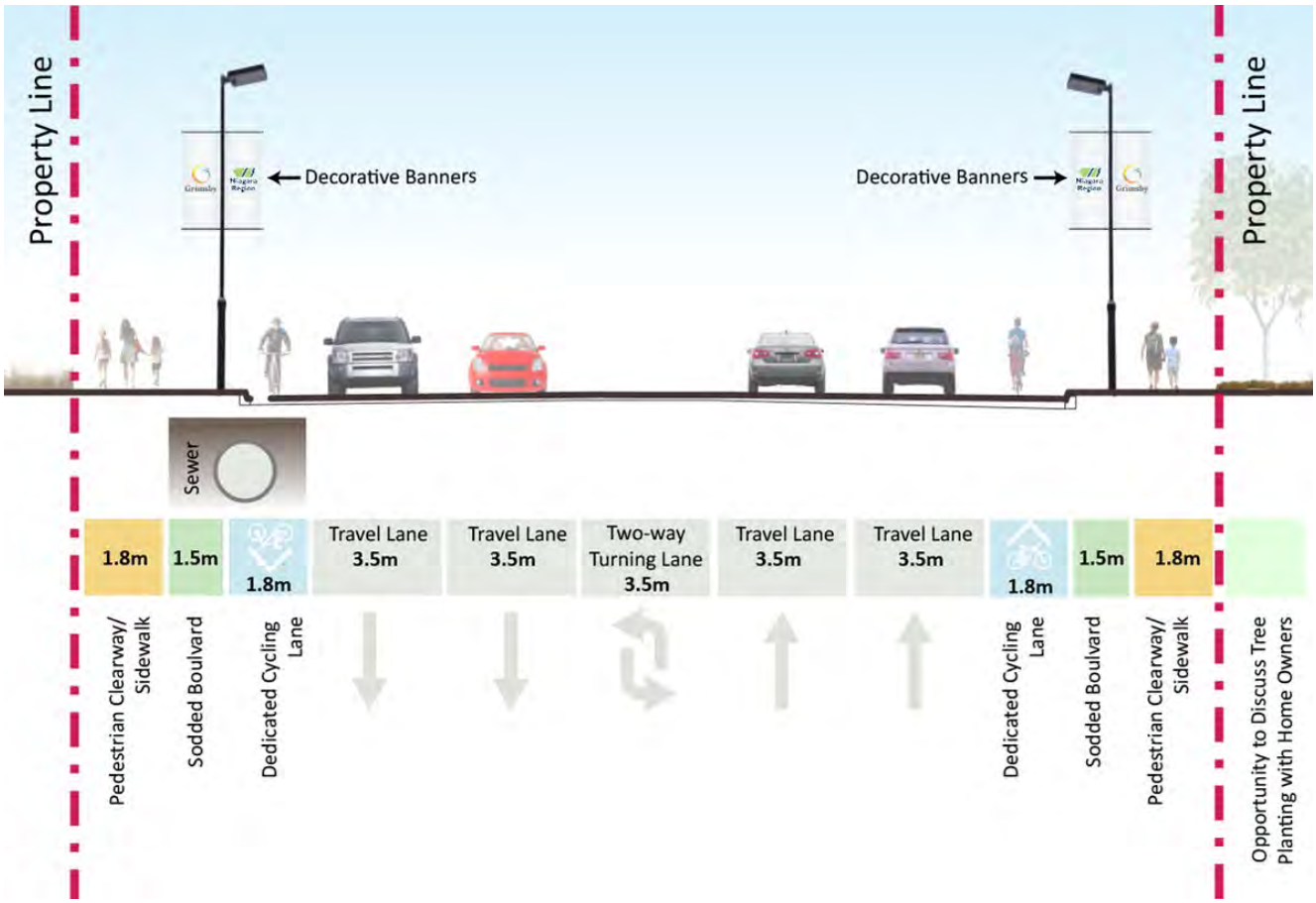


Figure ES-9 Typical Casablanca Boulevard Cross Section (north of Livingston Avenue)

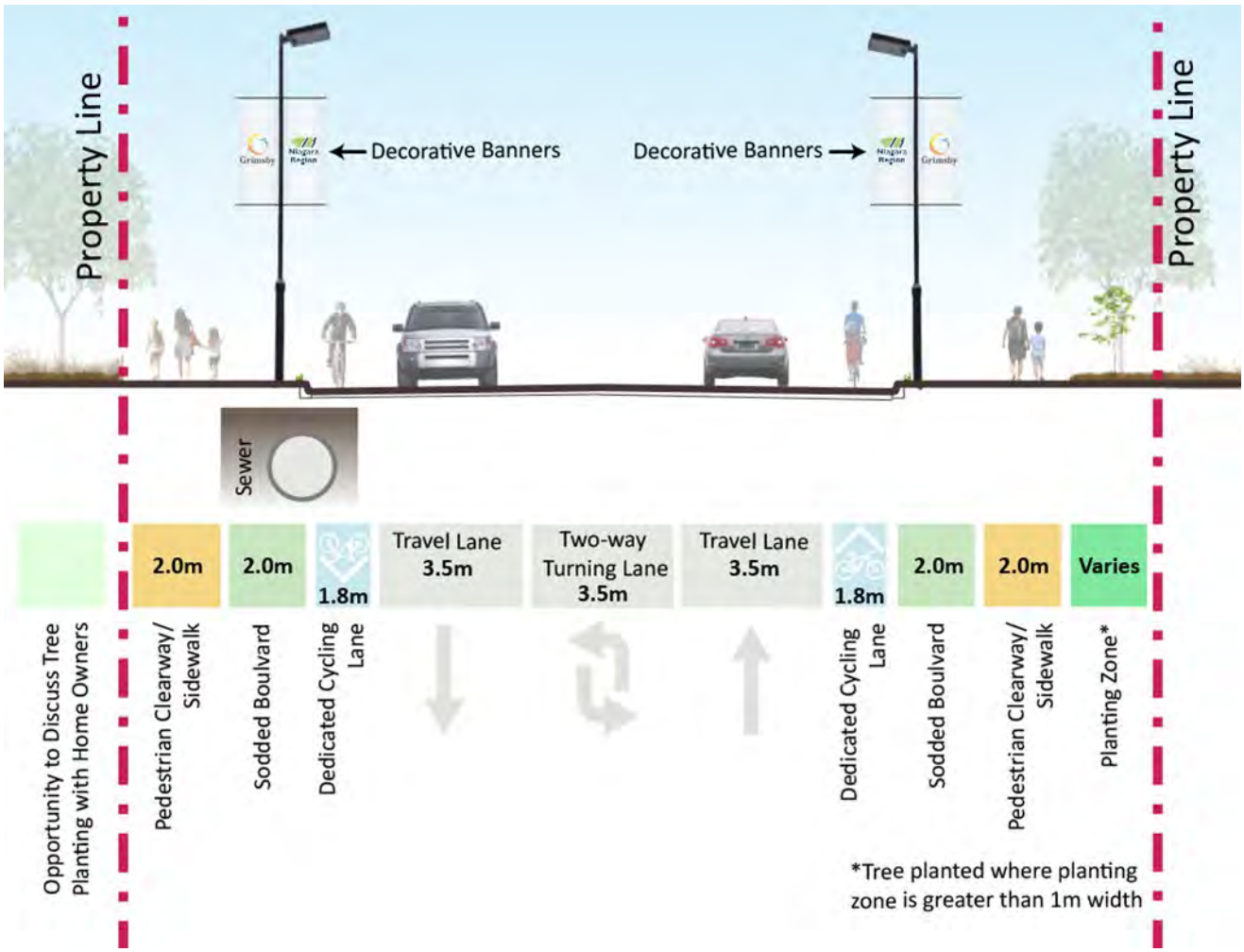
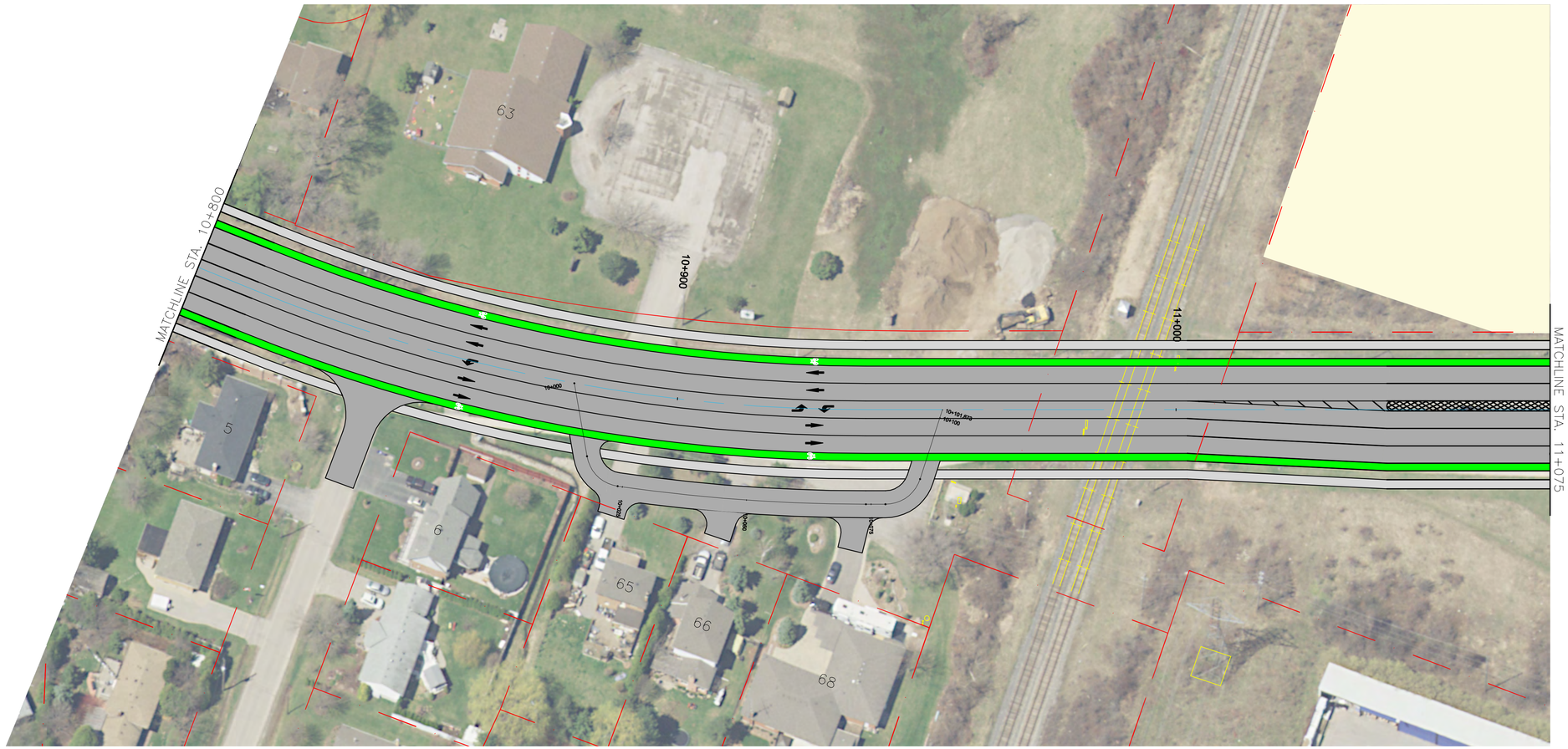


Figure ES-10 Typical Proposed Casablanca Boulevard Cross Section (south of Livingston Avenue)



CASABLANCA BOULEVARD

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DESIGN	SMP
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APPROVED BY	PAM

Niagara Region PUBLIC WORKS

DILLON CONSULTING

PREFERRED DESIGN

CASABLANCA BOULEVARD (SOUTH OF SOUTH SERVICE ROAD TO NORTH OF LIVINGSTON AVENUE)

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DWG No.	ES-11
REV.	0

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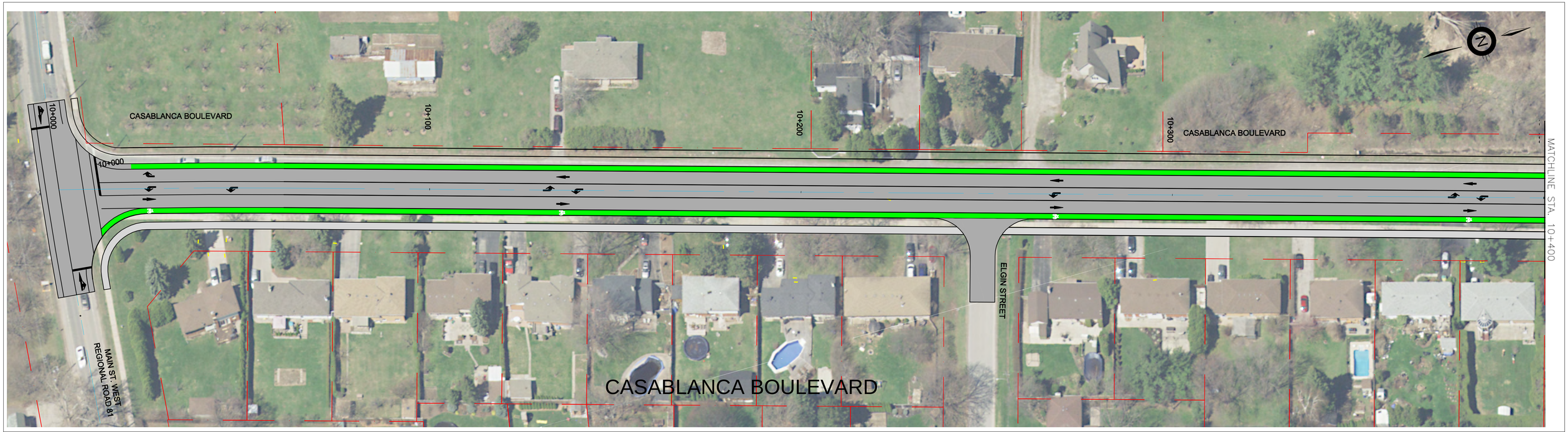
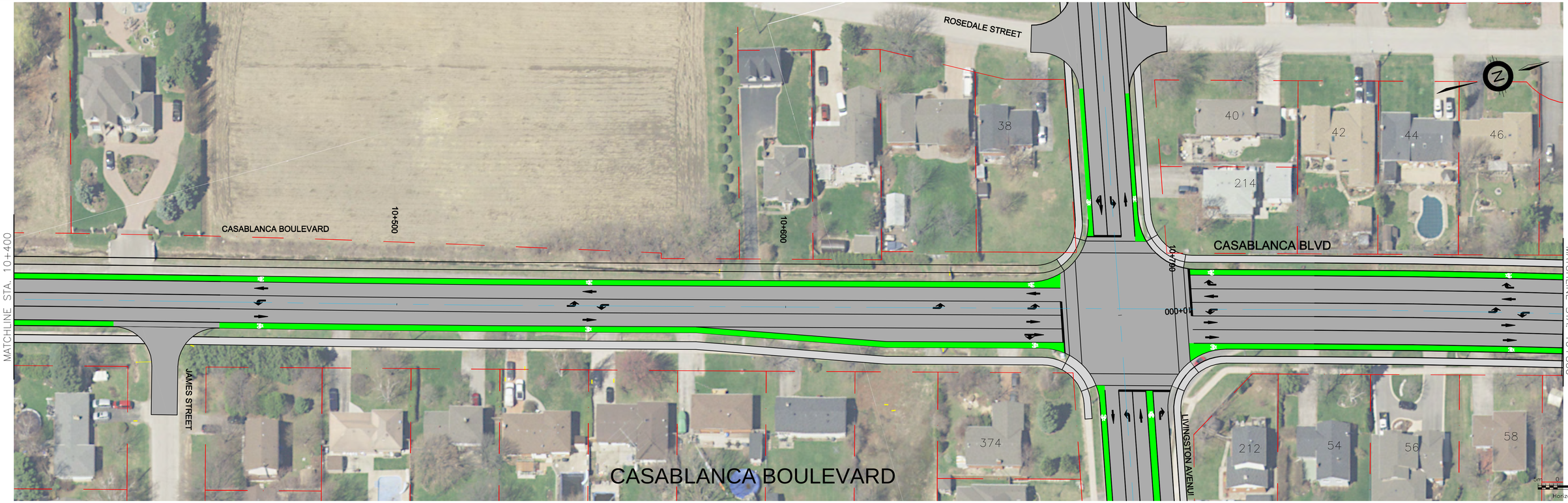




NO.	REVISION	DATE	INIT.
0	ISSUED FOR	YYYY-MM-DD	XXX

NOTES/LEGEND

1 THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWER AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

2 PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.

DRAFTING	GCC
DESIGN	SMP
CHECKED BY	SMP
APPROVED BY	PAM

Niagara Region
PUBLIC WORKS

DILLON CONSULTING

PREFERRED DESIGN

CASABLANCA BOULEVARD (NORTH OF LIVINGSTON AVENUE TO MAIN STREET WEST)

CONSULTANT FILE No.	18-7650
DATE	2019-01-07
SCALE	AS SHOWN
REF. No.	#
DWG No.	ES-12
REV.	0

DRAWING FILE: C:\projectwise\working directory\projects 2018\20gcc\dms42232\187650 - Casablanca and Livingston Corridor Option 1_V4.dwg PLOTTED: Jan 07, 2019 - 10:32am PLOTTED BY: 20gcc

Livingston Avenue West of Casablanca Boulevard

Livingston Avenue between Casablanca Boulevard to just west of Emily Street is proposed to be improved to provide a centre turning lane along with sidewalks and cycling lanes on both sides of the road, as depicted in the conceptual cross section on Figure ES-13, and in the more detailed layout on Figure ES-14.

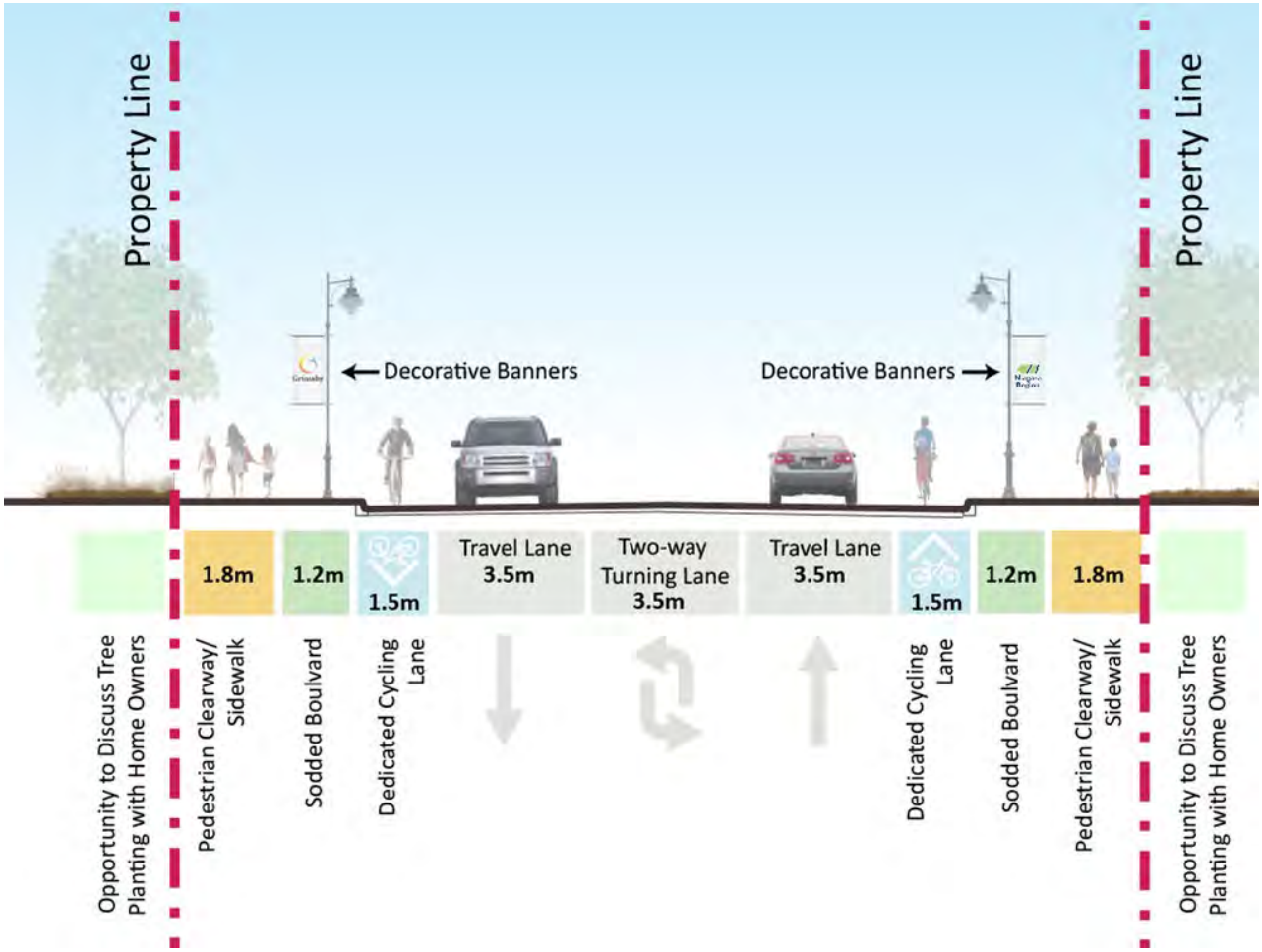
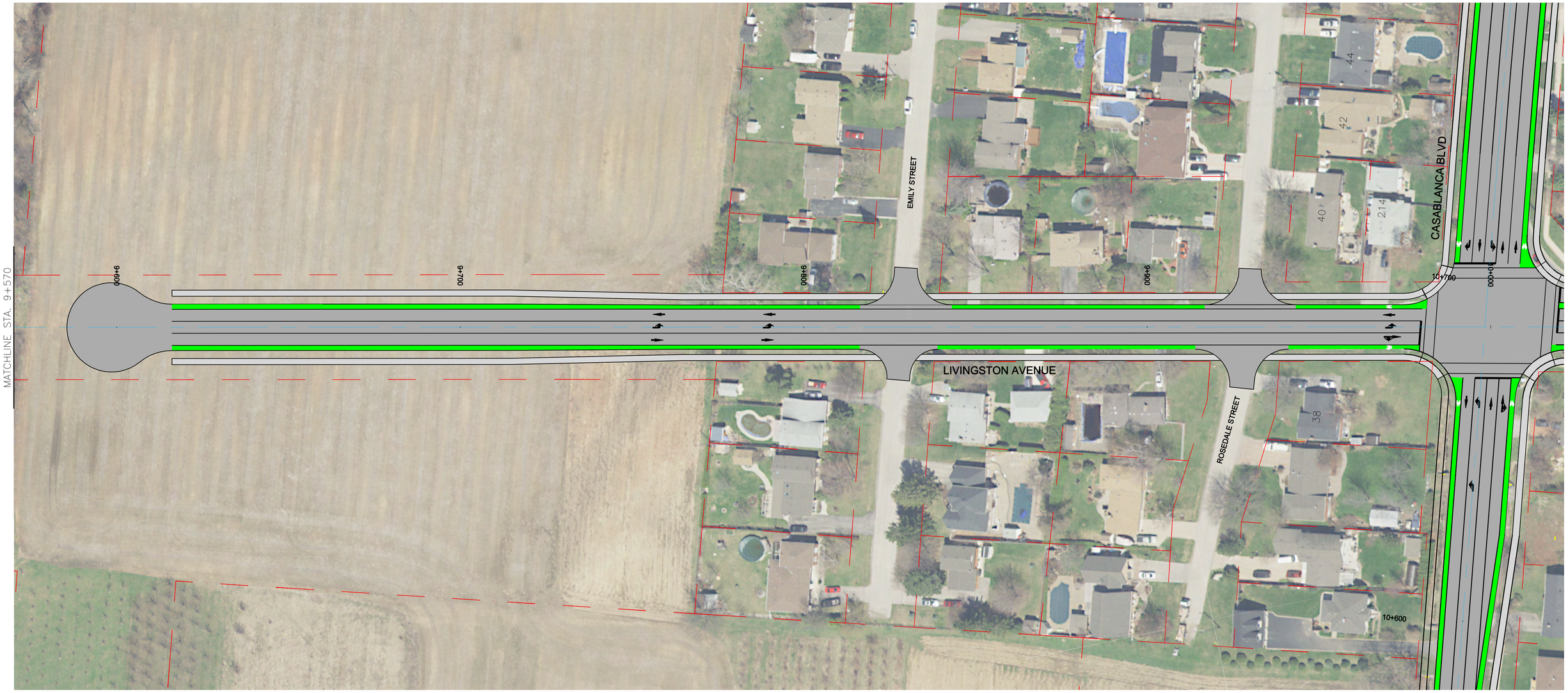


Figure ES-13 Proposed Livingston Avenue Road Cross Section form Casablanca Boulevard to West of Emily Street



LIVINGSTON AVENUE

NOTES/LEGEND

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NO.	REVISION	DATE	INIT.
0	ISSUED FOR	YYYY-MM-DD	XXX

DRAFTING	GCC
DESIGN	SMP
CHECKED BY	SMP
APPROVED BY	PAM

Niagara Region PUBLIC WORKS

DILLON CONSULTING

PREFERRED DESIGN

LIVINGSTON AVENUE (CASABLANCA BOULEVARD TO WEST OF EMILY STREET)

CONSULTANT FILE No.	18-7650
DATE	2019-01-07
SCALE	NTS
REF. No.	#
DWG No.	ES-14
REV.	0

DRAWING FILE: C:\projectwise\working directory\projects 2018\20gcc\dms42232\187650 - Casablanca and Livingston Corridor Option 1_V4.dwg PLOTTED: Jan 07, 2019 - 10:44am PLOTTED BY: 20gcc

Casablanca Boulevard – Stormwater Management

Four main alternatives were identified for managing stormwater along the roadways within the Focused Study Area identified on **Figure ES-1**:

- **Alternative A – Conveyance and End of Pipe Control in MTO Corridor**, which involves using the general strategy referred to as 'end-of-pipe' stormwater management control. The improved Casablanca Boulevard corridor would be serviced with a new trunk storm sewer capable of conveying runoff generated by the corridor and external drainage areas for both major and minor storm events.

- **Alternative B – New Conveyance, End of Pipe Control and Use of Vine Road Drain**, which employs a combination end-of-pipe and conveyance system stormwater management control strategies. Similar to Alternative A, the improved Casablanca Boulevard corridor would be serviced with a new trunk storm sewer capable of conveying runoff generated by the corridor and external drainage areas for both major and minor storm events. A proposed stormwater management facility located on the Region-owned lands south of the CN Railway (west of Casablanca Boulevard) could consist of a traditional stormwater management pond, an underground stormwater management system located under the future parking lot facility, or a hybrid combination of the two facilities. The facility could be designed to minimize impact on other future land uses on this property.

- **Alternative C – New Conveyance and End of Pipe Control, an evolution of Alternative B** in that it has been developed using a combination end-of-pipe (stormwater management facility located on the Region's property) and conveyance system stormwater management control strategies, but in addition it incorporates a new storm sewer outlet that diverts surface water from the Vine Road intermittent flow channel. Similar to Alternatives A and B, the improved Casablanca Boulevard corridor would be serviced with a new trunk storm sewer capable of conveying runoff generated by the corridor and external drainage areas for both major and minor storm events. Similar to Alternative A, a crossing of the CN Railway is required for the storm sewer.

- **Alternative D – New Conveyance with Super-Pipes and New Storm Sewer Outlet,** which minimizes the property implications along the Casablanca Boulevard corridor while incorporating a new storm sewer outlet that diverts surface water away from the Vine Road intermittent flow channel. Similar to the previous options, the improved Casablanca Boulevard corridor would be serviced with a new trunk storm sewer capable of conveying runoff generated by the corridor and external drainage areas for both major and minor storm events. Similar to previous options, the proposed trunk storm sewer would intercept surface water runoff from the residential areas directly adjacent to the road corridor. The use of super-pipes

provides for the stormwater storage needs within this system and avoids the need for an additional stormwater management facility on the Region-owned lands south of the CN Railway.

Alternative D as depicted in the conceptual layout on **Figure ES-15** was selected as the preferred alternative based on the evaluation, which noted the reduced property impacts and more streamlined infrastructure associated with this alternative as well as the ability to address flood risk through diversion of a significant area from the existing drainage outlet along Vine Road and shifting the outlet to a location downstream of the existing drainage channel located on private property.

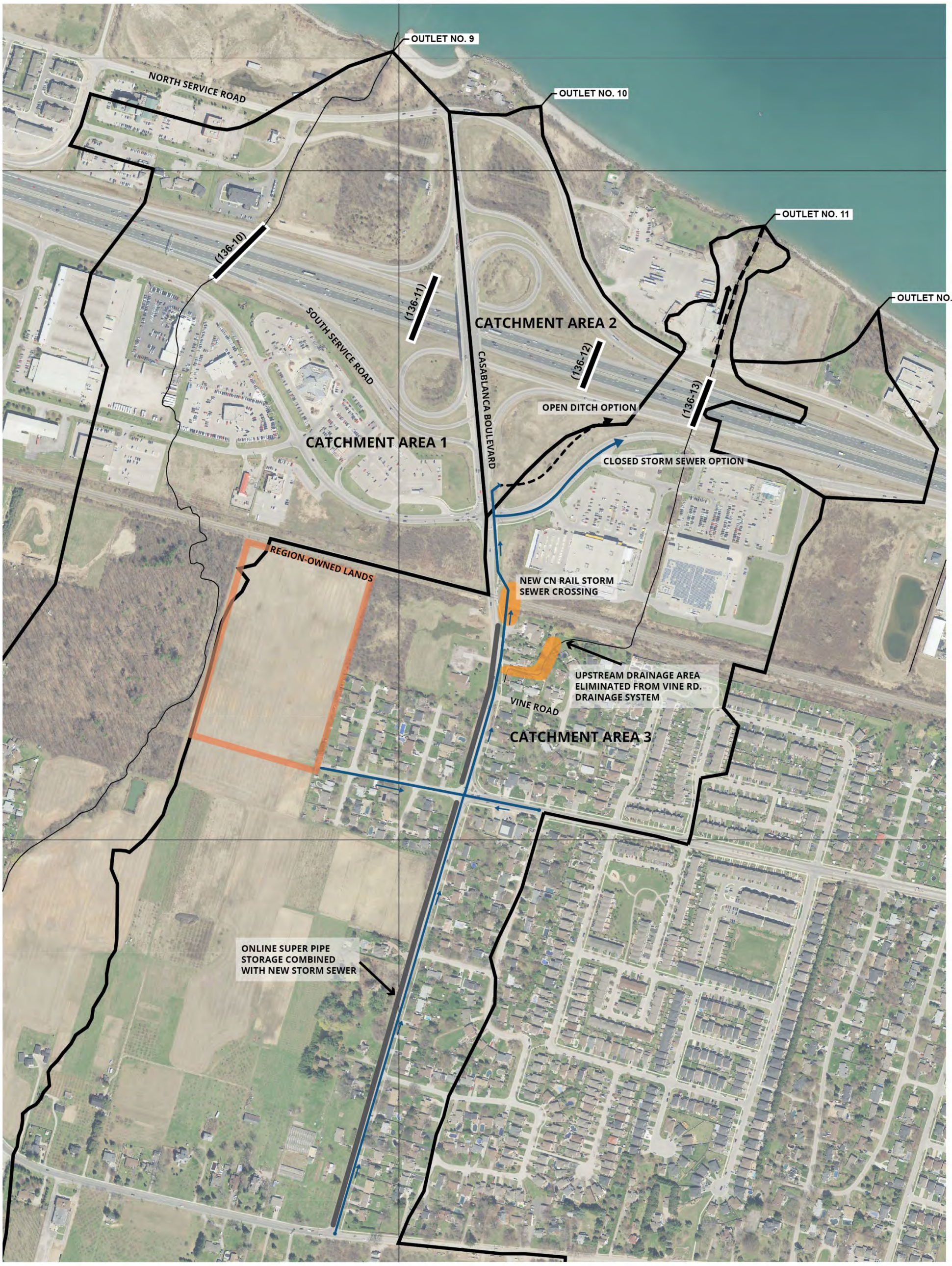


Figure ES-15 Preferred Drainage Strategy

Casablanca Boulevard – CN Rail Crossing Treatment

Three main alternatives were identified for addressing the traffic queueing and safety concerns at the CN Rail crossing:

- **Alternative A - Improved At-Grade Crossing**, which includes crossing control and signal upgrades. The cross-section for Alternative A would be confirmed in consultation with CN as the Rail owner, and would mimic the 5-lane cross section proposed for Casablanca Boulevard north of Livingston Avenue, with property protection for a third southbound queueing lane crossing the CN Railway and terminating shortly south of the CN Railway when if required in the future for queue capacity;
- **Alternative B - Underpass Grade Separated Crossing**, which would involve the development of an underpass for Casablanca Boulevard to go under the CN Rail Corridor and emerge back to grade to meet north of the intersection with the South Service Road; and
- **Alternative C - Overpass Grade Separated Crossing,** which would involve creation of a road overpass over the CN Rail corridor, tying back into to Casablanca Boulevard well north of the intersection with South Service Road.

Alternative A as depicted in the cross section in **Figure ES-16** was determined through the evaluation to be the preferred design for the short-medium term, with Alternative B as conceptualized in **Figure ES-17** being required in the longer term based on ongoing monitoring of the at-grade crossing. A more detailed layout of the future grade separation is provided on **Figure ES-18.**

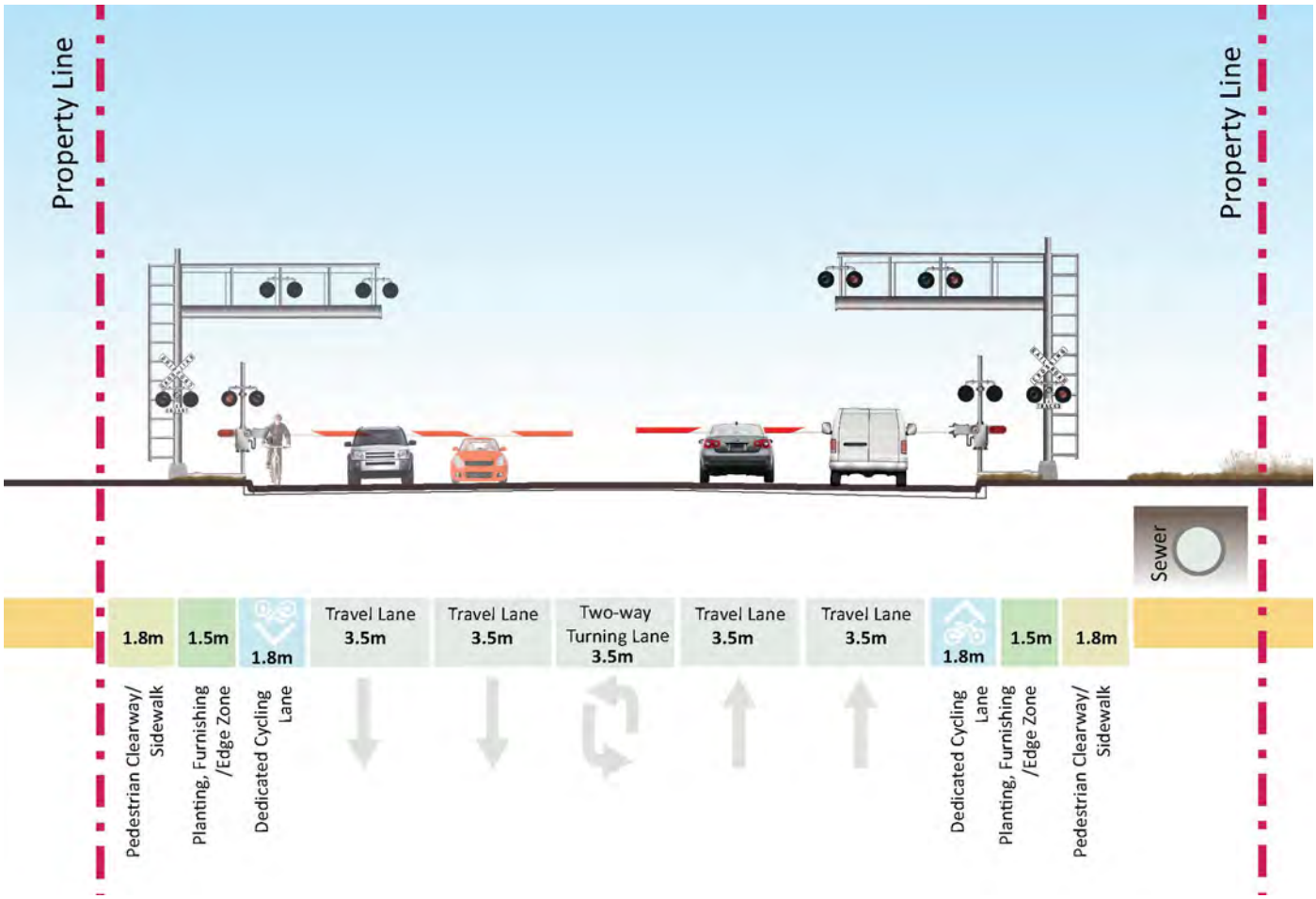


Figure ES-16 SSR Loop Road Cross Section of Alternative A – Improved At-Grade Crossing

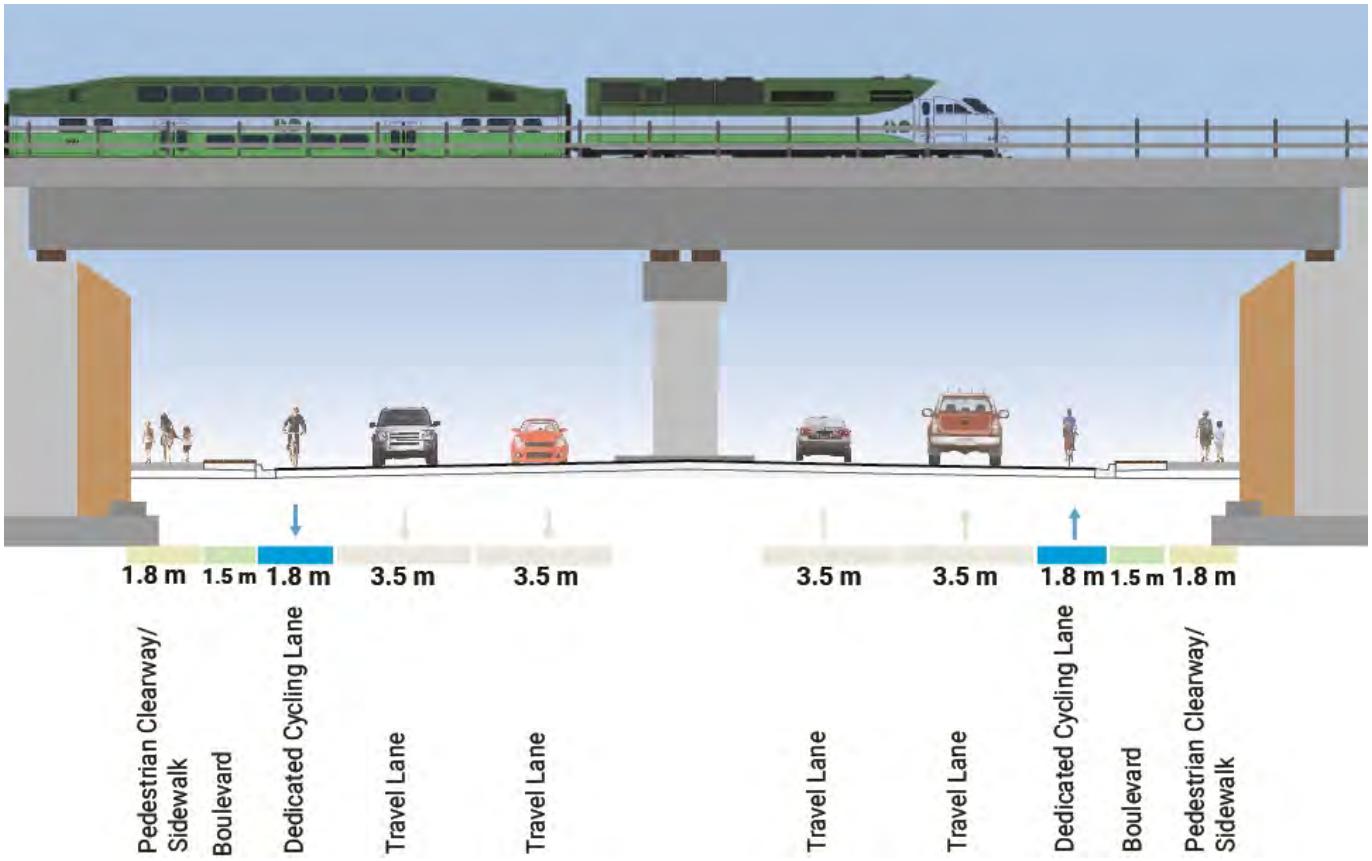
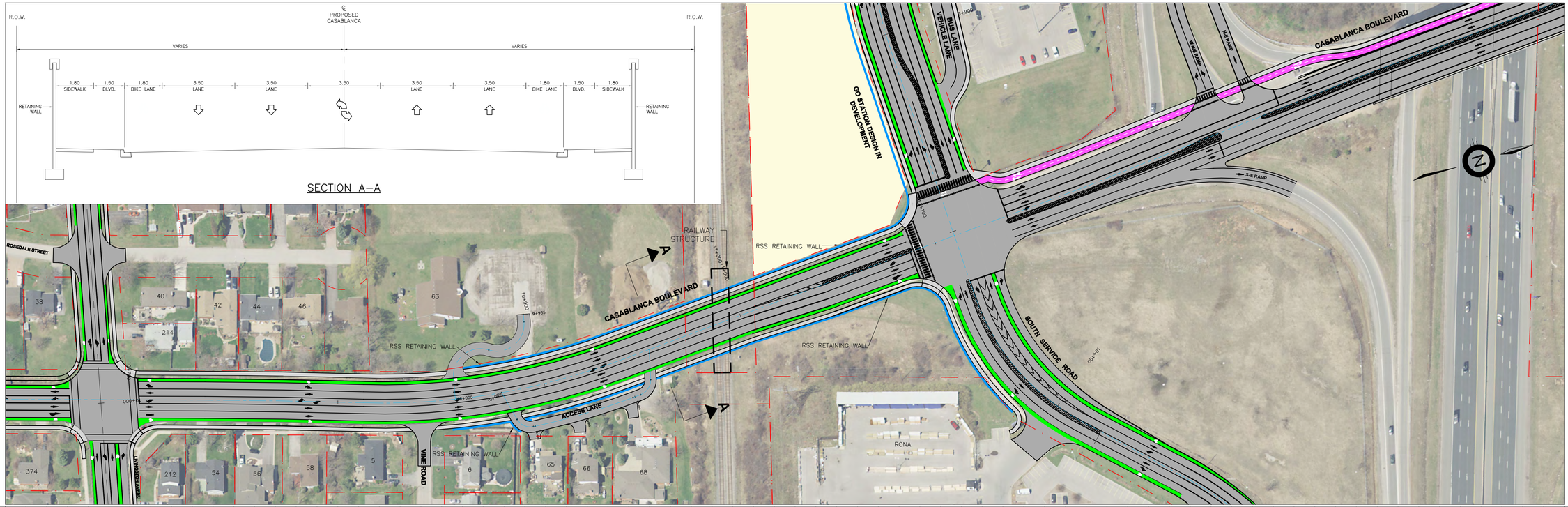
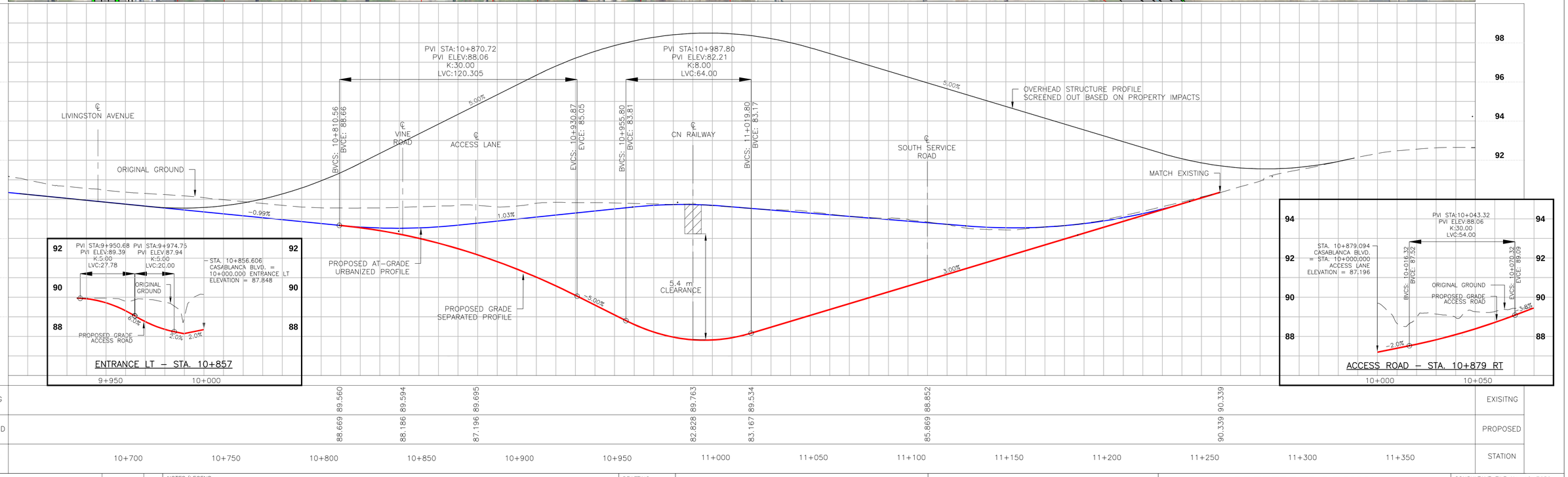


Figure ES-17 Cross Section of Alternative B – Underpass Grade Separated Crossing

SECTION A–A





NO.	REVISION	DATE	INIT.
1	ISSUED FOR STAKEHOLDER REVIEW	2018–09–18	PAM

NOTES/LEGEND

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PRELIMINARY ONLY

DRAFTING	SMP
DESIGN	SMP
CHECKED BY	SMP
APPROVED BY	PAM

Niagara Region
PUBLIC WORKS

DILLON CONSULTING

PREFERRED DESIGN

FUTURE CASABLANCA BOULEVARD CN RAIL GRADE SEPARATION

CONSULTANT FILE No.	18–7650
DATE	2019–02–22
SCALE	AS SHOWN
REF. No.	
DWG No.	ES-18
REV.	0

Impacts and Mitigation

The impacts associated with implementing the recommended improvements for the preferred alternatives for each component of the Focused Study Area were identified, along with mitigation measures to address these related to the construction and operational phases of the project, as summarized in the tables below.

Table ES 1 Summary of Project Effects and Mitigation

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[1]	Net Effect
TRANSPORTATION			
Potential for impact on traffic operations during construction.	Project construction could lead to traffic delays through the corridor particularly for the construction of new travel lanes, and intersection improvements including turning lanes.	As part of Detailed Design, prepare a construction phasing plan/detour plan as required to minimize delays to through movement of traffic.	Some temporary delays to traffic movement through the corridor.
Potential for conflicts with driveways and other entrances.	During construction there could be obstruction to entrances, including residential properties, along the corridor. The possible long term implementation of a grade separated crossing of the rail corridor could block entrances to residences along the east side of the corridor.	Property owners to be informed of any temporary entrance restrictions in advance. Restrictions to entrances to be minimized as much as possible. Alternative parking to be provided in the event that entrances are blocked during construction. In regards to the CN Rail crossing, an alternative driveway/entrance to be provided for residences along the east side of the corridor as per the design.	Some short term entrance restrictions may occur during construction.

[1] Mitigation to be refined during Detailed Design phase.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[1]	Net Effect
Potential to accommodate school buses and waiting students.	Potential for some delay to school bus travel through the corridor during construction. Potential for disturbance/safety issues to students waiting for school bus during construction.	Project constructor to be made aware of school bus activity and location of school bus stops prior to construction. Use of heavy equipment in vicinity of school bus stop locations to be minimized during student pick-up and drop-off periods. Project constructor to inform school boards/transportation provider of construction phasing and activities in advance.	Some temporary minor disturbance to students during construction.
Potential for impact on response times/access for Emergency Vehicles during construction.	Project construction could lead to delays in response times of emergency access vehicles.	Consult with emergency service providers during Detailed Design and development of the construction phasing plan to seek their input. Keep emergency response providers aware of construction phasing and any roadway lane closures.	Minimal delay to emergency response times.
ENGINEERING CONSIDERATIONS			
Impact to existing and planned servicing and utilities (e.g. hydro poles) within the corridor.	Depending on the project area location and proposed improvement, there is the potential need for the relocation of below/above ground utilities (power, communications, TV, municipal) as described in Section 8.0 of the ESR.	Need for relocations to be confirmed during detailed design. Consultation with utility companies and the Town of Grimsby to be undertaken as part of Detailed Design to confirm utility relocations.	Some short-term service interruption possible during construction. Long-term effects to utilities or service levels are not expected.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[1]	Net Effect
Impact on existing drainage related infrastructure.	The project will require alteration to drainage infrastructure to accommodate the widened footprint of the roadway. This will include the change from the Casablanca Boulevard rural ditch based system to an urban drainage system that includes the installation of an underground storm sewer.	Finalize new drainage system/underground pipe as part of Detailed Design.	With implementation of recommended drainage infrastructure corridor drainage system(s) will function more efficiently.
Increase in stormwater run-off (water quantity).	The additional roadway lanes and cycle facilities will result in an increase in the impervious area in the corridor. This will lead to an increase in the area of imperviousness and result in a greater amount of runoff.	The upgraded drainage and stormwater management system will need to accommodate the additional amount of run-off as a result of the additional roadway lanes.	With implementation of recommended drainage and stormwater management infrastructure and improvements, impacts to existing storm systems are anticipated to be minor. No flooding issues are anticipated. With the new system in place the potential for flooding to properties along the Vine Road ditch east of Casablanca Boulevard is reduced.
CULTURAL ENVIRONMENT			
Potential for impacts to registered archaeological sites	As a result of road widening and wider/relocated pathway, there could be some impact to undisturbed lands with archaeological potential as identified	Conduct Stage 2 Archaeological Assessment on planned extension to Livingston Ave. Pending results of Stage 2 work, additional archaeological investigations may be	No net adverse effects anticipated through following of provincial archaeological

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[1]	Net Effect
and undisturbed lands.	through the Stage 1 work.	warranted.	assessment protocol.
Potential to impact known built heritage resources (i.e. listed/designated under Part IV or Part V of the Ontario Heritage Act and/or identified as culturally significant).	There are no cultural heritage features along Casablanca Boulevard The closest cultural heritage building, 400 Main Street West, is approximately 400m away from Casablanca Boulevard and is not expected to face any impacts as a result of this project.	No specific mitigation required due to absence of cultural heritage features within or in vicinity of the project area.	No net adverse effects to cultural heritage resources.
SOCIO-ECONOMIC ENVIRONMENT			
Requirement for property and/or easement acquisition(s) and impacts to buildings.	Buildings are generally well set back from the edge of roadway/Right-of-Way. For the most part the project will not require further acquisition of property. Relatively minor property widenings will be required at the Casablanca intersections at Livingston Avenue and at Main Street West. The exception would be if a third south bound (SB) lane (3.5 m) is provided between the South Service Road and north of Livingston Ave. If a third SB lane is included, property would be required from a few landowners. It is recommended that this widening be protected for.	If implemented in the longer term, landowners will be compensated at fair market value for the required property.	With provision of compensation to property owners for required property, not adverse net effects are anticipated.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[1]	Net Effect
Air emission/quality effects to residents and business during construction.	Temporary air emission effects to residents and businesses from construction equipment operation and soil disturbance.	• Develop and implement a dust control plan. • Apply water and dust suppressants during construction to protect air quality due to dust. • Contractors are required to keep idling of construction equipment to a minimum and maintain equipment in good working order to reduce emissions from the construction activities. Air quality related complaints received by the public (e.g. dust) will be monitored by the proponent and/or the project constructor. Follow up action will be taken where appropriate.	Some short-term air quality nuisance effects (e.g. dust) may occur for some receptors during construction. With monitoring and follow-up/mitigation to any received complaints, the effects should be minimized.
Noise disturbance effects to residents and business during construction.	There are no businesses located along Casablanca Boulevard. There is potential for temporary noise effects to residents from construction equipment operation.	• Develop and implement noise control plan. • Contractor operational constraints related to construction noise will be incorporated into the contract documents. • Construction activities throughout the project will conform to current Municipal noise by-laws giving due consideration to such factors as the time of day, proximity and size of equipment and type of operation.	Some short-term noise effects may occur for some receptors during construction. With mitigation and the monitoring and follow-up to any received complaints, the effects should be minimized.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[1]	Net Effect
		• Contractors are required to keep idling of construction equipment to a minimum and maintain equipment in good working order to reduce noise from the construction activities. • Noise related complaints received by the public will be monitored by the proponent and/or the project constructor. Follow-up action will be taken where appropriate.	
Change in noise levels during operations	More vehicles will be attracted to the corridor as a result of roadway improvements and changing land use in the area. This will result in increased noise levels to surrounding residents. The noise modelling undertaken (see **Appendix K**), shows that noise level increases will be less than 5 dB and are not considered to be significant.	No mitigation recommended.	No significant noise impacts are predicted to result from the project.
Disruption in access to residential property and local businesses.	Very low potential for temporary access restrictions to property during construction. No long-term access restrictions.	Contractor to minimize access restrictions as much as possible. Landowners to be notified of any access restrictions in advance.	Minimal to no restrictions to/from property access are expected.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[1]	Net Effect
Impacts on farm operations/Removal of agricultural land.	The Livingston Avenue Right-of-Way is owned by the Region. Active agricultural land will not be removed for the extension of Livingston Ave. This land has been fallow for several years and is no longer designated for long term agricultural use.	The area of impact is owned by the Region and is intended for a long-term transit facility.	No specific mitigation warranted.
NATURAL HERITAGE FEATURES			
Potential impacts to terrestrial vegetation and wildlife habitat.	There are minimal natural features located within the project footprint/along Casablanca Boulevard. Notable effects include the removal of the ditch along the west side both sides of Casablanca Boulevard The drainage feature ditch on the west side is covered by emergent vegetation throughout and shaded by trees for approximately 30% of the area. The banks of this drainage feature do not contain significant wildlife habitat. Vegetation cover along a portion of South Service Road consists of Dry - Fresh Mixed Meadow/ Gray Dogwood Deciduous Shrub Thicket complex which will be impacted. There is also the potential for the removal of about up to 40-45 individual trees of varying levels of maturity. The final number	• Develop a tree compensation/re-planting plan during Detailed Design to compensate for tree removals. • Establish Tree Protection Zones (TPZs) during Detailed Design and show the TPZs on the contract drawings adjacent to proposed work areas in the Study Area to protect vegetation to be retained. Tree protection fences/barriers demarcate TPZs and protect existing trees along cut lines from equipment damage. • Avoid vegetation clearing during sensitive timing windows for nesting birds. • Plant replacement trees during/following construction. Areas to be planted to be determined with input from landowners,	With the implementation of the mitigation measures and re-planting of replacement trees and/or habitat, net impact will be minimal.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[1]	Net Effect
	to be removed will be confirmed during Detailed Design.	local Municipalities and (Niagara Peninsula Conservation Authority) NPCA.	
Potential impact to fisheries and fish habitat.	The results of the assessment indicated that the main west-side drainage feature along Casablanca Boulevard is used for flow conveyance and does not provide suitable fish habitat. As such, it is not anticipated that the proposed road widening activities at Casablanca Boulevard and proposed entrapment replacement of the drainage feature with a storm sewer will cause serious harm to fish or fish habitat as per Section 35 of the Fisheries Act.	No specific mitigation other than those noted below with respect to mitigating potential for alteration to water quality.	No significant impacts to fish or fish habitat are anticipated from the project.
Potential to impact to Species at Risk (SAR).	The potential for SAR and SAR habitat has been assessed. While no SAR were observed in association with the 2018 field investigations, it was determined that the Study Area has the potential for the following species to be present: • Barn Swallow (THR) • Eastern Meadowlark (THR) • Bobolink (THR) • Monarch Butterfly (SC) None of these species have regulated habitat under Ontario Regulation	• Future follow-up work is recommended to confirm the presence or absence of species (and/or habitat) at the Detailed Design stage. • If necessary, develop species specific mitigation plans. • Review species specific seasonal timing windows to avoid sensitive periods for species. • If necessary, conduct wildlife sweeps prior to the commencement of work activities to determine if SAR (or other wildlife) are present at the site and engaged in critical	With implementation of the mitigation measures, impacts to SAR are anticipated to be minimal.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[1]	Net Effect
	242/08.Potential impacts to the above SAR as a result of the project include: • Potential removal of habitat; • Potential encroachment of SAR habitat; • Potential to kill harm or harass the species during construction.	life processes (e.g. nesting, etc.). • Potential impacts to these species and their habitat should be identified as early as possible. Depending on the extent of work proposed and the potential impact, targeted surveys may be required to confirm presence of these species and identify any permitting requirements under the ESA 2007. It is recommended that if permits are required, the process be initiated as early as possible, as permitting can take significant time and potentially affect the project delivery schedule. Many infrastructure rehabilitation and replacement works proposed by MTO can be addressed under Section 23.18 of the Ontario Regulation 242/08 “Threats to Health and Safety, Not Imminent”, which should be reviewed as part of the impact assessment during the Detailed Design phase.	

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[1]	Net Effect
Potential for wildlife disturbance during construction.	While the surrounding lands do not contain significant wildlife habitat, there is potential for some species (e.g. birds) to be present. As such, there is some potential for temporary disturbance to wildlife due to noise, dust and habitat encroachment during construction.	• Conduct wildlife sweeps prior to the commencement of work activities to determine if or other wildlife are present at the site and engaged in critical life processes (e.g. nesting, etc.). • Following the wildlife sweep, the area of activity is to be isolated to wildlife from entering the work space area. • Develop and implement a dust control plan.	Some temporary disturbance to wildlife is possible although species are likely habituated to road noise etc. With mitigation effects expected to be minimal.
Potential for alteration to surface water quality	The project area includes a ditch/drain that runs parallel to the corridor and empties into Lake Ontario to the north of the project area. During construction there is the potential for alterations to surface water quality due to sedimentation and the introduction of deleterious substances to watercourses. Sources may include fuel leaks from construction equipment, entry of sediment or stockpiled materials into the watercourses. With the installed stormwater management controls, surface water resources are not	• Develop and implement an effective erosion and sediment control plan (ESCP) to prevent migration of loose soils and accumulated sediment into local drains and downstream areas. • Include measures for managing water flow onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering the drain. • Handling of fuel, excess materials and debris will be properly managed on-site and removed as per standard construction practices necessary to protect watercourses. • Develop a spills response plan.	During construction some increase in sedimentation levels in local watercourses may occur. With the implementation mitigation, adverse effects are anticipated to be temporary and minimal.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[1]	Net Effect
	expected to be impacted.	• All materials used or generated (e.g. organics, soils, woody debris, temporary stockpiles, construction debris, etc.) will be temporarily stored, handled and disposed of during site preparation, construction and clean-up in a manner that prevents entry into watercourses. • Erosion and sediment control measures are inspected and maintained on a regular basis during drainage works. • Any damages to erosion and control measures are to be repaired immediately. • Removal of non-biodegradable erosion and sediment control materials once site has been stabilized. • During operations, monitor effectiveness of the SWM facility. Monitoring program to be determined during detailed design. ….	
Potential for impact to groundwater resources.	During construction, uncontrolled runoff could potentially result in contamination of groundwater through infiltration of potential contaminants, and/or infiltration of contaminated surface water. Local water resource/supply impacts are not anticipated as residents are serviced by Town piped water.	• Implement best management practices (BMPs) as noted above in regards to potential impacts on surface water quality. If groundwater dewatering is required during construction, then dewatering should be conducted in accordance with applicable procedures including determination of the need for a Permit to Take Water (PTTW) from MECP.	During construction there is some potential for effects to groundwater resources in the local area (primarily in the vicinity of lands requiring dewatering). With the implementation mitigation, adverse effects are anticipated to be temporary and minimal.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[1]	Net Effect
		Give regard to and implement measures required to meet source water protection policies – to be defined during Detailed Design.	

Project Benefits

Casablanca Boulevard Road Widening

The benefits associated with this project primarily relate to the improvement of transportation along Casablanca Boulevard and parts of the South Service Road and Livingston Avenue. The improvements to Casablanca Boulevard through road widening and creation of a complete street will accommodate forecasted future vehicle demands, including those associated with the planned GO Transit Station, and with the included active transportation facilities that will promote more cycling and walking through the corridor.

CN Rail Crossing Treatment

The improvements to the CN Rail crossing on Casablanca Boulevard north of Vine Road will benefit the safety of drivers and reduce the probability of incidents involving train and vehicular conflict.

South Service Road Improvements

Improvements made to the South Service Road will provide for more efficient access into the GO Transit Station for west bound vehicles, and allows for better traffic flow as it provides additional queue storage for vehicles making west bound left-turns into the GO Transit Station and also reduces chances of delay.

Effects Monitoring

Recommended effects monitoring during the construction period includes:

- Monitoring of traffic flow to ensure the minimization of delays;
- Public complaints monitoring and follow-up regarding construction disturbances;
- Monitoring of vegetation removal; and
- Monitoring of the effectiveness of SWM controls to ensure erosion and sedimentation effects are minimized.

Effects monitoring during the operations phase once the project has been implemented is proposed for the CN Rail crossing, to monitor traffic and queues relevant to the need for a grade separation at this location.

Considerations for Detailed Design

A number of key considerations were put forward through the stakeholder and public consultation process, to be carried forward for consideration in the detailed design process:

- Traffic calming and control of speeding, to be investigated through the refinement of the roadway design;
- Noise and property security concerns due to the road widening and completion of the active transportation network, to be considered in the roadway design (e.g. landscaping);
- Mitigation of visual distractions or other sightline impacts from streetscaping elements (e.g. roadside banners and signage);
- Development of a Signage Strategy to improve laneway legibility and direct drivers to appropriate lanes on the QEW Interchange and at the GO Transit Station access on the South Service Road;
- Utility pole placement relative to residences, with mitigation to keep poles as removed from residences as possible; and
- Development of a Signals and Illumination Strategy to coordinate signal timing for intersections and the CN Rail crossing on Casablanca Boulevard.

Phasing of the recommended improvements associated with the preferred alternative for each component of the Focused Study Area as discussed in this section will also be determined through the detailed design process.

1.0 Introduction

The Regional Municipality of Niagara (the Region) retained Dillon Consulting Limited (Dillon) in 2018 to complete an Environmental Assessment (EA) Study for proposed improvements to Casablanca Boulevard (from the North Service Road to Main Street West) and other adjacent roadways (the North Service Road, South Service Road, and Livingston Avenue) to support the projected population and employment growth targeted for 2041 in the vicinity of the aforementioned road network and to support the planned Grimsby GO Transit Station, scheduled for opening day in 2021. The scope of the EA Study (hereafter referred to as the Study) also includes a review of proposed improvements to the Casablanca Boulevard/QEW interchange.

This section provides an overview of the Study purpose, definition of the Study Area, and the EA process followed, which included satisfying the requirements of the Municipal Class EA process for Schedule C projects as well as the MTO Class EA process for Group B projects.

1.1 Purpose of the Study

Situated within the Town of Grimsby, Casablanca Boulevard (RR10, hereafter referred to as Casablanca Boulevard) is a two-lane arterial road with rural and urban segments. This north-south road connects the North Service Road to Main Street West, and provides access to commercial and residential land uses along the corridor as well as to the QEW to the north. Two key planning studies were undertaken to inform the need for the Study, namely the Niagara Region Transportation Master Plan (TMP), which was approved by Regional Council in 2017, and a Secondary Plan for the Grimsby GO Transit Station, which was approved by Regional Council in 2018. The Grimsby GO Transit Station is proposed at the southeast corner of the intersection of Casablanca Boulevard and the South Service Road. These planning studies recommended a series of short to long term capacity and safety improvements to Casablanca Boulevard, including intersection and interchange modifications, sight line improvements, and improvements to the Canadian National (CN) Railway crossing that bisects the Study Area.

The purpose of this Study is to address the transportation needs of the surrounding area to 2041, with a view to providing adequate operations to support population growth and access to the QEW and the planned Grimsby GO Transit Station. Future transportation needs along Casablanca Boulevard and other associated local roadways were assessed, related to traffic operations, future traffic capacity needs, pedestrian and cyclist access, and safety. The Study examines all modes of transportation, including active modes (walking and cycling), and also addresses engineering requirements to support the recommended improvements; including utilities, signals, illumination, and stormwater management/drainage.

In response to this Study purpose, a Municipal Class EA was undertaken to:

- Assess the need and justification for the proposed project or undertaking;

- Assess the environmental effects and engineering aspects of the alternatives;
- Identify a preferred solution/design; and
- Recommend measures to mitigate any potential adverse effects.

The EA was completed to meet the Municipal Engineers Association (MEA) *Ontario Municipal Class EA* Schedule C project requirements. In addition, as improvements are also proposed at the Casablanca Boulevard/QEW Interchange, the project was completed to meet the Ministry of Transportation (MTO)'s Class EA for Group B Projects. Further information on the processes is provided in Section 1.3 of this Report.

In completing the above steps, consultation with key stakeholders, regulatory agencies, Indigenous Communities, and the general public was undertaken.

1.2 Study Area

The Study Area was established early on in the Class EA process and includes a 'Focused Study Area' boundary where any improvements to road corridors would be located. The Focused Study Area consists of:

- Approximately 1.7 kilometres (km) of the Casablanca Boulevard corridor, extending from the North Service Road to Main Street West and including the QEW Interchange bridge;
- The South Service Road from Casablanca Boulevard west to Industrial Drive, and approximately 100 metres (m) east of Casablanca Boulevard; and
- Livingston Avenue from Casablanca Boulevard to west of Emily Street.

The Study Area includes lands up to approximately 250 metres (m) on either side of these roadways (500 metres (m) total width) as identified in **Figure 1-1**. A number of background studies (described in Section 4) were conducted for the entire Study Area to understand the existing conditions and inform the development of alternatives to address the needs and opportunities, while other baseline studies concentrated on the Focused Study Area.

CASABLANCA BOULEVARD & GO ACCESS ENVIRONMENTAL ASSESSMENT
Niagara Region

Figure 1-1
Environmental Assessment Study Area

- Casablanca Boulevard & Go Station Focused Natural Environment Study Area
- Grimsby GO Transit Station Area (2011 ESR Boundary, Metrolinx)
- Study Area
- Arterial Road
- Highway
- Railway (CN)

0 75 150 225 m

N W E S

MAP DRAWING INFORMATION:
ESRI IMAGERY (2013), MNRF

MAP CREATED BY: SFG / LK
MAP CHECKED BY: CV
MAP PROJECTION: NAD 1983 CSRS UTM Zone 17N

FILE LOCATION: G:\cad\GIS\187650\MXD\ESR Figures\Environmental Assessment Study Area.mxd

DILLON CONSULTING

PROJECT: 187650
STATUS: DRAFT
DATE: 2019-01-31

1.3 Environmental Assessment Process

1.3.1 Canadian Environmental Assessment Act, 2012

When a project has the potential to cause environmental effects that are within federal jurisdiction, a federal EA may be required. The Canadian Environmental Assessment Agency (CEAA) has created a list referred to as the *Regulations Designating Physical Activities List*, which identifies the types of projects that may require a federal EA. As the proposed project is not identified in the list of Designating Physical Activities, an EA under the CEAA is not required. It is noted that the CEAA (2012) is current under review by the federal government and there is potential for changes to the Act to be in place by 2019.

Non-CEAA designated projects may still however, require federal approvals (e.g. Navigable Waters Protection Act, Fisheries Act).

1.3.2 Ontario Municipal Class Environmental Assessment Process

An EA is a planning and decision-making process used to promote environmentally responsible decision-making. In Ontario, this process is defined by and finds its authority under the *Environmental Assessment Act (EA Act).* The purpose of the *EA Act* is to provide for the protection, conservation and wise management of Ontario's environment. To achieve this purpose, the *EA Act* promotes responsible environmental decision-making and ensures that interested persons have an opportunity to comment on undertakings that may affect them. In the *EA Act*, the environment is broadly defined and includes the physical, natural, and socio-economic environment.

Five key principles of planning are outlined in the *EA Act* including the following:

- Consultation with affected parties early on, in and throughout the process, such that the planning process is a co-operative venture;
- Consideration of a reasonable range of alternatives, both the functionally different alternatives to the project (known as Alternative Solutions) and the alternative methods of implementing the preferred solution (known as the Alternative Designs);
- Identification and consideration of the effects of each alternative on all aspects of the environment (i.e. natural, cultural and socio-economic environments);
- Systematic evaluation of alternatives in terms of their advantages and disadvantages, to determine their net environmental effects; and
- Provision of clear and complete documentation of the planning process followed, to allow "traceability" of decision-making with respect to the project.

This Class EA was carried out in accordance with the *Ontario Municipal Class EA* (October 2000, amended 2007, 2011 and 2015). A Class EA is an approved planning process that describes the steps that a proponent of a Municipal project must follow in order to meet the requirements of the *EA Act*. The Class EA approach requires the evaluation of both Alternative

Solutions and Alternative Designs. It includes mandatory requirements for public input and expedites smaller recurring projects with known and mitigatable impacts.

The Municipal Class EA process includes the following five phases (this Study fulfills Phases 1-4) (**Figure 1-2**):

- Phase 1: Problem/Opportunity Identification;
- Phase 2: Identification and Evaluation of Alternative Solutions;
- Phase 3: Identification and Evaluation of Alternative Design Concepts;
- Phase 4: Environmental Study Report Documentation; and
- Phase 5: Implementation.

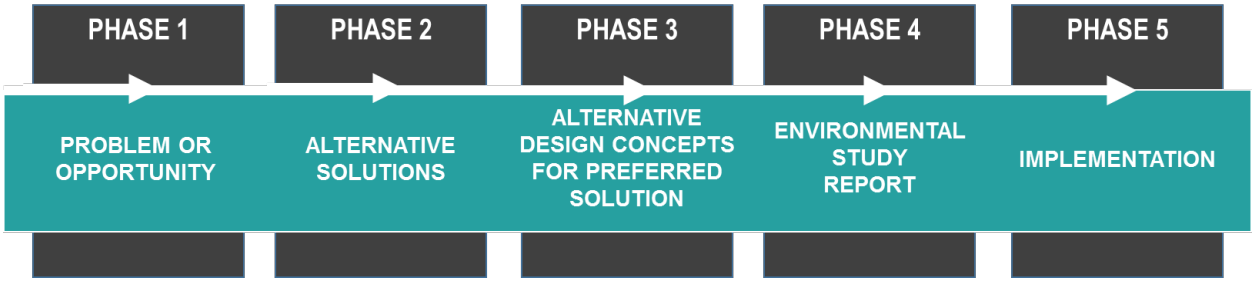


Figure 1-2 Municipal Class EA Process

1.3.2.1 Municipal Class Environmental Assessment Project Schedules

Under the Municipal Class EA, projects are categorized according to their environmental significance and their effects on the surrounding environment. Planning methodologies are described within the Class EA and are different according to the type of undertaking.

Projects are classified into three schedules according to their environmental significance including Schedule A/A+, B or C. The overall significance and level of potential impact of a project determines its schedule.

Schedule "A"/ "A+" projects are limited in scale, have minimal adverse effects and include the majority of Municipal road maintenance and operational activities. Other projects may be included in this category such as traffic control devices, depending on their anticipated construction cost as specified in the Class EA. These projects are generally pre-approved, and may proceed directly to Phase 5 for implementation, with the exception of A+ projects, which require the public to be advised prior to implementation.

Schedule "B" projects generally include improvements and minor expansions to existing facilities. These projects have some potential for adverse environmental impacts, and consultation with those who may be affected is required. Examples of Schedule B projects include the installation of traffic control devices, smaller road-related works, or the extension of

certain types of Municipal water/wastewater infrastructure. These kinds of projects typically require completion of a screening exercise under the Class EA process, including consultation with those who may be affected.

Schedule "C" projects generally include the construction of new facilities and major expansions of existing facilities, and require the completion of Phases 1-4 of the Class EA process.

This Project is being carried out as a Schedule "C" undertaking. Such projects have the potential for significant environmental effects and must proceed under the full planning and documentation procedures specified in the Class EA document. Schedule "C" projects require that an Environmental Study Report (ESR) be prepared and submitted for review by the public.

The Study followed the Class EA process to ensure a thorough understanding of the problems and opportunities, the various alternatives and their potential environmental effects, and associated mitigation measures. As the project is a Schedule "C" project, Phases 1 to 4 of the Class EA were carried out as follows:

Phase 1: Problem/Opportunity Identification (Project Need/Justification) - To establish the need and justification for the project, the Study included a review of existing and future projected roadway capacity and operational issues (for all modes of transportation). The opportunities and constraints in the context of existing plans and policies were assessed; this included a review of the Region's Transportation Master Plan with an understanding of Metrolinx's intention to develop a new GO Transit Station at Casablanca Boulevard and the South Service Road in Grimsby.

Phase 2: Identification and Evaluation of Alternative Solutions (Identify Preferred Solution) - Considering the identified problems and opportunities, Alternative Solutions (alternative ways of solving the problem) were developed, assessed and evaluated considering environmental, socio-economic, technical and cost considerations. The Alternative Solutions were presented to the public for review and comment. Through this process a preferred solution was identified.

Phase 3: Identification and Evaluation of Alternative Design Concepts (Identify Preferred Design) -Considering the recommended solution, alternative ways of implementing it (Alternative Designs) were then developed, assessed, and evaluated considering environmental, socio-economic, technical and cost considerations. The Alternative Designs as well as the preferred design, identified impacts, and proposed mitigation measures were presented to the public for review and comment. Through this process a preferred design (the undertaking) was refined.

Phase 4: Environmental Study Report Documentation - The final phase of the process involved the preparation and public release of this ESR for stakeholder review and comment.

Phase 5: Implementation - Subject to the completion of the above phases, the ultimate project will be constructed. Detailed Design for the project is being initiated in early 2019 with a consultation event planned for spring 2019. The intent is for construction of the recommended improvements to be completed in time for the opening of the planned GO Transit Station in 2021.

1.3.2.2 Class Environmental Assessment Part II Order

If concerns arise during the ESR review period that cannot be resolved through discussions with the Region, a person or party may request that the Minister of the Environment, Conservation and Parks (MECP) make an order for the Study to comply with Part II of the *EA Act*. The Minister will consider the request and make one of the following decisions, with the Minister's decision being final:

- Deny the request, stating the reason for the decision;
- Deny the request with conditions, such as requiring that the proponent prepare an annual report on the environmental impact of the project;
- Refer the matter to mediation, whereby one or more appointed persons will endeavor to resolve the concern; or
- Issue what is referred to as a “Part II Order,” which requires that the proponent comply with Part II of the *EA Act* and undertake the planning and design as an Individual EA. An Individual EA requires that the proponent define a planning and design process specifically for the proposed project, and submit it to the Minister of the Environment, Conservation and Parks for approval prior to carrying out the EA.

1.3.3 MTO Class Environmental Assessment for Provincial Transportation Facilities

As improvements are also required at the Casablanca Boulevard/QEW interchange, the EA for these interchange improvements must also meet the requirements of the MTO Class Environmental Assessment for Provincial Transportation Facilities (amended 2000) (MTO Class EA) which is also approved under the Ontario *EA Act.*

The MTO Class EA is a principle-based environmental planning process for four “groups” of MTO projects. The principles that MTO adheres to in addressing the requirements of the *EA Act* are as follows:

- Transportation engineering
- Environmental protection
- Evaluation
- Consultation
- Documentation and Bump-up
- Environmental clearance.

The four-stage planning and design process that MTO adheres to in addressing the requirements of the *EA Act* is as follows:

- Planning;
- Preliminary Design;
- Detailed Design; and,
- Construction.

Provided MTO follows the principles and planning process of the MTO Class EA, no project-specific approval is required under the *EA Act*.

The Study process for the proposed improvements to the Casablanca Boulevard/QEW interchange has complied with the requirements of the MTO Class EA for major improvements to existing facilities, which are classified as Group 'B' projects. The following work steps were undertaken:

- Consultation (including a Notice of Study Commencement and a Public Information Centre) as discussed in Section 2.1.1;
- Inventory of natural, socio-economic and cultural environments as discussed in Section 4.0;
- Problems and opportunities as discussed in Section 5.0;
- Planning alternatives (Alternative Solutions) as discussed in Section 6.0;
- Preliminary Design alternatives and evaluation as discussed in Section 7.0;
- The preferred Preliminary Design as discussed in Section 8.0; and
- Impacts (issues and effects) and mitigation measures as discussed in Section 9.0.

A Notice of Study Completion and ESR Submission is being published to advise stakeholders of the release of this ESR for a 45-day public review period for the public and other interested parties to provide comments, and to advise of the process to make a bump-up (Part II order) request, should their concerns not be resolved through discussions with the Region.

Following completion of the Detailed Design phase, a Design and Construction Report (DCR) will be prepared to document the detailed design process for the Casablanca Boulevard/QEW interchange; including additional consultation conducted, proposed construction staging and traffic management plans and recommended environmental mitigation measures. There will be additional opportunities for public engagement during the Detailed Design phase.

1.3.4 Environmental Study Report Outline

This ESR documents the process followed to identify the recommended design/undertaking and the potential environmental and socio-economic effects of the planning, design, and construction of the project. This ESR will also document stakeholder and public consultation and engagement efforts undertaken, and any commitments to be followed during subsequent

steps relating to the implementation of the recommended design/undertaking (Phase 5 of the Municipal Class EA). In particular, this ESR documents:

- The problems and opportunities being addressed;
- Alternative solutions and designs that were considered;
- A description of the preferred alternative;
- Description of existing environmental and socio-economic setting, potential effects and proposed mitigation measures;
- Public, stakeholder and Indigenous Community consultation that was undertaken; and
- Commitments to further work, consultation, and monitoring.

The ESR is organized as follows:

- **Section 1** provides an introduction and purpose of the project, the Study Area, and an overview of the applicable EA processes;
- **Section 2** includes an overview of the consultation program;
- **Section 3** describes the policy context for the project;
- **Section 4** provides a description of the existing transportation, infrastructure, socio-economic, natural, cultural, and physical context in the Study Area (i.e. baseline conditions);
- **Section 5** describes the projected future transportation conditions and outlines the identified Study Area problems and opportunities that have been addressed through this Study;
- **Section 6** identifies the Alternative Solutions identified for the project including their description and evaluation;
- **Section 7** describes the Alternative Designs of the recommended solution including how they were developed, rationalized and evaluated;
- **Section 8** provides a description of the preferred project design including intersections, pedestrian/cycling facilities, stormwater requirements, utilities, traffic signals, phasing, access management, and preliminary cost estimates;
- **Section 9** presents the anticipated environmental effects and proposed mitigation measures for the preferred design; and
- **Section 10** provides a description of additional considerations/future requirements prior to project implementation, including for example permitting, implementing policies, additional consultation commitments, Detailed Design requirements, etc.

2.0 Consultation and Communications

2.1 Consultation Overview

Public, affected property owner, Indigenous Community and agency consultation was an integral component of the Study process. The primary purpose of the consultation program was to involve the local community, property owners potentially affected by the proposed improvements, Indigenous Communities, government agencies, and other potentially affected persons in the Study and decision-making process.

Figure 2-1 Study Process and Consultation Activities

Specifically, the overall objectives of the consultation program were to:

- Create general awareness of the project to as many potentially interested stakeholders and community members as possible; and
- Generate an open and interactive approach to the planning process by creating opportunities for the public, government agencies, Indigenous Communities and interest groups to provide project comments and suggestions.

The following sections describe the consultation program that was undertaken for this Study. Subsequent sections of this ESR describe the input received and how it was considered in the Study. **Appendix A** contains the consultation program supporting materials, including summaries of consultation events and the feedback received.

A number of consultation activities were undertaken as part of the Study, including:

- Development of a stakeholder contact list, which was updated throughout the Study;
- Communication with Indigenous communities by mail and email;
- Development of a subpage on the Region's website with Study updates and contact information (https://www.niagararegion.ca/projects/moving-transit-forward/projects/casablanca-livingston-ea.aspx);

- Project notices and mailings/emails through an E-Bulletin;
- Two Public Information Centres (PICs), the first on June 20th, 2018 and the second on January 16th, 2019;
- Two online surveys;
- A Workshop for affected property owners along Casablanca Boulevard held on September 27th, 2018;
- Engagement with Indigenous Communities;
- Consultation with utility companies in the Study Area;
- Consultation with Regional Municipality of Niagara and Town of Grimsby Elected Representatives;
- Consultation with the Town of Grimsby;
- Consultation with local and Provincial agencies; and
- Public release of this ESR.

2.1.1 Project Notices

The Notice of Study Commencement was combined with the notice for the first PIC, which was held on June 20th, 2018. The notice was hand delivered to residents in the Study Area, and circulated to those subscribed for email updates on June 14th, 2018. As a result of the public's high level of interest in the project, PIC notices were also published in consecutive issues of local newspapers to invite attendance from residents in the Study Area. The advertisements were published on May 31st and June 14th, 2018, in Niagara This Week (Grimsby Zone).

The Notice for PIC #2, which was held on January 16th, 2019, was sent by email to the contact list on January 6th, 2019, with a reminder on January 14th, 2018. A hard copy of the notice was also distributed to agencies and key stakeholders by mail on January 6th, 2018. The notice was hand delivered to residents in the Study Area on January 10, 2019, and published in Niagara This Week (Grimsby Zone) on January 3, 2019 and January 10, 2019.

The Notice of Study Completion will be sent to the Study contact list by email and to agencies and key stakeholders by paper mail, and will be published in *Niagara This Week*.

2.1.2 Agency Engagement

Government agency consultation was a cornerstone of the Study, with multiple information sharing and stakeholder feedback meetings conducted at various points in the process. Agency consultation was initiated through the Notice of Commencement and continued with in-person and telephone communications.

Government agencies that were consulted as part of this Study include provincial ministries/agencies, the Town of Grimsby and the Niagara Peninsula Conservation Authority (NPCA).

Given the proposed improvements to the Casablanca Boulevard/QEW interchange, MTO was consulted as an Approval Agency throughout the Study process. As the Study is closely connected to and intended to aid service to the GO Transit Station, Metrolinx was also continuously updated and consulted with, both in conjunction with MTO and in separate meetings.

The agencies contacted or met with as part of the consultation program included the following:

- Provincial Ministries and Agencies
  - Ministry of Transportation;
  - Ministry of Environment, Parks and Conservation;
  - Ministry of Natural Resources and Forestry; and,
  - Metrolinx.
- Municipalities
  - Town of Grimsby; and,
  - Regional Municipality of Niagara.
- Other Agencies
  - Niagara Peninsula Conservation Authority; and,
  - CN Railway Company.

This ESR was reviewed by MTO in advance of filing for public review. A record of official email or letter correspondence with agencies is provided in **Appendix A**.

2.1.3 Elected Representatives Engagement

The Municipal elections for the Niagara Region and Town of Grimsby Councils were held on October 22nd, 2018. Prior to the elections, elected representatives were engaged through presentations to the respective Councils by Niagara Region staff. Following the elections, a meeting was held with newly elected representatives on November 8th at the Casablanca Winery Inn and Spa.

2.1.4 Utility Companies Engagement

Utility companies were engaged at the stage of evaluating the Alternative Designs in order to identify any potential conflicts that may need to be addressed as the project progressed. A Request for Information was sent out to utility owners in the Study Area (**Appendix A**), and responses collated to create a utilities composite plan. This step was followed by a meeting with utility companies with confirmed assets in the Study Area, to present the preliminary design concepts and discuss potential impacts to buried and aboveground utilities on September 6th, 2018 at the Town of Grimsby Council Chamber. Further details on the utilities assessment in the Study Area are provided in Section 4.1.5 and in **Appendix C**.

2.1.5 Public Engagement

The main opportunities for consultation during Phases 1 and 2 of the Study process included:

- Two Public Information Centres;
- Two online surveys;
- A Workshop for affected property owners;
- Release of information on project website; and
- Distribution of notices, letters, and emails at key milestones.

Comments received from in-person and email communications with the public were compiled and considered in the completion of the Study. These are documented in various sections of this ESR, according to the phase of the Study process that they pertain to.

2.1.6 Indigenous Communities Engagement

Indigenous Community engagement was an important part of the consultation process. The following describes the activities that were undertaken to provide Indigenous Communities with an opportunity to be informed about the project and provide input.

The project team completed a search of the Aboriginal and Treaty Rights Information System (ATRIS) in developing the Indigenous communities contact list. Based on this search and information received, it was determined that the following communities should be consulted:

- Mississaugas of the New Credit First Nation;
- Six Nations of the Grand River Territory;
- Haudenosaunee Confederacy; and
- Métis Nation of Ontario (MNO).

These Indigenous Communities were provided with project notices (September 4, 2018) including the Notice of Study Commencement and PIC #1. Following an inquiry received from the Mississaugas of the New Credit First Nation, the Stage 1 Archaeological Assessment Report was provided for review. Indigenous Communities will continue to be engaged through the Detailed Design process, including any additional archaeological investigations required for the Study.

Correspondence with Indigenous Communities did not lead to the identification of any specific or comprehensive claims or litigation that materially affected the project. The identified communities will be notified of the ESR release and the Region is committed to working with Indigenous Communities should any issues arise.

2.1.7 Notice of Study Completion

The filing of this ESR completes the Municipal Class EA process for the project. As per the Municipal Class EA, this ESR is to be made available for public review for a period of forty-five

(45) calendar days through publication of the Notice of Completion. Project information will also be provided on the Region's website. A copy of the report will be available for viewing at the following locations:

Niagara Region Headquarters
1815 Sir Isaac Brock Way
Thorold, ON
L2V 4T7

Town of Grimsby Town Hall
160 Livingston Avenue
Grimsby, ON
L3M 4G

Subject to comments received as a result of this Notice and the receipt of all necessary approvals, the Region intends to proceed with the Detailed Design and construction as documented in this ESR.

3.0 Planning Context

3.1 Project Planning Context

As noted in Section 1.1, this Study has a primary focus on providing adequate traffic and transportation operations for all modes in the Study Area to the year 2041, and providing access to the planned Grimsby GO Transit Station, scheduled for opening in 2021. A number of conditions in the Study Area have created the impetus for the Study, including emerging medium density residential development along the North Service Road, which has created the need for improvements to the Casablanca Boulevard/QEW interchange.

In reviewing and assessing the existing infrastructure and future transportation requirements of the key road corridors in the Study Area, it is essential to establish a planning policy context for infrastructure expansion, considering both growth and transportation objectives. The policy framework includes all levels of government that have influence in the Study Area, and guides strategic investment decisions to support community objectives and accommodate forecasted population and employment growth.

The assessment and evaluation of the Study Area issues and opportunities was carried out with due consideration to the policy framework, to align the ultimate set of recommended improvements and the preferred alternative as presented in **Table 3-1** with the policies and objectives of the various levels of government.

Table 3-1 Summary of Planning and Regulatory Framework for the Study

Policy/Regulatory Document	Governing Authority	Applicability to the Study – Compliance Requirement
Provincial Policy Statement (2014)	Ministry of Municipal Affairs and Housing	Required
Places to Grow – Growth Plan for the Greater Golden Horseshoe (2017)	Ministry of Municipal Affairs and Housing	Required
Greenbelt Plan	Ministry of Agriculture, Food and Rural Affairs	Required
#CycleON - Ontario's Cycling Strategy (2013)	Ministry of Transportation	Guidance
Niagara Region Regional Official Plan (2014)	Niagara Region	Required

Policy/Regulatory Document	Governing Authority	Applicability to the Study – Compliance Requirement
Niagara Region Transportation Master Plan (2017)	Niagara Region	Guidance
Niagara Rail Service Expansion Environmental Study Report (2011)	Niagara Region	Background Study
Town of Grimsby Official Plan (2012)	Town of Grimsby	Required
Grimsby GO Transit Station Secondary Plan (2018)	Town of Grimsby	Required
Town of Grimsby Zoning By-laws	Town of Grimsby	Required
Niagara Peninsula Source Protection Plan	Ministry of the Environment, Conservation and Parks	Required

In addition to the planning and regulatory documents identified in **Table 3-1**, recent and ongoing policy directives from Provincial authorities could have a potential impact on the planning considerations for the Study. These include a market-driven approach to GO Transit Station development announced by Metrolinx on November 26th, 2018, that indicated the agency's intent to place the development of new Stations on hold until a partner could be identified to develop the GO Transit Station site for transit-oriented development uses.

The following sections provide an overview of the components of the policy framework highlighted in **Table 3-1**, and identify the key elements that informed the development of the Study issues and opportunities as well as the alternatives (Sections 4 and 5 of this ESR). The key elements of the Region's Transportation Master Plan (2017) and the Grimsby GO Transit Station Secondary Plan (2018) that provide the policy basis for the development of the alternatives considered in the Study are discussed.

3.2 Provincial Planning Framework

3.2.1 Provincial Policy Statement (2014)

The Provincial Policy Statement (PPS) was issued under the authority of Section 3 of the *Planning Act* and came into effect on April 30th, 2014. The PPS sets out the province's vision for how lands are settled, infrastructure is designed and built, and land and resources are managed, in order to achieve the long-term objective of livable and resilient communities. The PPS supports and promotes providing a range of transportation choices in and between communities, including by way of active transportation facilities. Section 3 of the *Planning Act*

requires that decisions affecting planning matters “shall be consistent with” policy statements issued under the Act.

The PPS supports and promotes healthy and active communities. This includes planning public streets to be safe, meet the needs of pedestrians, foster social interaction, and facilitate active transportation and community connectivity (Section 1.5 - Public Spaces, Recreation, Parks, Trails and Open Space of the PPS).

Planned improvements to the corridor (defined as “infrastructure” in the PPS) are to be consistent with the relevant Transportation Systems and Transportation and the Infrastructure Corridors policies included in Sections 1.6.7 and 1.8 respectively of the PPS, as summarized below:

- The proposed improvements should be safe, energy efficient, facilitate(s) the movement of people and goods, and be appropriate to address projected needs;
- The project shall make efficient use of existing and planned infrastructure;
- As part of a multimodal transportation system, connectivity within and among transportation systems and modes should be maintained and, where possible, improved, including connections which cross jurisdictional boundaries; and
- Promote the use of active transportation in and between residential, employment (including commercial and industrial) and institutional uses and other areas.

The PPS therefore provides a strong basis to include a complete network of active transportation facilities wherever possible within the Study Area.

3.2.2 Growth Plan for the Greater Golden Horseshoe (2017)

The Growth Plan sets out policies to guide long range growth planning in the Greater Golden Horseshoe. The guiding principles for the plan include:

- Build compact, vibrant and complete communities;
- Support residential and employment intensification and higher densities through efficient land uses, infrastructure, and transit-oriented development; and,
- Plan and manage growth to build a strong economy.

Complete communities feature a diverse mix of land uses (both residential and employment), convenient access to the amenities residents need, such as local stores, services, and public service facilities, while supporting affordable housing initiatives, active transportation, and compact built form.

The Growth Plan emphasizes using transit infrastructure as a means to shape growth and improve linkages between urban growth centres, major transit Station areas and other intensification areas. This point is highlighted for *Transit Corridors and Station Areas* which stipulates major transit Station areas and intensification corridors need to be designated in

municipal official plans and planned to achieve mixed-use development at transit-supportive densities.

There is a strong focus in the Growth Plan on land use and infrastructure, particularly planning for transit. The Growth Plan require that municipal growth planning take into account the availability and location of existing and planned community infrastructure, including affordable housing and transit, supporting connectivity and reductions in automobile usage. Linkages between major transit Station areas and surrounding residential, office, institutional, and commercial development will facilitate strategic growth and efficient transportation growth.

3.2.3 Greenbelt Plan (2017)

The Growth Plan provides the framework for where and how urban growth should occur in the Greater Golden Horseshoe. The Greenbelt Plan was established to provide a parallel framework for environmental management and protection in the same general area as the Growth Plan and is important to note as it applies to the environment, although there are no explicit employment or commercial land policies. The Greenbelt Plan includes the protection of lands designated under the Niagara Escarpment Plan and Oak Ridges Moraine Plan and allows for the protection and management of prime agricultural and specialty crop lands across the Greater Golden Horseshoe. **Figure 3-1** shows the limits of the protected countryside Greenbelt Area in the Town of Grimsby. Lands in the protected countryside are subject to the entirety of the Greenbelt Plan.

The lands north of Livingston Avenue and west of Casablanca Boulevard, including the Region-owned lands are designated as Protected Countryside (Tender Fruit and Grape Lands) in the Greenbelt Plan. This designation permits infrastructure (including transit Station) approved under the Environmental Assessment Act. Specifically, Policy 4.2.1.B of the Greenbelt Plan states that infrastructure is permitted within the Protected Countryside where “it serves the significant growth and economic development expected in southern Ontario beyond the Greenbelt by providing for the appropriate infrastructure connections among urban growth centres and between these centres and Ontario’s borders”.

The characteristics of agricultural lands that fall within the Greenbelt in the Study Area are provided in **Section 4.6.3**. As part of this ESR, the impacts of any extension to Livingston Avenue west of Casablanca Boulevard that would fall within the Greenbelt are considered (see **Section 8** and **9**).

3.2.4 #CycleON – Ontario’s Cycling Strategy (2013)

The MTO released Ontario’s Cycling Strategy, titled #CycleON in 2013. The Strategy was developed in collaboration with a number of stakeholders, including the Region. The Strategy notes that MTO surveys of road users suggest that around 1.2 million adults in Ontario ride a bicycle daily during the spring, summer and fall, and 2.8 million ride at least once a week. As such, “Cycling generates a wide range of health, economic, environmental, social and other

benefits. These include improved personal health, reduced health care costs as a result of lower rates of chronic conditions through active living, reduced traffic congestion in urban areas, a cleaner environment and increased tourism opportunities across the province." (#CycleON, 2013).

The vision presented in the Strategy is that by 2033 cycling in Ontario is recognized, respected, and valued as a core mode of transportation that provides individuals and communities with health, economic, environmental, social and other benefits. Five aspirational goals for the province are identified:

- Ontario is recognized as the best Canadian province for cycling and ranked among the top 10 jurisdictions worldwide for cycling;
- The built environment in most Ontario communities supports and promotes cycling for all trips under 5 km;
- Ontario's cycling environment is safe for people of all ages, striving to achieve a record of zero fatalities and few serious injuries;
- Ontario's cities and towns will have interconnected networks of safe cycling routes enabling people to cycle to work, school, home and key destinations; and
- Ontario has an integrated province-wide network of cycling routes.

The Strategy identifies the importance of partnership between MTO and local municipalities to implement the vision and goals of the Strategy.

The Strategy points to the increase in cycling tourism in Ontario, and identifies the need to support this practice in both rural and urban areas by developing a province-wide cycling network. A study by the Clean Air Partnership cited in the Strategy notes the important benefits from day-to-day spending by Ontarians who cycle in urban areas, with cyclists and pedestrians spending more money at local establishments and businesses than motorists who visit the neighbourhood

In addition, a 2015 report by the Ontario by Bike Network, *From Niche to Now: Cycle Tourism in Ontario* further highlights the growing cycling tourism sector in Ontario. The report includes the following findings from the research conducted by the organization:

- 54% of Ontarians indicated they would prefer to cycle more;
- 96% who want to cycle more said yes to more recreational cycling activities, 48% said yes to cycle tourism in Ontario; and
- 70% of experienced cyclists took cycling trips in Ontario vs. 30% of recreational / leisure cyclists.

3.3 Niagara Region Planning Framework

3.3.1 Niagara Region Official Plan (2014)

The Regional Official Plan (ROP), titled 'Imagine Niagara' (approved in 2014), establishes the policy framework for managing growth, protecting resources and providing direction on land use decisions in the Region to 2031. The Region is currently undertaking a number of background studies to inform an update of its Official Plan, a process which is expected to conclude in 2021.

The ROP outlines objectives for a healthy Region, implemented through the policies of the Plan. The objectives are focused on the long-term prosperity and social well-being of the Region to maintain strong, sustainable and resilient communities, a clean and healthy environment and a strong economy. Schedule A of the ROP (Regional Structure) identifies the built-up area and Greenbelt Plan Area within the Study Area (**Figure 3-1**).

Section 9 (Transportation) of the Official Plan outlines a number of objectives and relevant policies that were taken into consideration through the Study, including the following objectives identified in Section 9.A:

- To promote and support safe, convenient, efficient, aesthetic and economical transportation systems for all modes of transport for the movement of people and goods;
- To provide an arterial road system which, in conjunction with the Provincial and local road systems, will give convenient access throughout all parts of the Region and to adjacent areas; and
- To ensure that transportation infrastructure contributes to the development of vibrant communities; recognizes the historical context within which it is developed and enhances the public realm by designing pleasing streetscapes and supporting active transportation.

Section 9.B of the ROP includes the following relevant transportation-related policies that were taken into consideration throughout this Study:

- The Region will ensure that corridors are identified and protected to meet current and projected needs for various modes of travel including active transportation.
- Planning for transportation systems and facilities should be sensitive to community values and the physical setting, embodying the principles of context sensitive design.
- An Environmental Assessment for a transportation project should include consideration of:

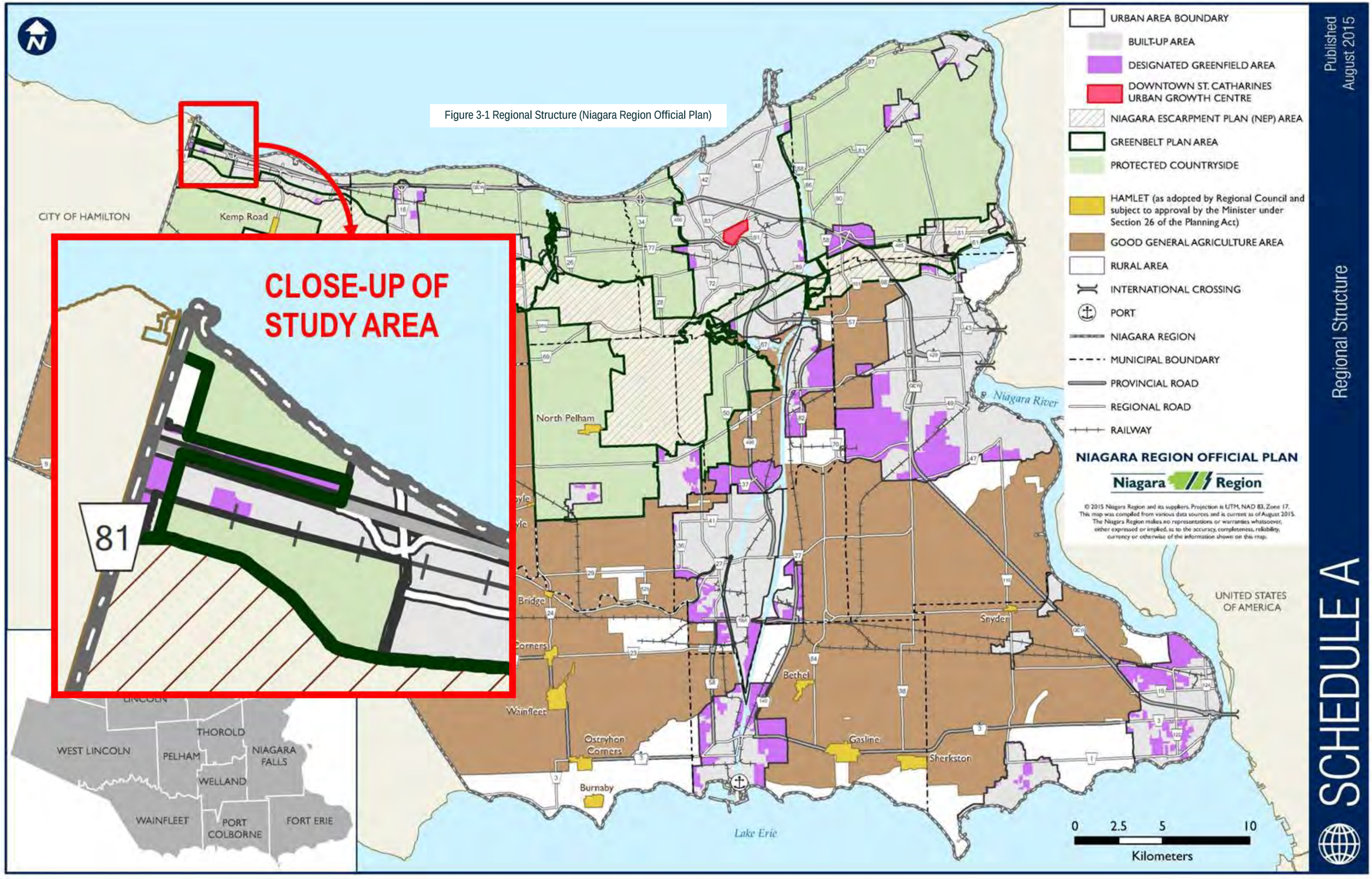
    - The opportunity to improve the living environment of existing residents adjacent to the street and within the adjacent neighbourhood.

  - The opportunity to improve the pedestrian environment for both residents and visitors.
  - The opportunity to provide for or improve other modes of transportation including transit and cycling.
  - The opportunity to improve the safety, efficiency and pleasure of road users including drivers and their passengers, pedestrians and cyclists.
- The Region and local municipalities shall develop policies to promote vibrant and walkable streets and bridges, consistent with the Region's Model Urban Design Guidelines on Regional and local roads, respectively.

Section 9.C of the ROP includes the following relevant Regional Road-specific policies that were taken into consideration throughout this Study these include providing access that is aligned with existing and future land uses and development patterns, a focus on safety, efficiency, system continuity, character of the existing community, and efforts to mitigate the impacts of improvements and reconstruction resulting from road widenings. Urban design and opportunities to improve the public realm through the design of stormwater management facilities and streetscaping were also considered per the policies in this section of the ROP.

Section 9.F of the ROP includes the a number of relevant active transportation policies that were also taken into consideration , particularly to align with the goal of completing the Bike Network and providing safe, attractive, and integrated cycling facilities to cater to users of all abilities.

Figure 3-1 Regional Structure (Niagara Region Official Plan)



3.3.2 Niagara Region Transportation Master Plan (2017)

The Region's Transportation Master Plan (TMP), How We Go (approved July, 2017), sets out a strategic vision for transportation in the Niagara Region to 2041, and illustrates how effective transportation can enhance the quality of life for residents. As Section 6.0 of the TMP states, "The transportation network should promote healthy communities where all residents, regardless of age or ability, enjoy a high quality of life. Residents will have a wide range of options available to them for getting around and meeting their daily needs including accessing goods, services, employment and recreation by alternate travel modes (i.e., walking, cycling, public transit and the automobile)." Overall, the TMP establishes a long-term transportation vision to ensure that future transportation needs are addressed through development of pedestrian and cycling facilities, rapid- and conventional transit, and the integration of roads and highways within the Regional transportation network.

The goals of the TMP include, in summary:

- Integrate transportation and land use;
- Support economic development;
- Enhance multi-modal connectivity;
- Improve options for sustainable modes of transportation;
- Maintain and improve efficiency of the goods movement network;
- Promote the development of healthy communities; and
- Develop a realistic yet innovative blueprint for implementation.

The TMP also outlines challenges and opportunities for improvement for the Region's transportation network. With 352 kilometres (km) of cycling lanes, the TMP indicates that there are many gaps and discontinuities within the active transportation network, recommending a need for increased connectivity in cycling infrastructure.

There is also a low level of transit coverage throughout the Region, as travel patterns do not align with administrative boundaries, and much of the Region's land area is rural, complicating transit coverage. Most of the road network is found to be adequate, but improvements are recommended with regard to connections to the provincial highway network, most critically the QEW. Overall, the TMP recommends that the Region's transportation system become more responsive to the complexities of travel demands of its residents through better connections locally, regionally, and externally.

The following are recommended strategies from the TMP that are relevant to this project:

- Plan and design all Regional Road projects identified in the Road Capital Plan, including repaving, using a Complete Streets approach, designing roads to be universally accessible, safe and comfortable for all users.

- Invest in active transportation facilities and supporting infrastructure to promote active lifestyles and healthy communities.
- Strengthen core transit services and provide transit connections to all of its local municipalities through a combination of fixed-route and demand-responsive transit, using existing and emerging technologies to improve efficiency and cost-effectiveness, to support growing demand for inter-municipal travel and inter-regional transit services.
- Accommodate future growth in travel through strategic network capacity increases and address operational improvements at key constraints. It is recommended that the Region continue to advocate for highway capacity improvements to address inter-regional and international trade and tourism-related demands, including a new trade corridor connecting Niagara to Hamilton and the international border.

The integration of the strategies of the TMP as policies within the ROP helps the Region plan effectively for future growth, while also supporting progress towards its other goals such as reductions in greenhouse gas emissions, improving social equity, and promoting healthier lifestyles. Issues related to traffic and congestion on the QEW and its crossings/interchanges in the Region are recognized in the TMP, along with the Region's intent to work with MTO to resolve these issues.

The need and recommendation for improvements to the Casablanca Boulevard Corridor from the QEW to Livingston Avenue are identified in Section 6.3 of the TMP as an opportunity to better accommodate economic demands, tourism demands and travel for Niagara residents. The phasing of these improvements is identified to take place between 2017 and 2021. Improvements to the Casablanca Boulevard/QEW interchange were noted in the TMP as being needed but outside of the scope of the TMP, and therefore to be pursued separately by the Region and MTO.

A number of technical papers were developed to support the TMP that are of relevance to the Study, including the Strategic Cycling Network and the Complete Streets Design Guidelines which are reviewed in the following sections.

3.3.2.1 Strategic Cycling Network (2017)

One of the supporting elements of the Region's TMP (2017) is the Strategic Cycling Network (SCN) that identifies the key corridors across the Region to be improved with cycling infrastructure in order to provide a more complete network of cycling lanes in key areas. The ROP was updated to integrate the SCN into Schedule E2 (September 2017). **Figure 3-2** shows an excerpt from Schedule E2 of the ROP, indicating that Casablanca Boulevard, the North Service Road, Livingston Avenue, and Main Street West are identified as being part of the network.

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Figure 3-2
Excerpt from Schedule E2 of the Regional Official Plan: Strategic Cycling Network

- Focused Study Area
- Grimsby GO Transit Station Area (2011 ESR Boundary, Metrolinx)
- Study Area
- Strategic Cycling Network (Niagara Region, 2017)
- Local Road
- Arterial Road
- Highway
- Railway (CN)
- Water Body

0 75 150 225 m

N W E S

MAP DRAWING INFORMATION:
ESRI IMAGERY (2013), MNRF

MAP CREATED BY: SFG / LK
MAP CHECKED BY: CV
MAP PROJECTION: NAD 1983 CSRS UTM Zone 17N

FILE LOCATION: G:\cad\GIS\187650\MXD\ESR Figures\Strategic Cycling Network.mxd

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3.3.2.2 Complete Streets Design Guidelines (2017)

The Niagara Region Complete Streets Design Guidelines were developed to support the Region's TMP (2017). This document provides guidance on the aspirational vision for Regional Roads, with the intent noted in Section 1.2 of the Guidelines being to create "a coordinated family of complete streets" across the Region. As all roads in the Region are designated as Arterials under the ROP, the guidelines set forth design criteria with a hierarchy of typologies that takes into account the form, function, and surrounding environment of the roads. The six typologies are:

1. Main Street;
2. Urban General (Narrow);
3. Urban General (Wide);
4. Transitioning;
5. Hamlet; and
6. Rural.

The typical planned Right-of-Way for each of these Complete Street Typologies forms the basis for the streetscape elements that are recommended. The Guidelines present demonstrations and typical cross sections for each of the typologies.

The roads in the Study Area which are proposed to be improved were compared against the typologies in the Guidelines (**Table 3-2**). The associated design guidance and streetscape elements in the Guidelines for each road corridor segment were considered in the development of the Alternative Designs and the preferred design (**Section 7** and **Section 8** of this ESR, respectively).

Table 3-2 Complete Streets Typologies for Roads in the Study Area

Road Segment	Road Typology	Function
Casablanca Boulevard (the North Service Road to Main Street West)	Transitioning	Residential transitioning to more urbanized context
The South Service Road (Casablanca Boulevard to Industrial Drive)	Urban General (Wide)	Major urban arterial with adjacent high density commercial/retail development
Livingston Avenue (Casablanca Boulevard to west of Emily Street)	Hamlet	Local community road with adjacent low density residential

3.4 Other Relevant Documents/Plans

3.4.1 Niagara Rail Service Expansion Environmental Study Report (2011)

In 2010, Metrolinx undertook an EA to assess the need and potential locations for GO Transit Stations across Niagara. The resulting Niagara Rail Service Expansion Environmental Study Report (April, 2011) identified the Casablanca Boulevard GO Transit Station as the preferred location for GO Rail service to Grimsby. The EA was completed in accordance with GO Transit's Class EA document, dated December 2003 (as amended August 2005). The approval of the 2011 ESR created the impetus the Region to undertake the development of the Grimsby GO Transit Station Secondary Plan (2018) as part of the Niagara GO Hub and Transit Stations Study (NGHTSS) which was undertaken by the Region from 2016 to 2018.

The design concept for the Grimsby GO Transit Station at Casablanca Boulevard provided in the 2011 ESR was as follows:

"A Casablanca Boulevard Station would include a Station building along the north side of the CNR mainline, along with parking, bus bays and a Kiss and Ride area to allow for drop-off and taxi patrons. Initial parking would be sized to accommodate 470 spaces. The train platform would be constructed on the south side of the CNR mainline along with a pedestrian tunnel including stairs and elevator connecting the north parking lot with the south platform. Future improvements would allow for a platform on the north side of the CNR mainline and parking capacity to accommodate 970 additional spaces" (E.6.2, page iii).

Metrolinx has since developed a Functional Design concept for the GO Transit Station indicating a plan to provide 197 parking spaces on the north side of the Station Area site north of the CNR mainline, and is undertaking Detailed Design of the GO Transit Station site.

3.4.2 Town of Grimsby Official Plan (2012)

The Town of Grimsby's Official Plan (OP, approved May 12, 2012) aligns with the ROP to establish a cohesive policy framework for the upper and lower tier municipalities. The focus of the Town's OP is to manage future growth compatibly with its designated land uses, protect and enhance its natural heritage features, promote economic development, and coordinate planning policies with various levels of government to ensure consistency in planning for Grimsby to 2031.

The Town's OP outlines a strategic direction for future growth and development in Grimsby, which is implemented through the policies of the Plan. The vision is focused on long-term growth, well-being of residents, healthy communities, increased employment and economic development, and attainable and affordable housing, all while preserving the Town's roots in agriculture as a farming community. The following vision statement in **Section 2.1** is relevant to the current Study:

"Transportation choices will be improved with an efficient and connected road network and a future public transit service anchored on Downtown and potential future GO Transit service along the QEW and/or the railway corridor."

Section 2.2 outlines the guiding principles for the strategic direction of the OP. The following are relevant transportation-related principles that were taken into consideration throughout this Study:

- Promote an urban structure that is less dependent on cars, and encourages alternative modes of transportation such as public transit, cycling, and walking.
- Develop and maintain a transportation system that will provide for the safe, convenient and efficient movement of people and goods while providing a variety of transportation options.

Section 5.0 outlines the Town's transportation vision, goals, objectives, and implementation policies. The goals focus on the provision of alternative modes of transportation and encouragement of their use. The following are relevant transportation-related policies in the Town's OP that were taken into consideration throughout this Study, with references to the relevant section of the OP provided in brackets:

- The Town will encourage the efficient movement of people and goods (Section 5.4.1.6).
- Consideration shall be given, where appropriate, to reducing the number of driveways along Regional arterial roads through the provision of service roads, shared driveways, and common off street parking areas (Section 5.4.3.3).
- The following future road connections are planned: Connect Livingston Avenue from its current terminating point west of Emily Street, to Regional Road No. 81. The proposed intersection configuration would encourage the use of Livingston Avenue as an east-west corridor and mitigate congestion on Main Street West. An Environmental Assessment is required for the future Livingston Avenue road extension, and is currently underway as a separate study (Section 5.4.7.1).
- Road rights of way facilitate transportation and transit networks, pedestrian and bicycles connections, opportunities for vistas and view corridors, pedestrian amenity areas, as well as space for utilities and services (Section 5.6.1).
- This Plan will ensure the integration of cycling opportunities with the Niagara Wine Route and the Niagara Region Bicycle Network (Section 5.6.3.3).

With respect to the land uses in the area, Schedule B-1 of the Town's OP identifies the general intent for the lands in the Study Area, with more specific detail provided in the Grimsby GO Transit Station Secondary Plan. Land use designations and their definitions outlined in the Town's OP are listed below and shown on **Figure 3-3.**

- Hazardous Land Area (section 9.20) - Property or lands that could be unsafe for development due to naturally occurring processes. Along river, stream and small

inland lake systems, this means the land, including that covered by water, to the furthest landward limit of the flooding hazard or erosion hazard limits.

- Residential Mixed Use (section 9.20)- The lands designated as residential/mixed use area are ideal locations for a mixture of residential, convenience retail, service commercial, and prestige employment uses. It is the intent of the Town to promote the *development*/redevelopment of the lands designated as residential/mixed use area for higher density, transit supportive and mixed use *developments* that take advantage of the attributes of their physical location.
- Service Commercial Area (section 9.20)- Within the service commercial area designation, permitted uses shall include those which rely on vehicular traffic for their economic existence as well as uses which require relatively large land areas that are not available in the downtown district, and uses serving tourists and visitors to the area.
- Employment Area (section 9.20)- means areas designated in an official plan for clusters of business and economic activities including, but not limited to, manufacturing, warehousing, offices, and associated retail and ancillary facilities.
- Agricultural (section 9.20)- means the growing of crops, including nursery and horticultural crops; raising of livestock; raising of other animals for food, fur or fibre, including poultry and fish; aquaculture; apiaries; agro-forestry; maple syrup production; and associated on-farm buildings and structures, including accommodation for full-time farm labour when the size and nature of the operation requires additional employment. Agricultural uses include value retention uses required to make a commodity saleable (i.e. corn dryer, washing, sorting, packing and packaging).
- Hamlet Residential (section 9.20)- The hamlet residential Area designation shown on Schedule B is designed to recognize existing Hamlets which provide social and economic services for residents of the Town in the agricultural area, south of the *Escarpment*, and which have potential for limited additional development.
- Medium Density Residential (found in section 3.4.3) - recognize existing locations of medium density house forms within the Grimsby Urban Settlement Area and to identify on Schedule B new locations where medium density house forms are considered appropriate.
- Low Density Residential (found in section 3.4.2) - The Low Density Residential Area Designation applies to existing low density *stable residential neighbourhoods* throughout the Grimsby Urban Settlement Area, as delineated on Schedule B-1.

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Figure 3-3
Town of Grimsby Official Plan-Schedule B-1 Land Uses

Lake Ontario
N SERVICE RD
S SERVICE RD
QEW
WINSTON RD
HUNTER RD
ESPLANADE LANE
WINDWARD DR
CONCORD PL
TOPS DR
OAKES RD N
INDUSTRIAL DR
MAIN ST W
OAKES RD S
HUNTER RD
ELMER ST
EMILY ST
VINE RD
GAGE ST
MAGNOLIA CRES
TAMI CRES
LIVINGSTON AVE
MERRITT CRES
GEORGE ST
ASPEN DR
BEECH ST
CEDAR ST
JAMES ST
CASABLANCA BLVD
ELGIN ST
FATHY CIR
TAMARACK CRT
TULIP ST
CHESTNUT DR
ORIOLE CRES
ROBERTS RD
EVERGREENS DR
WILLOW LANE
SYCAMORE CRES
TRILLIUM LANE
LINDEN LANE
WOOLVERTON RD

- Focused Study Area
- Grimsby GO Transit Station Area (2011 ESR Boundary, Metrolinx)
- Study Area
- Urban Boundary
- Arterial Road
- Highway
- Railway (CN)
- Parcel

Land Use

- Employment Area
- Environmental Conservation Area
- Environmental Protection Area
- Escarpment Natural Area
- Escarpment Protection Area
- Institutional
- Low Density Residential Area
- Medium Density Residential Area
- Residential / Mixed Use Area
- Parks and Open Space
- Rural Area
- Service Commercial Area
- Specialty Crop Area - Tender Fruit and Grape Lands
- Transit Station Area
- Utility Area
- Water

0 75 150 225 m

N W E S

MAP DRAWING INFORMATION:
ESRI IMAGERY (2013), MNRF

MAP CREATED BY: SFG / LK
MAP CHECKED BY: CV
MAP PROJECTION: NAD 1983 CSRS UTM Zone 17N

FILE LOCATION: G:\cad\GIS\187650\MXD\ESR Figures\Schedule B1- Land Uses.mxd

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3.4.3 Grimsby GO Transit Station Secondary Plan (2018)

To support the Provincial investment in high order transit, Niagara Region undertook the GO Hub and Transit Stations Study (completed in 2018) for four future GO Transit Stations across the Region (Grimsby, Lincoln, St. Catharines, and Niagara Falls). The intent of the Study was to prepare the lands for transit-oriented development and growth while ensuring direction for high quality urban design. The Study included the preparation of planning and design tools, including Secondary Plans (under Section 17 of the Planning Act) for the lands in and around the Stations, which included urban design guidelines and implementation/phasing guidance.

The purpose of the Grimsby GO Transit Station Secondary Plan was to provide the vision and planning policy framework that will guide future transit-oriented development and redevelopment in the Grimsby GO Transit Station Area. The plan provides long range policy for land use (**Figure 3-4**); transportation including walking, cycling, and road infrastructure; municipal infrastructure improvements; urban design and public realm improvements; and, implementation tools and a monitoring program. The Plan was adopted by Town of Grimsby Council as Amendment No.6 to the Town's Official Plan on February 20, 2018, and approved by Region Council on May 3, 2018.

The Secondary Plan guidance provided the basis for some of the design elements of the Casablanca Boulevard and GO Transit Station Access EA, with respect to adjacent land uses, population and employment projections, and urban design guidelines.

3.4.4 Town of Grimsby Zoning Regulations

The Town of Grimsby Zoning By-law 14-45 (as amended), Schedules 3,4,10 and 11 illustrate the zoning that applies to the immediate project area. The applicable Schedules can be found in **Appendix E.** The following summary provides an overview of the applicable zoning regulations for the Study Area:

- North Service Road: the area north of the North Service Road is zoned as Neighborhood Development ND, with Open Space 1 and Open Space 2 slightly west.
- QEW Interchange Lands: the area south of the eastbound QEW exit ramps and north of the North Service and South service intersection is zoned Service Commercial.
- Casablanca Boulevard:
    - The lands on the west side of Casablanca Boulevard north of the westbound QEW ramps are zoned as Residential Multiple 3 (RM3) and Service Commercial (CS);
    - On the east side of Casablanca Boulevard, north of the North Service Road, the lands closest to the shoreline are zoned as Private Open Space 1 (O1) , Neighborhood Development (ND) to the south, and as Utility (U) to the east;

- The east side of the Casablanca Boulevard roadway is also zoned as Commercial Service area. To the south where Livingston Avenue extends to a small cluster of residential homes connecting to Rosedale and Emily Street is zoned as a Rural Area (RU);
- South of the CN railway on the west side of the corridor is a plot zoned for Speciality Crop (SC) which ends at the west side of Casablanca opposite of Vine Road. To the south of the land zoned for the speciality crop, is a small cluster of residential units where Livingston Avenue intersects Casablanca Boulevard and ends at Emily Street, this area is zoned as a Rural Area (RU). Where Emily and Rosedale Street end their southern direction, another plot zoned for Specialty Crop (SC) begins and continues to Main Street West;
- South of the railway, on the east side of Casablanca Boulevard north of Vine Street continuing south towards James Street land is zoned for a series of residential designations. To properties on the immediate east side of Casablanca Boulevard are zoned as Residential Detached 2 (RD2.25);
- At the southernmost end of the corridor, south of where Casablanca Boulevard meets Main Street West are lands subject to the Niagara Escarpment Planning Act, zoned as an (NEDC) area.

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Figure 3-4
Grimsby GO Transit Station Secondary Plan-Schedule G Land Use Plan (2018)

Lake Ontario

WINSTON RD
N SERVICE RD
S SERVICE RD
QEW
TOPS DR
OAKES RD N
HUNTER RD
ESPLANADE LANE
WINDWARD DR
CONCORD PL
INDUSTRIAL DR
QEW
N SERVICE RD
MAIN ST W
OAKES RD S
HUNTER RD
ELMER ST
EMILY ST
VINE RD
GAGE ST
MAGNOLIA CRES
TAMI CRES
LIVINGSTON AVE
MERRITT CRES
GEORGE ST
ASPEN DR
BEECH ST
CEDAR ST
JAMES ST
CASABLANCA BLVD
ELGIN ST
FATHY CIR
TAMARACK CRT
TULIP ST
CHESTNUT DR
ORIOLE CRES
ROBERTS RD
EVERGREENS DR
WILLOW LANE
SYCAMORE CRES
TRILLIUM LANE
LINDEN LANE
WOOLVERTON RD

- Focused Study Area
- Grimsby GO Transit Station Area (2011 ESR Boundary, Metrolinx)
- Study Area
- Urban Boundary
- Arterial Road
- Highway
- Railway (CN)
- Water
- Parcel

Schedule G Land Use Plan

- Agriculture - Specialty Crop Area
- Employment - General Industrial
- Employment - Office
- Environmental Conservation Area
- Environmental Protection Area
- Low Density Residential
- Medium Density Residential
- Mixed Use - High Density
- Mixed Use - Medium Density
- Parks and Open Space
- Rural Area
- Utility Area

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N W E S

MAP DRAWING INFORMATION:
ESRI IMAGERY (2013), MNRF

MAP CREATED BY: SFG / LK
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3.4.5 Niagara Peninsula Source Protection Plan (2013)

Under the authority of the *Clean Water Act, 2006 (Ontario Regulation 287/07),* the Niagara Peninsula Source Protection Committee (SPC) established a Source Protection Plan Working Group (SPPWG) to develop a Source Protection Plan (SPP, 2013) derived from Ministry of the Environment guidance. Municipalities have a critical role in implementing the SPP, as they are responsible for the delivery of municipal drinking water and land use planning. As a result, much of the implementation of the SPP must be incorporated into the municipal planning processes. Municipalities are therefore responsible for bringing Official Plans and Zoning By-laws into conformity with the policies contained in the SPP.

The identification of threats to Municipal drinking water intakes is a key step to source water protection. A threat is an existing or potential land use activity that has the potential to impact water quality or the quantity of water that is used as a source for Municipal drinking water. The Ministry of Environment, Conservation and Parks prescribes 21 types of activities considered as drinking water threats, which can be found in the Niagara Peninsula SPP. Further description of potential effects of the undertaking as it relates to groundwater is described in Section 4.2 of the SPP.

The Niagara Region Official Plan identifies “Intake Protection Zones” (Schedule H), which is based on the findings of the Niagara Peninsula SPP. As explained in the Plan, Intake Protection Zones are areas of land and water where drainage run-off could directly impact water quality at Municipal drinking water intakes. The evaluation found there to be significant threats related to land uses associated with water treatment plants within the Region. The ROP outlines policies for the water treatment sites, along with implementation and monitoring procedures.

As shown on **Schedule PA** of the Niagara Peninsula SPP, the Study Area is not designated as an “Intake Protection Zone.”

4.0 Existing Conditions

This Section provides a description of baseline conditions for the identified Study Area (See **Section 1.2**). The baseline conditions were considered in the development of alternatives and assessment of effects as described further in this ESR.

Baseline conditions are described for the following topic areas:

- Transportation and Infrastructure (Section 4.1)
- Drainage and Stormwater Management Conditions (Section 4.2)
- Socio-Economic Environment (Section 4.3)
- Physical Environment (Section 4.4)
- Natural Environment (Section 4.5)
- Cultural Heritage Environment (Section 4.6)

4.1 Existing Conditions Summary

This section provides an overview of the existing conditions for each of the key topic areas that are further detailed in **Sections 4.2 to 4.7.**

4.1.1 Transportation and Infrastructure

The transportation infrastructure within the study area experiences traffic congestion and queuing issues during peak travel periods at the following locations, as summarized on **Figure 4-1**:

- QEW off-ramp terminals
- Casablanca Boulevard / South Service Road intersection
- CN Rail Crossing

The Active Transportation network is limited to pedestrian movements along a sidewalk located on the west side of the QEW Bridge, disconnected from the sidewalk along the east side of Casablanca Boulevard. Transit service within the Study Area is limited to GO Bus Route 12 and school bus service along Casablanca Boulevard.

There are a number of utility service providers with assets in the Study Area, particularly along Casablanca Boulevard, the South Service Road, and Livingston Avenue, in addition to some local streets. Several Utility Companies have aerial and underground assets that would be impacted during the design and construction of improvements to in the Study Area, including Bell, Enbridge Gas Distribution, Grimsby Power (with aerial line service), Bell, Niagara Regional Broadband network, and Cogeco Cable.

The Town of Grimsby services along the South Service Road and Casablanca Boulevard include watermain, sanitary sewer, and storm sewer infrastructure.

Additional information on the transportation and infrastructure systems in the Study Area is provided in **Section 4.2**.

4.1.2 Drainage

Surface water drainage along Casablanca Boulevard is facilitated by a system of open drainage ditches that flank the east and west side of the two-lane "rural" cross-section. The ditches along the easterly side of the road receive surface water runoff (sheet flow) from the residential areas between Casablanca Boulevard and Fathy/George/Gage Street. The ditches on the westerly side of road receive surface water runoff from the properties fronting onto Casablanca Boulevard. The existing road ditches discharge directly to the intermittent channel located along the rear yards of the residential properties on Vine Road.

North of the CN Rail crossing, the roadside ditches on either side of Casablanca Boulevard convey surface water to culverts under the QEW discharging to Lake Ontario.

Additional information on the drainage conditions in the Study Area is provided in **Section 4.3**.

4.1.3 Socio-Economic Environment

The existing population base for the Town of Grimsby is currently at approximately 28,000 persons, and is anticipated to increase to over 30,000 by 2021, and to over 35,000 by 2041. The majority of development applications are located north of the QEW, within the Winston Neighbourhood Secondary Plan area.

The key employment sectors in the Study Area include Healthcare, Education, Manufacturing, and Retail Trade. In addition, there are agricultural uses south of the CN Rail corridor as well as some tourism-related services in the northern portion of the Study Area.

There are no First Nation Reserves in the Study Area. The First Nation and Indigenous Communities identified in this geography include the Six Nations of the Grand River, Mississaugas of the New Credit First Nation, Haudenosaunee Confederacy, and Metis Nation of Ontario.

Additional information on the socio-economic environment in the Study Area is provided in **Section 4.4**.

4.1.4 Physical Environment

The Study Area is located in the Lake Iroquois Plain, which is comprised mostly of permeable sand. Fill soils (sand and gravel, gravelly sand, silty sand and silty clay) are located below the

asphalt on Casablanca Boulevard. At the CN Rail crossing, shale bedrock was found at depths ranging from 0.6 to 2.9 meters (m) below ground surface.

Depths of groundwater between 4.0 metres (m) and 6.0 metres (m) were observed from geotechnical survey.

Additional information on the physical environment in the Study Area is provided in **Section 4.5**.

4.1.5 Natural Environment

Fisheries and Aquatic Habitat

A drainage feature runs parallel to Casablanca Boulevard to the west and becomes more defined with riparian features east of Casablanca Boulevard north of Vine Road, the CN railway and residential lands. The surface flows associated with the drainage feature flow north before discharging to Lake Ontario. This drainage feature is not mapped by the DFO as critical habitat and/or a feature in which aquatic Species at Risk (SAR) are known to occur.

The aquatic assessment indicated that the drainage feature is used for flow conveyance and does not provide suitable fish habitat.

Terrestrial Resources

There are no natural heritage features or significant vegetation features located within the Focused Study Area (**Figure 1-1**). The field surveys confirmed that the following features were not present:

- Wildlife Concentration Areas;
- Areas of Natural and Scientific Interest (ANSI);
- Provincially Significant Wetlands (PSW); and
- Significant Wildlife Habitat (SWH).

A total of 41 botanical species were documented in the Focused Study Area, representing an altered landscape which is typical of an urban environment as compared to naturally occurring environments. Of these:

- 5 could not be identified to species;
- 15 of the plant species are listed as Secure and Apparently Secure; and
- 21 of the plant species are listed as non-native or status unknown.

Species at Risk

No Species at Risk were observed in the Study Area. In the event that the project has the potential to impact Barn Swallow, Eastern Meadowlark and/or the Bobolink habitat, the project can be registered under the Ontario Endangered Species Act (2007). As long as the applicable

regulations are followed, the project is exempt from Section 9 (species protection) and Section 10 (habitat protection) under the ESA requirements.

Additional information on the natural environment context in the Study Area is provided in **Section 4.6**.

4.1.6 Cultural Heritage

There are no built heritage features identified along Casablanca Boulevard. One cultural heritage resource was identified approximately 77 metres (m) east of Casablanca Boulevard (Echo Hall – 366 Main Street West).

No archaeological sites were identified with the Focused Study Area as part of the Stage 1 Archaeological Assessment. Three (3) previously registered archaeological sites are located within one kilometre of the Focused Study Area. The lands adjacent to Casablanca Boulevard and the South Service Road have been previously disturbed and past work in the area indicated low archaeological potential. However, the portion of Livingston Avenue west of Emily Street lies in a previously undisturbed area, and a Stage 2 Archaeological Assessment would need to be conducted for this area as part of the Detailed Design process.

Additional information on the cultural and archaeological heritage environment in the Study Area is provided in **Section 4.7**.

4.2 Transportation and Infrastructure

This section provides a summary of the baseline information for the following components of the existing transportation system in the Study Area:

- Existing Road Transportation Network;
- Existing Geometry and Traffic Controls;
- Active Transportation Facilities;
- Collision History;
- Corridor Operation and Level of Service (LOS);
- Transit Operation;
- Student Transportation Services;
- Structures/Crossings; and
- Utilities.

More information is provided on each component below. **Appendix B** includes the Transportation Assessment Report, which provides a detailed technical analysis of the transportation system including an assessment of projected future traffic demands and capacities.

In summary, a number of key issues were identified related to the movement of all transportation modes through the area:

- The main Arterial Roads within the study area experience traffic congestion and queuing issues during peak travel periods at the following locations (see **Figure 4-1**), which results in impacts to operations along the South Service Road between Industrial Drive and Casablanca Boulevard, and on Casablanca Boulevard between the North Service Road and Livingston Avenue:
    - The QEW off-ramp terminals on the bridge;
    - The intersection of Casablanca Boulevard and the South Service Road; and
    - The CN Rail Crossing on Casablanca Boulevard.

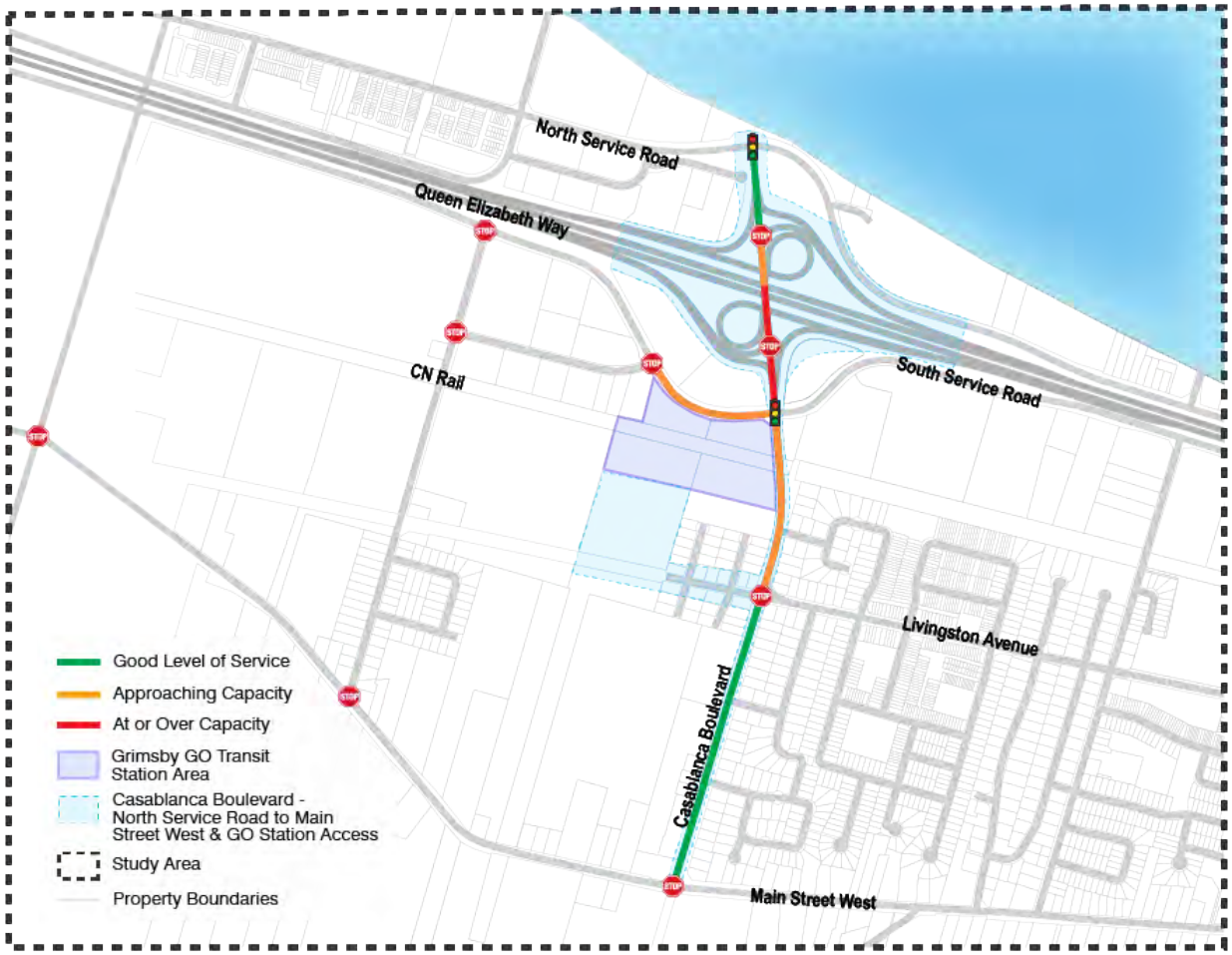


Figure 4-1 Existing Traffic Conditions along Key Arterial Roads in the Study Area

- The active transportation network is limited to sidewalks located along the west side of the QEW bridge and the east side of Casablanca Boulevard; and

- Transit Service within the Study Area is limited to GO Bus Route #12 and school bus service along Casablanca Boulevard.

These issues are further explored in the following sections.

4.2.1 Existing Road Network

The characteristics of and existing conditions along the main roads in the Study Area are described below.

Casablanca Boulevard (Regional Road 10) is a two-lane arterial street running north-south from the North Service Road to Main Street West. The annual average daily traffic (AADT) for 2018 for Casablanca Boulevard was 12,000 between the South Service Road and Livingston Avenue, and 5,400 between Livingston Avenue and Main Street West. Casablanca Boulevard is the only road in the Study Area that has an interchange with the QEW (Oakes Road to the west crosses the QEW at a fly-over, but does not include ramps to access the QEW). Casablanca Boulevard features a two-lane rural cross-section, with added turning lanes at the North Service Road, the QEW ramp terminals, the South Service Road, and at Livingston Avenue. The posted speed limit is 60 kilometres (km)/h. A sidewalk is provided running along the east side of Casablanca Boulevard from Main Street West where it terminates at the south ramp terminal at the QEW interchange. The CN Rail crossing at the Grimsby subdivision on Casablanca Boulevard has crossing gates. South of the CN Rail corridor, the land along Casablanca Boulevard is fronted by a low residential neighborhood of single family homes with driveway access to Casablanca Boulevard. The majority of these homes are located along the east side of Casablanca Boulevard. The lands north of the CN Rail corridor feature large parcels developed with commercial land uses.

Photo 4-1 Casablanca Boulevard at the CN Rail crossing (east side of the road, looking south)

Livingston Avenue (Regional Road 512) is an east-west arterial street that runs east of Casablanca Boulevard through downtown Grimsby, and then continues east as Main Street East. The AADT (2018) of Livingston Avenue is 9,100 to the east of Casablanca Boulevard. Livingston Avenue has a two-way left-turn lane and painted cycling lanes in both directions. The posted speed limit is 50 kilometres (km)/h. Sidewalks are provided on both side of Livingston Avenue east of Casablanca Boulevard through the Study Area. The Livingston Avenue Right-of-Way west of Casablanca Boulevard runs west to meet Oakes Road/Main Street West, although only a short segment has been built out, terminating just west of Emily Street (shown on **Figure 4-1**). The lands adjacent to Livingston Avenue in either direction from Casablanca Boulevard are fronted by single family homes, many with driveway access to Livingston Avenue.

Queen Elizabeth Way (QEW) is an MTO owned six-lane divided freeway running east-west through the Study Area. The cross-section includes wide, paved shoulders, and a concrete median barrier. The AADT (2016) for the QEW was 107,100 to the east and 112,300 to the west of Casablanca Boulevard, respectively. A sidewalk is provided along the west side of the bridge over the QEW. Through the Study Area, the posted speed limit is 100 kilometres (km)/h. The cross-section includes service roads on each side of QEW, namely the North Service Road and the South Service Road that run through the Study Area.

Photo 4-2 View of Existing Conditions on the Casablanca Boulevard bridge over the QEW (Centre of Bridge, Looking South)

The North Service Road is a two-lane minor arterial street running east-west along the majority of the QEW in Niagara Region. The AADT (2018) on North Service Road was approximately 6,200 and 2800 to the west and east of Casablanca Boulevard, respectively. No sidewalk or cycling infrastructure is present along the North Service Road within the bounds of the Study Area. To the east of Casablanca Boulevard, the North Service Road provides occasional driveway access to commercial and residential properties and local roads. To the west of Casablanca Boulevard, the North Service Road is being developed to accommodate a range of commercial and medium density residential development. A traffic control signal was recently installed at the intersection of the North Service Road and Casablanca Boulevard.

The South Service Road is a two-lane minor arterial road that provides access to big box commercial development (including a highway rest area, car dealers, grocery, home improvement, and fast food) and light industrial / warehousing uses within the Study Area. The AADT (2017) on the South Service road was 6,700 to the east and 4,100 to the west of Casablanca Boulevard, respectively. As with the North Service Road, the South Service Road runs parallel to the QEW along essentially its whole length within the Niagara Region. Auxiliary turning lanes are provided in the vicinity of major commercial properties and at major

intersections (e.g., with Casablanca Boulevard). Within the Study Area, no sidewalks or cycling infrastructure are provided along the South Service Road.

Main Street West (Regional Road 81) is an arterial road running east-west from the City of Hamilton, through downtown Grimsby and further east to the City of St. Catharines. The AADT (2017) for Main Street West is 7,600 to the east and 7,000 to the west of Casablanca Boulevard, respectively. Through the Study Area, Main Street West has a two-lane cross-section with paved shoulders and a sidewalk along the north side of the road. The posted speed limit along this corridor varies, with 70 kilometres (km)/h between Oakes Road and Hunter Road, 60 kilometres (km)/h between Hunter Road and Casablanca Boulevard, and 50kilometres (km)/h to the east of Casablanca Boulevard. From Casablanca Boulevard to the east, Main Street West runs along the bottom of a steep slope. Lands along Main Street West are developed with backing single family homes on the north side, and fronting single family homes on the south side. West of Casablanca Boulevard, Main Street West curves to the north, with sparse adjacent development largely consisting of single family residential homes, and several parcels used for agricultural or industrial uses.

Oakes Road is a two-lane collector street running north-south from south of Main Street West to Winston Road, north of the North Service Road. The AADT (2018) for Oakes Road is approximately 850 to the north of the CN Rail corridor. A sidewalk is provided on the east side of Oakes Road between Main Street West and the CN Rail corridor. Several single family homes have frontages on Oakes Road in this segment of the corridor. Additionally, Smith School, a Kindergarten to Grade School, fronts onto Oakes Road North just south of the CN Rail corridor. The CN Rail crossing on Oakes Road has crossing gates. Travelling north of the CN Rail corridor to the QEW, the lands adjacent to Oakes Road are largely undeveloped, with the exception of an industrial development south of the QEW. Oakes Road has a grade-separated crossing over the QEW, with multi-family residential development along the east of the road on the north side of the QEW.

Hunter Road is a two-lane collector street running north-south from Main Street West to the South Service Road. The AADT (2018) for Hunter Road south of the CN Rail corridor is approximately 800. There are no sidewalks, and ditches are present on both sides, leading pedestrians to walk on the pavement. Land uses along Hunter Road consist of single family residential homes at the south end towards Main Street West. Further north towards the CN Rail corridor, the adjacent lands are undeveloped. The CN Rail crossing on Hunter Road has crossing gates. The lands north of the CN Rail corridor towards the QEW and the South Service Road are developed with industrial and commercial uses.

Figure 4-2 illustrates the existing road network, lane configurations at intersections, and traffic control at intersections under existing conditions.

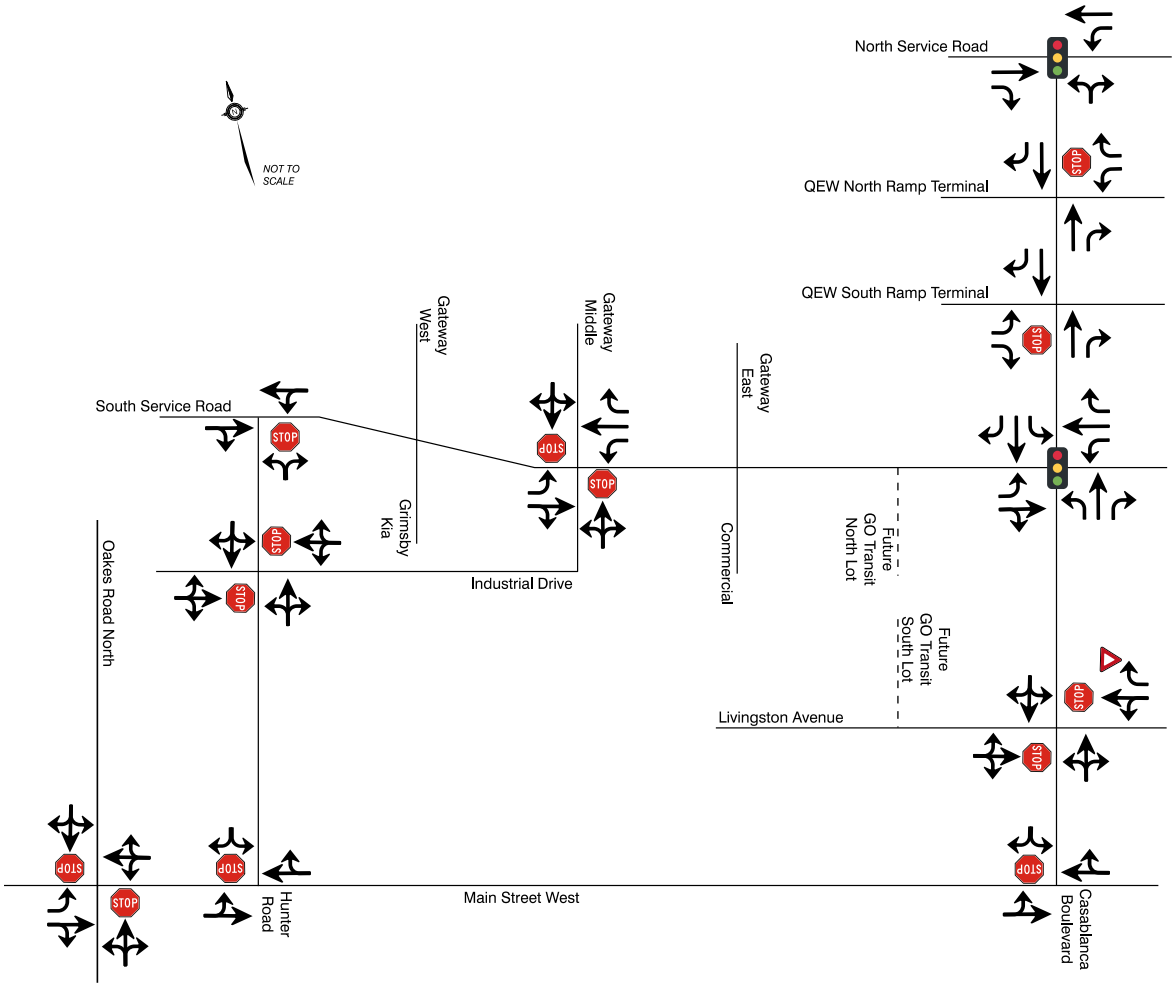


Figure 4-2 Existing Road Network

4.2.1.1 Active Transportation Infrastructure

Active transportation encompasses a range of non-vehicle modes of travel, including walking and cycling. The main walking infrastructure in the Study Area is the aforementioned sidewalks along the arterial as well as local streets. Additionally many neighborhoods include paths connecting streets across park space.

Dedicated cycling infrastructure in the Study Area is limited to the cycling lanes on Livingston Avenue east of Casablanca Boulevard. Main Street West has shoulders at least 1.0 m wide in all sections, with widths of over 2.0 m in many sections, which provides some utility as infrastructure for cyclists, especially given the connectivity of the corridor between the City of Hamilton to the west and the City of St. Catharines to the east.

The Casablanca Boulevard/QEW interchange has several high-speed, free-flowing or yield-controlled ramps which can be intimidating for pedestrians and cyclists to cross. The intersection of Casablanca Boulevard and Livingston Avenue features a westbound right turn lane and two-way stop-control. The westbound right turn lane can be intimidating for pedestrians and cyclists to cross, particularly given the lack of a traffic signal at the intersection.

4.2.1.2 Transit Service and Infrastructure

There is currently no local transit operating in the Study Area. GO Transit operates a GO Bus transit loop on the north side of the South Service Road, integrated with an MTO-owned carpool lot located on the northwest corner of the Casablanca Boulevard and the South Service Road intersection. The GO Bus Route 12 provides service between Niagara Falls and Burlington where it connects to the GO Train. The GO Bus operates on weekdays between 4:54 AM and 12:24 AM with service approximately every 30-45 minutes during peak periods. The route operates primarily along the QEW and uses Casablanca Boulevard and the South Service Road to access the MTO carpool lot. Buses use a bus loop off of the South Service Road to turn around and access the Casablanca Boulevard/QEW interchange. The intersection of the bus loop and the South Service Road is unsignalized.

4.2.2 Traffic Data

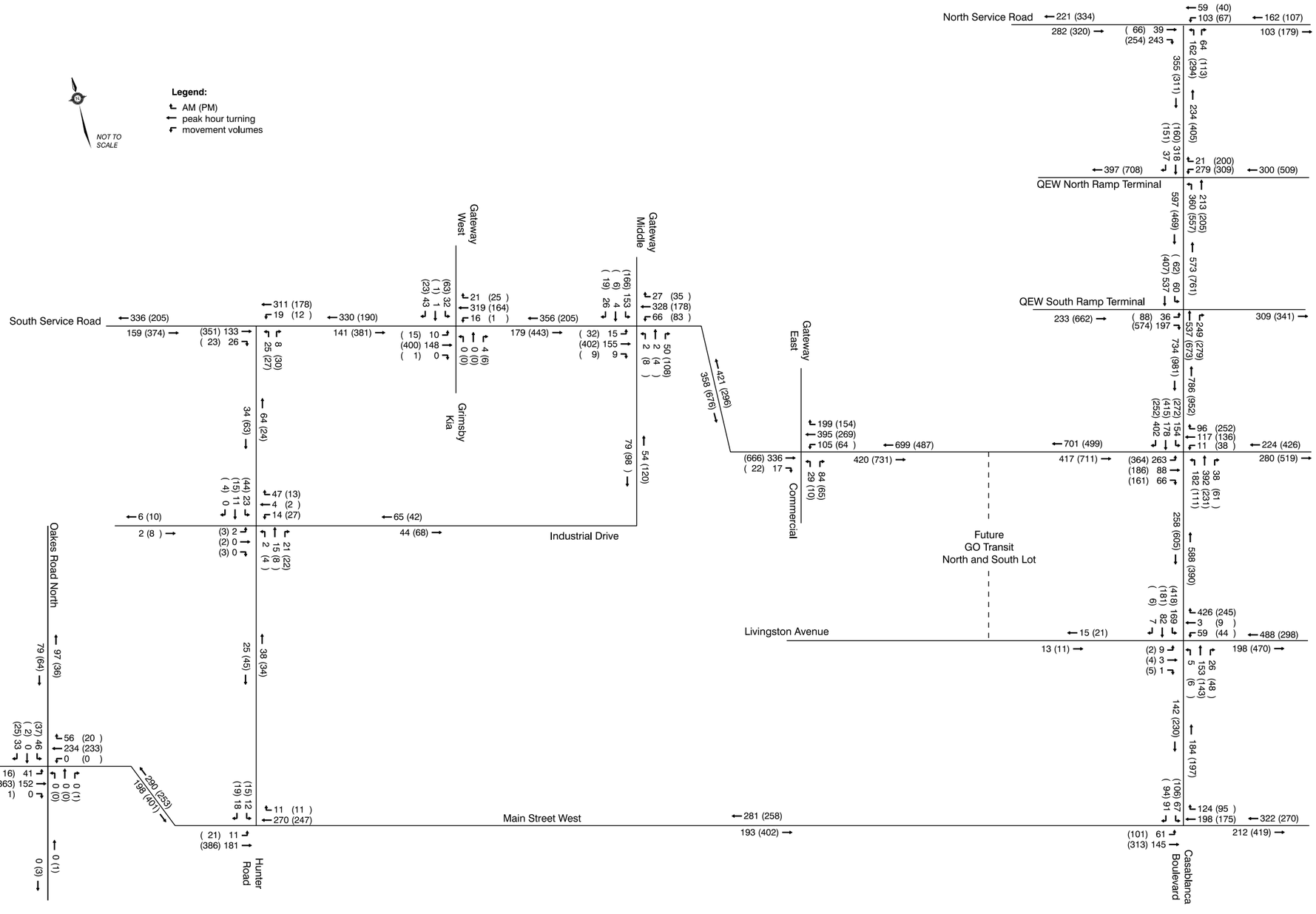
Traffic data for the Study Area was analysed to determine the existing issues related to traffic operations and queuing. Niagara Region provided traffic count data to use for the analysis in two forms:

- 8-hour turning movement counts (TMC) - all TMCs were collected on Wednesday, May 9, 2018
- 24-hour Automated Traffic Recorder data (ATR) – collected between May 5 and May 10, 2018

Figure 4-3 illustrates the existing traffic volumes used for the analysis. **Appendix B** contains the full traffic counts.

In addition, traffic signal timing and phasing plans were received from Niagara Region for applicable intersections within the Study Area. Dillon's previous work in the area (Transportation Assessment for the Niagara GO Hub and Transit Stations Study, 2017) also included field visits in the Study Area, which informed the understanding of existing conditions and issues.

Figure 4-3 Existing Traffic Volumes



4.2.3 Corridor Operations

Under existing conditions, the road network in the Study Area generally operates well during non-peak periods (and when there are no emergency conditions on the QEW adjacent to the Casablanca Boulevard interchange).

There are, however, a few exceptions, as shown in **Table 4-1 and 4-2**. On the Casablanca Boulevard/QEW interchange, the south ramp terminal with Casablanca Boulevard and the intersection of Casablanca Boulevard and the South Service Road show long queues and delays, with a poor level of service (LOS) for the intersection of Casablanca Boulevard and the South Service Road. Note that in the following tables, the intersection LOS is provided only for signalized intersections.

Table 4-1 Existing Conditions Operational Assessment Results: AM Peak Hour

Intersection Name	Control Type	# Vehicles Entering Intersection	Intersection Average (Weighted by Movement and Volume)				Critical Movement			Overall Intersection LOS
			Average Queue Length (m)	Max Queue Length (m)	Total Delay (sec)	Stopping Delay (sec)	Movement	Max Queue Length (m)	Average Delay (s)	
Casablanca Blvd & North Service Rd	Sig.	670	5.6	39.5	16.5	12.5	NBR	80.5	30.0	B
Casablanca Blvd & North Ramp Terminal	TWSC	1,187	1.9	11.9	2.8	0.2	WBL	50.1	11.6	-
Casablanca Blvd & South Ramp Terminal	TWSC	1,558	0.0	0.4	0.6	0.1	EBL	15.7	13.6	-
Casablanca Blvd & S Service Rd	Sig.	1,948	58.8	125.2	38.0	30.1	NBR	267.2	42.3	D
Casablanca Blvd & Livingston	TWSC	876	6.4	37.6	10.2	6.6	WBR	56.4	18.6	-
Casablanca Blvd & Main St W	TWSC	756	0.5	11.2	2.4	0.3	SBR	38.2	9.8	-
S Service Rd & Industrial Dr	TWSC	757	0.6	12.2	3.2	0.2	SBT	40.1	9.8	-
S Service Rd & Hunter Rd	TWSC	540	0.1	3.1	1.2	0.1	NBL	18.6	7.3	-
Hunter Rd & Industrial Dr	TWSC	259	0.5	9.9	2.5	0.1	WBR	20.2	5.0	-
Hunter Rd & Livingston Ave	TWSC	128	0.0	0.0	0.0	0.0	None	0.0	0.0	-
Hunter Rd & Main St W	TWSC	688	0.1	7.6	0.9	0.1	EBL	19.8	2.3	-
Main St W & Oakes Rd N	TWSC	764	0.4	7.3	2.2	0.1	SBR	30.4	7.6	-

Table 4-2 Existing Conditions Operational Assessment Results: PM Peak Hour

Intersection Name	Control Type	# Vehicles Entering Intersection	Intersection Average (Weighted by Movement and Volume)				Critical Movement			Overall Intersection LOS
			Average Queue Length (m)	Max Queue Length (m)	Total Delay (sec)	Stopping Delay (sec)	Movement	Max Queue Length (m)	Average Delay (s)	
Casablanca Blvd & North Service Rd	Signalized	809	14.7	67.8	22.8	17.6	NBR	124.8	35.3	C
Casablanca Blvd & North Ramp Terminal	TWSC	1,529	1.8	13.9	2.8	0.3	WBL	52.6	11.1	-
Casablanca Blvd & South Ramp Terminal	TWSC	1,850	40.0	67.1	30.2	23.8	EBR	241.7	120.0	-
Casablanca Blvd & S Service Rd	Signalized	2,243	49.5	117.2	52.2	41.7	NBR	220.1	43.2	D
Casablanca Blvd & Livingston	TWSC	831	0.3	21.8	1.6	0.3	SBL	50.4	2.7	-
Casablanca Blvd & Main St W	TWSC	732	0.2	12.3	1.6	0.2	SBR	26.0	7.2	-
S Service Rd & Industrial Dr	TWSC	905	1.7	17.9	5.4	0.7	SBL	41.4	12.5	-
S Service Rd & Hunter Rd	TWSC	537	0.0	0.4	0.3	0.0	NBR	15.4	7.5	-
Hunter Rd & Industrial Dr	TWSC	285	0.2	10.0	2.6	0.2	WBR	19.7	4.4	-
Hunter Rd & Livingston Ave	TWSC	146	0.0	0.0	0.0	0.0	None	0.0	0.0	-
Hunter Rd & Main St W	TWSC	733	0.1	10.9	0.9	0.1	EBL	17.2	0.9	-
Main St W & Oakes Rd N	TWSC	783	0.2	3.2	1.1	0.1	SBR	28.5	7.2	-

*The maximum queue listed in the table may be related to a blocked condition at an adjacent movement

4.2.4 Collision History

Niagara Region provided data on the collision history for regional/municipal roads within the Study Area. There were a total of 62 collisions in the Casablanca Boulevard corridor between 2013 and 2018. The following highlights were obtained from the available data:

- 57 of the 62 collisions occurred at intersections, and 5 at mid-block points;
- The majority of collisions were rear-end collisions (61%). Of these, 87% occurred under clear conditions, 71% occurred during daylight, and 82% resulted only in property damage;
- Approximately 50% of all collisions along Casablanca Boulevard occurred at the intersection with the South Service Road;
- No fatal injuries were recorded along Casablanca Boulevard in the observed period; and
- The corridor averages approximately 13 collisions per year, or slightly more than one collision per month on average.

The collision data point to the operational and safety issues at the intersection of Casablanca Boulevard and the South Service Road, and the need to address these through this Study.

4.2.5 Utilities

There are a number of utility services in the Study Area, particularly along the arterial roads and the CN Rail corridor. From Main Street West north to Elgin Street along Casablanca Boulevard, the main utilities include a mixed use aerial line on the east side of the road that supports Grimsby Power, Bell and Cogeco lines. There is also buried utilities infrastructure in the form of a Town sanitary sewer along the east of the road and an Enbridge Gas line and Town watermain line under the centre of the road. North of Elgin Street, the Town's sanitary sewer line and the east side mixed use aerial and gas lines continue, as well as the watermain under the road. These lines continue to run north and are joined by a watermain running north from James Street located just east of the existing road. North of Livingston Avenue, most of the utilities are situated on the east side of the existing road corridor (including gas, mixed aerial, watermain, and sanitary sewer) with Bell underground cables situated on the west side of the road. Just north of Livingston Avenue is a Grimsby Power underground hydro line, running just west of the existing road (within the road Right-of-Way).

There are numerous utilities running east-west along the rail corridor including underground Bell (numerous lines) and underground Rogers Cable lines. An existing Bell/6T/360 fibre optic cable also runs along the rail corridor.

Photo 4-3 View of Utility Poles along the CN Rail Corridor (Looking West at Casablanca Boulevard Crossing)

Just south of the South Service Road in the Casablanca Boulevard Right-of-Way, there is underground Bell and sanitary, water and gas lines on the east side with the Grimsby Power underground line on the west side. A Niagara Region Broadband Network aerial line runs along the south side of the South Service Road intersection with Casablanca Boulevard.

North of the South Service Road, there are fewer utilities along the Casablanca Boulevard corridor, with only underground Grimsby Power and Bell lines along the west side of the road.

Along Livingston Avenue east of Casablanca Boulevard, there is an underground gas line, Bell underground line, water and sanitary lines along the north side of the road. Along the segment of Livingston Avenue between Casablanca Boulevard and Emily Street, there is a south side aerial line hosting Grimsby Power, Bell and Cogeco services. Emily Street has buried gas, water and sanitary lines plus an overhead line containing Grimsby Power, Bell and Cogeco lines. Similar services exist along Rosedale Street.

Table 4-3 provides information received from the known utility providers in the area.

Table 4-3 Known Utility Owners and Assets in the Study Area

Utility Owner	Description	Notes
Bell Canada	• Underground plant on Livingston Avenue from Emily Street to Chestnut Drive • Underground plant at the Casablanca/Livingston intersection and an aerial throughout the Casablanca Boulevard corridor.	
Cogeco Cable	• Aerial line on shared poles along the east side of Casablanca Boulevard • Underground cable on the east side of Casablanca Boulevard just south of James Street. • Aerial line along the south side of Livingston Avenue.	
Enbridge Gas Distribution	• Facilities on the North Service Road crossing Casablanca Boulevard • East-west gas main crossing Casablanca Boulevard north of the rail corridor • North-south gas main along the Casablanca Boulevard east property line from the rail corridor south to Main Street • East-west gas main crossing Casablanca Boulevard along the north side of Livingston Avenue • North-south gas main along the Casablanca Boulevard corridor (west side) from Main Street north to just south of Elgin Street • East-west gas main along Main Street West through the south side of the Casablanca Boulevard intersection.	
Enbridge Pipelines Inc.	• n/a	Confirmed on June 13, 2018 that Enbridge Pipelines Inc. does not have any facilities in the Study Area
Grimsby Power Incorporated	• Aerial facilities running along the south side of the South Service Road from west of Industrial Drive to east of Casablanca Boulevard • Aerial facilities along the south side of Industrial Drive south of the South Service Road • East-west facilities running along the north side of the Hydro One corridor crossing Casablanca Boulevard	

Utility Owner	Description	Notes
	• Poles on both sides of Casablanca Boulevard at various locations in the road corridor • Aerial line (shared) along the south side of Livingston Avenue east of Emily Street and along the west side of Emily Street	
Group Telecom	• There is an existing Bell/6T/360 fibre optic cable located in the CN corridor crossing Casablanca Boulevard	
Hydro One	• East-west transmission tower line north of the CN Rail corridor	
Niagara Peninsula Energy Inc.	• n/a	Grimsby Power services the Study Area and not Niagara Peninsula Energy (confirmed July 20. 2018 by NPEI)
Niagara Regional Broadband Network	• Aerial facilities crossing Casablanca Boulevard along the south side of the South Service Road • Aerial facilities along the North Service Road corridor crossing Casablanca Boulevard	
Ontario Power Generation	• n/a	Confirmed on July 26 2018 that Ontario Power Generation, Niagara Operations does not have any existing or proposed facilities in the Study Area
Niagara Region	• 450 mm storm sewer along the north side of the South Service Road west from Casablanca Boulevard (flowing to the west) • Sanitary sewer along Livingston Avenue Right-of-Way from Casablanca Boulevard to Hunter Road (flowing east)	
Rogers	• Aerial plant on the south side of the South Service Road transitioning south underground along the CN Rail corridor	
Town of Grimsby	• Watermain, sanitary sewers and storm sewers along the South Service Road • Watermain and sanitary sewer along the east side of Casablanca Boulevard south from the South Service Road • Watermain along Vine Road	The Town of Grimsby has jurisdiction over sanitary sewers and watermain distribution pipes only. The Town has yet to receive as-built information regarding

Utility Owner	Description	Notes
	• Storm sewer running from north of Livingston Avenue (east side) south to Main Street West • Small section of storm sewer on the west side of Casablanca Boulevard at Livingston Avenue.	storm sewer and watermain locations on the North Service Road east and west of Casablanca Boulevard. The Town intends to replace watermain infrastructure at the intersection of Casablanca Boulevard and Livingston Avenue. The Town has noted that the lowering of the road profile elevation between Livingston Avenue and Main Street West will necessitate a replacement of the watermain and associated appurtenances to achieve the minimum frost cover required.
TransCanada Pipelines	• n/a	Confirmed on July 23, 2018 that TransCanada Pipelines has no facilities in the Study Area

4.3 Drainage and Stormwater Management Conditions

4.3.1 Roadway Drainage Conditions

Casablanca Boulevard and the lands surrounding the north-south road corridor fall within the Grimsby Watershed Planning Area. The authority for drainage approvals within this area has been transferred to Niagara Region from the Niagara Peninsula Conservation Authority. Within the Study Area there are several defined watercourses that convey surface water runoff in a south to north direction from the Niagara Escarpment towards Lake Ontario (See **Figure 4-4**). The existing drainage features include a permanent unnamed watercourse that conveys a substantial drainage area through the QEW corridor, just west of the Casablanca Boulevard interchange. The unnamed watercourse, identified as Stream No. 136-10 in MTO's Ontario QEW Stormwater Management Report (1995), has an extremely limited potential for fish habitat due to extensive historical alterations to the watercourse.

Figure 4-4 Existing Drainage System

Surface water drainage along Casablanca Boulevard is facilitated by a system of open drainage ditches that flank the east and west side of the existing two-lane 'rural' cross-section. The ditches along the easterly side of the road receive surface water runoff (sheet flow) from the residential areas between Casablanca Boulevard and Fathy/George/Gage Street. The ditches along the westerly side of the road receive surface water runoff from the properties fronting Casablanca Boulevard, and intercept a portion of the Outlet No. 11 drainage area south of Main Street West up to Woolverton and Ridge Road.

Photo 4-4 Drainage channel along the north side of the residential neighbourhood on the west side of Casablanca Boulevard, south of the CN Rail crossing (looking west on Casablanca Boulevard).

The ditches on both sides of the road convey surface water through private entrances with a series of small diameter culverts. The existing road side ditches discharge directly to the intermittent channel located along the rear-yards of the residential properties on Vine Road. The configuration of the existing drainage ditches means that both major and minor system flows are conveyed to the Vine Road outlet channel from Casablanca Boulevard and the external drainage areas associated with the road corridor. With the exception of benefits from the surface water runoff being conveyed through the existing well vegetated ditches, prior to discharging to the receiving water system there are no existing stormwater management

controls for surface water runoff from the Casablanca Boulevard and Livingston Avenue corridors.

Photo 4-5 Intermittent channel along rear of Vine Road properties (south of CN Rail corridor, east side of Casablanca Boulevard)

North of the CN Rail crossing, Casablanca Boulevard forms the drainage divide between the east and west portions of the QEW interchange drainage areas. Surface water runoff from Casablanca Boulevard and the associated intersections and ramp drainage areas are collected and conveyed by small local storm sewer systems that discharge directly to the adjacent roadside ditches. The roadside ditches to the west of Casablanca Boulevard convey surface water runoff from the interchange area north to Outlet No. 9, while the roadside ditches to the east of Casablanca Boulevard convey surface water north to Outlet No. 10 and Outlet No. 11.

4.3.2 QEW Interchange Drainage Conditions

The north-west and north-east quadrants of the Casablanca Boulevard/QEW interchange discharge to Lake Ontario through Stream No. 136-10 and QEW Crossing No. 136-11, via an outlet identified as Outlet No. 9 in the Town of Grimsby's Stormwater Management Master Plan Strategy (2016) (**Figure 4-4**).

The north-east and south-east quadrants of the interchange, with exception of the area located between the South Service Road and the South-East Ramp, discharge to Lake Ontario through QEW Crossing No. 136-12, at an outlet identified as Outlet No. 10. The drainage area associated with the Casablanca Boulevard and Livingston Avenue corridors are identified as discharging to Lake Ontario via Outlet No. 11 in the 2016 Town of Grimsby Study. The 1995 MTO Study identifies this unnamed watercourse as Stream No. 136-13, which crosses the QEW corridor east of Casablanca Boulevard near the end of the South-East Ramp terminal.

Table 4-4 provides a summary of the drainage areas and outlets associated with the Casablanca Boulevard/Livingston Avenue Study Area.

Table 4-4 Summary of Study Area Drainage Areas and Outlets

Stream No.	Catchment Areas*	Drainage Areas	Outlet Identification	Location
136-10	610A, 610B, 610C	256 Ha	Outlet No. 9	West of Casablanca, North of the North Service Rd
136-11	611	1.9 Ha	Outlet No. 9	West of Casablanca, North of the North Service Road
136-12	612	1.4 Ha	Outlet No. 10	Near North terminus of Casablanca North of the North Service Rd
136-13	613A, 613B, 613C	105 Ha	Outlet No. 11	East of Casablanca, well north of the North Service Road

*Drainage Area from MTO QEW Stormwater Management Report (Upstream of QEW Corridor)

The drainage areas associated with the three affected surface water outlets are generally described as either falling within the intensely developed QEW corridor north of the CN Rail corridor, or located within the ‘Greenbelt’ area south of the rail corridor.

4.4 Socio-Economic Environment

The assessment of baseline socio-economic conditions completed for the Study Area included a review of governing documents such as The Town of Grimsby’s OP, data collected through site reconnaissance activities, desktop study and background reviews of existing conditions, and input received through public and stakeholder consultation.

The socio-economic environment section provides baseline information on the following features:

- Land Use;
- Population and Demographics;
- Economic Activities, Employment and Labour Force;

- Tourism and Recreation;
- Indigenous Communities; and
- Community Services.

4.4.1 Existing Land Uses

A description of existing land use within the Study Area is provided below from north to south. For a description of natural features (e.g. wooded areas) please refer to **Section 4.5**. .

North Service Road and the South Service Road

This northern section of the Casablanca Boulevard corridor includes mixed-use medium density residential developments, as well as stand-alone commercial developments such as restaurants, plazas and hotels west of Casablanca Boulevard along the North Service Road.

Photo 4-6 Emerging Residential and Mixed Use Development on North Service Road (Looking West)

Large format and service commercial uses such as RONA and the Real Canadian Superstore are located along South Service Road, as well as gas Stations, restaurants and car dealerships. The Casablanca Boulevard/QEW interchange is located between the North and South Service Roads.

Photo 4-7 Office/Commercial Uses in the Northern Portion of the Study Area

This area also includes the existing GO Bus stop and MTO Carpool lot on the north side of the South Service Road. On southwest corner of the intersection of South Service Road and Casablanca Boulevard is an undeveloped plot reserved for the future location of the GO Transit Station.

Photo 4-8 Existing GO Bus Loop on South Service Road

Photo 4-9 Site of the Planned Grimsby GO Transit Station (east side of South Service Road approaching Casablanca Boulevard)

Casablanca Boulevard: Between the South Service Road and Livingston Avenue

Continuing south in the Study Area, CN Rail Corridor separates the commercial zone to the north and the residential areas to the south. The stable residential neighbourhood is largely focused on the east side of Casablanca Boulevard. South of the CN Rail corridor where Casablanca Boulevard intersects with Vine Road is the former location of the United Pentecostal Church on the west side of the roadway, which is backed by Region-owned property and agricultural land further west. The Church congregation has relocated, however the building structure remains on the site. To the east on the opposite side of the roadway is a residential neighbourhood.

Photo 4-10 Existing Road Conditions on Casablanca Boulevard (looking north to CN Rail Crossing)

Livingston Avenue: West of Casablanca Boulevard

Along Livingston Avenue west of Casablanca Boulevard, there is a small neighbourhood of residential homes. West of Emily Street in this area is the Region-owned parcel identified as the

'West Niagara Transit Terminal' in the Grimsby GO Transit Station Secondary Plan The lands south of the CN Rail Corridor and west of Casablanca Boulevard are outside of the Town's Urban Boundary and within the Greenbelt, designated as Protected Countryside (Tender Fruit and Grape Lands).

Photo 4-11 View of Region-owned lands between Livingston Avenue and the CN Rail corridor (looking north from Livingston Avenue)

Casablanca Boulevard: Between Livingston Avenue and Main Street West

This section of the Study Area incudes older well established single family homes that front onto the east side of Casablanca Boulevard. On the west side of Casablanca Boulevard, the uses are primarily agricultural lands with some sparsely placed single family homes fronting onto the road.

Photo 4-12 Intersection of Casablanca Boulevard and Main Street West with view of Residential/Agricultural Uses

4.4.1.1 Current Development Applications

There are a number of ongoing developments in the area, as well as some active development applications. The majority of these are focused in the northern part of the Study Area, north of the QEW.

As of November 23rd 2018 the following information was provided by the Town of Grimsby regarding the current development applications and their locations in the surrounding area:

- 560 North Service Road – LJM Developments Phase II - 213 units
- Concord Place – Aqua Zul – 316 units
- 10 Windward Drive – Rosebay – 206 units
- 709-721 Winston Road – 36 units
- 4 Windward Drive – construction of 2 towers (19 storeys & 22 storeys)
- 361 South Service Road – Commercial Development

There are no development applications along Casablanca Boulevard.

4.4.2 Population and Demographics

With a current population of 27,314, the Town of Grimsby is one of the fastest growing municipalities in the Niagara Region (Statistics Canada, 2016). Statistics Canada's most recent data indicates that Grimsby's population growth increased by 7.9% between 2011 and 2016. Grimsby's growth rate is currently greater than the Ontario average, which stands at 4.6%. Within the Study Area, population and employment growth forecasts were based on land use concepts identified in the Grimsby GO Transit Station Secondary Plan (2018). Based on this Plan, population growth is forecasted to increase by 2,189 individuals by 2021.

The Town has an approximate total of 8,195 families in private households, nearly half of which consist of two persons. Based on 2016 data from Statistics Canada, Grimsby has total of 10,380 occupied dwellings (Statistics Canada, 2016). The two largest age cohorts in Grimsby are ages 0-14 consisting of approximately 4,750 individuals and age 65+ consisting of 5,265 individuals (Statistics Canada, 2016).

The majority of Grimsby's population derive from European origin. A total of 22,655 individuals of European origin were identified in Grimsby making up nearly 82% of the total population (Statistics Canada, 2016). The most popular language spoken in Grimsby is English, with 26,925 (98% of the population) identifying as fluent speakers and 1,630 (5% of the population) who identify as French/English bilingual.

4.4.3 Economic Activities, Employment and Labour Force

Grimsby has grown over the past decade serving as a midpoint between Hamilton and St. Catharine's. Due to Grimsby's proximity to the QEW and resulting ease of vehicle access from the GTA, industries have access to a large and well-educated labour pool. The local labour force in Grimsby is currently approximately 14,710 workers. **Table 4-5** below indicates the top four major employment sectors in Grimsby (Statistics Canada 2016).

Reported by the Town of Grimsby's socio-economic profile a high number of residents travel daily to larger urban centres through Niagara, Hamilton and the Greater Toronto Area (Grimsby Socio-economic profile, 2016).

Table 4-5 Largest Labour Markets in Grimsby

Industry	Number of people employed within industry	Percentage of Total Population
Healthcare	1,805	12%
Education	1,335	9%
Manufacturing	1,765	11.9%

Industry	Number of people employed within industry	Percentage of Total Population
Retail Trade	1,595	10.8%

According to the Grimsby Economic profile, “small offices, home office and knowledge-based industry are all growing industrial sectors in Grimsby. Professional services are available through a variety of financial, educational, accounting, communications, and transportation and health care firms.” The Grimsby Chamber of Commerce and Downtown Improvement Area promote member businesses, and maintain strong links with other regional and provincial Chambers (Grimsby Socio-Economic profile, 2016).

The mix of light industrial and economic opportunities in Grimsby falls into what would be typical for many municipalities in Ontario. A majority of the population earn their income in a field relating to or centering on healthcare, retail, and manufacturing. With respect to the Study Area, a majority of the employment opportunities are retail-based and located on either side of Casablanca Boulevard between the North Service Road and the South Service Road. According to the population and growth assumptions of the Niagara GO hub and Transit Station Study, an increase of over 400 jobs is anticipated by 2021.

Historically, the Niagara Region has been an important centre for agritourist attractions based on viticulture (grape harvesting). However, several areas of the Region including Grimsby have experienced a decrease in the number of orchards as the land area once used for crops shifted towards residential development between the 1950’s and 1980’s (Remax Realty, 2017). Specialty Crop (Tender Fruit and Grape Lands) are located within the Greenbelt west of Casablanca Boulevard and south of the CN Rail Corridor. The lands immediately west of Casablanca Boulevard north of Livingston Avenue are fallow, with a Woodlot occupying some of the land further west. There are some active agricultural operations south of Livingston Avenue as well as further west.

4.4.4 Tourism and Recreation

With its scenic location between the Niagara Escarpment and the edge of Lake Ontario, the Town of Grimsby offers a number of recreational areas including beaches, parks and recreational trails, community centres, and wineries which offer tours.

A few of the tourism related services in the Study Area include the Casablanca Winery Inn and Spa and a Super 8 hotel along the North Service Road on the west side of the corridor, and the Niagara Gateway Tourist Information Centre located along the South Service Road to the west of Casablanca Boulevard. The Great Lakes Waterfront Trail runs along the Lake Ontario waterfront, at the northern edge of the Study Area.

Photo 4-13 Waterfront Trail (Northern end of the Study Area)

4.4.5 Community Services

The Study Area is comprised of commercial, retail, and residential uses; however there are few community amenities within the Study Area boundary. Just west of the Study Area is the Grimsby Town Hall offices (160 Livingston Avenue), and the Peach King Centre (162 Livingston Avenue), a recreational and community hub operated by the Town of Grimsby. The Christ Our Saviour Lutheran Church is located close to the south-west end of the Study Area, at 448 Main Street West. The only school in the Study Area is the Smith Public School located at 19 Oakes Road North, serving students from Junior Kindergarten to Grade 8.

4.4.6 School Bus Services:

The Niagara Student Transportation Services (NSTS) plans, administers, and manages student transportation services for both the public school board (DSBN) and the catholic school board (NCDSB) within the Niagara Region. According to the NSTS, there are 14 bus routes that use Casablanca Boulevard between the hours of 7:07a.m to 8:34 a.m. These bus routes service a total of 7 different schools in the morning. In the late afternoon there are 15 Routes that access Casablanca Boulevard between 1:55p.m to 3:34 p.m., servicing 8 different schools. According to the NSTS, these routes have a combined 10 stops along Casablanca Boulevard, including Vine Road, Livingston Avenue, and James Street. These routes include “house stops” to service special needs students on Vine Road.

4.4.7 Indigenous Communities

A review of the Aboriginal and Treaty Rights Information System (ATRIS) indicated that there are no First Nations reserves within the immediate Study Area. The closest reserve lands are approximately 43 kilometres (km) southwest of the Study Area, belonging to the Six Nations Grand River Territory where both the Mississaugas of the New Credit First Nation and the Haudenosaunee Confederacy are located. The nearest Metis Nation of Ontario is approximately 30 kilometres (km) southeast of the Study Area.

Based on the above, engagement was undertaken with the following communities as described further in **Section 2.1.6**:

- Six Nations of the Grand River;
- Mississaugas of the New Credit First Nation;
- Haudenosaunee Confederacy; and
- Metis Nation of Ontario.

4.5 Physical Environment

4.5.1 Physiography

According to the Physiography of Southern Ontario (Chapman and Putnam, 1984) the Study Area is located within the Lake Iroquois Plain physiographic region. The Lake Iroquois Plain is comprised mostly of permeable sands and extends for a distance of approximately 300 kilometres (km) around the western part of Lake Ontario, from the Niagara River to the Trent River. It lies between the Lake Ontario shore and the Lake Iroquois bench. Lake Iroquois was a glacially-dammed lake which formed during the regional deglaciation approximately 12,500 years ago. The bedrock geology consists of a sequence of ancient rock beds or strata, originating over 500 million years ago as marine sediments in a warm shallow inland sea.

4.5.2 Bedrock and Soils

Immediately to the south of the Study Area is the Niagara Escarpment. This rock-hewn feature sits between 30 to 50 metres (m) above the Iroquois Plain. The area between the Niagara Escarpment and Lake Ontario is characterized by heavy textured, low permeability red clay. The heavy clay soils shed water easily and dry out rapidly, thus containing little organic matter. Sandy soils overlying the red clay subsoils occur in greater abundance along Casablanca Boulevard

The soft Queenston red shale constitutes the principal bedrock below the Niagara Escarpment and on the Lake Iroquois Plain. The multiple thick layers of marl, clay, sand and the petrified remains of salt water organisms characterize the bedrock geology. Relatively soft and easily eroded, these rocks layers yielded a great deal of material to the glaciers that ultimately

influenced the fertility and water-holding capacities of the soils. A geotechnical investigation was undertaken by GeoPro Consulting Limited as part of this project.

Fill soils (sand and gravel, gravelly sand, silty sand, silty clay) generally exist below the asphalt on Casablanca Boulevard. These are underlain by clayey silt till and / or weathered shale. The fill soils generally consist of non-cohesive fill soils (sand and gravel, gravelly sand, silty sand) and/or cohesive fill soils (silty clay). The cohesive fill soils are generally brown and grey in colour, and contain some sand and trace gravel. The clayey silt till extends, on average, to approximately 2.0 to 3.0 metres (m) below the ground surface. Underneath this layer is weathered, reddish brown shale.

At the CN Rail crossing, the shale bedrock was found at depths ranging from 0.6 to 2.9 metres (m) below ground surface. This bedrock of the Queenston Formation primarily consists of typically fresh to highly weathered, reddish brown, fine to very fine grained, fissile, very weak to medium strong shale bedrock interbedded with fresh to slightly weathered, light grey to dark grey, fine to very fine grained, fissile to massive, medium strong to very strong limestone/siltstone. It is concluded that significant variations in depths to bedrock can be expected.

4.5.3 Groundwater

Groundwater conditions were observed during and on completion of drilling in the open boreholes undertaken for this Study. No freestanding groundwater was encountered in any of the boreholes on completion of drilling. It should be noted that the groundwater could fluctuate seasonally and could be expected to be somewhat higher during the spring months and in response to major weather events. Depths of groundwater of between 4.0 to 6.0 metres (m) are common where groundwater was found during the drilling program.

4.6 Natural Environment

This section provides a summary of natural environment baseline conditions and includes a summary description of:

- Fisheries and Aquatic Habitat;
- Terrestrial Resources; and
- Species at Risk.

In developing the description of baseline conditions, a variety of data sources were considered including provincial data sets from Ministry of Natural Resources and Forestry (MNRF), Municipal Official Plans, Niagara Peninsula Conservation Authority (NPCA) data, and field surveys completed within the Focused Study Area. Further details are contained in the Aquatic and Terrestrial Natural Features Report included as **Appendix F**.

4.6.1 Fisheries and Aquatic Habitat

The Focused Study Area is located within the NPCA designated Lake Ontario South Shore sub-watershed and the Niagara Peninsula Source Protection Area (NPSP; NPCA, 2004 and NPCA, 2013). The drainage basin of the sub-watershed covers approximately 40% of the Niagara Peninsula Source Protection Area, and has a drainage area of 598 square kilometres (NPCA 2012; NPCA 2013). The northern portion of the Focused Study Area (Casablanca Boulevard/QEW Interchange) is located within the floodplain of Lake Ontario Tributary 39; floodplain mapping for this tributary is currently being completed by the NPCA.

A review of base mapping provided by the NPCA indicates that one water body feature (i.e. a drainage feature) is located within the Focused Study Area (NPCA, 2018). Additional online mapping indicates that a drain classification has not been assigned to the drainage feature by the Department of Fisheries and Oceans Canada (DFO) (OMAFRA, 2018). The drainage feature runs parallel to Casablanca Boulevard to the west and becomes more defined with riparian features east of Casablanca Boulevard north of Vine Road, the CN railway and residential lands. Surface flows associated with the drainage feature flow north before eventually discharging in to Lake Ontario. The location of the drainage feature is illustrated on **Figure 4-5**.

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Figure 4-5
Natural Heritage Features

- Focused Study Area
- Grimsby GO Transit Station Area (2011 ESR Boundary, Metrolinx)
- Study Area
- Arterial Road
- Highway
- Railway (CN)
- Watercourse
- Life Science Area of Natural and Scientific Interest

Niagara Escarpment

- Escarpment Natural Area
- Escarpment Protection Area

0 75 150 225 m

N W E S

MAP DRAWING INFORMATION:
ESRI IMAGERY (2013), MNRF

MAP CREATED BY: SFG / LK
MAP CHECKED BY: CV
MAP PROJECTION: NAD 1983 CSRS UTM Zone 17N

FILE LOCATION: G:\cad\GIS\187650\MXD\Natural Heritage Features.mxd

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PROJECT: 187650
STATUS: DRAFT
DATE: 2018-11-13

In response to Dillon's information request, NPCA acknowledged that fish species and other water quality information associated with the drainage feature (including the sub- watershed and Lake Ontario) were limited and not available. A similar information request submitted to MNRF received acknowledgement that the agency did not have any detailed fisheries information for the drainage feature. Furthermore, the drainage feature is not mapped by the DFO as critical habitat and/or a feature in which aquatic Species at Risk (SAR) are known to occur (DFO, 2018).

SAR are defined as those listed as *Endangered* or *Threatened* under the *Endangered Species Act* (ESA), 2007. Species of Conservation Concern (SCC) are defined as species listed as *Threatened* or *Endangered* under the federal *Species at Risk Act* (SARA) 2002, but not under the provincial ESA; species that are provincially rare/tracked (i.e., have a Sub-national (provincial) Rank of S1 – Critically Imperilled, S2 – Imperilled or S3 – Vulnerable) and/or are designated as Special Concern (SC) under the ESA.

An aquatic assessment of the drainage feature was completed on August 7, 2018 by a Dillon aquatic biologist. A summary of observations resulting from the assessment are provided below. Refer to Photos 1 through 9 in Table A-1, Appendix A of the Report provided in **Appendix F** for representative site photos.

Drainage Feature (Casablanca Boulevard):

The drainage feature along the west side of Casablanca Boulevard, starting at Main Street West, was dry at the time of the site investigation for approximately 330 m. Just south of Elgin Street, the drainage feature ends at a driveway where a culvert appears to convey flow to the east side of Casablanca Boulevard (**Photo 1**). The drainage feature starts again north of the driveway. In this stretch, its main function appears to be conveyance of stormwater flow since the drainage feature ended at a catch basin (**Photos 2 and 3**).

Approximately 330 m north of Main Street West, in between Elgin Street and James Street, flow originating from a corrugated steel pipe (CSP) culvert was observed in the drainage feature. The origin of the culvert was not identified during the field investigation but it appeared to come from below the upstream sections of the drainage feature (**Photo 4**). From this point, the drainage feature maintained flow in a northerly direction until Vine Road where it flowed east into a culvert under Casablanca Boulevard before exiting into a swale in association with a residential property. It exhibited flat morphology with predominantly clay substrate with some silt.

The mean bankfull width of the drainage feature channel was approximately 4.0 m and the mean bankfull depth was approximately 2.5 m. At the time of the field survey, the wetted width was approximately 0.30 m and the mean depth was approximately 0.02 m. The drainage feature was covered by emergent vegetation throughout and shaded by trees for approximately 1-30% of the area. Further, the banks were well vegetated and protected (**Photos 5 and 6),** but had areas that appeared to have exposed soil, vulnerable to erosion. The riparian zone along the right upstream bank was scrubland due to the fencerows along the property lines and lawn along the left upstream bank. Beyond the direct riparian zone, the road ditch was surrounded by

residential homes, roads and agricultural fields. Watercress (*Nasturtium officinale*) was observed downstream of the southern culvert, where flow originated, suggesting potential groundwater input (**Photo 7**).

Green Frogs (*Lithobates clamitans*) were observed within the drainage feature at the Vine Road culvert where the water was deeper. Duckweed (*Lemna minor*) and an Arrowhead species (*Sagitarria sp.*) were also observed in this part of the drainage feature (**Photo 8**). North of Vine Road and up to the CN Rail corridor, the drainage feature contained standing water and appeared to convey water towards the Vine Road culvert to the south (**Photo 9**).

4.6.2 Terrestrial Resources

Adjacent land-use to the Focused Study Area along Casablanca Boulevard is primarily residential, agriculture and commercial business. There are no natural heritage features located within the Focused Study Area; however, the Escarpment Natural Area, the Escarpment Protection Area as well as the Niagara Section Escarpment Life Science Area of Natural and Scientific Interest (ANSI) are located immediately south of the Focused Study Area (MNRF, 2018) which are shown on **Figure 4-5**.

Numerous sources were consulted to characterize baseline conditions. These are summarized below.

Ministry of Natural Resources and Forestry

An Information Request was sent to the MNRF Guelph District Office on August 30th, 2018. Comments and received from the MNRF (September 26th, 2018) indicated that none of the following significant natural features are located within the Focused Study Area:

- Wildlife Concentration Areas;
- Areas of Natural and Scientific Interest (ANSI); and
- Provincially Significant Wetlands (PSW).

No unevaluated, locally significant and/or provincially significant wetlands (PSW) are located within the Focused Study Area.

NHIC Database records (i.e. 1 kilometres (km) data squares 17PH1384, 17PH1484, 17PH1383, and 17PH1483 that intersect with the Focused Study Area) indicate there are no potentially significant vegetation communities within the Study Area (MNRF, 2018). Furthermore, no significant vegetation communities were identified during the field studies that were completed within the Focused Study Area.

Niagara Peninsula Conservation Authority

An information request was sent to the NPCA on August 30th, 2018. The response (received on November 5th, 2018) was consistent with information provided by MNRF, confirming that there are no PSWs or other natural heritage features (e.g., woodlands, ANSIs, etc.) known to occur within the Focused Study Area.

NPCA online mapping indicates that the Focused Study Area falls within lands designated as Significant Groundwater Recharge Areas, and areas of Highly Vulnerable Aquifer (NPCA 2018). NPCA outlines planning guidelines for Significant Groundwater Recharge Areas and Highly Vulnerable Aquifer areas in the *Policies, Procedures and Guidelines for the Administration of Ontario Regulation 155/06 and Land Use Planning Policy Document* (2011). These planning guidelines shall be considered in the development of alternatives for the Study Area.

Local Municipal and Regional Official Plans were also consulted to characterize baseline conditions along the corridor. These are described below.

Niagara Region Regional Official Plan – Natural Systems

The Niagara ROP outlines the Core Natural Heritage System containing environmental features and functions of special importance to the Region's ecosystem. Schedule C of the ROP maps these features. Within the Casablanca Boulevard Study Area, there are no significant Core Natural Heritage features.

Town of Grimsby Official Plan – Natural Systems

Section 4.0 of the Town of Grimsby's OP outlines policies for Environmental Management and Sustainability, specifically containing policies to protect Grimsby's ecological health and environmental sustainability. Appendices 1 through 5 of the OP map these features (**Appendix E**).

Within the Focused Study Area, there are no significant Natural Heritage Features or Hydrological Features. Appendix 5 of the Town's OP does indicate an area of high aquifer vulnerability within the larger Study Area, located between the western extent of the South Service Road and Casablanca Boulevard between the South Service Road and approximately 50m south of the CN Rail. Within this area, certain types of uses related to manufacturing, managing or storing hazardous materials would be restricted in order to avoid contamination of surface water which could in turn affect groundwater quality. Section 4.2.7 and Section 10.2.2.4 of the Town's OP identifies these uses, none of which apply to the proposed improvements to Casablanca Boulevard.

Results of Field Investigations

Field investigations to confirm background information were completed within the Focused Study Area on June 8, August 7, and October 23. The Focused Study Area primarily consists of anthropogenic areas in association with urban and rural developments. Observations of vegetation communities made during the field investigations were consistent with background information provided in agency feedback received from submitted Information Requests and MNRF and NPCA online mapping (MNRF 2018; NPCA 2018).

Detailed information pertaining to the field investigations are presented in the following sections.

4.6.3 Ecological Land Classification and Botanical Surveys

Vegetation communities were assessed using Ecological Land Classification (ELC) for Southern Ontario (Lee et al. 1998) to identify and assess potential natural heritage features within the Study Area. During the field investigations, vegetation was characterized using ELC in order to classify and map ecological communities to the vegetation level. The ecological community boundaries were determined through the review of aerial photography and then further refined during field investigations. ELC was completed for the Study Area during field investigations on August 7, 2018.

The ELC protocol recommends that a vegetation community be a minimum of 0.5 hectares (ha) in size before it is defined. Based on the composition of vegetation communities within the Focused Study Area, patches of vegetation less than 0.5 ha or disturbed/planted vegetation can be described, provided they clearly fit within an ELC vegetation type.

Spring (June 8), summer (August 7), and fall (October 23) botanical surveys were conducted over the course of 2018 using wandering transects to determine species presence, richness and abundance. Species nomenclature is based on the Ontario Plant List (Newmaster et al., 1998).

Results

ELC mapping completed in 2018 is illustrated in **Figure 4-6.** Resulting ELC communities mapped within the Focused Study Area were found to be comparable to vegetation communities previously mapped by NPCA (NPCA 2018). Refer to Photos 10 through 21 in Table A-1, Appendix A, of the report in **Appendix F** for representative site photos.

Within the Focused Study Area, areas immediately adjacent to Casablanca Boulevard contain low density residential (CVR_1), transportation roadways (CVI_1), open agriculture (OAG) and annual row crops (OAGM1).

Business Sector (CVC_1) areas comprise of the majority of lands present along the portion of the South Service Road located west of Casablanca Boulevard. Vegetation cover along a portion of the South Service Road consists of Dry - Fresh Mixed Meadow/ Gray Dogwood Deciduous Shrub Thicket complex (MEMM3/THDM2-4).

With respect to the Casablanca Boulevard/QEW interchange, the primary vegetation cover consists of Dry-Fresh Mixed Meadow (MEMM3). The Dry-Fresh Mixed Meadow (MEMM3) areas also contain smaller, interspersed sections of Dry-Fresh Deciduous Shrub Thicket (THDM2). In addition to the QEW (CVI_1), anthropogenic land uses such as business sector areas (CVC_1) and active construction (AC) are mapped within the Focused Study Area northwest and southwest of the Casablanca Boulevard/QEW interchange. The aforementioned communities are further described in **Table 4-6.**

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Niagara Region

Figure 4-6
Ecological Land Classification

Lake Ontario

CVC_1
MEMM3
CVC_1
CVC_1
MEMM3/ THDM2-4
MEMM3
OAG
OAGM1
CVR_1
See Inset
AC
THDM2
THDM2
THDM2
MEMM3
MEMM3
THDM2
CVC_1
THDM2
MEMM3
CVC_1
MEMM3/ THDM2-4
MEMM3
OAG
OAGM1
CVR_1
OAGM1

N RD
HUNTER RD
ESPLANADE LANE
WINDWARD DR
CONCORD PL
QEW
INDUSTRIAL DR
EMILY ST
VINE RD
N SERVICE RD
QEW
GEO HUNTER RD
ELMER ST
JAMES ST
CASABLANCA BLVD
ELGIN ST
FATHY CIR
WOOLVERTON RD
GAGE ST
MAGNOLIA CRES
TAMI CRES
MERRITT CRES
LIVINGSTON AVE
ASPEN DR
BEECH ST
CEDAR ST
CHESTNUT DR
ORIOLE CRES
TULIP ST
TAMARACK CRT
ROBERTS RD
EVERGREENS DR
WILLOW LANE
SYCAMORE CRES
TRILLIUM LANE
LINDEN LANE

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- Focused Study Area
- Grimsby GO Transit Station Area (2011 ESR Boundary, Metrolinx)
- Arterial Road
- Highway
- Railway (CN)
- Watercourse

Ecological Land Classification

- AC - Active Construction
- CVC_1 - Business Sector
- CVR_1 - Low Density Residential
- MEMM3 - Dry - Fresh Mixed Meadow
- MEMM3 - Dry - Fresh Mixed Meadow/ THDM2-4 Gray Dogwood Deciduous Shrub Thicket
- OAG - Open Agriculture (Fallow Field)
- OAGM1 - Annual Row Crops
- THDM2 - Dry - Fresh Deciduous Shrub Thicket

0 75 150 225 m

N W E S

MAP DRAWING INFORMATION:
ESRI IMAGERY (2013), MNRF

MAP CREATED BY: SFG / LK
MAP CHECKED BY: CV
MAP PROJECTION: NAD 1983 CSRS UTM Zone 17N

FILE LOCATION: G:\cad\GIS\187650\MXD\Ecological Land Classification.mxd

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PROJECT: 187650
STATUS: DRAFT
DATE: 2018-11-13

Table 4-6 Ecological Land Classification

ELC Community	Area within Study Area	Vegetation	Photo (Appendix F)
MEMM3 Dry – Fresh Mixed Meadow	8.90 ha	This community was present within both the maintained road rights-of-way adjacent to Casablanca Boulevard as well as the Casablanca Boulevard/QEW interchange. There were two distinctive areas present consisting of both managed and unmanaged segments. Managed areas occurred adjacent to either a roadway or road interchange and were frequently mown. The unmanaged areas had not been actively managed (mowed) and were left in a more natural state. These communities were dominated by several species of grass and disturbance tolerant forbs such as Wild Carrot (*Daucus carota*), Cow Vetch (*Vicia cracca*), and Birdsfoot Trefoil (*Lotus corniculatus*).	10 - 12
THDM2 Dry - Fresh Deciduous Shrub Thicket	0.67 ha	This area consisted of small areas of tall shrubs and low trees mainly located within or adjacent to the interchange associated with the QEW. Dominant species consisted of common upland trees and shrubs associated with higher levels of disturbance such as Common Buckthorn (*Rhamnus cathartica*), Russian Olive (*Elaeagnus angustifolia*), Tatarian honeysuckle (*Lonicera tatarica*), Staghorn Sumac (*Rhus Typhina*), Gray Dogwood (*Cornus racemosa*) and Multiflora Rose (*Rosa Multiflora*).	13 - 14
MEMM3 THDM2-4 Complex - Dry - Fresh Mixed Meadow / Gray Dogwood Deciduous Shrub Thicket	0.22 ha	This community consisted of a complex of a gray dogwood dominated deciduous thicket with inclusions of mixed meadow. Dominant vegetation was composed of a mixture of tall shrubs and low trees consisting primarily of Gray Dogwood (*Cornus racemosa*), Green Ash (*Fraxinus pennsylvanica*), Common Buckthorn (*Rhamnus cathartica*), Hawthorn (*Crataegus sp.*), Apple (*Malus spp.*) and Tatarian honeysuckle (*Loncera tatarica*).Groundcover consisted mainly of disturbance tolerant uplands species such as Wild Carrot (*Daucus carota*), Canada Goldenrod (*Solidago canadensis*), Eastern Late Goldenrod (*Solidago altissima*), Riverbank	15

ELC Community	Area within Study Area	Vegetation	Photo (Appendix F)
		Grape (*Vitis riparia*), Teasel (*Dipsacus sylvestris*) and several species of grasses (*Poaceae spp.*) and sedges (*Carex spp.).* In addition, in lower topographic areas several species of rushes (*Juncaceae spp.*), Reed Canary Grass (*Phalaris arundinacea*) and Purple Loosestrife (*Lythrum salicaria*) were also observed. One area to the south of the rail tracks, west of Casablanca Boulevard was observed to contain a small; area dominated by Reed Canary Grass.	
OAG Open Agriculture (Fallow Field)	4.95 ha	A former agricultural field, this community has been left fallow and is now dominated by weedy species such as Wild Carrot (*Daucus carota)*, Goldenrods (*Solidago sp.)* and Chicory (*Cichorium intybus*).	16
OAGM1 Annual Row Crop	0.1 ha	This area consists of agricultural row crops.	17
CVR_1 Low Density Residential	2.05 ha	This area consisted of single family residential dwellings.	18
CVC_1 Business Sector	0.84 ha	This area consisted of commercial and industrial buildings	19
CVI_1 Transportation	8.57 ha	These areas consist of Municipal roads and Highways.	20
AC Active Construction	0.3 ha	This area consists of an active construction site.	21

A total of 41 botanical species were documented within the Focused Study Area during the 2018 botanical surveys.

Of the 41 species, five (5) could not be identified to species. Fifteen (15) of the plant species are listed a Secure or Apparently Secure (i.e. SRank of S5 and/or S4) in the province. The remaining 21 species are listed as non-native, status unknown or not suitable targets for conservation activities (i.e. SRank of SE, SU or SNA). None of the 41 species observed are considered Special Concern under the ESA and/or SCC. The Co-efficient of Conservatism (CC) provides additional information on the nature of the vegetation communities within the Focused Study Area. The CC values range from 0 to 10 and represent an estimated probability that a plant is likely to occur in a landscape that is relatively unaltered or is in a pre-settlement condition. For example, a CC of 0 is given to plants such as Manitoba Maple (Acer negundo) that demonstrate little fidelity to any remnant natural community (i.e. may be found almost anywhere). Similarly, a CC of 10 is applied to plants like Shrubby Cinquefoil (Potentilla fructicosa) that are almost always restricted to a pre-settlement remnant (i.e. high quality natural area). Introduced plants were not part of the pre-settlement flora, so no CC values have been applied to these species.

Of the 41 botanical species identified within the Study Area, none had a CC value of seven (7) or greater. The mean CC value for the site is 1.78, indicating an altered landscape. This is typical of an urban environment as compared to naturally occurring environments. A full list of the botanical species observed within the Study Area has been included in the report in **Appendix F** (see Appendix A, Table A-2 of the report).

4.6.4 Species at Risk

Feedback received from the MNRF Guelph District (September 26, 2018) included a list of 34 SAR that have the potential to occur within the Town of Grimsby; this list was reduced through completing a review of secondary source information, including NHIC database records of the Focused Study Area. In total, 14 SAR and 5 SCC were determined to have the potential to occur within 1 kilometres (km) of the Focused Study Area. The resulting list includes species specifically identified by comments provided by the MNRF to be potentially impacted within the Study Area.

A habitat assessment was then completed for the Study Area to determine which SAR have the potential to be impacted by the proposed road widening activities for Casablanca Boulevard. This was done by identifying each SAR's habitat requirements and comparing those to the conditions and ELC communities observed within the Focused Study Area. The assessment determined that habitat requirements for the following three (3) SAR and one (1) SCC have the potential to be present in the Focused Study Area:

- Barn Swallow (THR);

- Eastern Meadowlark (THR)
- Bobolink (THR) and
- Monarch (SC).

Results of the assessment are presented in Appendix A, Table A-3 of the report in **Appendix F.** Future targeted fieldwork is recommended to confirm the presence or absence of species (and/or habitat) at the Detailed Design stage. None of the aforementioned species have regulated habitat under *Ontario Regulation 242/08*.

No SAR were observed in association with the 2018 field investigations. In the event the project has the potential to impact Barn Swallow, Eastern Meadowlark and/or Bobolink habitat, the project can be registered under Section 23.5 (Barn Swallow) or Section 23.6 (Bobolink, Eastern Meadowlark) of Ontario Regulation 242/08 of the Endangered Species Act (ESA, 2007), respectively. So long as the project is registered, and the rules in the regulation are followed, the project is exempt from Section 9 (species protection) and Section 10 (habitat protection) under the ESA.

4.6.5 Candidate Significant Wildlife Habitat

Significant Wildlife Habitat (SWH) are types of natural heritage features that are identified for protection by provincial policy. They consist of wildlife habitats, including vegetation communities, that are ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or a Natural Heritage System. SWHs are identified on the basis of ELC communities using applicable criteria specific to a region.

In order to identify candidate SWH within the Focused Study Area, ELC communities were compared to those listed in the Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (MNRF, January 2015). Following the review of ELC communities and SWH Criteria Schedules, it was determined that no criteria were met for Candidate SWH to exist within the Focused Study Area.

4.7 Cultural Heritage

The following section provides baseline information for:

- Built and Cultural Heritage Resources; and
- Archaeological Resources.

A more detailed description of cultural heritage resources and archaeological conditions are provided in the technical reports in **Appendix G** and **Appendix H** respectively.

4.7.1 Built and Cultural Heritage Resources

Archeological Services Incorporated (ASI) was contracted by Dillon to undertake a Cultural Heritage Resource Assessment. The results of ASI's study indicated that there were no cultural heritage features identified within the Focused Study Area.

One cultural heritage resource is located adjacent to the Focused Study Area. Echo Hall is located at 366 Main Street West approximately 77 meters to the east of the Casablanca Boulevard. This property is designated as a heritage site under Part IV of the Ontario Heritage Act. Other properties identified to have heritage potential in the surrounding areas are described in the Cultural Heritage Report (available as **Appendix G**).

Based on the completion of the cultural heritage resource checklist, the Focused Study Area has been screened for built and cultural heritage resources.

4.7.2 Archaeological Resources

Archaeological Services Inc. (ASI) was contracted by Dillon to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the Study. The Stage 1 Report is available in **Appendix H**.

Results of the property inspection indicated that the lands adjacent to the Focus Study Area have been previously disturbed and therefore have no archaeological potential (as illustrated on Figure 13 of the report in **Appendix H**). Because the project location is developed and occupied, several land areas along the corridor have been previously assessed for archaeological resources. The results of this previous work were used as a reference point in forming the conclusions of the Archaeological Assessment.

The Stage 1 Archaeological Assessment determined that there are three previously registered archaeological sites are located within one kilometre of the Study Area, although none located in the Focused Study Area. The property inspection determined that while the larger Study Area exhibits archaeological potential, the lands potentially affected by the improvements to Casablanca Boulevard and South Service Road do not retain archaeological potential on account of previous and existing land disturbance. Therefore these lands do not require further archaeological assessment. However, any partial extension of Livingston Avenue to support access to a future transit Station to the north of the road corridor would be in previously undisturbed lands, and would therefore merit a Stage 2 Archaeological Assessment as part of the Detailed Design stage.

5.0 Identification of Problems/ Needs/ Opportunity

5.1 Identifying the Problems/Needs/Opportunity

Phase I of the Municipal Class EA process involves the identification of the problem and/or opportunity to be addressed by the EA. The identified problems/opportunities highlighted in Section 5.1.1 which provided the justification or need for the undertaking were determined through consideration of the following factors:

- The project planning context including relevant Municipal planning policies, and other related studies including multi-modal transportation plans;
- The existing multi-modal transportation network including traffic volumes and capacities, intersection operations and existing collision data, pedestrian and cycle use, etc. (**Section 4.1**);
- Review of roadway safety including collision data and with particular consideration to cyclists and pedestrian movements;
- Projected future transportation demands;
- Stakeholder input; and
- Relevant government policies and plans (**Section 3.0**).

5.1.1 Summary of Problems/Needs/Opportunity

The Study was conducted with the intent to provide for the long term transportation needs of the community. The Region's TMP (2017) identifies the 2041 horizon year as the basis for planning for forecasted growth in population and traffic needs across Niagara. The Study therefore aims to consider the future needs of the community to 2041. In addition to assessing the existing conditions, 2041 was applied as the long-term horizon year in the traffic modelling and technical analysis undertaken to confirm the need and justification for improvements to the Study Area road corridors. As the Grimsby GO Transit Station is anticipated to open in 2021, this was taken as the forecasting year to determine the problems/needs/opportunity in the short term.

Considering the results of the existing conditions review and the traffic forecasting work that was completed for 2021 and 2041 horizon years, the key problems and opportunities for the Casablanca Boulevard corridor are described below.

Identified Problems

The key issues identified for the Regional Road corridors in the Study Area to the year 2041 are summarized below by road segment.

- QEW Interchange/Bridge (**Figure 5-1**):
  - North and Southbound traffic conditions are forecast to be at/over capacity
- South Service Road (**Figure 5-1**):
  - Existing roadway capacity will be inadequate to support future growth in activity associated with both area development and the future GO Transit Station at a reasonable level of service; and
  - Increased traffic flow could potentially result in significant conflicts between roadway users.

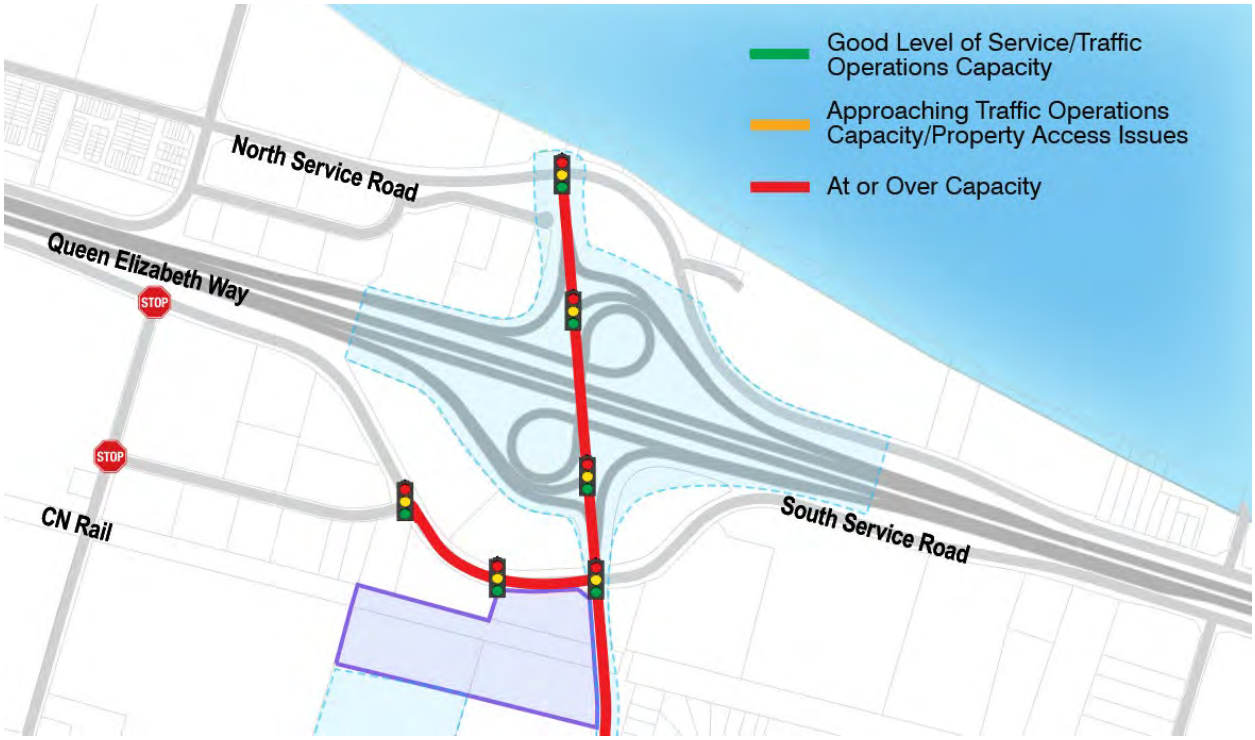


Figure 5-1 Roadway Problems (2041) Identified: QEW and the South Service Road

- Casablanca Boulevard between the South Service Road and Livingston Avenue (**Figure 5-2**):
  - Lack of dedicated pedestrian and cyclist facilities;
  - Need for improved capacity at the at-grade rail crossing, including a long-term need for a grade separated rail crossing;
  - Lack of future roadway capacity to support the forecast growth in activity associated with both area development and the future GO Transit Station at a reasonable level of service;
  - Increased traffic flow resulting in significant potential conflicts between roadway users.; and

  - Impact on increased activity on ability of local residents to safely access roadway.
- Casablanca Boulevard between Livingston Avenue and Main Street West (**Figure 5-2**):
  - Lack of dedicated pedestrian and cyclist facilities;
  - Lack of future roadway capacity to support the forecast growth in activity associated with both area development and the future GO Transit Station at a reasonable level of service; and
  - Impact on increased activity on ability of local residents to safely access roadway.
- Livingston Avenue west of Emily Street (**Figure 5-2**):

  Need for access to Region-owned lands, intended for the Regional Multi-Modal Transportation hub and potential GO Transit Station south parking lot.

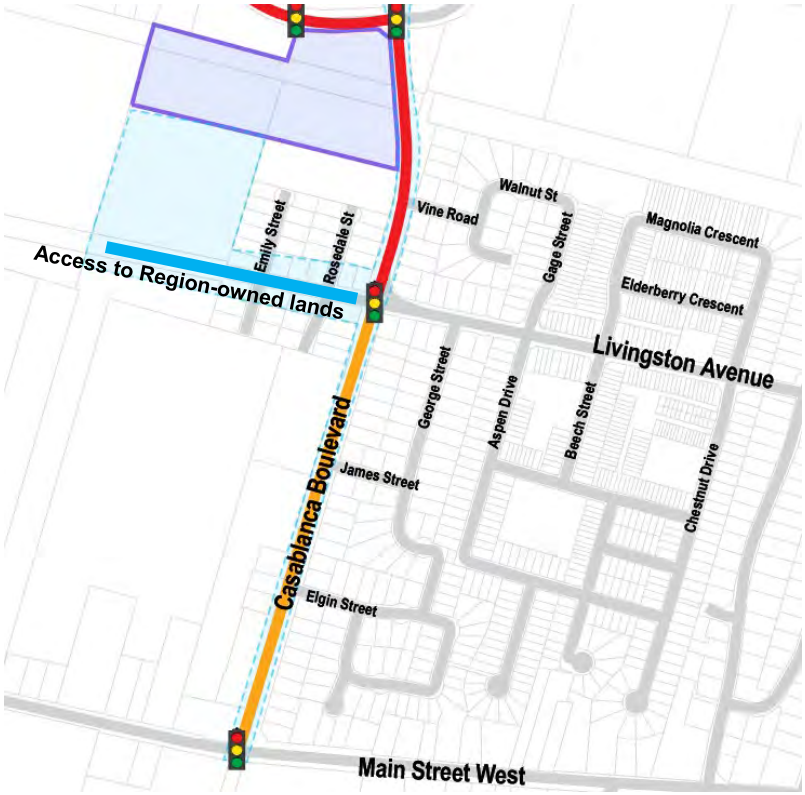


Figure 5-2 Roadway Problems Identified: Casablanca Boulevard

Identified Opportunities

The key opportunities identified for improvements to the Regional Road corridors in the Study Area include opportunities to:

- Implement the policies and direction of the relevant plans and studies for the Study Area road corridors (as identified in Section 3.0);
- Improve the character of the roadway through improved design;
- Improve active transportation opportunities by providing dedicated space for all users;
- Allow safe access to driveways along corridor; and
- Improve safety along the corridor.

5.1.2 Problem and Opportunity Statement

Considering the above, the problem/opportunity statement for the project is identified as follows:

Improvements to the Casablanca Boulevard corridor are needed to address traffic operations, access, and capacity issues related to development activity in the Town of Grimsby and specifically in the Study Area, in addition to providing access to the planned new GO Transit Station. The improved transportation corridor will serve the needs of the transportation system for the surrounding area, support area growth to 2041, and support the planned GO Transit Station. The project also provides an opportunity to implement the Region's active transportation objectives through the provision of pedestrian and cycling facilities.

The following sections provide more detail on the technical work and analysis that informed the identification of the problems/needs/opportunity and the development of the above problem statement.

5.2 Travel Demand Forecasts

Travel demand forecasts were created through examination of existing traffic volumes and forecast growth within the long term horizon (2041). Growth of travel in the study comprises three (3) components: Regional activity that passes through the study area; local development; and future GO Transit Station activity, Forecasting was completed for the 2021 and 2041 horizon years. The following describes forecasting work completed for the 2041 horizon year. Details of the forecasting work for 2021 and 2041 are described in **Appendix B**.

5.2.1 Background Growth

Background traffic growth was forecast by accounting for population and employment growth within the Study Area and regional growth outside the Study Area.

5.2.1.1 Within Study Area – Development Related Growth

Within the Study Area, population and employment growth forecasts were based on land use concepts developed for 2041 as part of the Niagara GO Hub and Transit Station Study (NGHTSS). The population and employment forecasts were then converted to auto trips using auto trip generation factors. The auto trip generation factors were taken from Niagara Region's regional travel demand forecasting model.

5.2.1.2 Regional Growth

To account for regional growth in areas surrounding the Study Area, Niagara Region's regional travel demand forecasting model was reviewed to determine an appropriate compound annual growth rate (CAGR) to apply to auto traffic travelling through the Study Area. The CAGR was applied to traffic on roadways crossing the Study Area boundary, such as the North Service Road, the South Service Road, Main Street West, etc.

Table 5-1 summarizes the 2041 development and background growth assumptions and the resultant traffic volume growth.

Table 5-1 2041 Development and Background Growth

Type of Growth	Growth Assumptions	Traffic Volume Growth	
		AM Peak Hour	PM Peak Hour
Within Study Area	+4,750 population +1,870 employment	+899	+1,393
Regional growth	2.4% CAGR (AM Peak Hour) 1.5% CAGR (PM Peak Hour)	+1,448	+1,004
	Total	**+2,347**	**+2,397**

5.2.2 GO Transit Station Traffic

In the NGHTSS, "base" and "high" ridership forecasts were developed for the 2041 horizon. The NGHTSS used the high ridership forecast since it was "beneficial as a sensitivity test to better assess the risks associated with unclear future influences with the potential increase to GO ridership". To be consistent with the NGHTSS, the high ridership forecast was applied for the 2041 horizon.

By 2041 it was assumed that a GO Transit Station south parking lot would also be in operation along with the north parking lot. The north Station access was assumed to be the primary access. For the AM peak hour, the north parking lot was assumed to be 85% filled before the south parking lot began to be used. For the PM peak hour, the north parking lot was assumed to empty before the south parking lot. **Table 5-2** summarizes the assumed GO Transit Station auto traffic forecasts for the 2041 horizon. It should be noted that the AM and PM Peak Hour forecasts for trips into the GO Transit Station from the South Service Road access exceed the total number of parking spaces planned for the site (based on the 2018 Metrolinx Functional Site Plan). It is expected that a number of these would be drop-off trips, and that once the parking spaces are filled, any additional parking demand may be met by other adjacent parking facilities.

Table 5-2 GO Transit Station Auto Traffic Forecasts (2041)

Station Access	2041 Horizon			
	AM Peak Hour		PM Peak Hour	
	Out	In	Out	In
North Station Access (South Service Road)	130	306	345	169
South Station Access (Livingston Avenue)	6	99	59	13
Total	**136**	**405**	**404**	**182**

5.2.3 Traffic Volumes

The forecast trips for the study area as assigned to the road network were used for both the strategic and operational capacity assessments. The strategic assessment compares the forecast volumes for critical sections of roadways to the carrying capacity of the section to identify deficiencies. The operational assessment reviews the performance of individual intersections in order to identify specific geometric and operational deficiencies. **Figure 5-3** illustrates the 2041 forecasted traffic volumes for Study Area intersections assuming no new roads are constructed or extended.

5.2.4 Pedestrian and Cycling Facilities

Due to the emerging development on the North Service Road and in the Winston Neighbourhood Secondary Plan Area, as well as the opening of the GO Transit Station by 2021, pedestrian and cyclist volumes are anticipated to significantly increase in the Study Area. In line

with the Region and Town of Grimsby's strategic direction to support and encourage non-vehicle travel modes (as detailed in Section 3), a complete network of sidewalks and cycling lanes are expected to be needed along the Regional Roads in the Study Area to meet the demand for safe and accessible active transportation facilities into the future as seen on **Figure 5-4 Pedestrian Volume Forecast, and Figure 5-5 Cycling Volume Forecast**.

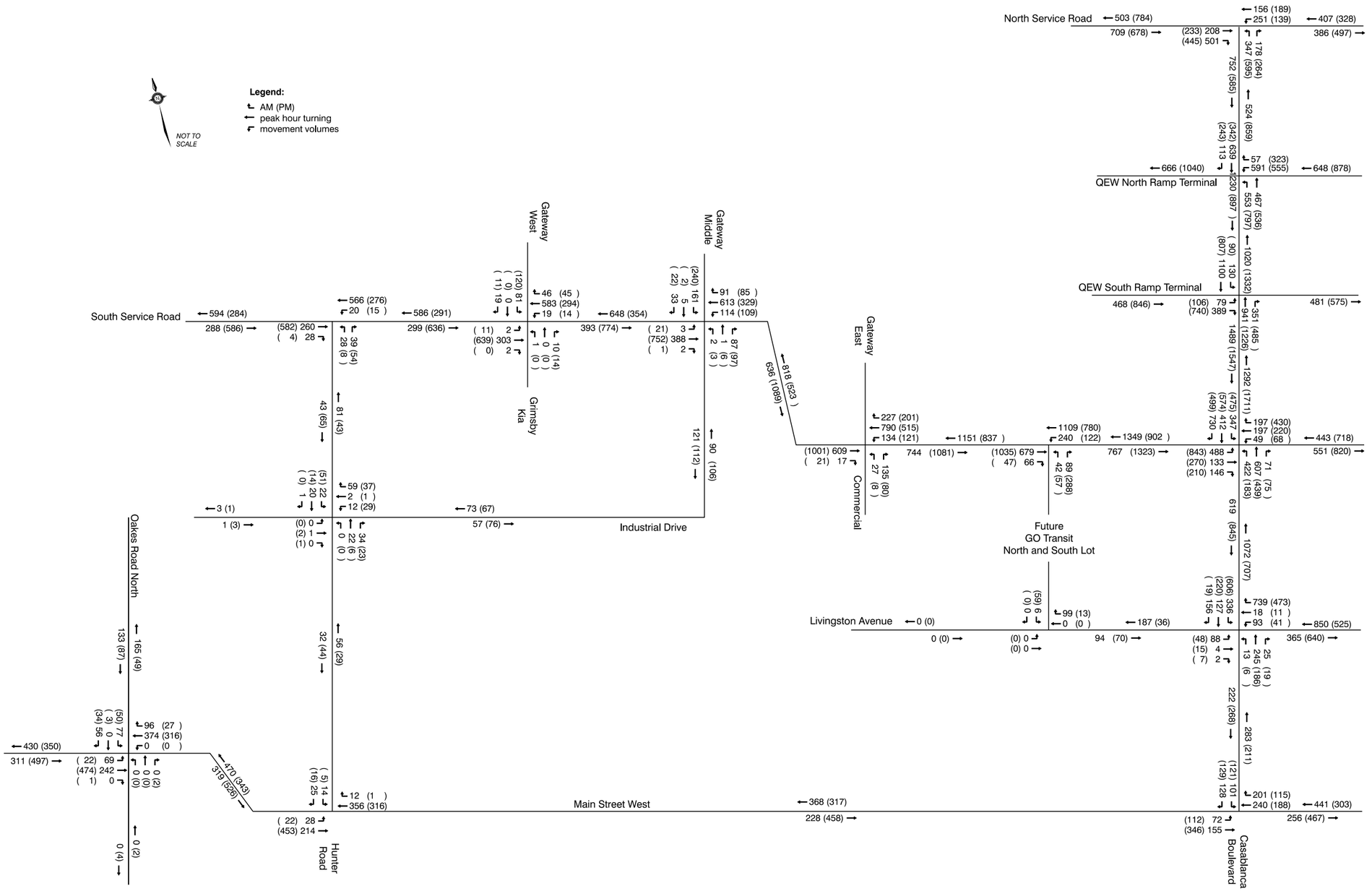


Figure 5-3 2041 Traffic Volume Forecasts

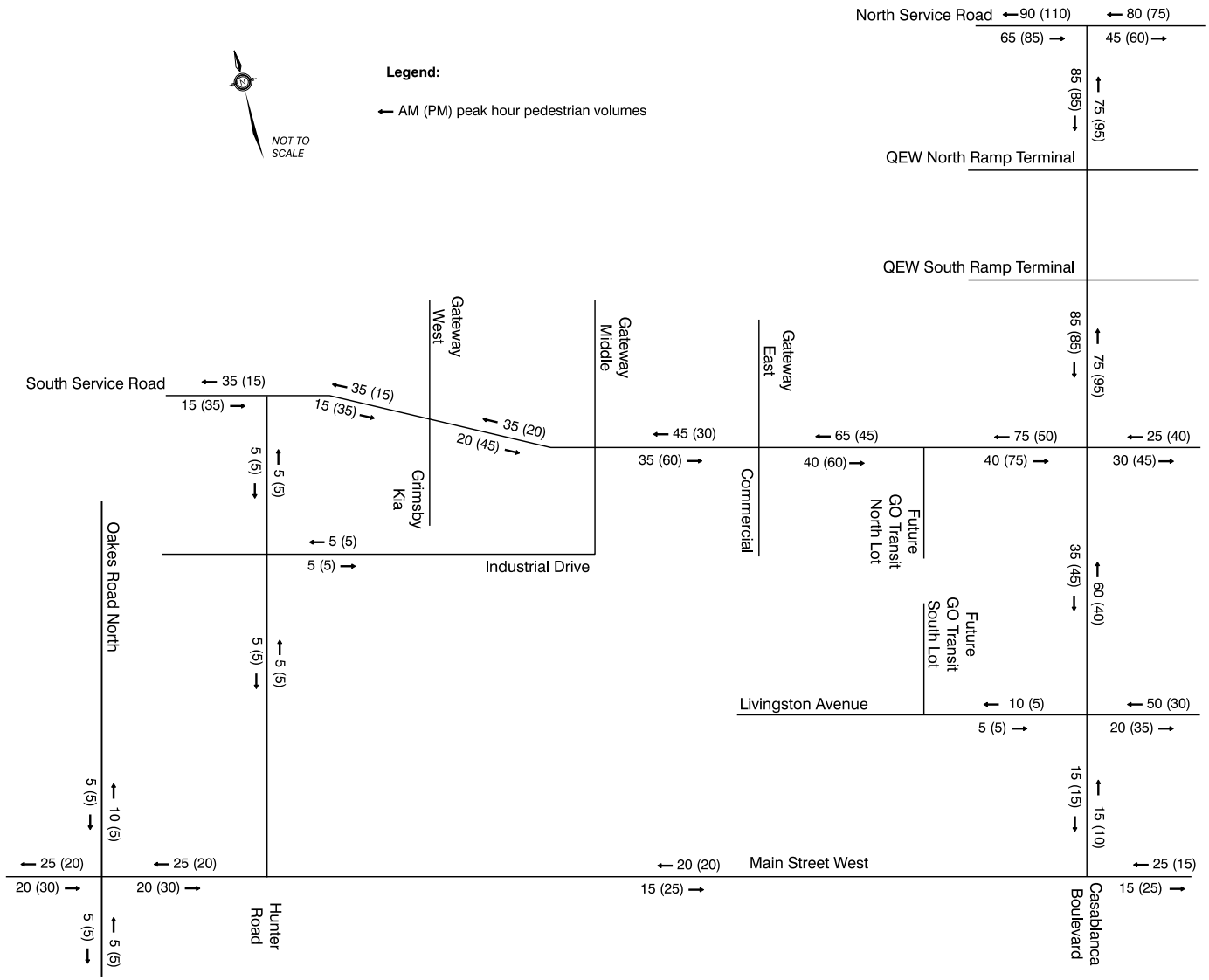


Figure 5-4 2041 Pedestrian Volume Forecasts

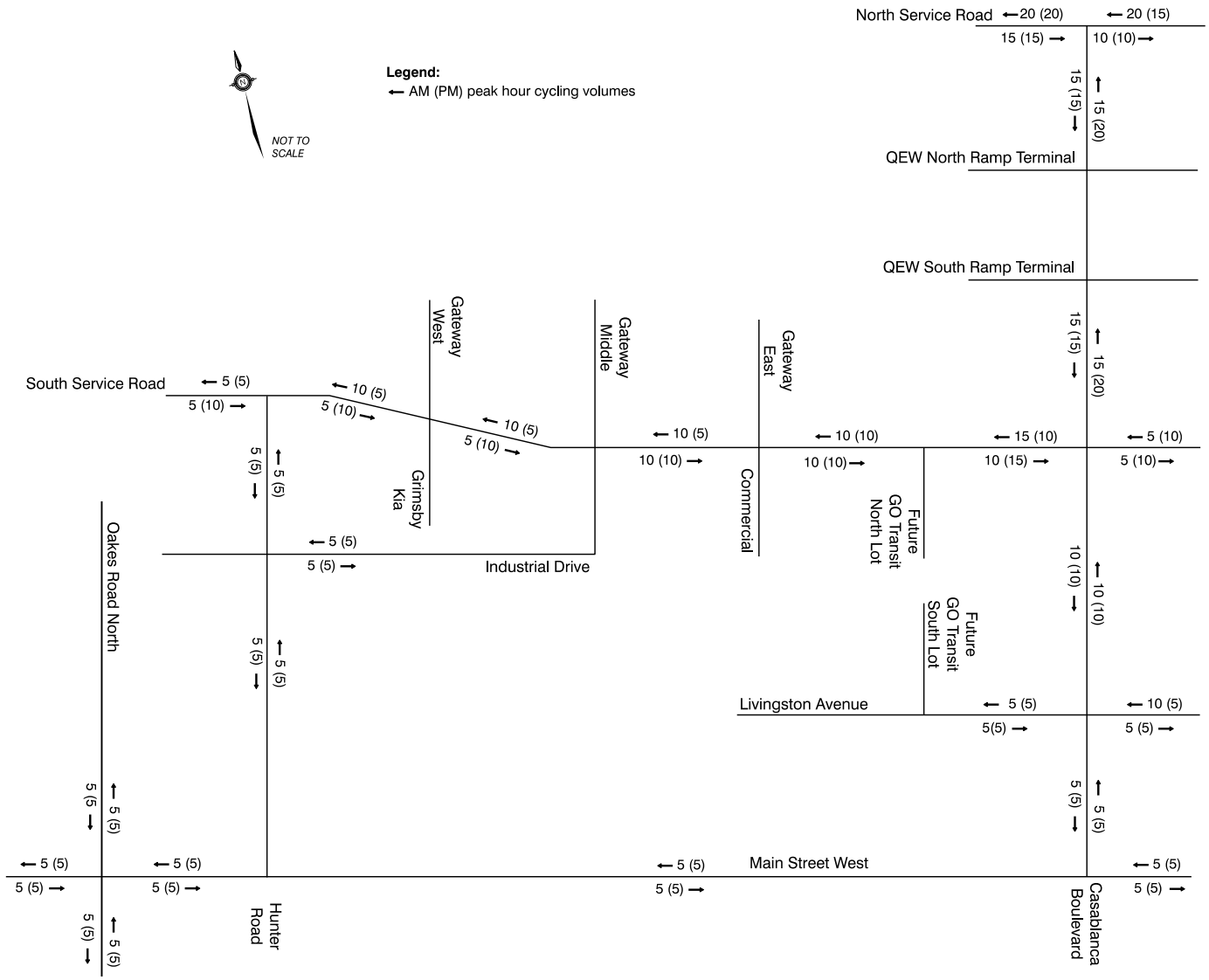


Figure 5-5 2041 Cycling Volume Forecasts

5.3 Strategic Operational Assessment

The microsimulation analysis identified the following discussion topics:

- Casablanca Boulevard/QEW interchange
- Casablanca Boulevard & QEW South Service Road
- QEW South Service Road and GO North Parking Lot Access

Summary tables are presented in the sections below to discuss specific study area issues.

5.3.1 Casablanca Boulevard/QEW Interchange

Table 5-3 summarizes the results of the analysis. During the PM peak hour, the 2021 “Do Nothing” analysis shows that the QEW ramp terminals are not able to process the demand; the eastbound and westbound off-ramps experience long delays (2-4 minutes) and queues (250-500 metres).

The analysis confirms the need to improve the QEW ramp terminals by the 2021 horizon. The 2021 Base road network analysis in **Figure 5-6** shows that traffic signals at the ramp terminals will increase capacity and reduce delays and queues.

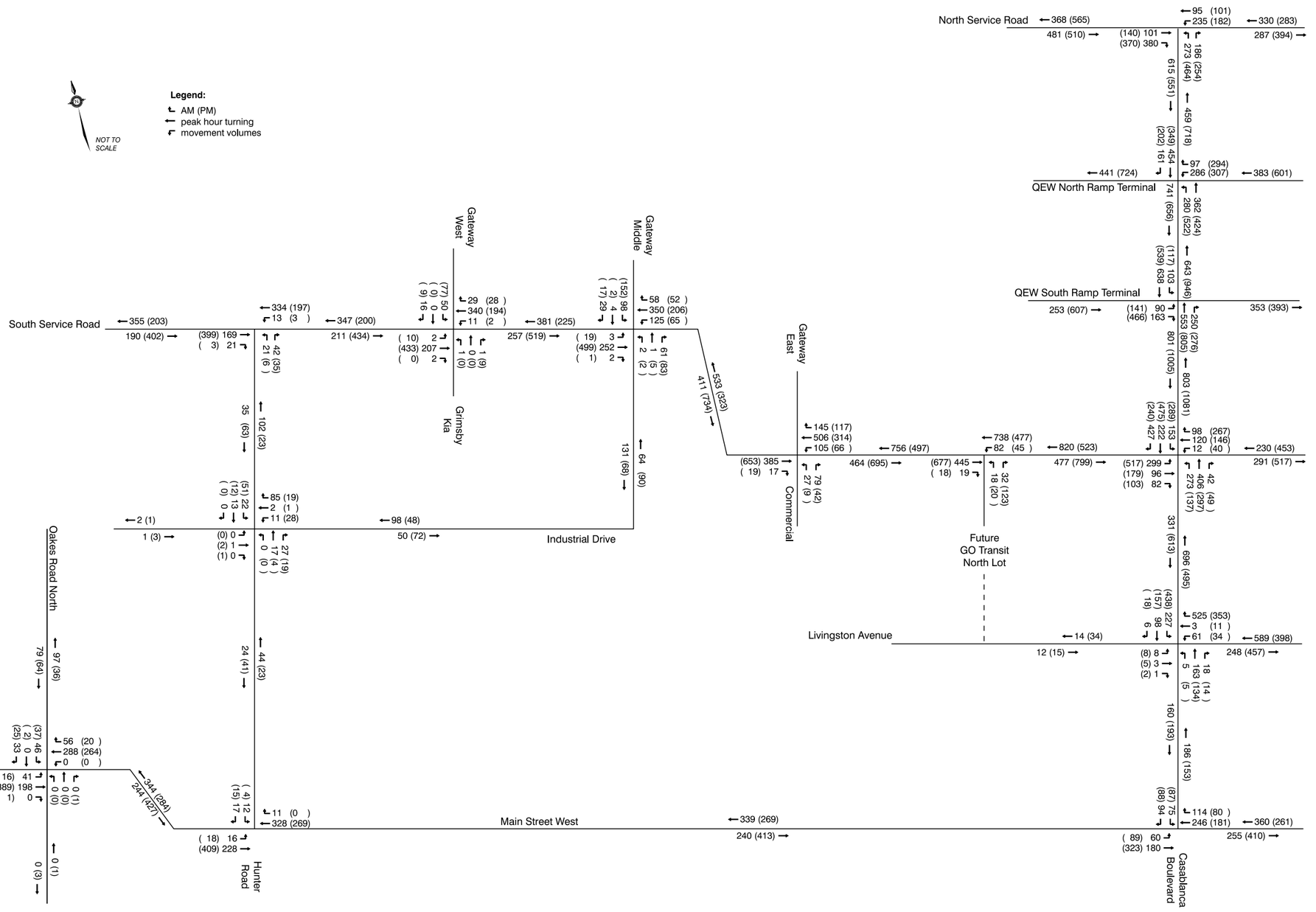


Figure 5-6 2021 Traffic Volume Forecast

Table 5-3 2021 Casablanca Boulevard/QEW Interchange Analysis Results

	Alt	Control Type	# Veh. Entering Int.	Int. Avg. (Weighted by Mvmt. and Vol.)				Critical Movement			Overall Int. LOS
				Avg. Queue (m)	Max Queue (m)	Total Delay (sec)	Stopping Delay (sec)	Mvmt	Max Queue (m)	Avg. Delay (s)	
AM Peak Hour	Casablanca Blvd & North Ramp Terminal										
	2021 Do Nothing	TWSC	1577	2	14	4	1	WBL	59	17	-
	2021 Base	Sig.	1614	4	29	10	7	WBL	68	22	A
	Casablanca Blvd & South Ramp Terminal										
	2021 Do Nothing	TWSC	1720	0	2	1	0	EBL	32	18	-
	2021 Base	Sig.	1778	2	33	5	3	SBT	44	3	A
PM Peak Hour	Casablanca Blvd & North Ramp Terminal										
	2021 Do Nothing	TWSC	1809	57	131	48	37	WBR	505	269	-
	2021 Base	Sig.	2078	3	33	7	5	WBL	75	23	A
	Casablanca Blvd & South Ramp Terminal										
	2021 Do Nothing	TWSC	2028	42	67	35	28	EBR	242	145	-
	2021 Base	Sig.	2330	6	49	9	4	EBR	84	19	A

5.3.2 Casablanca Boulevard & South Service Road

Table 5-4 summarizes the results of the analysis. The 2021 “Do Nothing” analysis demonstrates that the intersection is also not able to process the demand, resulting in long delays, long queues, and a poor level of service for several turning movements.

Traffic to and from the new GO Transit Station will put pressure on the eastbound approach and therefore it is recommended to increase the turning capacity. The 2021 Base road network geometry includes dual eastbound left-turn lanes and a shared eastbound through/right turn lane. These improvements are sufficient for the 2021 horizon and greatly improve intersection operations.

Table 5-4 2021 Casablanca Boulevard & South Service Road Analysis Results

	Alt	Control Type	# Veh. Entering Int.	Int. Avg. (Weighted by Mvmt. and Vol.) Avg. Queue (m)	Max Queue (m)	Total Delay (sec)	Stopping Delay (sec)	Critical Movement Mvmt	Max Queue (m)	Avg. Delay (s)	Overall Int. LOS
AM	2021 Do Nothing	Sig.	2062	61	134	38	30	NBR	267	45	D
	2021 Base	Sig.	2176	12	69	20	15	NBT	94	24	C
PM	2021 Do Nothing	Sig.	2373	67	135	59	48	NBR	267	72	E
	2021 Base	Sig.	2694	17	80	24	18	EBR	125	14	C

5.3.3 QEW South Service Road & GO North Parking Lot

Table 5-5 shows the results of the analysis. Both alternatives have the same geometry and traffic control, which includes a traffic signal and a westbound left-turn lane into the north parking lot. The “Do Nothing” alternative shows better performance than the Base road network alternative because traffic is being metered in the “Do Nothing” scenario by the QEW ramp terminals and the Casablanca Boulevard & South Service Road intersection. The Base scenario implemented traffic signals at the QEW ramp terminals, which alleviated much of the congestion and queuing there and allowed more vehicles to progress through the study area than in the Do Nothing scenario.

The intersection performs well and therefore no additional mitigation is required.

Table 5-5 2021 QEW South service Road & GO North Parking Lot Analysis Results

	Alt	Control Type	# Veh. Entering Int.	Int. Avg. (Weighted by Mvmt. and Vol.) Avg. Queue (m)	Max Queue (m)	Total Delay (sec)	Stopping Delay (sec)	Critical Movement Mvmt	Max Queue (m)	Avg. Delay (s)	Overall Int. LOS
AM	2021 Do Nothing	Sig.	1279	1	37	2	1	WBL	70	8	A
	2021 Base	Sig.	1334	8	95	9	5	WBT	118	8	A
PM	2021 Do Nothing	Sig.	1325	1	23	2	1	WBL	58	12	A
	2021 Base	Sig.	1422	8	92	10	5	EBT	109	11	A

5.4 Future Transportation Operations

Table 5-6 shows the operations of the road network when the forecasted volume for 2041 is applied to existing roadway and intersection geometry.

As can be seen in the table, significant operational issues exist in both peak hours and in the PM peak hour in particular for the 2041 horizon year. In addition, as the analysis was performed via a Vissim microsimulation model, issues of congestion and queuing at critical points will reduce traffic on downstream links which makes their performance look better than if the vehicles were able to access the intersections in a free flow manner.

The performance of the westbound left-turn at the QEW north ramp terminal is of particular concern, with average delays of 240-380 seconds (4-6 minutes) and queuing that stretches beyond 500m during both peak hours. Similarly, the southern QEW ramp terminal shows significant queuing that maxes out at 240m with delays of 160 seconds during the PM peak hour. Queues do not extend to the QEW main line, and are limited to the ramps. The performance of the intersection of Casablanca Boulevard and the South Service Road is also problematic, with average vehicle delays of 65 to 90 seconds (LOS E and LOS F) observed in the peak hours. PM peak hour operations at the intersection of the South Service Road and Industrial Drive also show significant delays with an average of 70 seconds.

Table 5-6 Forecasted Road Operations in 2041: AM and PM Peak Hour

AM Peak Hour

ID	Intersection Name	Control Type	# Vehicles Entering Intersection	Intersection Average (Weighted by Movement and Volume)				Critical Movement			Overall Intersection LOS
				Average Queue Length (m)	Max Queue Length (m)	Total Delay (sec)	Stopping Delay (sec)	Movement	Max Queue Length (m)	Average Delay (s)	
1	Casablanca Blvd & North Service Rd	Signalized	1,446	32.5	118.7	46.0	34.3	WBT	201.6	68.9	D
2	Casablanca Blvd & North Ramp Terminal	TWSC	1,657	54.7	99.8	47.8	32.9	WBL	504.7	376.7	-
3	Casablanca Blvd & South Ramp Terminal	TWSC	2,206	19.9	48.9	19.1	10.7	SBL	201.2	0.0	-
4	Casablanca Blvd & S Service Rd	Signalized	2,724	104.0	144.1	65.8	47.8	NBR	267.2	50.0	E
5	Casablanca Blvd & Livingston	TWSC	1,077	12.9	49.9	21.5	14.2	SBL	64.8	3.2	-
6	Casablanca Blvd & Main St W	TWSC	990	1.0	19.6	3.5	0.6	SBR	52.7	13.5	-
7	S Service Rd & Industrial Dr	TWSC	1,107	7.4	53.4	20.6	10.8	NBR	81.1	52.1	-
8	S Service Rd & Hunter Rd	TWSC	804	0.5	6.3	2.0	0.2	NBL	28.5	9.1	-
9	Hunter Rd & Industrial Dr	TWSC	489	0.3	11.4	2.2	0.2	WBR	24.5	5.4	-
10	Hunter Rd & Livingston Ave	TWSC	296	0.0	0.0	0.0	0.0	None	0.0	0.0	-
11	Hunter Rd & Main St W	TWSC	911	0.2	10.7	1.9	0.4	EBL	27.8	4.4	-
12	Main St W & Oakes Rd N	TWSC	882	0.4	9.9	2.1	0.2	SBR	33.3	8.1	-
14	South Service Road & GO North Access	Signalized	1,792	21.8	105.9	17.5	12.2	EBT	118.8	28.6	B
16	Livingston Avenue & GO South Access	TWSC	80	0.0	0.7	1.0	0.0	SBL	8.7	5.1	-

PM Peak Hour

ID	Intersection Name	Control Type	# Vehicles Entering Intersection	Intersection Average (Weighted by Movement and Volume)				Critical Movement			Overall Intersection LOS
				Average Queue Length (m)	Max Queue Length (m)	Total Delay (sec)	Stopping Delay (sec)	Movement	Max Queue Length (m)	Average Delay (s)	
1	Casablanca Blvd & North Service Rd	Signalized	1,554	29.6	73.4	29.2	22.3	NBR	126.2	57.4	C
2	Casablanca Blvd & North Ramp Terminal	TWSC	1,893	83.9	137.9	57.1	41.7	WBL	504.8	240.7	-
3	Casablanca Blvd & South Ramp Terminal	TWSC	2,276	49.7	58.9	35.6	27.5	EBR	241.8	161.3	-
4	Casablanca Blvd & S Service Rd	Signalized	2,848	122.3	161.1	92.1	71.0	NBR	267.2	78.4	F
5	Casablanca Blvd & Livingston	TWSC	942	14.1	78.6	34.4	24.2	SBL	117.4	7.6	-
6	Casablanca Blvd & Main St W	TWSC	944	0.7	29.7	2.6	0.5	EBL	54.1	4.4	-
7	S Service Rd & Industrial Dr	TWSC	1,128	32.6	78.5	70.1	41.1	EBT	127.5	49.6	-
8	S Service Rd & Hunter Rd	TWSC	798	0.0	0.5	0.3	0.0	NBL	16.0	7.4	-
9	Hunter Rd & Industrial Dr	TWSC	369	5.5	54.6	13.1	8.3	NBR	111.9	11.9	-
10	Hunter Rd & Livingston Ave	TWSC	222	0.0	0.0	0.0	0.0	None	0.0	0.0	-
11	Hunter Rd & Main St W	TWSC	903	0.2	19.1	1.6	0.3	EBL	29.6	1.8	-
12	Main St W & Oakes Rd N	TWSC	881	0.1	2.7	1.0	0.1	SBR	26.7	7.0	-
14	South Service Road & GO North Access	Signalized	1,789	33.0	90.3	21.0	13.9	EBT	119.2	29.7	C
16	Livingston Avenue & GO South Access	TWSC	65	0.4	13.8	4.8	0.2	SBL	15.5	5.3	-

5.5 Grade Separation Rail Crossing Warrant Analysis

An investigation was undertaken to determine if the rail line crossing of Casablanca Boulevard warranted a grade separated crossing. The first step in determining a possible warrant for a rail grade separation is to calculate a Rail/Road Crossing Exposure Index (RRCEI) to see if the crossing should be considered for the introduction of a grade separation. The Exposure Index analysis showed the following:

- Rail/Road Crossing Exposure Index (RRCEI) = AADT x Average Number of Daily Trains
- A RRCEI of 200,000 is considered the "threshold" value where a grade separation could be considered if warranted by other factors (essentially if there are any specific safety and operational issues)
- "Existing" RRCEI (as per the Niagara GO Hub & Transit Stations Study (Integrated Mobility Hub)) = 10 trains/day x 11,692 AADT = 116,920 (well below the threshold)
- "Future" (2041) RRCEI (also as per the above study) = 24 trains/day x 20,543 = 493,032 (well over the warrant)

The above "future" calculation assumes a frequency of 14 GO Trains per day (up from none today), with an additional six trains being associated with CN freight service, with the assumption of two trains being VIA passenger rail service, and two more being Amtrak passenger rail service. It is likely that the RRCEI will be met fairly early in the planning period once GO service is introduced, as the Future (2041) RRCEI is well over the warrant threshold. At that time, the crossing should be monitored for any performance and safety issues and if there are concerns then implementing the grade separation should be assessed in more detail as well as introducing other mitigating measures. As there is a relatively wide open corridor with good sight lines, there is the ability to engineer a reconstructed at-grade crossing that will support safety and mitigate operational issues. This will mean the likely deferral of the consideration of a grade separation for at least the 5-10 year period then undertake a safety assessment if there are any issues.

6.0 Alternative Solutions

6.1 Overview of Alternative Solutions Evaluation

Phase 2 of the Municipal Class EA process involves the development of 'Alternative Solutions' to address the needs, opportunities, and problem for the Study (as previously summarized in **Section 5.0**). 'Alternative Solutions' are different ways of potentially solving the problem or addressing an opportunity.

Considering the problem and opportunity statement (**Section 5.1.2**), the following set of Alternative Solutions were identified, presented to the public at PIC #1, and subsequently assessed/evaluated:

- Alternative #1: Do Nothing/Status Quo, with no improvements made to the Regional Roads in the Study Area;
- Alternative #2: Transportation Demand Management, involving improvements that would broaden the range of opportunities for a range of travel modes;
- Alternative #3: Improve Other Road Corridors, which looks at whether improvements to other roads in the Study Area might satisfy the problem/opportunity;
- Alternative #4: Roadway Operational Improvements, focusing on improving intersection operations to move traffic through the Study Area more efficiently; and
- Alternative #5: Additional Roadway Lanes, with a view to improving traffic capacity on Casablanca Boulevard and the South Service Road through widening to add travel and turning lanes.

The evaluation of the Alternative Solutions as shown in **Table 6-1**, concluded that Alternative #1 (Do Nothing) would not address the problem/opportunity, and would not be carried forward for further development. Alternative #3 could reduce some but not all of the traffic issues in the Study Area, but would not aid in addressing the need specific to Casablanca Boulevard. This alternative would also not be carried forward. Alternatives #2, #4, and #5 all had the potential to contribute to a partial satisfaction of the problem/opportunity, and could therefore be combined to work in tandem.

Table 6-1 Alternative Solutions Evaluation Overview

Criteria	Alternative 1 - Do Nothing	Alternative 2 – Transportation Demand Management	Alternative 3 – Improve Other Road Corridors (Hunter Road or Roberts Road)	Alternative 4 – Roadway Operational Improvements	Alternative 5 – Additional Roadway Lanes
TRANSPORTATION					
Ability to address identified roadway capacity deficiencies.	Less Preferred	Preferred	Moderately Preferred	Moderately Preferred	Preferred
Ability to address identified access and operations deficiencies.	Less Preferred	Less Preferred	Less Preferred	Preferred	Moderately Preferred
Ability to address identified safety issues.	Less Preferred	Less Preferred	Less Preferred	Preferred	Moderately Preferred
NATURAL ENVIRONMENT					
Potential for removal and disturbance effects to terrestrial and aquatic habitat.	Preferred	Moderately Preferred	Less Preferred	Moderately Preferred	Moderately Preferred

Criteria	Alternative 1 - Do Nothing	Alternative 2 – Transportation Demand Management	Alternative 3 – Improve Other Road Corridors (Hunter Road or Roberts Road)	Alternative 4 – Roadway Operational Improvements	Alternative 5 – Additional Roadway Lanes
ENGINEERING/ROAD DESIGN					
Potential for significant roadway design challenges	Preferred	Preferred	Moderately Preferred	Less Preferred	Less Preferred
SOCIO ECONOMIC					
Potential for loss of residential/business property	Preferred	Preferred	Preferred	Moderately Preferred	Moderately Preferred
Potential for disruption effects to residences	Preferred	Preferred	Less Preferred	Preferred	Preferred
Potential for improved street corridor character	Less Preferred	Preferred	Less Preferred	Preferred	Preferred

Criteria	Alternative 1 - Do Nothing	Alternative 2 – Transportation Demand Management	Alternative 3 – Improve Other Road Corridors (Hunter Road or Roberts Road)	Alternative 4 – Roadway Operational Improvements	Alternative 5 – Additional Roadway Lanes
Potential for loss of agricultural land	Preferred	Preferred	Preferred	Preferred	Preferred
COST					
Relative capital cost estimate	Preferred	Preferred	Moderately Preferred	Moderately Preferred	Less Preferred
SUMMARY					
	Do Not Carry Forward	Combine with Other	Do Not Carry Forward	Combine with Other	Combine with Other

Each of these alternatives is discussed in more detail in the following sections, followed by a summary of the associated assessment results for each.

6.2 Identification of Alternative Solutions

This section provides an overview of each of the Alternative Solutions.

6.2.1 Alternative Solution #1: Do Nothing/Status Quo

The *EA Act* requires the consideration of the "Do Nothing" or base case scenario. The Do Nothing alternative is included to identify for comparison purposes what would happen if no further action was taken to improve the transportation conditions on Casablanca Boulevard. This includes assuming that the road condition as it exists at the time this ESR was prepared would continue, including maintaining the current number of lanes, intersection configuration and Casablanca Boulevard/QEW interchange configuration.

6.2.2 Alternative Solution #2: Transportation Demand Management

Transportation Demand Management (TDM) measures include a wide range of policies, programs, services and products that influence how, why, when, and where people travel to make travel behaviors more sustainable. The emphasis of TDM strategies is to reduce the overall demands on the transportation network, shift demands to non-peak times, and to encourage the use of other modes of transportation.

This study recognizes the importance of promoting and implementing TDM initiatives, including key policy tools such as the design of complete streets, as supported by the Region's TMP. Typical TDM measures included as part of other Alternative Solutions include, as examples:

- New active transportation facilities such as bike lanes (on or off-road) and sidewalks;
- Charging for car parking;
- Priority parking spaces for carpools;
- Discounted transit passes;
- Bike racks;
- Change-room and shower facilities for cyclists; and
- Telecommuting programs and flexible work hours.

The key advantage of this alternative is that it may help to improve traffic flow in the corridor (through reduction in vehicles during peak periods), and would not result in additional impacts to the Casablanca Boulevard corridor over the "Do Nothing". For TDM to be effective, several different measures would likely need to be implemented, and there may be some limitations as to the extent to which some of these measures would be applicable or effect change on the corridor.

6.2.3 Alternative Solution #3: Improve Other Road Corridors

This alternative involved consideration of upgrades to adjacent/parallel roadways to reduce the travel demand on Casablanca Boulevard. The alternative north-south roadways that were considered included either Roberts Road to the east or Hunter Road to the west. It is assumed that some of the TDM measures proposed as part of Alternative 2 would be combined with this alternative and applied to these alternative roads. There would also not be any improvements to support active transportation modes along the Casablanca corridor, which is a key initiative identified in the Region's TMP and the Grimsby GO Transit Station Secondary Plan.

6.2.4 Alternative Solution #4: Roadway Operational Improvements

This alternative includes addressing roadway operational issues at key intersections along Casablanca Boulevard, including at the North Service Road, at the South Service Road, at Livingston Avenue, and at Main Street West. Improvements would include the provision of turning lanes, adjustments to roadway geometrics, and adjustments to signal phasing. It is assumed that some of the TDM measures proposed as part of Alternative 2 would be combined with this alternative. This alternative also examined modifications to the Casablanca Boulevard/QEW interchange ramps.

6.2.5 Alternative Solution #5: Additional Roadway Lanes

This alternative examined the effectiveness of adding new roadway lanes on Casablanca Boulevard and the South Service Road to provide additional travel capacity and to better facilitate turns at the major intersections as well the collector roads that join Casablanca Boulevard. The options to add lanes consisted of the following:

- Widen Casablanca Boulevard to a basic four-lane cross-section (plus auxiliary turning lanes at intersections as required) from the North Service Road to Livingston Avenue;
- Widen Casablanca Boulevard to a basic two-lane cross-section with a two-way left-turn lane from Livingston Avenue and Main Street West; and
- Provide dual eastbound left-turn lanes at the intersection of Casablanca Boulevard and the South Service Road.

This alternative also includes roadway improvements to provide access to the planned GO Transit rail Station including modifications to the South Service Road to the west of Casablanca Boulevard and the partial western extension of Livingston Avenue.

6.3 Consultation Input on Alternative Solutions

The Alternative Solutions along with the evaluation results were presented for discussion with the public at PIC #1, with a subsequent follow-up period primarily related to the need for additional road lanes on Casablanca Boulevard, supported by an online survey.

6.3.1 Public Consultation Centre #1

The first PIC was held at the Casablanca Winery Inn and Spa in Grimsby, Ontario. The Notice of Commencement and the first PIC was published as a combined notice as described in Section 2.1.1, and a copy is provided in **Appendix A**. This PIC was held for both this Study and the Livingston Avenue Extension EA, as the two studies were begun concurrently with the latter subsequently following a separate timeline.

The PIC was held in an open-house format, beginning with a presentation and followed by a question and answer session. Following the presentation, attendees were able to browse through display boards that were set up around the room to provide information on the Study background and purpose, Alternative Solutions for the Study, and key issues identified to be addressed through the development of Alternative Designs. Copies of the Study Area map were laid out to allow attendees to leave location-specific comments regarding issues and opportunities for consideration in the Study Area. In total, 70 people signed the record of attendance. Representatives from the Region and Dillon were available to explain the project and displays, record verbal comments, and answer questions.

A copy of the display boards is provided in **Appendix A**.

Key themes from the public comments received during this event included:

- General:
  - Impacts of project to properties adjacent to corridor;
  - Potential for increase in traffic congestion and noise due to suggested rail grade separation;
  - Improvements are required to the corridor to improve operations;
  - Additional criteria for evaluation of alternatives, such as pedestrian/cyclist safety, noise, lifestyle disruptions, and cultural heritage preservation;
  - Traffic volume and speeds; and
  - Stormwater drainage issues.
- Road sections of concern included:
  - Main Street West and Casablanca Boulevard intersection, particularly during the tourist season or when the QEW is congested;
  - Casablanca Boulevard north of Livingston Avenue (with a request for traffic calming).
  - Consideration of a right-hand turning lane travelling northbound from Casablanca Boulevard onto Livingston Avenue to reduce traffic congestion.
- Road widening:
  - Support for the widening of Casablanca Boulevard to three-lanes including a centre turning lane south of Livingston Ave;
  - Need for improved access to properties directly south of the CN Rail on the east side of Casablanca Boulevard; and
  - Proposed intersection design of Livingston Avenue and Casablanca Boulevard – including size, safety and queuing.

- Active transportation:
    - Desire to see a connected network for active transportation along Casablanca Boulevard;
    - Safety and integration along Casablanca Boulevard due to number of driveways and the QEW overpass; and,
    - Active transportation connections across QEW overpass and to future GO Transit Station.
- GO Transit Station Design:
    - Concerns about the adequacy of parking;
    - Potential need for more parking south of the GO Transit Station; and,
    - Location of access points on the South Service Road and Casablanca Boulevard and potential for queuing/accidents.

While a number of needs and opportunities to improve Casablanca boulevard were discussed as noted above, some members of the public further queried the forecasted future traffic demand along Casablanca Boulevard (to access the future GO Transit Station), and inquired about the potential to satisfy the problem/opportunity through improvements to other north-south roads in the Study Area to accommodate future additional traffic demand. These concerns were considered in the development of the detailed transportation and traffic modelling undertaken as the next step in the Study as documented in Section 5 of this ESR.

6.3.2 Online Survey #1

The first survey focused on confirming the key transportation issues in the Study Area, and was open for participation on the Region's website from 17 September, 2018 to 26 October, 2018. A total of 1,158 responses were received, of which 760 were complete. A copy of the survey questions and a response summary are provided in **Appendix A**. Key findings from the survey included:

- The majority of respondents typically travel through the Study Area several times per week as compared to the number of Study Area residents;
- The most common mode of transportation among these travellers is vehicular, followed by walking and cycling;
- The most frequent issues experienced by respondents when travelling along Casablanca Boulevard included:
    - Long wait times at the CN Rail crossing;
    - Long wait times at the intersection of Casablanca Boulevard and the South Service Road when turning left either north or south, or travelling straight through; and,
    - Safety issues for motorists.
- Most respondents were in support of an additional parking lot south of the CN Rail corridor;
- The preferred mode and routes of access to the GO Transit Station identified by respondents included:

  - By vehicle from the South Service Road; and,
  - By vehicle using an access from Livingston Avenue (the existing section of Livingston, west of Casablanca Boulevard to west of Emily Street).
- A number of respondents also noted that they do not experience any issues travelling through the area under the current conditions.

6.4 Alternative Solutions Evaluation and Selection of Preferred Solution

The evaluation of the five Alternative Solutions described in **Section 6.1** was based on a set of evaluation criteria structured around five main criteria groupings as shown in **Table 6-2**: The evaluation results are presented in **Table 6-3**.

Table 6-2 Alternative Solutions Evaluation Criteria

Criteria Group	Criteria
Transportation	Ability to address identified roadway capacity deficiencies.
	Ability to address identified access and operations deficiencies.
	Ability to address identified safety issues.
Natural Environment	Potential for removal and disturbance effects to terrestrial and aquatic habitat.
Engineering	Potential for significant roadway design challenges
Cultural Environment	Potential for loss of residential/business property
	Potential for disruption effects to residences
	Potential for improved street corridor character
	Potential for loss of agricultural land
Socio-economic Environment	Potential for loss of residential/business property
	Potential for disruption effects to residences
	Potential for improved street corridor character
	Potential for loss of agricultural land
Cost	Relative capital cost estimate

Table 6-3 Alternative Solutions Evaluation

Criteria	Alternative 1 - Do Nothing	Alternative 2 – Transportation Demand Management	Alternative 3 – Improve Other Road Corridors (Hunter Road or Roberts Road)	Alternative 4 – Roadway Operational Improvements	Alternative 5 – Additional Roadway Lanes
TRANSPORTATION					
Ability to address identified roadway capacity deficiencies.	Less Preferred Roadway demand will exceed available capacity on Casablanca Boulevard north of Livingston Ave. resulting in a poor level of service.	Preferred While TDM measures will help to address some of the capacity problems by encouraging use of other transportation modes, they will not fully solve the problem on their own.	Moderately Preferred Improvements to the other roadways may help to address some of the north-south capacity deficiency in the surrounding transportation network. Roadway users may not be as attracted to use these other roadways given their locations. As such, traffic congestion related to GO Transit Station access could still occur.	Moderately Preferred Some roadway operational improvements at intersections may result in minor improvements to the roadway capacity deficiency.	Preferred Providing 2 additional lanes between the QEW and Livingston Ave. will address the identified future (2041) roadway capacity deficiency.
Ability to address identified access and operations deficiencies.	Less Preferred There will be no improvements to access and operations under the Do Nothing alternative.	Less Preferred TDM measures will not address access/ operations issues.	Less Preferred Improvements in other roadway corridors will not address access and operations constraints in the Casablanca corridor including access to the planned GO Transit Station.	Preferred Intersection improvements at the QEW interchange, the South Service Road, Livingston Avenue and Main St will improve traffic operations. Further interchange modifications could lead to further operational improvements.	Moderately Preferred Additional Roadway Lanes on their own will not address the identified operations and access deficiencies.
Ability to address identified safety issues.	Less Preferred There will be no improvements to user safety in the Casablanca corridor.	Less Preferred There will be no improvements to user safety along the Casablanca Boulevard corridor.	Less Preferred There will be no improvements to user safety along the Casablanca Boulevard corridor.	Preferred Some improvement to traffic and pedestrian safety through intersection modifications. While the need for a grade separated rail crossing is longer term, it could result in improvements to vehicle, pedestrian and cyclist safety.	Moderately Preferred Limited improvements to safety through provision of additional roadway lanes.

Criteria	Alternative 1 - Do Nothing	Alternative 2 – Transportation Demand Management	Alternative 3 – Improve Other Road Corridors (Hunter Road or Roberts Road)	Alternative 4 – Roadway Operational Improvements	Alternative 5 – Additional Roadway Lanes
NATURAL ENVIRONMENT					
Potential for removal and disturbance effects to terrestrial and aquatic habitat.	Preferred No impact to natural habitat	Moderately Preferred Some measures have potential for limited impact to natural habitat (e.g. new cycling lane). Encouraging alternative modes of transportation could reduce air emission levels. There is very limited important natural habitat within the Casablanca corridor.	Less Preferred Some potential for impact to natural features as a result of improvements to other roadways.	Moderately Preferred There is very limited important natural habitat within the Casablanca corridor. Some minor potential for impact to natural features depending on extent of modifications and there location.	Moderately Preferred There is very limited important natural habitat within the Casablanca corridor. Some minor potential for impact to natural features as a result of additional roadway lanes depending upon the location.
ENGINEERING/ROAD DESIGN					
Potential for significant roadway design challenges	Preferred No design challenges	Preferred No design challenges	Moderately Preferred Potential for design challenges depending on constraints in other corridors	Less Preferred Possible for significant design challenges - e.g. implementation of a grade separated rail bridge. Intersection improvements are not expected to have significant design challenges.	Less Preferred Some potential design challenges related to accommodating drainage and SWM measures in association with the road widening (conversion of a rural cross section to an urban cross section).

Criteria	Alternative 1 - Do Nothing	Alternative 2 – Transportation Demand Management	Alternative 3 – Improve Other Road Corridors (Hunter Road or Roberts Road)	Alternative 4 – Roadway Operational Improvements	Alternative 5 – Additional Roadway Lanes
SOCIO ECONOMIC					
Potential for loss of residential/business property	Preferred No potential for property loss.	Preferred No potential for property loss.	Preferred Potential for property impacts along other corridors depending on extent of improvements.	Moderately Preferred Minimal potential for loss of property with exception of a possible rail grade separated crossing which could result in property losses.	Moderately Preferred It is anticipated that most of the road widening can be accommodated within the existing roadway rights-of-way. As such minimal property loss is expected.
Potential for disruption effects to residences	Preferred No potential for additional disruption to residences.	Preferred No potential for additional disruption to residences.	Less Preferred Improvements could attract additional vehicles to these corridors resulting in additional vehicle related disruption effects. (e.g. noise)	Preferred Minimal potential for additional disruption effects to residents.	Preferred Capacity improvements could attract additional vehicles to the corridor resulting in additional vehicle related disruption effects. (e.g. noise).
Potential for improved street corridor character	Less Preferred No improvements to character of Casablanca Boulevard	Preferred Provision of new active transportation facility provides opportunity to improve street character.	Less Preferred No improvements to character of Casablanca Boulevard	Preferred Possible opportunity for street character improvements at specific locations (e.g. at intersections).	Preferred Potential opportunity for improved street character in combination with additional roadway lanes.

Criteria	Alternative 1 - Do Nothing	Alternative 2 – Transportation Demand Management	Alternative 3 – Improve Other Road Corridors (Hunter Road or Roberts Road)	Alternative 4 – Roadway Operational Improvements	Alternative 5 – Additional Roadway Lanes
Potential for loss of agricultural land	Preferred No loss of agricultural land.	Preferred No loss of agricultural land.	Preferred Improvements to Hunter Road may result in some impact to agricultural land.	Preferred No loss of agricultural land.	Preferred As additional roadway lanes would be north of Livingston Ave., where potential for loss of agricultural land is minimal.
COST					
Relative capital cost estimate	Preferred No capital cost	Preferred Low to moderate capital cost	Moderately Preferred Moderate to high capital cost	Moderately Preferred Moderate to high capital cost	Less Preferred Highest capital cost

6.5 Summary of Alternative Solutions Evaluation

The following section summarizes the results of the evaluation, with an at-a-glance overview provided in **Table 6-4**.

Alternative #1 – Do Nothing

While the Do Nothing alternative does not result in impact to the environment and has no capital cost, the identified problems (current and future) would persist. As there would be no improvements to the corridor, this alternative was not carried forward for further consideration.

Alternative #2 – Transportation Demand Management

The main benefit of TDM as a solution is that it has potential to address some of the future traffic demand by either encouraging people to use other modes of travel (e.g. walking or cycling), or to use their vehicles less at off-peak times. On its own, TDM would not fully address the future problems. As such, the alternative on its own is not recommended but was carried forward in combination with other alternatives (Alternatives #4 and #5).

Alternative #3 - Improve Other Road Corridors (Hunter Road or Roberts Road)

Instead of making physical improvements to Casablanca Boulevard, the potential to improve other north-south roads was reviewed and assessed. Being closest to Casablanca Boulevard, Hunter Road the Roberts Road was considered. The traffic assessment work indicates that as future demand will be associated around the planned GO Transit Station, improvements to these other roads would not help to address anticipated demand on Casablanca Boulevard and as a result, congestion and travel delays would result. Furthermore, there would still be environmental and/or socio-economic impacts resulting from improvements to these other roadways. As such, given that the problem would not be fully solved and that impacts would still result, this alternative was not carried forward for further consideration.

Alternative #4 – Roadway Operation Improvements

This alternative largely involves improvements to the intersections including the provision of turning lanes. This alternative also considers the potential to create a grade separated crossing of the railway on Casablanca Boulevard These improvements would allow better flow through the intersections and address safety issues for all modes, including for pedestrians. Generally the footprint for these improvements is relatively localized and thus environmental and socio-economics impacts would be minimized. While intersection improvements are not expected to be overly complex from the engineering perspective, the road-rail separated crossing would introduce some complexities. These improvements would have relative moderate costs.

Recognizing the benefits to roadways operations that would result from this alternative, this alternative was carried forward in combination with other alternatives (Alternatives #2 and #5).

Alternative #5 – Additional Roadway Lanes

New lanes would be added to Casablanca Boulevard to improve through capacity and potentially to improve access to/from properties along the boulevard. This alternative also includes improvements to the South Service Road west of Casablanca Boulevard and the partial western extension of Livingston Avenue to provide access to the Region-owned lands west of Emily Street. This alternative addresses the future roadway capacity problem and operational issues. While the addition of lanes has the potential for impacts, as the existing Right-of-Way is relatively wide and there are few natural features along the corridor, these impacts are expected to be minimal. The engineering complexity of this alternative is largely related to the accommodation and management of stormwater run-off. This alternative was carried forward in combination with other alternatives (Alternatives #2 and #4).

Table 6-4 Summary of Alternative Solutions Evaluation

Alternative Solution	Evaluation Summary
Alternative #1 – Do Nothing	Do Not Carry Forward — Does not address problem/opportunity. Do not carry forward for further consideration.
Alternative #2 – Transportation Demand Management	Combine with Other — Partially addresses problem/opportunity. While not to be carried forward on its own, combine with other Alternative Solutions (Alt #4 and #5). This would include the incorporation of active transportation facilities as part of other roadway improvements where deemed desirable and feasible.
Alternative #3 - Improve Other Road Corridors (Hunter Road or Roberts Road)	Do Not Carry Forward — Does not fully address problem/opportunity. Do not carry forward for further consideration.
Alternative #4 – Roadway Operation Improvements	Combine with Other — Partially addresses problem/ opportunity. While not to be carried forward on its own, combine with other Alternative Solutions (Alt #2 and #5). Potential for natural environment and socio-economic impacts to be addressed through Alternative Designs.

Alternative Solution	Evaluation Summary
Alternative #5 – Additional Roadway Lanes	Combine with Other Partially addresses problem/opportunity. While not to be carried forward on its own, combine with other Alternative Solutions (Alt # 2 and #4). Potential for natural environment and socio-economic impacts to be addressed through Alternative Designs.

Considering the results of the Alternative Solutions evaluation, it was determined that the preferred solution would include a combination of TDM measures, roadway operations improvements and additional roadway lanes. Alternative Designs were developed for this preferred solution as presented in the next section (**Section 7**) of this ESR.

7.0 Alternative Designs

7.1 Approach to Alternative Designs Development and Evaluation

As previously described in **Section 6.0** of this ESR, the preferred alternative solution was rationalized to include:

- Casablanca Boulevard/ South Service Road widening and intersection improvements;
- Partial extension of Livingston Avenue;
- Improvements to the Casablanca Boulevard/QEW interchange; and
- New active transportation facilities.

This section describes the alternative methods or Alternative Designs that were developed and evaluated to select the preferred design for the undertaking. The Alternative Designs represent alternative methods of implementing the preferred solution, including for example various roadway configuration and location options for the proposed improvements. In addition to considering roadway configurations, the Study also considered alternative methods to manage stormwater run-off.

Alternative Designs were developed considering a range of factors, including: the identified problems and opportunities described in **Section 2.4**, baseline conditions in the Study Area, design issues and constraints associated with the preferred alternative solution, and public and stakeholder feedback received during the consultation process. Alternative Designs were developed for each of the following project components:

- Casablanca Boulevard/QEW interchange;
- Casablanca Boulevard – Intersections;
- South Service Road Improvements;
- Casablanca Boulevard – Roadway Widening and Drainage;
- Livingston Avenue Partial Extension;
- Casablanca Boulevard – Stormwater Management; and
- Casablanca Boulevard – Rail Crossing

Once developed, the design alternatives were assessed and compared against a comprehensive set of evaluation criteria organized on the basis of the following criteria groups:

- Transportation;
- Engineering;
- Cultural Environment;
- Socio-economic Environment;
- Natural Environment; and
- Cost.

The evaluation criteria groupings used are similar to those used in the evaluation of Alternative Solutions, as described in **Section 6.0**. Some adjustments were made to the criteria to reflect the Alternative Designs and their potential impacts. No ranking or weighting of the criteria were undertaken. In rationalizing the differences among the alternatives, the magnitude of the impact/benefit was considered as well as the availability of impact management measures to reduce the significance of negative effects. The evaluation criteria are presented in the assessment tables/matrices below.

7.2 Casablanca Boulevard/QEW Interchange

7.2.1 Alternative Designs

As previously described in **Section 5**, there is a need to improve vehicle capacity at the Casablanca Boulevard/QEW interchange to meet future vehicle travel demands. Initially four alternative interchange designs were considered as follows:

- **Base Plus Active Transportation (A/T) Facilities**, involving the provision of a cycling lanes and sidewalks through the interchange. The road lanes would be narrowed (3.5 m) to accommodate this. No other major changes to the interchange would be made;
- **Improved Parclo A4 Interchange,** involving the realignment of the ramps and providing signals at the ramp terminals, in addition to the addition of road lanes and active transportation facilities;
- **Diverging Diamond Interchange (DDI)**, which would involve redesigning the interchange to a diverging diamond concept that would require significant modifications to the road lane arrangements, and the on- and off-ramps in both directions. Signals at each of the two cross-over points will be required; and
- **Straight Diamond**, which would replace the current Parclo design with a straight diamond design. It is expected that some amount of the existing ramps could be utilized.

It was the intent that none of the alternatives would require major modifications to the current QEW bridge structure, as this would add additional cost and timing for implementation. A structural study was undertaken to determine if the Alternative Designs, in particular the Diverging Diamond concept, could be supported without major bridge reconstruction. This analysis confirmed that all of the Alternative Designs could be supported (see report in **Appendix I**).

An initial review/screening of the designs was undertaken to assess the transportation performance of these Alternative Designs. The alternative **Base Plus A/T Facilities** would not accommodate future projected traffic demands at the interchange to the same degree as the other Alternative Designs. In both the AM and PM, westbound ramp queue length is shown to be in the range of 500 m. For this reason, this alternative was not considered further.

It was also determined through this screening that the **Straight Diamond Design** is not viable since the QEW underpass structure is not wide enough to accommodate northbound and southbound left-turn lanes (S-W and N-E movements, respectively), and therefore these left-turns would occur from a shared through lane. Without a dedicated left-turn lane and a left-turn traffic signal phase, there is not sufficient capacity to accommodate left-turning vehicles. Queues from vehicles attempting to turn left were shown to negatively affect adjacent intersections.

As a result of this initial screening, two design alternatives were developed for the improvement of the Casablanca Boulevard/QEW interchange, namely **Alternative A** – **Improved Parclo A4 Interchange** and **Alternative B - Diverging Diamond Interchange**. Also considered in the development of interchange Alternative Designs was the potential to improve active transportation facilities across the bridge structure and to integrate these facilities with the future GO Transit Station. These improvements are described below.

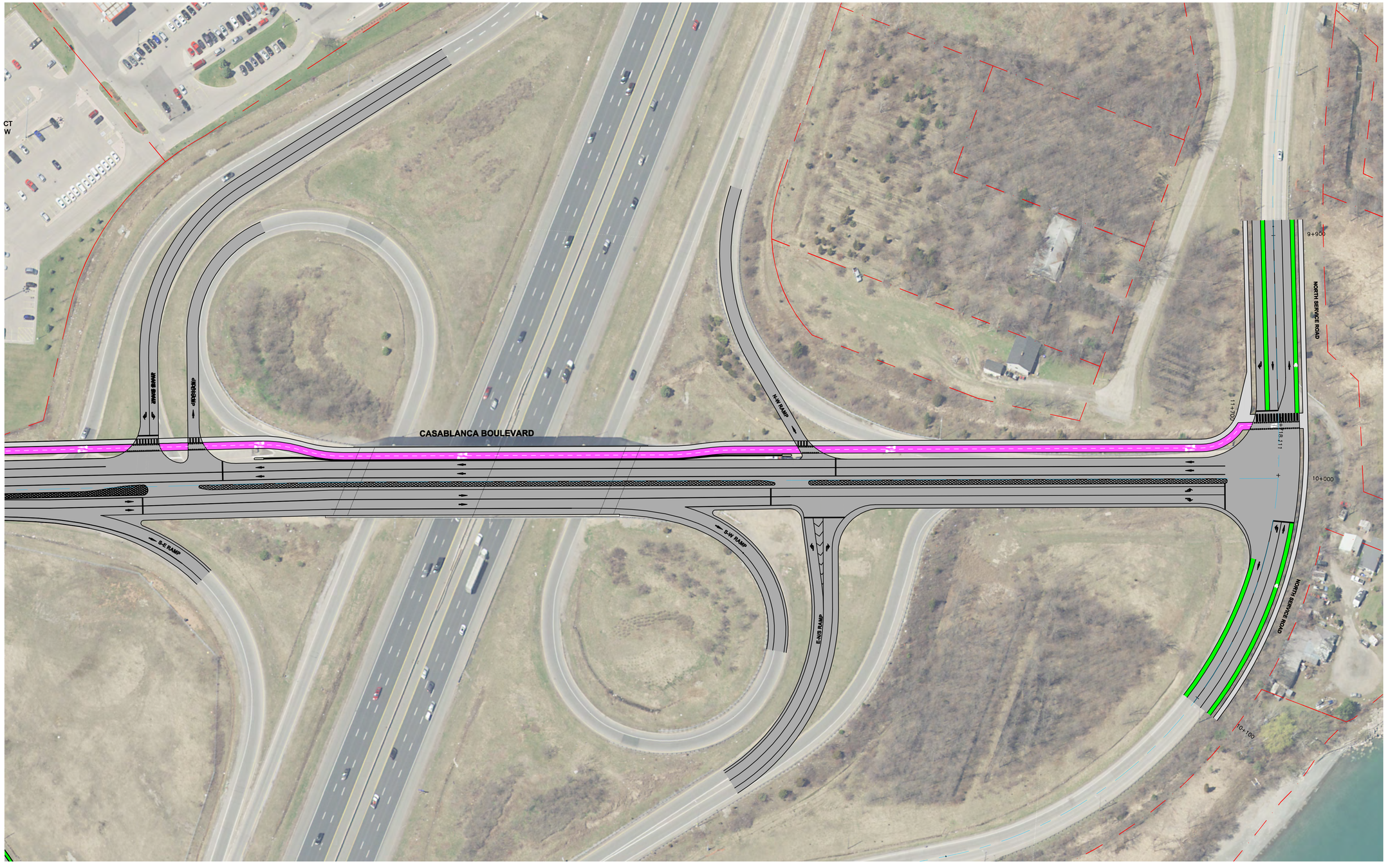
7.2.1.1 Alternative A – Improved Parclo A4 Interchange

The current interchange configuration includes two ramps respectively for the east and west bound incoming traffic from the QEW to Casablanca, one requiring right turns and the other requiring left-turns governed by yield signs. The key changes to this configuration would be the consolidation of the ramps to bring together the off- and on- ramps for each direction and to terminate these ramps at a signalized intersection.

This design alternative would also include the provision of new sidewalk/bicycling lane through the interchange. Various configurations were considered for this including:

- The placement of a sidewalk and on-street bicycle lane on each side of the bridge;
- The development of a centre median for the development of a multi-use path (MUP); and
- The development of a west-side MUP.

Through consideration of the available space over the bridge structure, safety considerations, and active transportation needs of the area, as well as consultation with MTO, the proposed active transportation facility design for the Improved Parclo A4 Interchange design was identified to be the development of a west-side MUP. This includes the development on the west side of the bridge of a protected MUP, consisting of a pedestrian pathway or sidewalk adjacent to a two-way bike path that is separated from the road lanes with a physical barrier. The specifics of the MUP configuration will be determined through the Detailed Design process with consideration for drainage, pedestrian and traffic safety and the adequacy of the underpass structure to support any additional loads. The ramps on the west side of the bridge would be normalized to as close to a 90 degree intersection as possible, providing signalized crossings for pedestrians and cyclists utilizing the MUP. **Figure 7-1** presents this design.



CASABLANCA INTERCHANGE

NO.	REVISION	DATE	INIT.
0	ISSUED FOR	YYYY-MM-DD	XXX

NOTES/LEGEND

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DRAFTING	SMP
DESIGN	SMP
CHECKED BY	SMP
APPROVED BY	PAM

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CASABLANCA INTERCHANGE
PARCLO A4 - NORMALIZED OPTION

CONSULTANT FILE No.	18-7650
DATE	2018-12-20
SCALE	NTS
REF. No.	#
DWG No.	**FIGURE 7-1**
REV.	**0**

DRAWING FILE: C:\projectwise\working directory\projects 2018\20gcc\dms39813\187650-D-Parclo A4 - Normalized Option.dwg PLOTTED: Dec 20, 2018 - 11:30am PLOTTED BY: 20gcc

7.2.1.2 Alternative B - Diverging Diamond Interchange

The Diverging Diamond Interchange (DDI) is a design that would eliminate the need for left-turns against traffic by the roadway lanes temporarily crossing the north and southbound lanes at controlled intersections (2). This configuration would allow the Casablanca Boulevard roadway to capture all of the incoming north and south bound traffic on a single passage while also allowing access to the QEW in the same manner. Pedestrian and cycling facilities would be accommodated through the placement of a multi-use path (MUP) through a centre median that would be protected from the road lanes with a physical barrier. The DDI has the benefit of not requiring low angle freeway ramp entrances, and thus improves safety for pedestrians and cyclists crossing the interchange. There would also be the potential to improve the character of the centre median with lighting and surface material selection. This alternative is illustrated in **Figure 7-2**.

CASABLANCA INTERCHANGE

10m 0 20m
Horizontal

NO.	REVISION	DATE	INIT.
0	ISSUED FOR	YYYY-MM-DD	XXX

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DRAFTING SMP
DESIGN SMP
CHECKED BY DPM
APPROVED BY PAM

Niagara Region PUBLIC WORKS

DILLON CONSULTING

CASABLANCA INTERCHANGE
DIVERGING DIAMOND
TOWN OF GRIMSBY

CONSULTANT FILE No. 18-7650
DATE 2019-02-25
SCALE AS SHOWN
REF. No. #
DWG No. FIGURE 7-2
REV. 0

DRAWING FILE: C:\projectwise\working directory\projects 2018\20gcc\dms73795\187650 – Diverging Diamond Interchange (ESR).dwg PLOTTED: Feb 25, 2019 – 9:26am PLOTTED BY: 20gcc

7.2.2 Alternative Designs Evaluation and Selection of Preferred Design

The following presents the evaluation of the Alternative Designs for the Casablanca Boulevard/QEW Interchange, and provides rationale for the selection of the preferred alternative.

The evaluation of the two Alternative Designs for the Casablanca Boulevard/QEW Interchange described in **Section 7.2.1** was based on a set of evaluation criteria structured around five main criteria groupings as shown in **Table 7-1**.

Table 7-1 Alternative Solutions Evaluation Criteria

Criteria Group	Criteria
Transportation	Ability to address existing and future traffic operations deficiencies.
	Ability to address identified access needs/deficiencies.
	Ability to address vehicle safety issues.
	Ability to provide safe access to driveways and properties along the corridor.
	Ability to provide safe, connected, effective, attractive and convenient cycling and pedestrian environment.
	Alignment with the Region's Transportation Master Plan and Strategic Cycling Network
	Ability to accommodate accessibility requirements along the corridor (e.g. AODA requirements).
Natural Environment	Vegetation and Wildlife: Potential for disturbance to /impact on function of adjacent terrestrial habitat.
	Aquatic Habitat: Potential for loss and/or degradation of aquatic habitat.
	Species at Risk: Potential for impact to SAR and/or their habitat.
Engineering/Road Design	Services/Utilities: Potential to impact to services or utilities in the corridor (e.g. water, sanitary, electrical, communications).
	Construction Staging: Potential for impact to traffic operations during construction.
	Implementation Timing
	(approvals, design and construction)
	Stormwater Management: Potential for impact on SWM infrastructure and potential for increased run-off and flooding.
Socio-economic Environment	Potential for loss of residential/business property.
	Potential for disruption to business activity and increased general travel times during construction.

Criteria Group	Criteria
Cultural Environment	Potential for lifestyle disruption effects to residents, such as noise or visual impacts.
	Potential to enhance street corridor character.
	Potential for loss of agricultural land.
	Potential for loss of residential/business property.
	Archaeological Resources: Potential for impact to registered archaeological sites and areas of archaeological potential.
	Built Heritage Resources: Potential to impact registered cultural heritage properties and properties of cultural interest.
	Potential for improved street corridor character
Implementation - Approval	Confirmation of Approval from MTO as Approval Agency
Cost	Relative capital cost estimate

A summary of the evaluation is provided below, and summarized in **Table 7-2**. The complete evaluation is provided in **Appendix J** (Table 1).

Based on the Transportation criteria evaluation, both alternatives have the ability to process/accommodate future traffic demand and provide safe and convenient A/T facilities. The provision of signalized crossings where the MUP crosses ramps in Alternative A provides for additional A/T user safety. With Alternative B, some cyclists may feel that the centre median path is less direct and would take longer to cross, and so may choose to ride along the edge of the road lane. Measures (e.g. signage) would likely be required to minimize this. Neither alternative has the potential to impact the natural environment, as the lands in the vicinity of the interchange do not contain significant/sensitive natural habitat.

With respect to socio-economic considerations, with Alternative A, some traffic delays would be expected to occur during construction, particularly along Casablanca Boulevard and Interchange ramps. Some short-term ramp closures would be required. It is expected that travel along Casablanca Boulevard could be largely maintained, with minimal delays. Delays for Alternative A would be less than those for Alternative B, as the construction period for Alternative A would be shorter. Some impacts including potential detours for Emergency Management Services (EMS) are possible during construction of Alternative A.

For Alternative B, ramp closures for a longer period of time would be required; one loop ramp would likely require closure for a full construction season. Casablanca Boulevard would likely require closure (e.g. for a one-month period). Traffic delays during construction could negatively

impact businesses/travellers in the vicinity of the project (e.g. along South Service Road), as road users seek alternative routes during construction if delays are significant. This alternative may result in increased traffic impacts to adjacent QEW interchanges during closures. There is the potential for greater impacts to Emergency Management Services (EMS). As well, businesses may find difficulty in attracting these customers back after construction is over. Local residents would experience delays in travelling to/from their homes in the area for as much as 12 months.

Based on preliminary construction staging assessments, while the Alternative B construction process could be manageable and the schedule achievable, it would require more significant (more and longer) QEW ramp closures (more and longer) which would require traffic diversion to adjacent interchanges. There could therefore be impacts/improvement needs at these other interchanges. Alternative B would take a longer time period to construct, with more complex construction required, creating an additional scheduling risk.

The cost of Alternative B was estimated to be more than double the cost of Alternative A. Alternative B could also have a slightly higher operation and maintenance cost, depending on the configuration of the centre median MUP. It is expected that the total cost for Alternative A could be covered through Development Charges, while by comparison, approximately 50-70% of the cost of Alternative B could be covered through development charges.

As the Casablanca Boulevard/QEW interchange is under MTO jurisdiction, continuous consultation was undertaken with the agency throughout the evaluation process for the Alternative Designs. The trade-offs between the alternatives was reviewed and discussed at length with MTO Staff and Senior Management. MTO feedback indicated that Alternative B would not be favoured due to considerations related to fit with the rest of the transportation system and operability concerns. There was support for the concept presented for Alternative A, with the expectation that the design would be further refined through the Detailed Design process.

Overall Comparison

Table 7-2 below provides a summary of the trade-offs between these two Alternative Designs. Neither of the alternatives would result in significant Natural Environment or Cultural Resources impacts.

In regards to Transportation considerations, both alternatives could accommodate projected future traffic demands on the interchange and would provide acceptable traffic operations level of service (LOS). Both alternatives employ an MUP, offering a safe, comfortable environment for cyclists and pedestrians, which could be made into a more attractive facility for crossing the structure. Alternative A offers more protection of A/T users crossing active ramps with signalized control of ramps intersecting with the MUP on the west side of the bridge. Both alternatives also meet the Region's and Town's policies (discussed in **Section 3**) of providing active transportation connections to complete the cycling network over the QEW to the North Service

Road and accommodate a range of users by providing sidewalks and on-road and off-road options for cyclists. .

There are some disadvantages with Alternative B including higher cost (more than twice the cost of Alternative A). More significantly, based on a preliminary construction staging assessment, Alternative B would require a longer construction implementation period. There is some resulting uncertainty and schedule risk as to whether it can be implemented in one construction season. The traffic delays could impact local area businesses as people may go elsewhere during the construction period. As well, there could be the need for diversion of traffic to other QEW interchanges during part of the construction period which could require improvements to those nearby interchanges and put pressure on local road networks.

Both alternatives would serve long term traffic demands and would not result in natural heritage or cultural heritage impacts. Neither alternative would require additional lands.

Given the MTO feedback as the Approval Authority indicating a preference for Alternative A, as well as the lower cost of this alternative and shorter construction period, it was determined that the preferred design is Alternative A – Improved Parclo A4 Interchange.

Table 7-2 QEW/Casablanca Interchange Alternative Designs Evaluation Summary

Criteria Group	Alternative A – Improved Parclo A4 Interchange	Alternative B - Diverging Diamond Interchange (DDI)
Transportation	Preferred	Preferred
Natural Environment		
Socio-Economic	Preferred	Less Preferred

Criteria Group	Alternative A – Improved Parclo A4 Interchange	Alternative B - Diverging Diamond Interchange (DDI)
Cultural Environment	Equal	
Engineering/Road Design	Preferred	Less Preferred
Cost	Preferred	Less Preferred
Implementation - Approval	Preferred	Less Preferred
OVERALL SUMMARY	Preferred	Less Preferred

7.3 Casablanca Boulevard Intersections Assessment

Considering the operating performance of the Casablanca Boulevard intersections (see **Section 5.3**) and results of the traffic forecasting work (see **Section 5.4**), an assessment was made of the potential to develop roundabouts at the main Casablanca Boulevard intersections including:

- North Service Road;
- South service Road;
- Livingston Ave; and
- Main Street West.

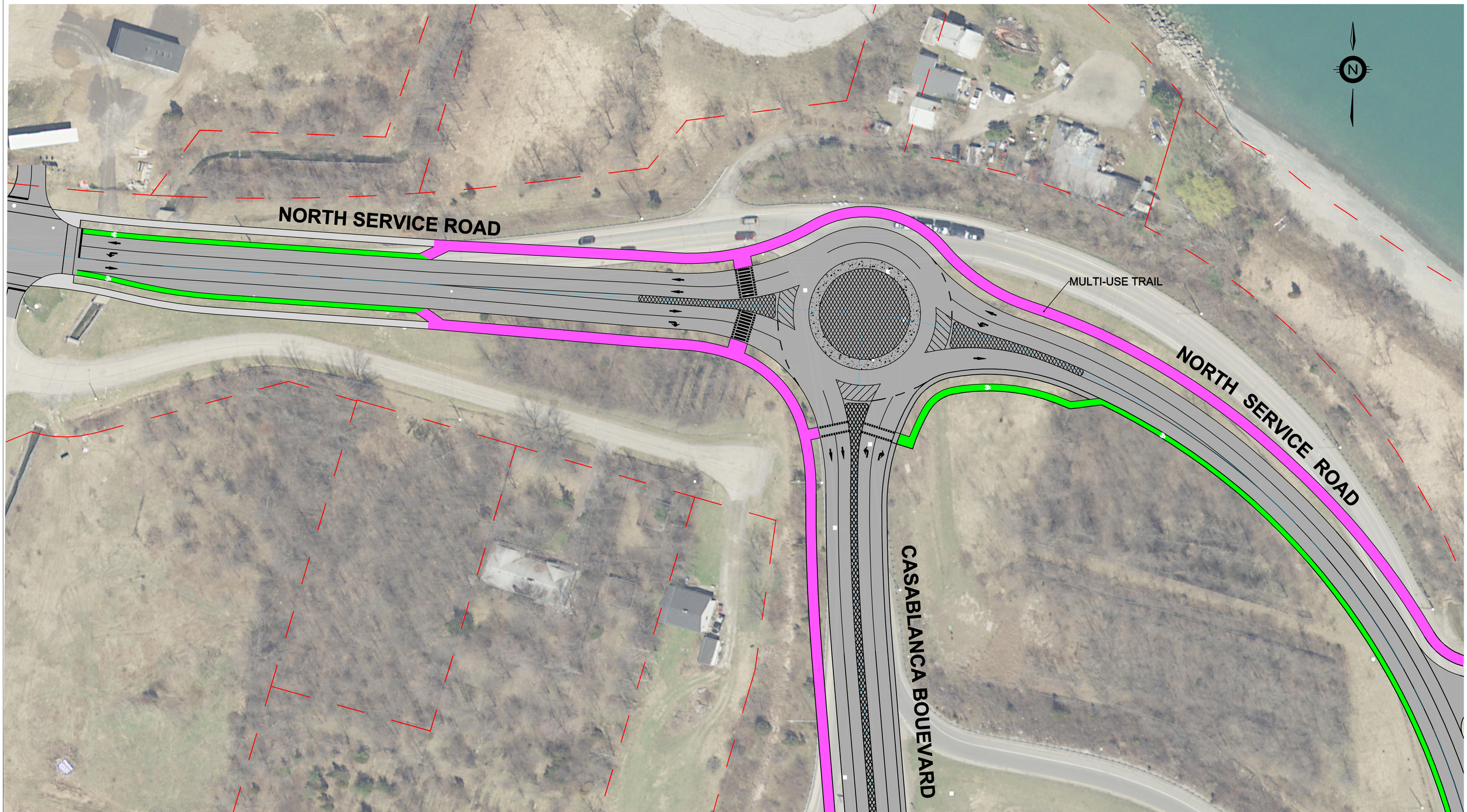
An assessment completed for each of these intersections was completed as an initial screening to first determine if it would be feasible to develop roundabouts at these intersections. If feasibility was determined to be possible, then a more detailed evaluation would be undertaken. The results of this screening/assessment are described in the sub-sections below:

North Service Road/Casablanca Boulevard

The North Service Road at Casablanca Boulevard was recently signalized in 2018 by the Town of Grimsby. The option of revising the signalized intersection to a multi-lane roundabout was reviewed as part of this Study (see **Figure 7-3**), but screened out for the following reasons:

- Restricts property owners access on the north side as well as the entrance to the beach to a right-in right-out movement;
- Encroachment into development lands in the south-west quadrant.
- Reduces left-turn storage into newly developed condominium complex;
- Reduction in separation from north ramp terminals to the intersection/roundabout which would increase concerns with traffic weaving;
- Active transportation safety concerns at pedestrian and bicycle crossings;
- Removal of forested land in the south-east quadrant (along south side of the North Service Road); and
- Costly road work to an area recently reconstructed and widened for the installation of the new signals.

Considering the above, it is recommended that the intersection remain signalized but with an additional through lane in each direction on Casablanca Boulevard.



NORTH SERVICE ROAD ROUNDABOUT

5m 0 10m
Horizontal

NO.	REVISION	DATE	INIT.
0	ISSUED FOR	YYYY-MM-DD	XXX

NOTES/LEGEND

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DRAFTING	SMP
DESIGN	SMP
CHECKED BY	DPM
APPROVED BY	PAM

Niagara Region
PUBLIC WORKS

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NORTH SERVICE ROAD ROUNDABOUT
OWNERSHIP LIMITS
TOWN OF GRIMSBY

CONSULTANT FILE No.	18-7650
DATE	2018-11-30
SCALE	AS SHOWN
REF. No.	#
DWG No.	**FIGURE 7-3**
REV.	0

DRAWING FILE: C:\projectwise\working directory\projects 2018\20smp\dms49850\187650-D-Roundabout at North Service Road.dwg.dwg PLOTTED: Nov 30, 2018 - 5:06pm PLOTTED BY: 20smp

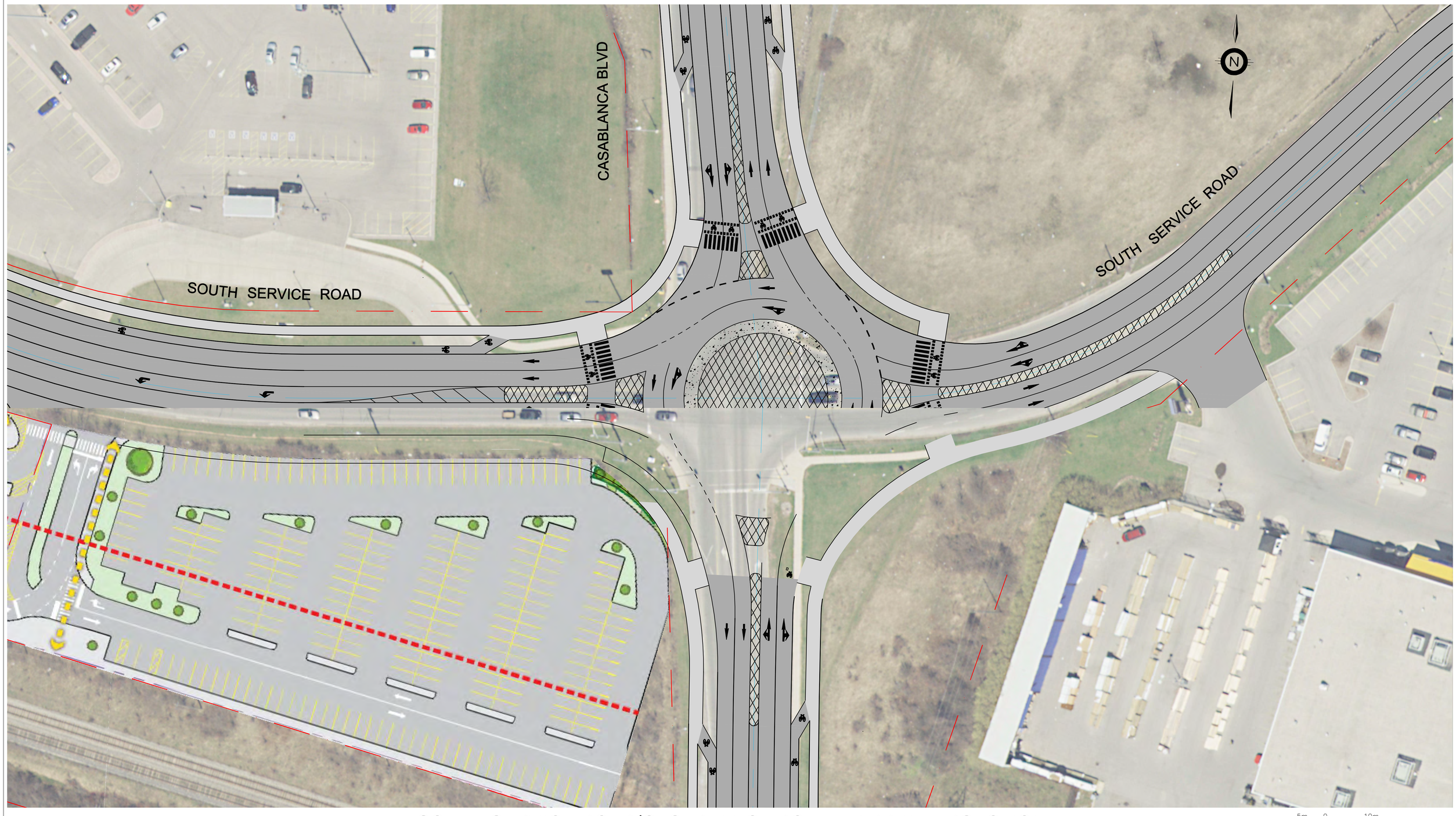
South Service Road/Casablanca Boulevard

Recommendations from the traffic assessment for the Study Area (see **Section 5.3**) identified the need to improve roadway capacity, via additional through lanes and turning lanes, at this signalized intersection. A multi-lane roundabout alternative was reviewed (see **Figure 7-4**) but screened out for the following reasons:

- The likelihood for low motorist comfort/familiarity with a busy multi-lane roundabout potentially compromising its ability to function adequately;
- Inability to control southbound movement during train delays which may cause queuing into the roundabout thus affecting the overall performance of the intersection;
- Inability to coordinate traffic flow with adjacent signalized intersections which may cause network traffic issues; and
- Active transportation safety concerns at pedestrian and bicycle crossings.

Considering the above, and is recommended that the intersection remain signalized but with the following improvements:

- Two southbound lanes north of South Service Road with a third southbound lane on the north side becoming a right turn lane
- Provide a double left-turn lane for the west-north movement to accommodate traffic from the future GO Transit Station heading to the QEW
- On the south provide two northbound lanes plus a left-turn lane to access points to the west, including the GO Transit Station
- On the east leg of the intersection provide one through lane in each direction plus a westbound left-turn lane and an eastbound right turn lane.
- The two northbound lanes continue on the north side of the intersection



SOUTH SERVICE ROAD/CASABLANCA BOULEVARD INTERSECTION

5m 0 10m
Horizontal

NO.	REVISION	DATE	INIT.
0	ISSUED FOR	YYYY-MM-DD	XXX

NOTES/LEGEND

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DESIGN	SMP
CHECKED BY	PAM
APPROVED BY	PAM

Niagara Region
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SOUTH SERVICE ROAD

TOWN OF GRIMSBY

CONSULTANT FILE No.	18-7650
DATE	YYYY-MM-DD
SCALE	AS SHOWN
REF. No.	#
DWG No.	**FIGURE 7-4**
REV.	0

DRAWING FILE: C:\projectwise\working directory\projects 2018\20gcc\dms42231\187650 - South Service Road - Roundabout - Concept 3.dwg PLOTTED: Sep 11, 2018 - 4:32pm PLOTTED BY: 20gcc

Livingston Avenue/Casablanca Boulevard

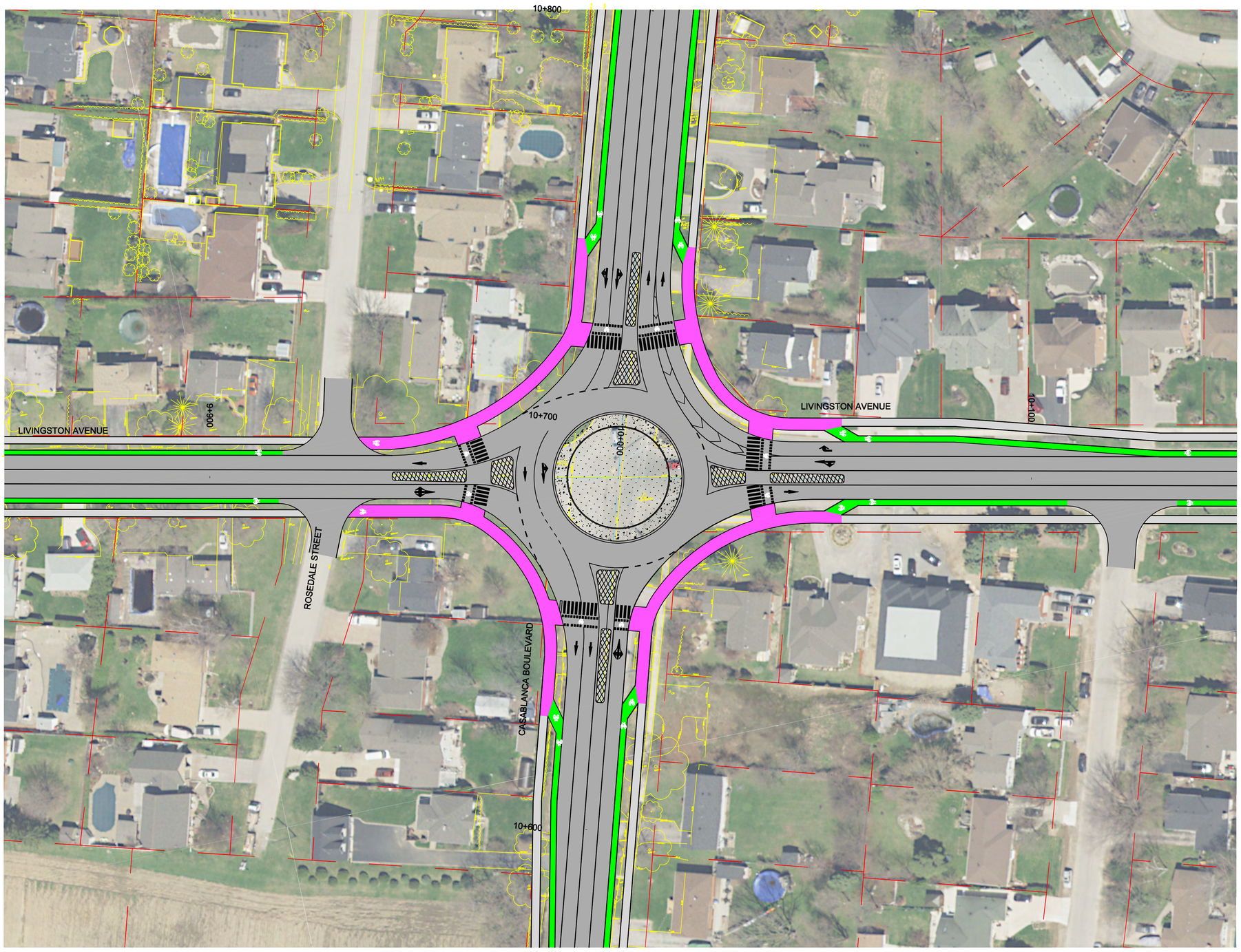
Recommendations from the traffic assessment of the Study Area (see **Section 5.3**) identify the need to improve the intersection at Casablanca Boulevard and Livingston Avenue from both a traffic and active transportation perspective.

Both signalization and roundabout options were reviewed as alternatives to meet the required improvement. A multi-lane roundabout layout was prepared as presented in **Figure 7-5**. The roundabout option was screened out from further consideration for the following reasons:

- Property impacts to the NW, NE, SW, and SE quadrants;
- Restricts property owners in the NE, NW and SE quadrant to a right-in right-out movement to gain access to and from their properties;
- Unlikely to sufficiently slow speed of westbound vehicles making a right turn from Livingston onto Casablanca northbound which is a current concern of residents in the NE quadrant under the existing right-turn channelization configuration; and
- Active transportation safety concerns at pedestrian and bicycle crossings.

Considering the above, and is recommended that the intersection be signalized and with the following improvements:

- Five-lanes on the northern leg (southbound right turn lane, southbound lane, left-turn lane two northbound lanes);
- Four-lanes on the southern leg (southbound lane, northbound left-turn lane, northbound lane, northbound through/right turn lane);
- Three-lanes on the west leg (westbound lane, eastbound left-turn lane, eastbound through/right turn lane);
- Four-lanes on the east leg (westbound right turn lane, westbound through lane, westbound left-turn lane, eastbound lane); and
- Elimination of the right turn island for westbound to northbound trips. This right turn will now take place from a separate right turn lane. This will improve conditions for northbound cyclists on Casablanca Boulevard.



LIVINGSTON AVENUE

5m 0 10m
Horizontal

NO.	REVISION	DATE	INIT.
0	ISSUED FOR	YYYY-MM-DD	XXX

NOTES/LEGEND

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DRAFTING SMP
DESIGN SMP
CHECKED BY DPM
APPROVED BY PAM

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DILLON CONSULTING

CASABLANCA / LIVINGSTON

TOWN OF GRIMSBY
INTERSECTION ALTERNATIVE - ROUNDABOUT

CONSULTANT FILE No. 18-7650
DATE 2018-12-17
SCALE AS SHOWN
REF. No. #
DWG No. **FIGURE 7-5**
REV. 0

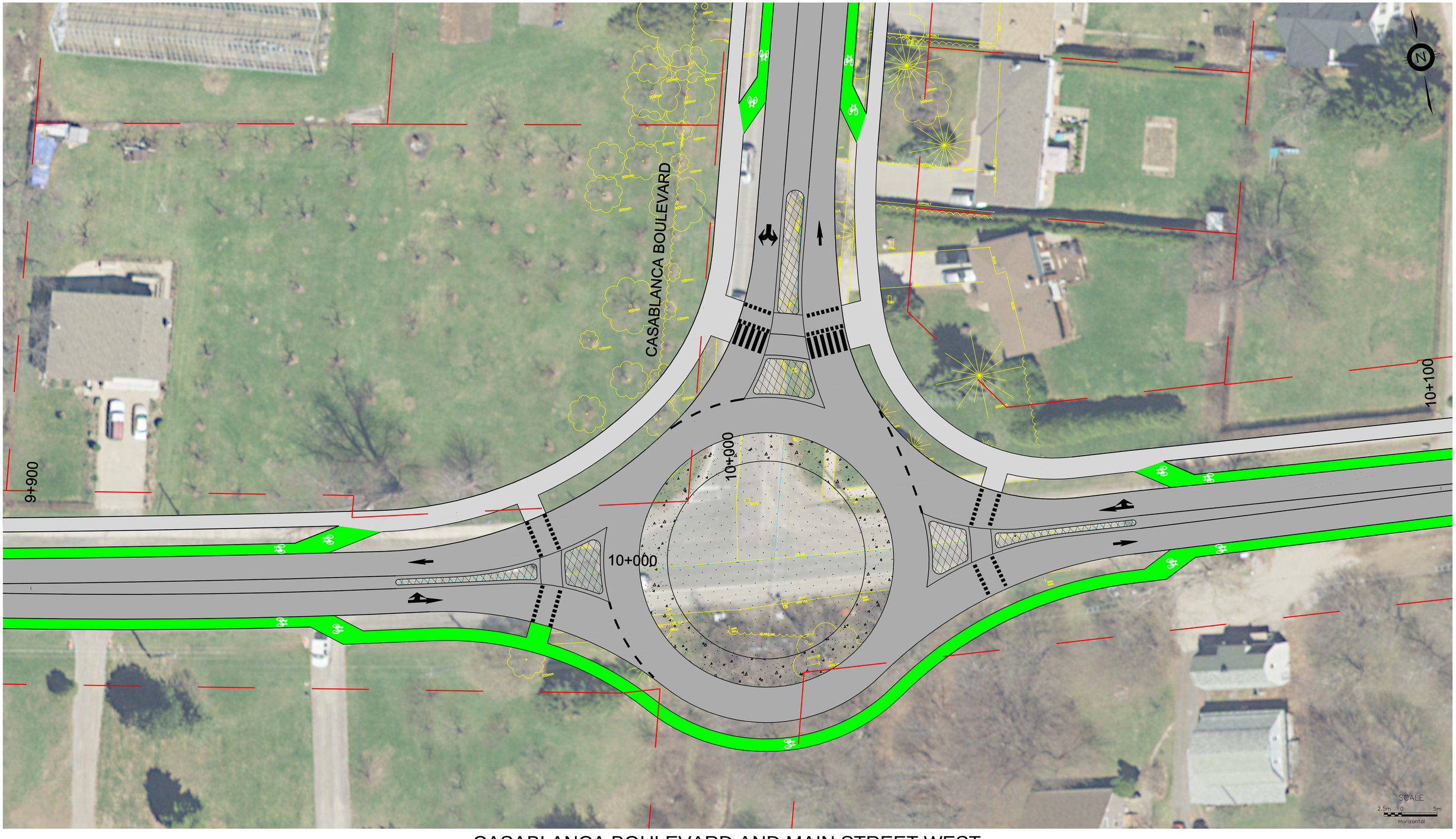
DRAWING FILE: C:\projectwise\working directory\projects 2018\20gcc\dms49850\187650 - Casablanca Livingston Intersection Roundabout.dwg PLOTTED: Dec 17, 2018 - 3:59pm PLOTTED BY: 20gcc

Main Street West/Casablanca Boulevard

Although the traffic assessment did not indicate the need for improvement at the Casablanca Boulevard/Main Street West intersection, local road users have cited difficulty in executing turning movements from Casablanca Boulevard onto Main Street during peak traffic times. As such, the provision of a roundabout was reviewed. The layout of the proposed roundabout is presented in **Figure 7-6.** While the single-lane roundabout shown would improve the existing conditions and meet future needs, it was screened out from further consideration for the following reasons:

- Property impacts within the NW, SW, and SE quadrants;
- Restricts two property owners in the NE quadrant to a right-in right-out movement to gain access to and from their properties;
- Restricts one property owner in the SW quadrant to a right-in right out movement to gain access to and from their property;
- Safety concerns of the street-side market stand operating in the NW quadrant; and
- Active transportation safety concerns at pedestrian and bicycle crossings.

Considering the above, it is recommended that the intersection be signalized with a southbound left-turn lane.



CASABLANCA BOULEVARD AND MAIN STREET WEST

NO.	REVISION	DATE	INIT.
0	ISSUED FOR	YYYY-MM-DD	XXX

NOTES/LEGEND

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DRAFTING	SMP
DESIGN	SMP
CHECKED BY	SMP
APPROVED BY	PAM

Niagara Region PUBLIC WORKS

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CASABLANCA / MAIN STREET WEST

TOWN OF GRIMSBY

INTERSECTION ALTERNATIVE - ROUNDABOUT

CONSULTANT FILE No.	18-7650
DATE	2018-10-03
SCALE	AS SHOWN
REF. No.	#
DWG No.	**FIGURE 7-6**
REV.	0

DRAWING FILE: C:\projectwise\working directory\projects 2018\20gcc\dms49850\187650 - Casablanca Main Street Intersection Roundabout.dwg PLOTTED: Oct 03, 2018 - 4:44pm PLOTTED BY: 20gcc

7.4 South Service Road Improvements

7.4.1 Alternative Designs

As previously described in **Section 5.3**, it was identified that improvements to South Service Road on the west side of Casablanca Boulevard are required to meet access demands for the future GO Transit Station that is planned for the south-west intersection quadrant of the South Service Road and Casablanca Boulevard intersection.

Two Alternative Designs were developed to meet the future access needs of the GO Transit Station, both of which involve the addition of roadway lanes. The alternatives differ in how westbound vehicles would access the rail GO Station, as follows:

1. **Alternative A – Intersection with Loop Road Access** includes development of a vehicle access road integrated with the existing GO Bus loop on the north side of the South Service Road, opposite the site of the planned GO Transit Station. This access would allow west-bound access into the GO Transit Station without requiring vehicles to make a westbound left-hand turn at the future intersection of the GO Transit Station entrance and the South Service Road. This Loop Access is illustrated in **Figure 7-7**, and is considered to be the future/long term design.
2. **Alternative B – Intersection with Left-turn Lane** includes a conventional west-bound left-turn lane and is illustrated in **Figure 7-8**, and would provide for more immediate/short term access needs to the GO Transit Station.

Both alternatives also addressed the need for improved traffic flow along the South Service Road with added left-turn lanes at commercial plaza entrances and signalization of the intersection of the South Service Road and Industrial Drive. In order to provide safe access for pedestrians and cyclists from the MTO Carpool lot/GO Bus loop on the north side of the South Service Road over to the GO Transit Station, a signal would be provided at the GO Transit Station access on South Service Road.

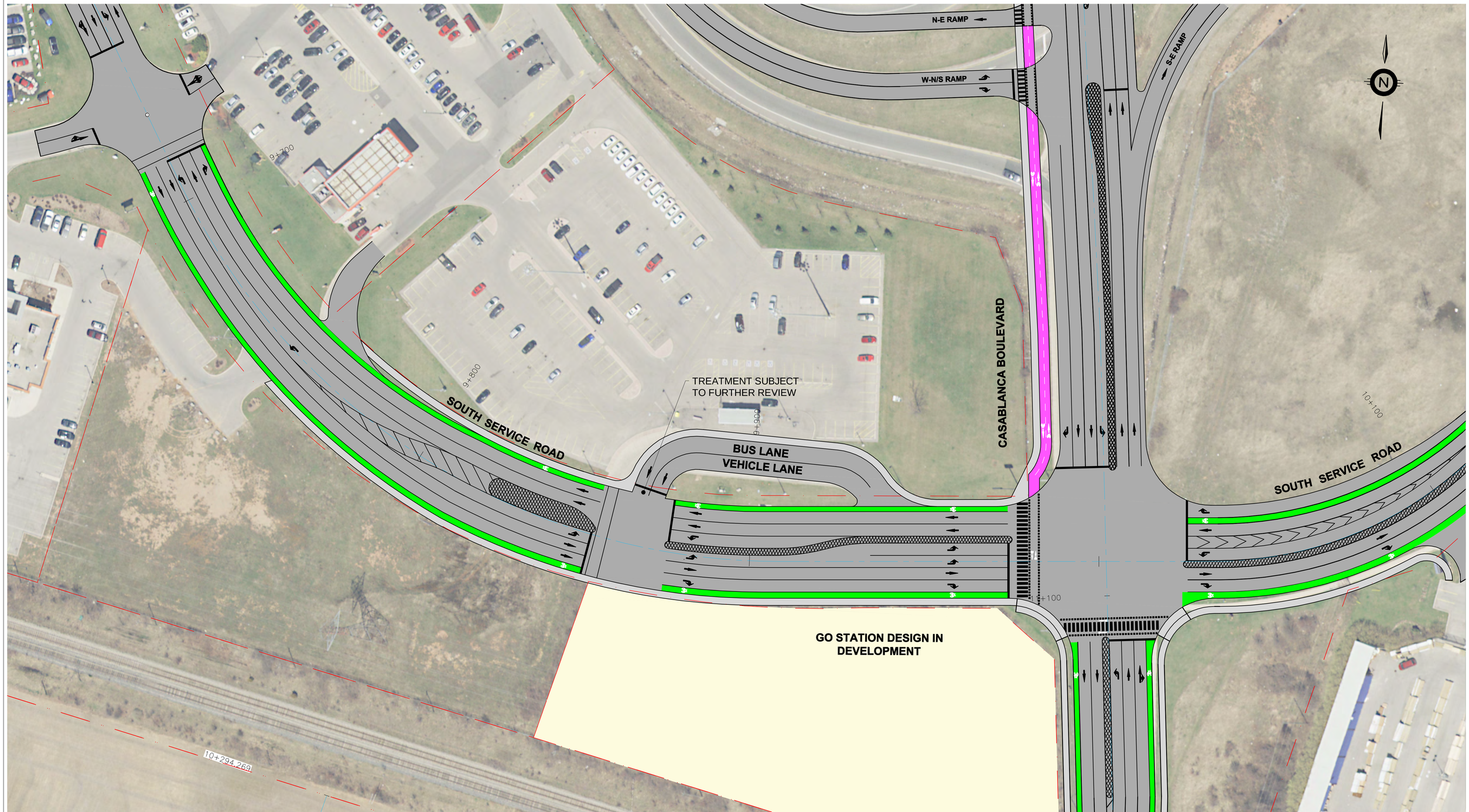
7.4.2 Alternative Designs Evaluation

The results of the evaluation of the two alternative designs on the South Service Road are presented in **Table 7-3**, with the detailed evaluation matrix provided in **Appendix J** (Table 2). Both of these alternatives would not result in impacts to natural heritage or cultural heritage features, as these features are not present on the affected lands. The key difference between these alternatives is with respect to Transportation considerations. Alternative A, which includes the Loop Access Road, is considered to be preferred as it allows for better traffic flow, has a higher level of safety, and would result in less delay for vehicles. The disadvantage of Alternative A is that as it is a less conventional design, it could be confusing for first time users accessing the Station. This would be a temporary issue.

To avoid the South Service Road sidewalk/cycling lane from having to cross the entrance of the new Loop Access Road, which would be an uncontrolled crossing, the path would need to parallel the Loop Access Road which would lengthen it. To mitigate this, pedestrians and cyclists would be encouraged to access the GO Transit Station along the south side of the South Service Road, with a pathway entrance to the Station being provided just to the west of Casablanca Boulevard.

The only other issue of note with respect to Alternative A is the potential for impact of the Loop Access Road on the MTO parking lot. As there is alignment general agreement on the goal of reducing vehicle traffic by supporting transit ridership, the use of the Loop Access Road would be permitted by MTO, with the design being developed in consultation with MTO and Metrolinx. Preliminary design shows that the Loop Access Road can be designed with minimal to no impact on the MTO parking area.

As noted above, Alternative A is considered as the preferred design. However, Alternative B could be implemented as a first stage, short-term alternative, avoiding the need for modifications to the existing bus loop.



SOUTH SERVICE ROAD/CASABLANCA BOULEVARD INTERSECTION

SCALE
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Horizontal

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NOTES/LEGEND

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DESIGN	SMP
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APPROVED BY	PAM

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SOUTH SERVICE ROAD
INTERSECTION WITH LOOP ROAD
ACCESS
ALTTERNATIVE A

CONSULTANT FILE No.	18-7650
DATE	2019-02-22
SCALE	AS SHOWN
REF. No.	#
DWG No.	7-7
REV.	0

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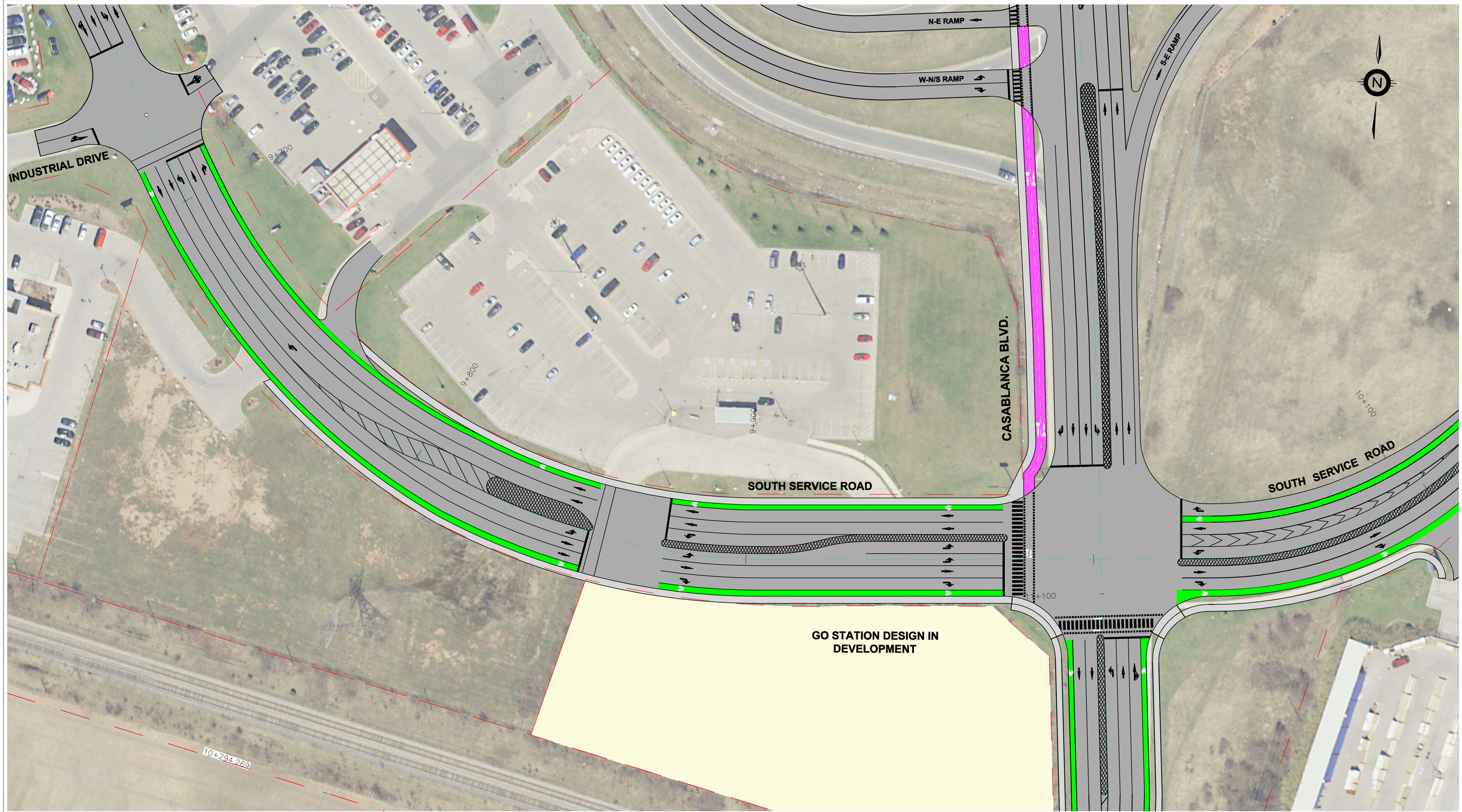

SOUTH SERVICE ROAD/CASABLANCA BOULEVARD INTERSECTION

SCALE
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SOUTH SERVICE ROAD INTERSECTION WITH LEFT ALTTERNATIVE B

CONSULTANT FILE No.	18-7650
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DWG No.	**FIGURE 7-8**
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Table 7-3 South Service Road Improvements Alternative Designs Evaluation Summary

Criteria Group	Alternative A – Intersection with Loop Access Road	Alternative B - Intersection with Westbound Left-turn
Transportation	Preferred	Less Preferred
Natural Environment	Equal	
Socio-Economic	Equal	
Cultural Environment	Equal	
Engineering/Road Design	Equal	
Cost	Less Preferred	Preferred
Implementation - Approval	Preferred	Less Preferred

Criteria Group	Alternative A – Intersection with Loop Access Road	Alternative B - Intersection with Westbound Left-turn
OVERALL SUMMARY	Preferred	Less Preferred

7.5 Casablanca Boulevard – Roadway Widening & Drainage

7.5.1 Alternative Designs

This report section describes the Alternative Designs that were developed and assessed for the planned improvements to Casablanca Boulevard. Based on the traffic forecasting work as described previously in **Section 5.3** of this ESR, it was determined that an additional roadway lane in each direction would be required between the South Service Road and Livingston Avenue. It was further determined that these additional lanes could be accommodated within the existing roadway rights-of way. South of Livingston Avenue, while additional travel lanes were not determined to be necessary, the provision of a two-way centre turn lane would be beneficial to the many residents of the many residential properties that are located along the corridor, considering that traffic volumes are projected to increase in the future along this roadway section. This centre turn lane would provide safer and more convenient access to these driveways, notably on the east side. In addition, improved A/T facilities were integrated into the Alternative Designs (sidewalks and cycling lanes).

Alternative Designs were not developed for the required additional roadway lanes. The lane configuration and positioning was optimized to consider the available space in the Right-of-Way and to minimize widening to the east side of the corridor as much as possible, as this is where most of the residential properties are located. Although only very limited private land is required to accommodate the improvements, the addition of the roadways lanes would reduce the “front yard”/drive way length (that are partially located on the Regional Road Right-of-Way) of many residential properties.

In combination with the additional roadway lanes, also considered was the potential to provide improved active transportation facilities through the corridor, in line with Regional and Town plans and policies for the Study Area (as discussed in **Section 3.0** of this ESR). Various configurations were considered including:

- Sidewalk and on-road cycling lanes on both sides of the street;
- Sidewalk on the east side of the street and on-road cycling lanes on both sides of the street; and

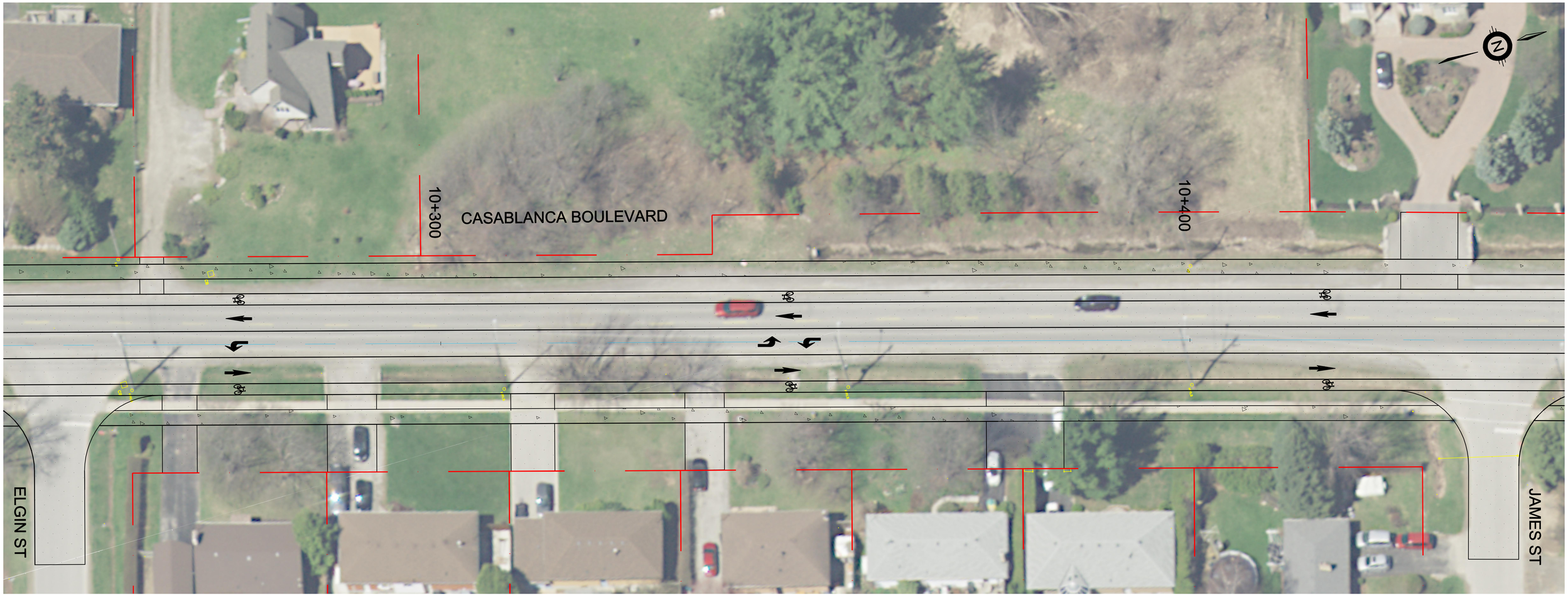
- Sidewalk on the east side of the street and multi-use path on the west side of the street.

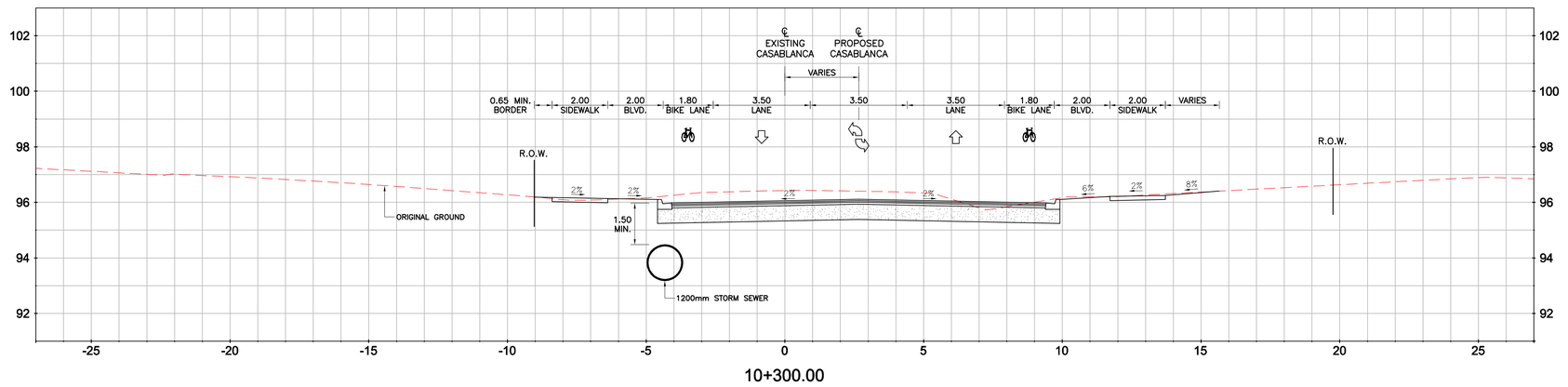
After consideration of available Right-of-Way space, expected use of the A/T facilities, continuity with other A/T facilities in the area, the presence of the majority of the residential properties on the east side of the roadway, and the planned GO Transit Station on the west side, it was determined that the preferred configuration of the A/T facilities on Casablanca Boulevard would be sidewalks and cycling lanes on both sides of the street, in line with the Region's Complete Streets Guidelines and with a view to providing continuity of the A/T network along Regional Roads.

Considering the recommended road lane and preferred A/T facility concept, Alternative Designs were then developed and assessed in regards to the collection of storm run-off from the corridor. Surface water drainage along Casablanca Boulevard is facilitated by a system of open drainage ditches, as discussed in **Section 4.3**. Considering this context, two Casablanca Boulevard widening Alternative Designs were developed:

1. **Alternative A - Urbanized Cross-Section** which would involve the replacement of the existing roadside drainage ditches with a buried storm sewer. With this option the road area would be "lowered" and adjacent properties graded so that run-off from adjacent lands would be directed to the new roadway catch basins.
2. **Alternative B - Maintain Rural Cross-Section** with a road ditch along the west side of the roadway that receives roadway surface flows. Under this design the road surface remains elevated compared to the surrounding lands.

The two concepts are illustrated in **Figures 7-9 and 7-10.**





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URBAN CROSS SECTION

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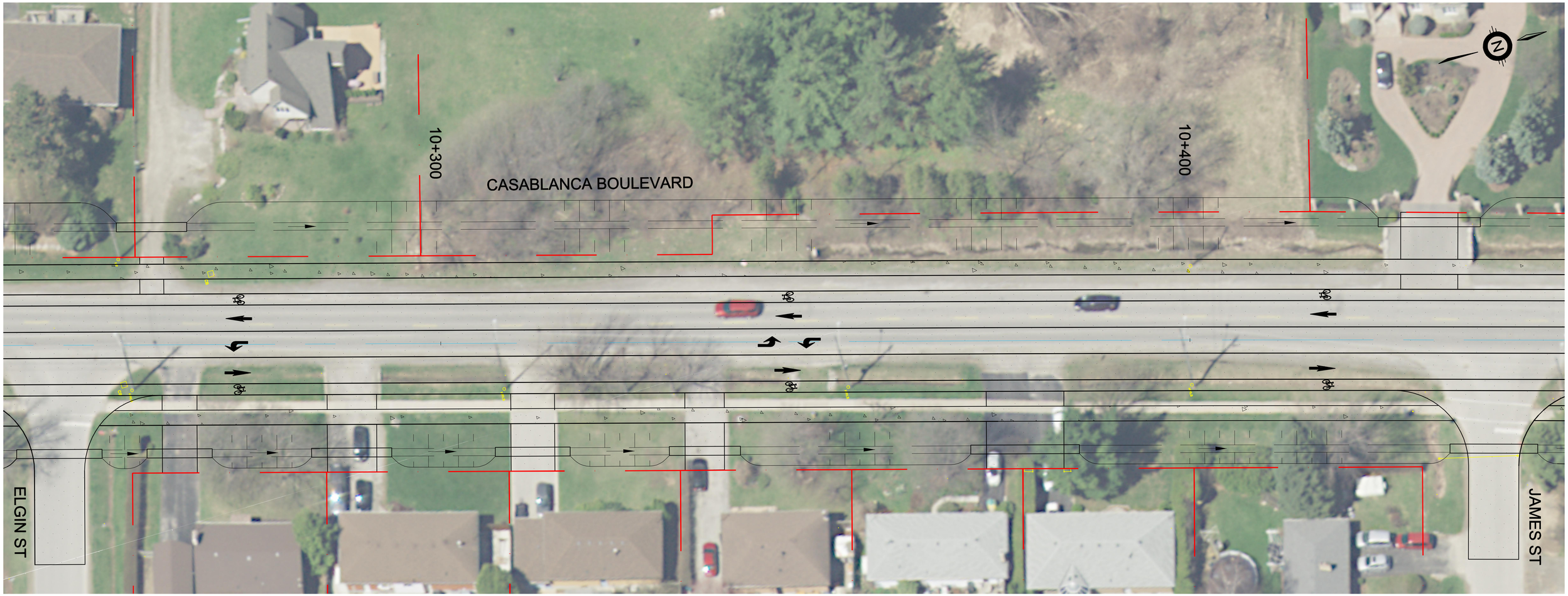

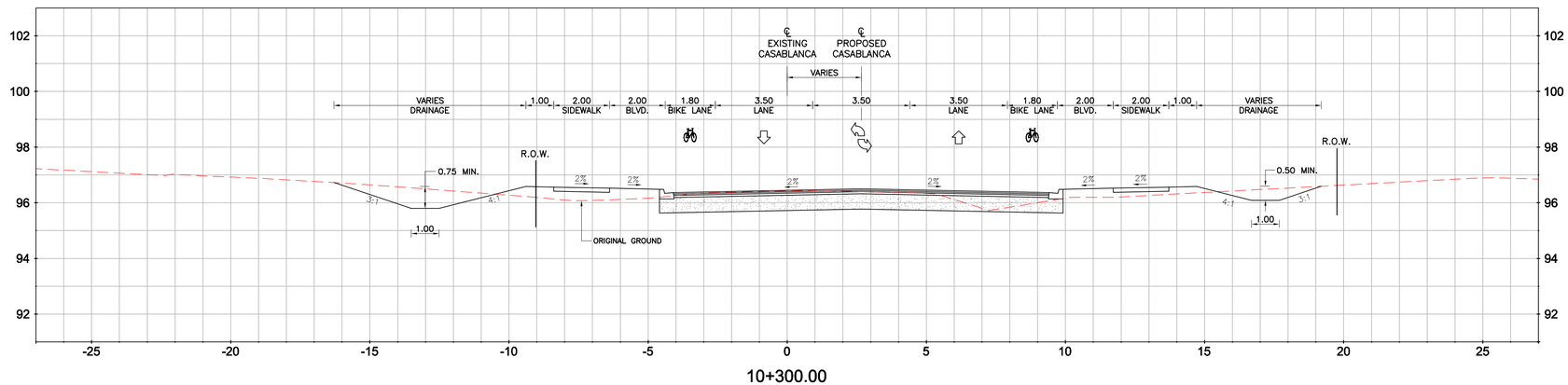

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TOWN OF GRIMSBY
RURAL CROSS SECTION

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REV.	0

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7.5.2 Alternative Designs Evaluation

The two Casablanca Boulevard Alternative Designs were assessed and evaluated. The detailed evaluation of the Alternative Designs is provided in **Appendix J** (Table 3). A summary of the assessment is presented in **Table 7-4**.

From a Transportation perspective, there is no notable difference between these alternatives. Both alternatives can meet future transportation demands. The main benefits of Alternative A (with a storm sewer) are with respect to lower/lessened impacts on natural heritage features, archaeological resource areas, agricultural land, and residential property. Alternative A also better facilitates meeting complete street objectives including the provision of active transportation facilities within the Regional Road Right-of-Way, as it provides greater flexibility in the configuration of the A/T facilities. The main benefit of Alternative B is that the maintenance of a storm ditch provides better water quality control (through infiltration) and would be less expensive to implement. It is anticipated that stormwater management objectives can still be met through Alternative A as both options would still require a downstream SWM facility. However, maintaining the ditch option in Alternative B would involve the requirement to widen the road allowance to accommodate the new ditch, significantly affecting adjacent properties.

Considering the above comparison of the two alternatives, Alternative A (Urbanized Cross-Section) was selected as the preferred alternative.

Table 7-4 Casablanca Boulevard Widening and Drainage Alternative Designs Evaluation Summary

Criteria Group	Alternative A - Urbanized Cross-Section	Alternative B - Maintain Rural Cross-Section
Transportation	Preferred	Less Preferred
Natural Environment	Preferred	Less Preferred
Socio-Economic	Preferred	Less Preferred

Criteria Group	Alternative A - Urbanized Cross-Section	Alternative B - Maintain Rural Cross-Section
Cultural Environment	Preferred	Less Preferred
Engineering/Road Design	Preferred	Less Preferred
Cost	Less Preferred	Preferred
Implementation - Approval	Preferred	Preferred
OVERALL SUMMARY	Preferred	Less Preferred

7.6 Stormwater Management

Considering the previous recommendation to widening Casablanca Boulevard with a new storm sewer within the corridor, the following describes the development and evaluation of alternative stormwater management (SWM) systems for the corridor. The results of this work are described in detail in a Technical Memo that is available in **Appendix D.**

7.6.1 Alternative Designs

Based on the key drivers identified for the Study Area, four stormwater management alternatives were developed, as follows:

1. **Alternative A – Conveyance and End of Pipe Control in MTO Corridor**, which involves using the general strategy referred to as 'end-of-pipe' stormwater management control. The improved Casablanca Boulevard corridor would be serviced with a new trunk storm sewer capable of conveying runoff generated by the corridor and external drainage areas for both major and minor storm events.

   The proposed trunk storm sewer would intercept surface water runoff from the residential areas directly adjacent to the road corridor (from the east and west) and the intermittent channel south of the former location of the United Pentecostal Church of Grimsby. From a proposed profile sag located just south of Vine Road the proposed trunk storm sewer capacity would be increased to convey both major and minor flows 'around' the future CN Rail grade separation, crossing the rail corridor through a Town of Grimsby easement, continuing north to the South Service Road. A traditional (end-of-pipe) stormwater management facility, located in the green-space between the South Service Road and the S-E interchange ramp, would provide both stormwater quality and quantity control of flows that would ultimately discharge to Outlet No. 11. **Figure 7-11** illustrates this alternative. It should be noted that the SWM pond size shown on the figures is conceptual, and subject to final modeling that will be undertaken as part of Detailed Design.

2. **Alternative B – New Conveyance, End of Pipe Control and Use of Vine Road Drain**, which employs a combination end-of-pipe and conveyance system stormwater management control strategies. Similar to Alternative A, the improved Casablanca Boulevard corridor would be serviced with a new trunk storm sewer capable of conveying runoff generated by the corridor and external drainage areas for both major and minor storm events. A proposed stormwater management facility located on the Region's property could consist of a traditional stormwater management pond, an underground stormwater management system located under the future parking lot facility, or a hybrid combination of the two facilities. The facility could be designed to minimize impact on other future land uses on this property.

   The stormwater management facility would be designed to provide significant over-control of stormwater flows from the Casablanca Boulevard corridor and external drainage areas so that flows could be released to the existing intermittent flow channel along Vine Road. Over-control of post-improvement flows would be necessary to address the limited conveyance capacity that exists within the intermittent flow channel and CN Rail culvert further downstream. The over-control of flows would also be necessary to reduce the flood risk of private residences upon which the Vine Road intermittent flow channel is located. **Figure 7-12** illustrates this alternative. Note that SWM pond size shown on the figures is conceptual and subject to final modeling that is being undertaken as part of Detailed Design.

3. **Alternative C – New Conveyance and End of Pipe Control,** an evolution of Alternative B in that it has been developed using a combination end-of-pipe (within the Region's property as noted in Alternative B) and conveyance system stormwater management control strategies, but in addition it incorporates a new storm sewer outlet that diverts surface water from the Vine Road intermittent flow channel. Similar to Alternatives A and B, the improved Casablanca Boulevard corridor would be serviced with a new trunk storm sewer capable of conveying runoff generated by the corridor and external drainage areas for both major and minor storm events. Similar to Alternative A, a crossing of the CN Railway is required for the storm sewer.

   Similar to Alternative B, the Alternative C stormwater management facility could be in the form of a traditional stormwater management facility, and underground storage system integrated into a future transit facility on the Region-owned lands, or a hybrid combination of stormwater management facility types. And as described above, the same options regarding the sizing of the pond and of the storm sewer also are applicable to this alternative. **Figure 7-13** illustrates this alternative. Similar to the first two alternatives, the SWM pond size shown on the figures is conceptual and subject to final modeling that is being undertaken as part of Detailed Design.

4. **Alternative D – New Conveyance with Super-Pipes and New Storm Sewer Outlet,** which minimizes the property implications along the Casablanca Boulevard corridor while incorporating a new storm sewer outlet that diverts surface water away from the Vine Road intermittent flow channel. Similar to the previous options, the improved Casablanca Boulevard corridor would be serviced with a new trunk storm sewer capable of conveying runoff generated by the corridor and external drainage areas for both major and minor storm events (**Figure 7-14**). Similar to previous options, the proposed trunk storm sewer would intercept surface water runoff from the residential areas directly adjacent to the road corridor. This alternative does not include an end-of-pipe facility as included in the other alternatives.

   For Alternative D the trunk storm sewer would be extended westerly on Livingston Avenue, intercepting the external drainage area flow conveyed by the existing undefined major overland flow route and would convey runoff back to the Casablanca corridor. The trunk storm sewer would be oversized to provide control of stormwater flows, by way of storage and attenuation, from the Casablanca Boulevard road corridor. The 'Super-Pipe' system would incorporate an outlet control system such that post-improvement peak runoff rates are reduced to pre-improvement levels and allow runoff to be discharged just upstream of the QEW culvert.

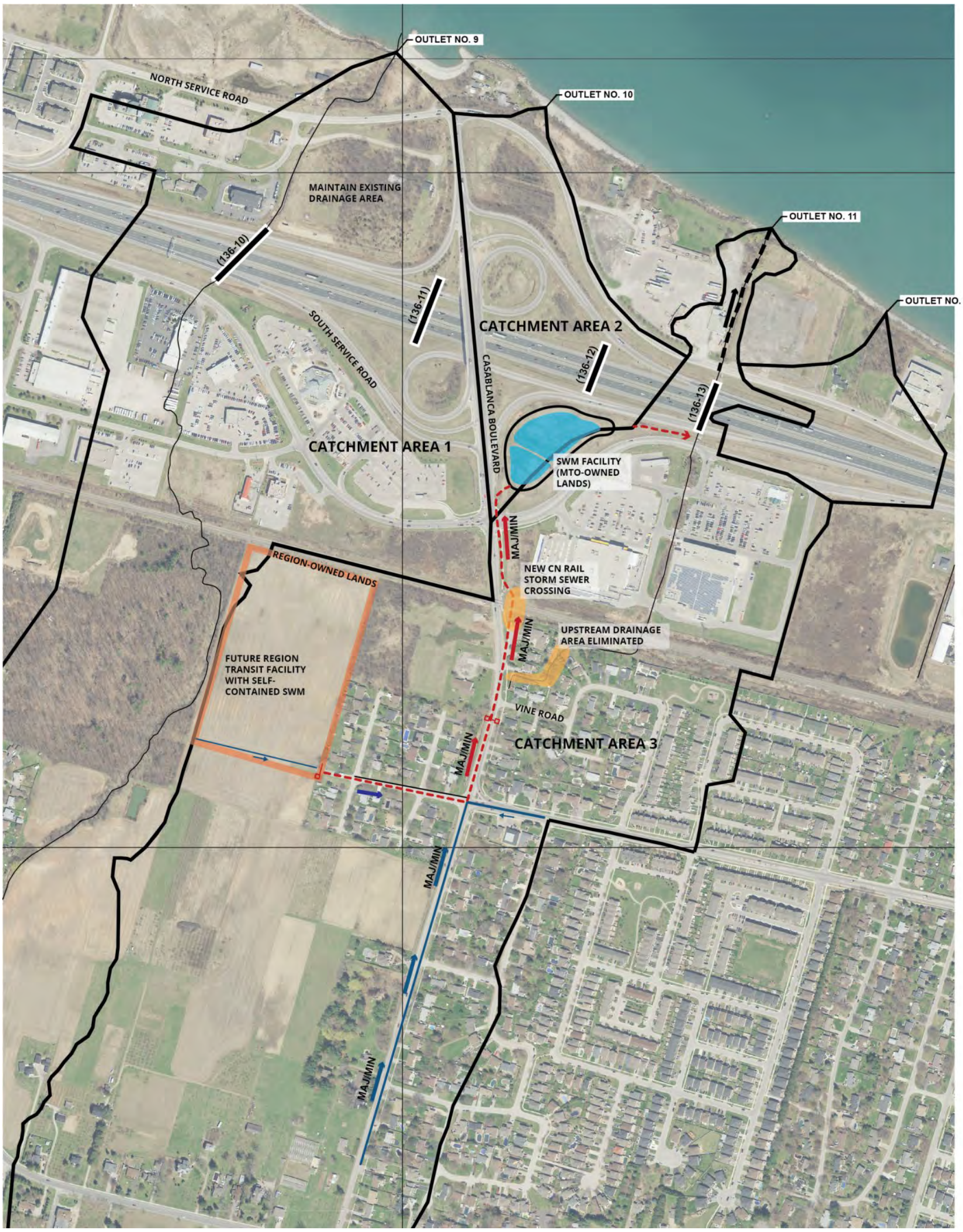


Figure 7-11 Stormwater Management Alternative A - Conveyance and End of Pipe Control in MTO Corridor

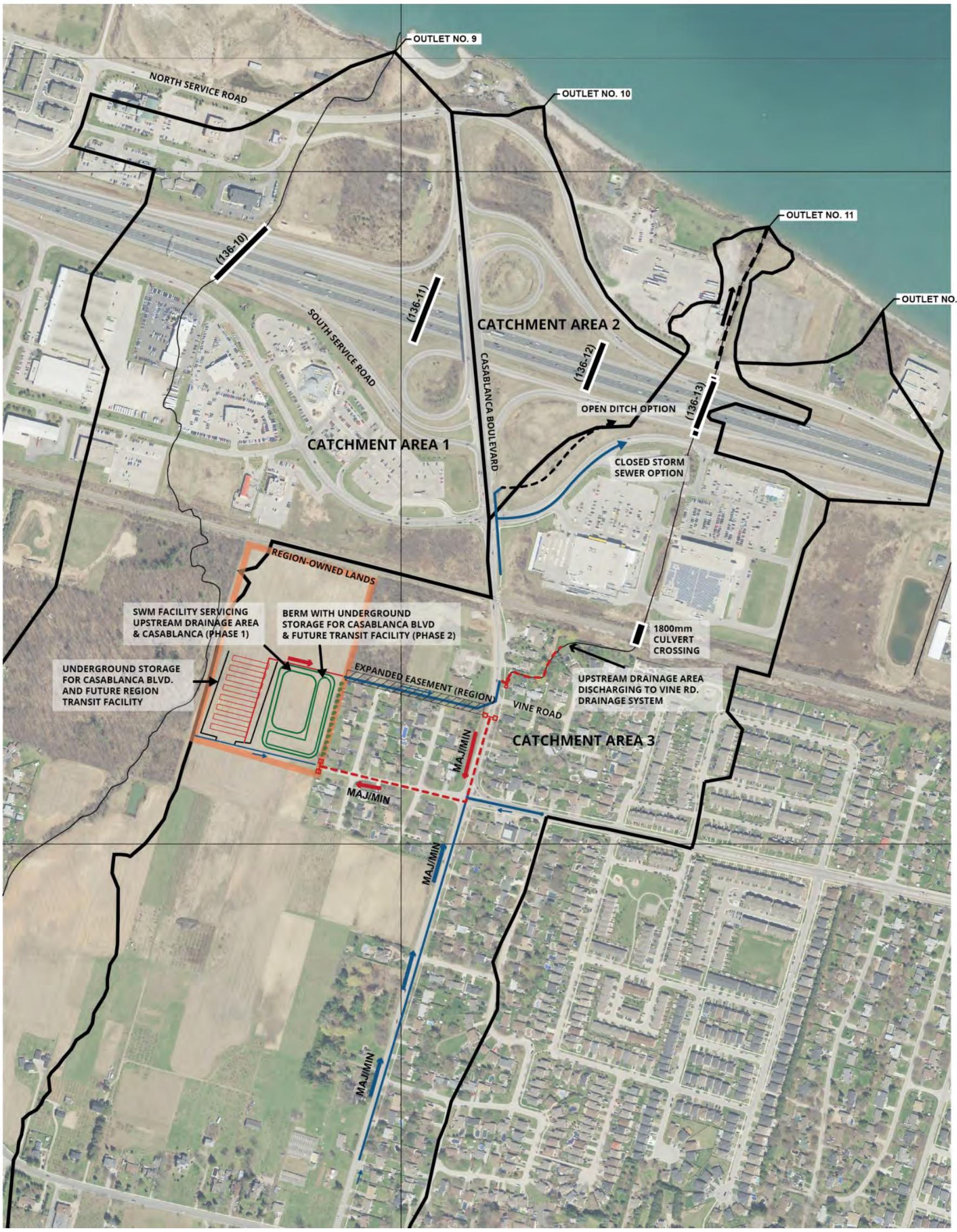


Figure 7-12 Stormwater Management Alternative B - New Conveyance, End of Pipe Control and Use of Vine Road Drain

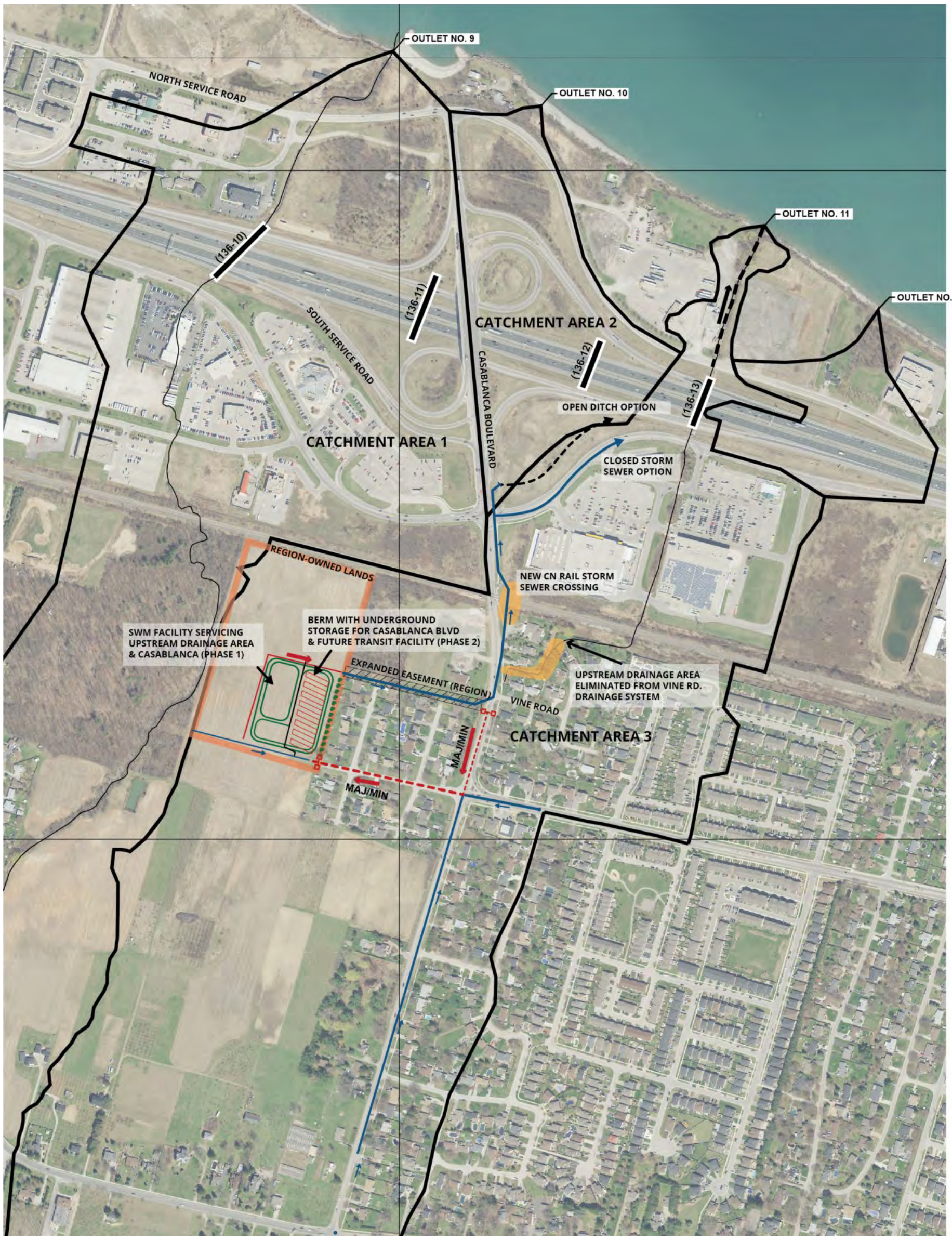


Figure 7-13 Stormwater Management Alternative C - New Conveyance and End of Pipe Control

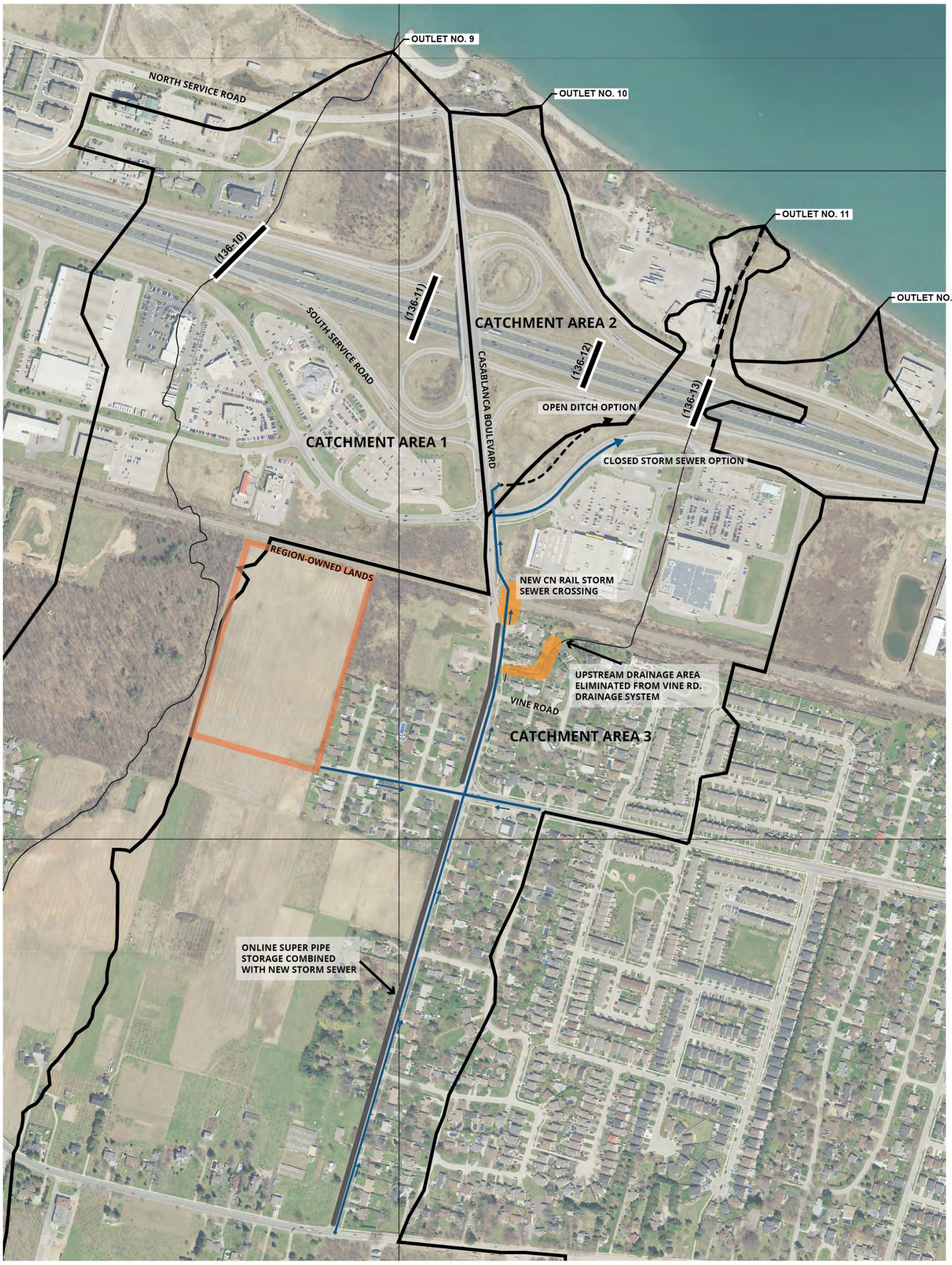


Figure 7-14 Stormwater Management Alternative D - New Conveyance with Super-Pipes and New Storm Sewer Outlet

7.6.2 Alternative Designs Evaluation

As Alternative A involves the development of a SWM pond within MTO property (between the South Service Road and the east side of the Casablanca Boulevard/QEW interchange), it was necessary to review this alternative with MTO Senior Management. MTO informed the Study team that placing a SWM pond in the southeast quadrant of the interchange would affect the future utilization of this property by MTO, and as such the property would not be available for this use. As a result this alternative was screened out and removed from further consideration.

A summary of the evaluation of Alternatives B, C, and D is provided in **Table 7-5**, with the detailed evaluation matrix provided in **Appendix J** (Table 4). Alternatives B and C differ in how water downstream of the proposed SWM pond is managed. The key trade-offs among these two alternatives is that Alternative B still has an inherent flood risk associated with directing runoff from the storm management facility onto private properties along Vine Road. As well, erosion protection enhancements within the intermittent flow channel (construction activities on private lands) may be required.

Conversely, Alternative C diverts upstream flow from the Vine Road drain addressing flood risk by shifting the outlet to a location downstream of the existing intermittent drainage channel. The disadvantage of Alternative C is that as a result of a greater section of new below-grade pipe infrastructure there is greater cost, potential for utility conflict and construction disturbance. The new conveyance pipe along Casablanca Boulevard would also need to be accommodated in the future grade separated crossing.

Alternative D would entail significant pipe infrastructure including a crossing of the CN Railway corridor adjacent to Casablanca Boulevard, It would however result in the lowest property impacts and provides the in-pipe storage that removes the need for a SWM pond or other surface/underground storage infrastructure on the Region-owned lands, as well as limiting other property impacts along the corridor. As well, the flood risk to properties along Vine Road is mitigated by directing a significant proportion of the discharge to a new outlet area. **On this basis, Alternative D** was selected as the preferred.

Table 7-5 Stormwater Management Alternative Designs Evaluation Summary

Criteria Group	Alternative B -New Conveyance, End of Pipe Control and Use of Vine Road Drain	Alternative C - New Conveyance and End of Pipe Control	Alternative D - New Conveyance, Super-Pipes and new Storm Sewer Outlet
Transportation	Equal		
Natural Environment	Equal		Preferred
Socio-Economic	Less Preferred		Preferred
Cultural Environment	Equal		
Engineering/Road Design	Less Preferred	Preferred	Less Preferred
Cost	Preferred	Less Preferred	

Criteria Group	Alternative B -New Conveyance, End of Pipe Control and Use of Vine Road Drain	Alternative C - New Conveyance and End of Pipe Control	Alternative D - New Conveyance, Super-Pipes and new Storm Sewer Outlet
OVERALL SUMMARY	Less Preferred	Less Preferred	Preferred

7.7 CN Rail Crossing Treatment

7.7.1 Alternative Designs

North of Vine Road, Casablanca Boulevard currently crosses the CN Railway tracks with a signalized crossing. Considering the forecasted increase in roadway traffic volumes and increase in rail traffic (see **Section 5.5** for the rail crossing warrant analysis), an evaluation of Alternative Designs for this crossing was undertaken. Three Alternative Designs were developed and assessed including:

1. **Alternative A - Improved At-Grade Crossing**, which includes crossing control and signal upgrades. The cross-section for Alternative A would be confirmed in consultation with CN as the Rail owner, and would mimic the 5-lane cross section proposed for Casablanca Boulevard north of Livingston Avenue, with property protection for a third southbound queueing lane crossing the CN Railway and terminating shortly south of the CN Railway when if required in the future for queue capacity (as shown on **Figure 7-15**);
2. **Alternative B - Underpass Grade Separated Crossing**, which would involve the development of an underpass for Casablanca Boulevard to go under the CN Rail Corridor and emerge back to grade to meet north of the intersection with the South Service Road (**Figure 7-16**). Retaining walls would be constructed on the east and west sides of the roadway, which would have property impacts for adjacent properties on both sides. A pumping Station would be needed to support area drainage and stormwater management; and
3. **Alternative C - Overpass Grade Separated Crossing**, which would involve creation of a road overpass over the CN Rail corridor, tying back into to Casablanca Boulevard well north of the intersection with South Service Road.

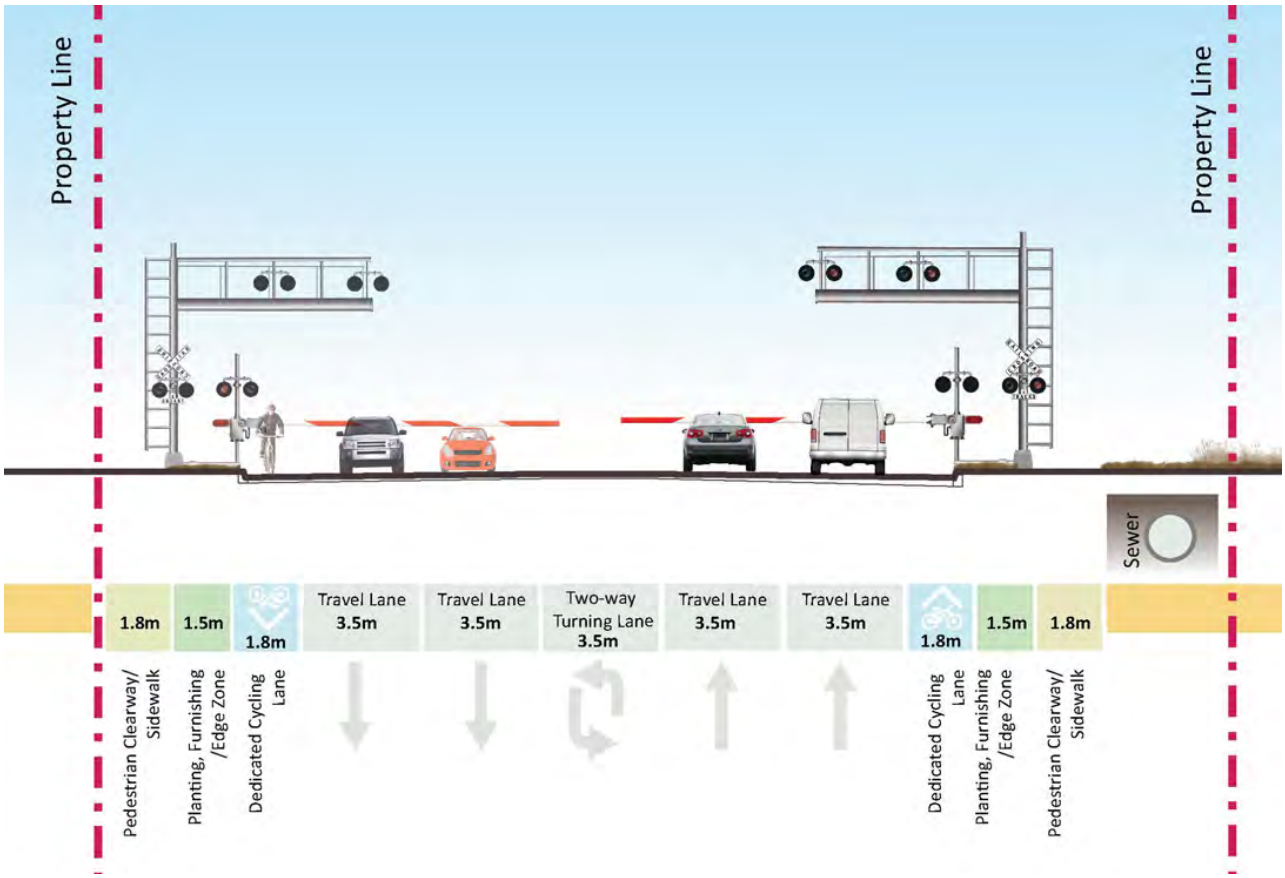


Figure 7-15 Cross Section of Alternative A – Improved At-Grade Crossing

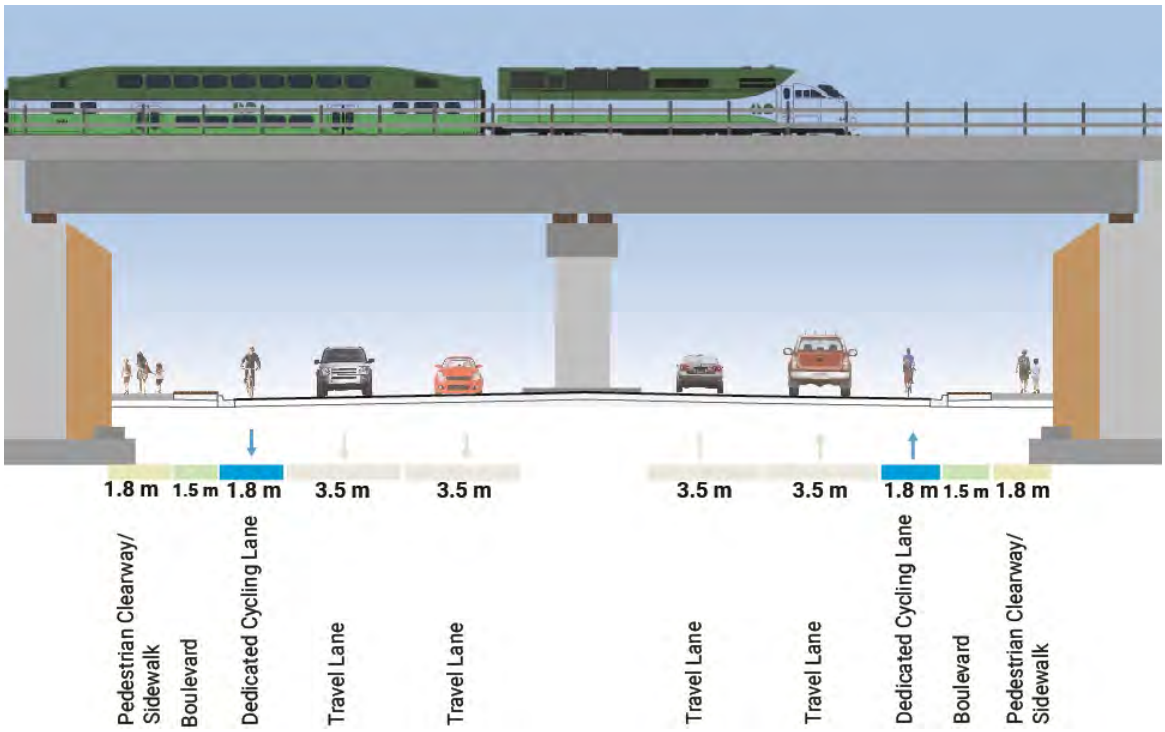


Figure 7-16 Cross Section of Alternative B – Underpass Grade Separated Crossing

7.7.2 Alternative Designs Evaluation

A summary of the evaluation of the Rail Grade Separation Alternatives A, B, and C is provided in **Table 7-6**, with the detailed evaluation matrix provided in **Appendix J** (Table 5). The following discusses the trade-offs between the three alternatives.

From a Transportation perspective, Alternative B is preferred as it accommodates future traffic operations better than Alternative A, and has less residential driveway conflicts than the Alternative C. While Alternative A does not accommodate future traffic operations as well as the other two alternatives, it does not impact access to adjacent properties. Alternative C is considered to be least preferred as it would cause the removal of direct access to Casablanca Boulevard for at least three residences directly south of the CN Rail corridor on the east side of Casablanca Boulevard, and the resulting steep approach to the South Service Road intersection would be problematic from a traffic operations perspective. Alternative C is also encumbered by a high voltage overhead transmission line.

Alternative A would result in the least amount of change to existing conditions with no impact to residential property, the lowest levels of traffic delays during construction of the three alternatives, and no change in views for adjacent residences. Alternative B is ranked second with some potential for property loss and some change to the character of the street. Alternative C is least preferred in this respect, as it would result in the greatest loss of property, would significantly impact views of several residences on the east side of the corridor, and entails

significant engineering and cost associated with the overhead high voltage transmission line. Alternative A also requires the least amount of engineering and is the most simple to implement. The two grade separated crossing alternatives are more complex and costly to implement, and would require changes to the local drainage system and have complex construction staging requirements.

Considering the evaluation summary above, it is recommended in the near- to medium-term time period for Alternative A to be implemented to provide improved safety and traffic processing at the CN Rail crossing on Casablanca Boulevard, with the least property impacts, construction delay, and cost. For the longer term period, the at-grade crossing will be monitored on an ongoing basis to collect data on traffic operations, and once train traffic volumes have increased if traffic safety concerns have been identified, Alternative B be considered for implementation as this alternative would have better performance than Alternative C with respect to impacts to adjacent residential properties, street character development, and integration with the South Service Road intersection.

Table 7-6 CN Rail Crossing Treatment Alternative Designs Evaluation Summary

Criteria Group	Alternative A – Improved At-Grade Crossing	Alternative B – Underpass Grade Separated Crossing	Alternative C – Overpass Grade Separated Crossing
Transportation	Less Preferred	Preferred	Less Preferred
Natural Environment	Equal		
Socio-Economic	Preferred	Less Preferred	Less Preferred
Cultural Environment	Equal		
Engineering/Road Design	Preferred	Less Preferred	Not Preferred
Implementation - Approval	Preferred	Preferred	Not Preferred

Criteria Group	Alternative A – Improved At-Grade Crossing	Alternative B – Underpass Grade Separated Crossing	Alternative C – Overpass Grade Separated Crossing
Cost	Preferred	Less Preferred	Less Preferred
OVERALL SUMMARY	Preferred **Short- to Medium-Term**	Preferred **Long Term**	Not Preferred

7.8 Consultation Input on Alternative Designs

Public and stakeholder feedback was sought on the Alternative Designs as they were developed, with a Stakeholder Workshop with Property Owners held during the earlier stages of development, followed by a public online survey (Survey #2 for the Study) to solicit input on the Alternative Designs and identify issues that should be considered in the development refinement of the Preferred Alternative, which was brought forward for public input at PIC #2 (**See Section 8.9**). The following sections provide an overview of the feedback received as part of the Alternative Designs consultation.

7.8.1 Stakeholder Workshop with Property Owners

The Stakeholder Workshop for affected property owners was held on September 27th, 2018 at the Southward Community Park in Grimsby (84 Mud St W, Grassie, ON L0R 1M0). The purpose of the session was to engage adjacent property owners on the Alternative Designs for each segment of the Study Area and obtain feedback regarding property impacts and/or concerns. A total of 30 people signed in to the event. A number of comments were also received via written and verbal feedback to members of the project team, and as part of the question and answer session that was held following a presentation.

The following summarizes comments based on the three working table discussion areas that were set up:

- CN Rail Crossing and GO Transit Station Access;
- Casablanca Boulevard (the North Service Road to Main Street West); and
- Intersection and Interchange Options.

Appendix A includes photos of the materials at the tables with the comments from workshop participants attached as sticky notes, for record keeping purposes. These comments were reviewed and carried forward for consideration in developing refining the preferred design.

The workshop provided an opportunity for dialogue with the community and to receive comments on the project. Key comments and questions posed by participants for consideration in developing the preferred design included:

- General:
  - Confirmation that widening of adjacent roads to Casablanca Boulevard would not solve the traffic flow issues identified;
- GO Transit Station Access:
  - Potential to move the location of the GO Transit Station, such as to the south side of the rail tracks or potentially to the east of Casablanca, to combat traffic congestion;
  - Confirmation on the construction schedule for the GO Transit Station;
  - Confirmation of current and future projected GO ridership;

    - Need for wayfinding and appropriate lane configurations to accommodate access to the GO Transit Station;
- Casablanca Boulevard:
    - Increased traffic and its implications on the neighbourhood;
    - Driveway access issues for property owners;
    - Need for traffic calming measures, including better speed enforcement, speed bumps, lowering of the speed limit, increased stop signs, and narrowing of lanes;
    - Need for active transportation improvements to provide safe pedestrian and cyclist access, with minimization of property impacts;
    - Noise abatement measures, including sound barriers; and
    - Tree removal mitigation.
- Intersections:
    - Alternative roadway configurations for the Casablanca Boulevard – South Service Road intersection to alleviate traffic congestion, including a possible underpass or traffic circle at the intersection; and,
    - Better wayfinding to and from the highway, particularly north of the intersection from Winston Road.
- Casablanca Boulevard/QEW Interchange:
    - Need for signals at ramp crossings to support pedestrian and cyclist safety; and
    - Need for visual clarity on the concepts and proposed improvements.

7.8.2 Online Survey #2

The second survey presented the Alternative Designs for each segment of the Study Area for feedback on the safety and ease of access from the perspective of motorists, cyclists, and pedestrians. The survey was open for participation on the Region's website from 29 October, 2018 to 21 December, 2018 and received 312 responses were received, of which 152 were complete. A copy of the survey questions and a response summary are provided in **Appendix A**. Key findings from the survey are summarized in the tables below, based on the segment of the Study Area they relate to.

The level of support shown in the middle column of **Table 7-7 to 7-11** was identified along a scale from 'Limited' to 'Very Good', based on the responses to questions as to whether the design provided a sense of safety and appropriate access for motorists, cyclists, and pedestrians. The scale was identified as follows, with the percentage being allocated to the number of responses to the survey that indicated support for the design from the perspective of each user type.

- Limited: Less than 69%;
- Good: 70% to 85%; and
- Very Good: 85% to 100%.

The responses to the survey identified a number of issues that will be carried forward for consideration in the Detailed Design stage of the Study, as noted in the tables below.

Table 7-7 Casablanca Boulevard/QEW Interchange

Design Alternative	Support from Survey Respondents			Concerns/Comments to be Addressed through Detailed Design
Ramp Signalization with Active Transportation	 Good	 Good	 Good	• Safety for pedestrians • More traffic lanes • Sharing the road
Diverging Diamond Interchange	 Limited	 Limited	 Limited	• Safety for cyclists and pedestrians • Design seems confusing for drivers

Table 7-8 CN Rail Crossing Treatment

Design Alternative	Support from Survey Respondents			Concerns/Comments to be Addressed through Detailed Design
Maintain At-Grade Crossing (Medium Term)	 Good	 Limited	 Good	• Underpass supported • Number of lanes at crossing
Protect and Plan for Grade Separation (Long Term)	 V. Good	 Good	 V. Good	• Number of lanes • Speeding • Noise impacts

Table 7-9 Casablanca Boulevard: Between South Service Road and Livingston Avenue

Preliminary Design	Support from Survey Respondents			Concerns/Comments to be Addressed through Detailed Design
4 Travel Lanes + Centre Turning Lane, sidewalk and cycling lanes on each side of the street	 V. Good	 Good	 V. Good	• Driveway access • Sidewalks • Cyclist safety • Speeding • Landscaping/tree planting

Table 7-10 Casablanca Boulevard: Between Livingston Avenue and Main Street West

Preliminary Design	Support from Survey Respondents			Concerns/Comments to be Addressed through Detailed Design
2 Travel Lanes + Centre Turning Lane, sidewalk and cycling lanes on each side of the street	 V. Good	 Good	 Good	• Driveway access • Sidewalks • Cyclist safety • Speeding • Landscaping/tree planting

Table 7-11 Livingston Avenue: From Casablanca Boulevard to West of Emily Street

Preliminary Design	Support from Survey Respondents			Concerns/Comments to be Addressed through Detailed Design
2 Travel Lanes + Centre Turning Lane, sidewalk and cycling lanes on each side of the street	V. Good	Good	V. Good	• Driveway access • Sidewalks • Cyclist safety • Speeding • Landscaping/tree planting

7.8.3 Agency Consultation

Ongoing consultation was conducted with MTO and Metrolinx during the development of the Alternative Designs. The meetings largely pertained to the areas of focus for each agency, primarily with respect to the portion of the Study Area north of the CN Rail corridor. The feedback on the Alternative Designs included, in summary:

Casablanca Boulevard/QEW Interchange

- Support for Alternative A – Improved Parclo A4 Interchange, with concerns about the implementability and suitability of Alternative B – DDI for this interchange;
- Support for a west-side MUP, with agreement to refine the preliminary concept through the Detailed Design Process.

South Service Road – GO Transit Station Access

- Support for Alternative A – Loop Access Road, with the understanding that Alternative B – Westbound Left-turn Access would be implemented for opening day of the GO Transit Station, allowing for continued active use of the GO Bus loop for GO service on the north side of the South Service Road; and
- Support for the signalization of the intersections of Industrial Road and the GO Transit Station Access with South Service Road, with the understanding that signal coordination would be undertaken during Detailed Design and the functioning of the system monitored once improvements are complete.

CN Rail Crossing Treatment

- Support for Alternative A – Improved At-Grade Crossing in the short-medium term, with the understanding that the crossing would be monitored and mitigation measures to limit queues back to the QEW Interchange would be implemented, including consideration of a third southbound queueing lane from the South Service Road, terminating shortly just south of the CN Rail crossing to allow for additional storage and traffic management at the crossing during peak periods;

- Support for Alternative B – Underpass Rail Grade Separation as the longer term alternative.

Copies of official correspondence with agencies are provided in **Appendix A.**

8.0 Preferred/Recommended Preliminary Design

8.1 Introduction to the Preferred Alternative

8.1.1 Analysis Sections

This chapter of the report outlines the specifics of the preferred preliminary design according to the following road corridor sections:

- Casablanca Boulevard (at the QEW Interchange and the North Service Road)
- Casablanca Boulevard (South of QEW to South of the South Service Road) and along the South Service Road
- Casablanca Boulevard (South of the South Service Road to North of Livingston Avenue)
- Future Casablanca Boulevard/CN Rail Grade Separation
- Casablanca Boulevard (North of Livingston Avenue to Main Street West)
- Livingston Avenue (Casablanca Boulevard to West of Emily Street)

The details of the preferred preliminary design in each section are summarized into the following general categories:

- Road elements and traffic lanes
- Multi-use path/active transportation elements
- Electrical and illumination
- Property
- Utilities
- Construction staging and traffic management

Additional topics are added to some specific road corridor sections where appropriate. A preliminary design drawing is provided for each section. A separate section dealing with overall corridor drainage is provided (Section 8.8).

8.1.2 Design Criteria

The design criteria were developed consistent with the *Transportation Association of Canada's Geometric Design Guide for Canadian Roads, 2017* (TAC) and their stated design philosophy:

> *Design is a process in which sound engineering judgement and experience play significant roles. Designers choose the features of the road and dimensions of the primary design elements. Although they may use judgement, technical references, and calculations to assist in selecting the appropriate primary design elements, selecting elements in isolation from each other is not design. The final design is the sum of all the decisions made during the design process.*

The *Niagara Region Complete Streets Design Guidelines (June 2017)* were used as the starting point in determining the appropriate road standards to consider. These Guidelines identify six street typologies for Regional roads:

- Main Street;
- Urban General (Narrow);
- Urban General (Wide);
- Transitioning;
- Hamlet; and
- Rural.

For this project, Casablanca Boulevard was considered to be classified as a Hamlet/Transition typology, serving local residents as well as through traffic, often centered around an intersection or a section of highway which may include residential frontages or a small number of commercial or other uses that serve the community but transitioning to a more urbanized and mixed-use context. For the Transitioning typology roads generally have wide Right-of-Way widths (26m – 36m+) with 4 or more vehicle lanes, serving semi-urban and rural areas. The corridors play important roles in connecting communities, cross-region travel and goods movement. They support regional cycling through a range of in-corridor cycling facilities, which are ideally separated. Pedestrians are accommodated on sidewalks or multi-use pathways, depending on the context. As new land uses are introduced, transitioning roads are expected to accommodate higher vehicle capacities, as well as transit and active transportation. Transit vehicles, cyclists and pedestrians should have dedicated space. These are also major goods movement corridors and may include a centre median and dedicated turning lanes.

Figure 8-1 illustrates a typical transitioning street layout. The following elements are typical:

- Wide sidewalks and high quality pedestrian amenities;
- Pedestrian crossings only at signalized intersections;
- Transit amenities with transit in mixed traffic, dedicated transit lane or transit priority lanes;
- Dedicated cycling facility (cycle track or multi-use path);
- Street supports goods movement; and
- Landscaping can include street trees, shrub/perennial beds, raised planters, buffer planting.

To initiate advancing the development of the design concepts, a draft Preliminary Design Criteria was prepared based on the need for incorporating the general street elements illustrated above and in accordance with TAC guidelines. The design criteria itemizes the existing and target standards to be used in developing the proposed plan, profile, ramp and structure facilities and indicates the standards achieved with the preferred alternative. For each road section a specific road classification has been selected based on the kind of facility under consideration (e.g. urban arterial, rural local, urban collector etc.) along with a proposed design speed with the need to accommodate all modes of travel, including active transportation (cycling and pedestrian traffic).

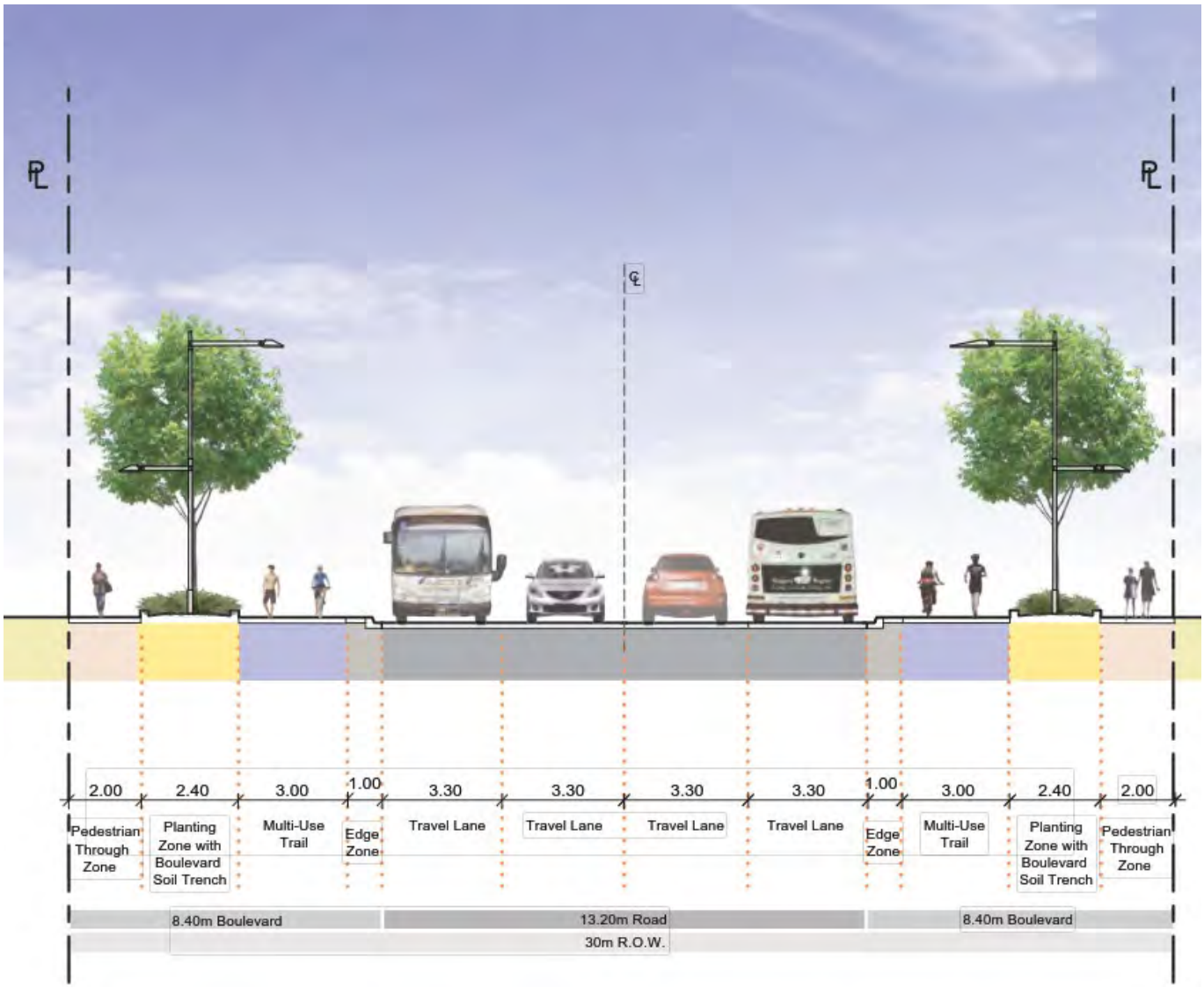


Figure 8-1 Typical Transitioning Street Layout

One of the key steps in developing the Preliminary Design Criteria was to establish the appropriate design speed for each component/road section. The design speed that is adopted directly influences the parameters used to layout the new road concepts including such key elements as lane widths, active transportation components, vertical alignment, shoulder widths, etc. The selection of the most appropriate design speed was based on the consideration of the service function of the road sections and the needs of all expected users (vehicles, cyclists and pedestrians) taking into account adjacent land uses, intersection spacing, access conditions and local resident concerns regarding road safety.

For Casablanca Boulevard the existing road is classified as a rural arterial roadway generally with a design speed of 70 kilometres (km)/h and a posted speed of 60 kilometres (km)/h. The

new road is classified as an urban arterial roadway. It is recommended to maintain the existing design speed of 70 kilometres (km)/h, and a posted speed of 60 kilometres (km)/h throughout the road corridor, with consideration of adopting a posted speed of 50 kilometres (km)/h in the future if any traffic speed concerns are identified after the roadworks have been operating for a reasonable period of time. For Livingston Avenue from Casablanca Boulevard to west of Emily Street (an urban collector roadway), a design speed of 60 kilometres (km)/h and a posted speed of 50 kilometres (km)/h is recommended, similar to the existing posted speed.

Travelling lane widths of 3.5m are recommended with auxiliary lane widths (right and left-turn lanes) of 3.25m. Where a two-way left-turn lane is provided a width of 3.5m is recommended. All widths are consistent with TAC recommendations. Recommended northbound lane widths are 4.0 m over the QEW structure due to the available bridge width.

8.1.3 Active Transportation

Providing for enhanced active transportation facilities is a key component of this project. In particular this includes considerations for linking the growing demands to the north and west of the Casablanca Boulevard/QEW interchange area with locations to the south, including the future GO Transit Station and to existing facilities on Livingston Avenue east to the downtown.

8.2 Casablanca Boulevard at the QEW Interchange and the North Service Road

This section deals with the recommendations for the QEW interchange from north of the South Service Road to the North Service Road (see **Drawing 8-1**).

Specific allowances for active transportation have been provided throughout all road corridors under assessment. This includes on-road bike lanes, new sidewalks and multi-use pathways. The proposed locations and widths of these treatments vary depending on the section under consideration. The specifics of active transportation improvements are discussed in the following sections for each segment of the Focused Study Area.

8.2.1 Casablanca Boulevard (Bridge over QEW)

The Casablanca Boulevard bridge over the QEW will be improved to have four basic lanes (two-lanes in each direction) with a median separating the directions of travel and left-turn lanes where required. Proposed lane widths are generally 3.5 m wide (over the QEW structure the northbound lane widths are 4.0 m due to the available width on the existing structure). Approaching the South Service Road from the north provides for separate left and an additional right lane. This right-turn lane can be converted to a right-through lane with the third lane carried south to the CN Rail crossing as a possible future queuing lane (see **Section 8.5** for additional information on this provision). Approaching the North Service Road from the south has the two through lanes developed as right and left-turn lanes respectively. Existing vertical grades will be

maintained (3% is the current maximum grade in this section). All required lanes can be accommodated on the existing QEW structure.

8.2.2 Multi-Use Path/Active Transportation

As indicated previously, the active transportation facilities north from the South Service Road are provided in the form of a wide multi-use pathway (MUP) located on the west side of the road. The MUP is 5.2 m in width and over the bridge is separated from the southbound road shoulder by provision of bollards. It will be used by both pedestrians and cyclists. At the North Service Road the west side MUP ends at the intersection and on-road bike lanes are provided along the service road with traditional sidewalks (both sides to the west and north side only to the east). A cross walk is provided across the North Service Road on the west leg only.

8.2.3 Ramp Terminal Adjustments

The preferred design consolidates and normalizes the existing ramp terminals at the interchange to achieve improved ramp crossing angles for active transportation users. The adjusted QEW ramps have been realigned to intersect Casablanca Boulevard at 90 degrees, or as close to 90 degrees as possible. Both ramp terminals will be signalized. The S-E on ramp (to St. Catharines) and the S-W on ramp (to Hamilton/Toronto) will continue as standard loop ramps. However, the active transportation facilities will be consolidated on the west side of Casablanca Boulevard north of the South Service Road eliminating cyclist/pedestrian crossings of these active loop ramps (see **Section 8.2.4**). The N-W on ramp (to Hamilton/Toronto) has been straightened to minimize the crossing angle. A 90-degree crossing could not be achieved at this location, but the angle of crossing is greatly improved.

8.2.4 QEW Structure

As indicated previously, all required lanes can be accommodated on the existing QEW structure. The QEW Casablanca Boulevard Bridge Structure, constructed in 1968, is a four span concrete slab on precast AASHO girder bridge. The structure carries four-lanes of traffic over the QEW and is 104 m long with span lengths of 26.5 m, 25.3 m, 25.3 m and 26.5 m. The bridge deck is skewed 22.1 degrees. The existing deck cross section is shown in **Figure 8-2** and the proposed cross section is shown in **Figure 8-3.**

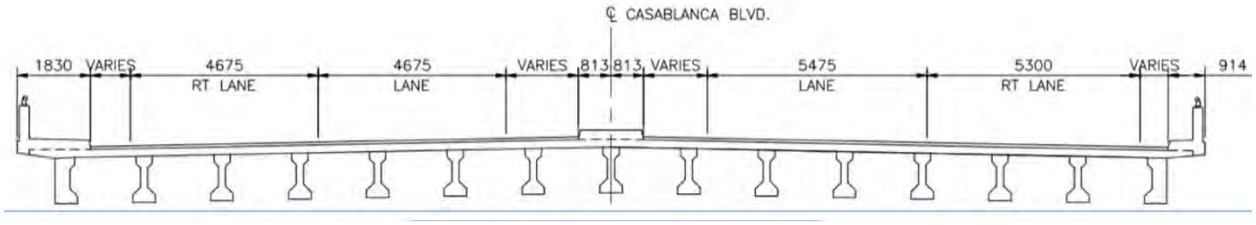


Figure 8-2 Cross Section of Existing-Casablanca Boulevard Across QEW Structure (looking north)

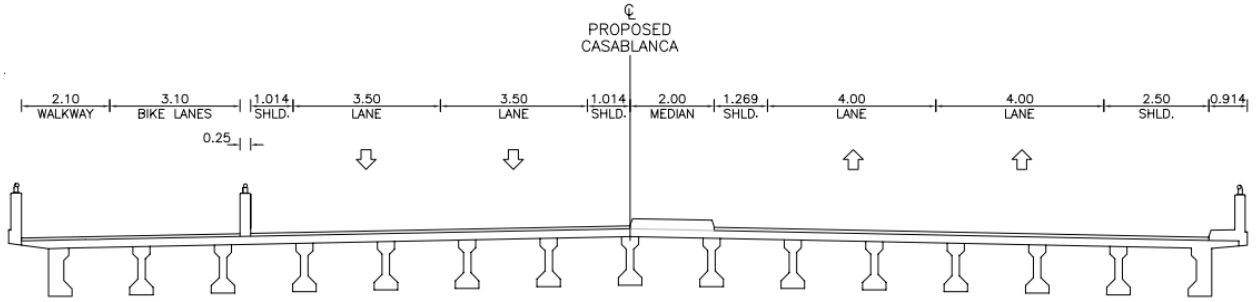


Figure 8-3 Cross Section of Proposed-Casablanca Boulevard Across QEW Structure (Looking North)

The structure is supported on three piers each consisting of a pier cap on six columns founded on individual spread footings. The pier caps are inverted tee bents supporting the dapped ends of the precast girders. The abutments are founded on spread footings. In 2014 MTO completed rehabilitation of the existing structure which included: abutment bearing seat reconstruction, new abutment bearings, new parapet walls, new semi-integral abutment retrofit including new approach slabs, waterproofing and asphalt paving of the deck, encasement of pier columns and slope paving repairs. Some additional bridge rehabilitation works will be required for the recommended design including the following:

- West sidewalk removal (to end of deck);
- Removal and reconstruction of west deck cantilever;
- West wingwall retrofit;
- Extension of approach slab to west wingwall;
- Installation of new 230m long combination traffic/bicycle parapet wall traffic side;
- Installation of new bicycle barrier with steel railing on curb; and
- Construction of a waterproof multi-use path.

8.2.5 North Service Road Intersection

The recommended treatment at the Casablanca Boulevard/North Service Road intersection is shown in **Figure 8-4**. This intersection will be signalized, similar to existing conditions.

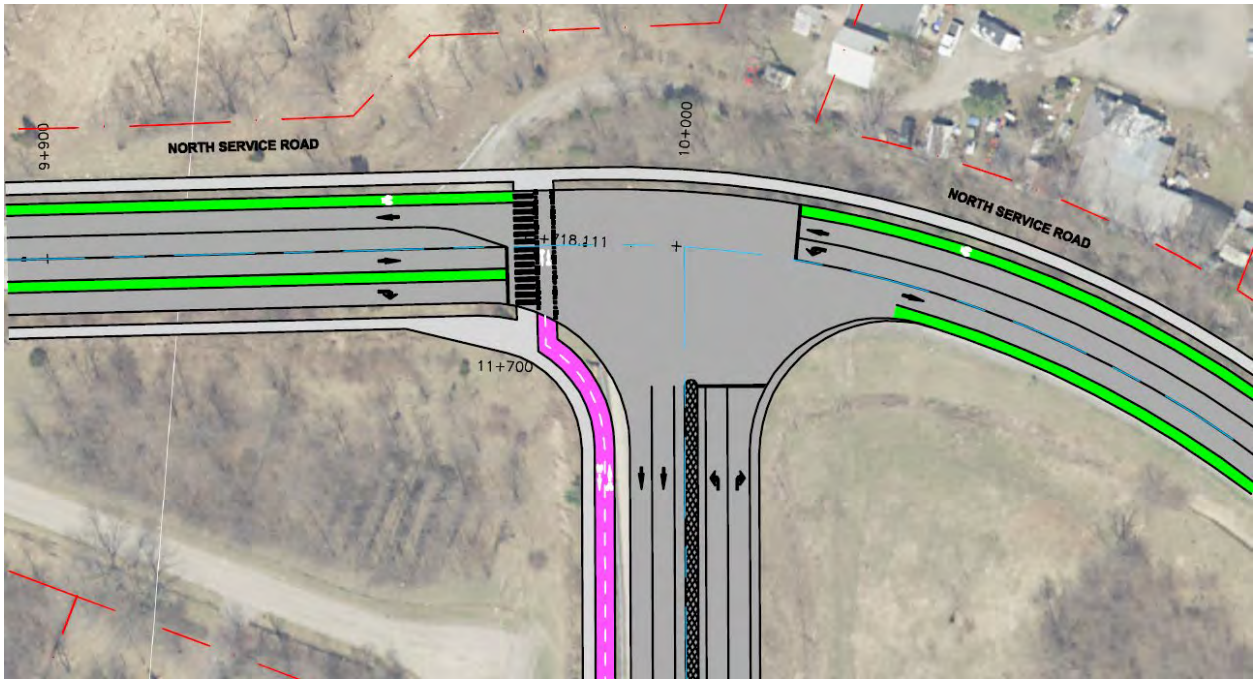


Figure 8-4 Casablanca Boulevard – North Service Road Recommended Treatment

A section of retaining wall (e.g. in the form of a retained soil slope treatment) will be required in the south west quadrant of the intersection to limit the extent of grading to the west.

8.2.6 Electrical, Illumination and Traffic Signals

Full illumination will continue to be provided along this section of Casablanca Boulevard and throughout the interchange and north to the North Service Road. A review of all existing illumination, warrants and determination of illumination recommendations will be completed during Detailed Design.

Traffic signals will be provided or signalized intersections improved as follows:

- Revised at Casablanca Boulevard and the North Service Road;
- New at Casablanca Boulevard and the new QEW North Ramp terminals; and
- New at Casablanca Boulevard and the new QEW South Ramp terminals.

8.2.7 Property

All proposed new facilities in this section can be constructed within existing property limits; no property acquisition will be required.

8.2.8 Drainage

Overall project drainage aspects are discussed in **Section 8.8**. There are three principle drainage catchment areas and outlets from which runoff from the new facilities will be directed.

Catchment Area 1 drains to Outlet No. 9, Catchment Area 2 drains to Outlet No. 10 and Catchment Area 3 drains to Outlet No. 11.

The Casablanca Boulevard/QEW interchange is located in Catchment Areas 1 and 2 and discharges runoff to Lake Ontario at Outlets 9 and 10. Three QEW cross culverts are located in these catchment areas conveying flows under the QEW from the south to the north. Roadway expansion works associated with this project within Catchment Areas 1 and 2 will add minimal additional new pavement areas and, as a result, peak flows to the three QEW culverts and at the two outlets at Lake Ontario are not expected to increase measurably.

8.2.9 Utilities

Existing utilities within the interchange area and north to the North Service Road are summarized in **Table 8-1**. Conflicts with the proposed construction will be identified and any necessary utility relocation will be determined during Detailed Design.

Table 8-1 Utilities in the QEW-Casablanca Interchange and North to the North Service Road

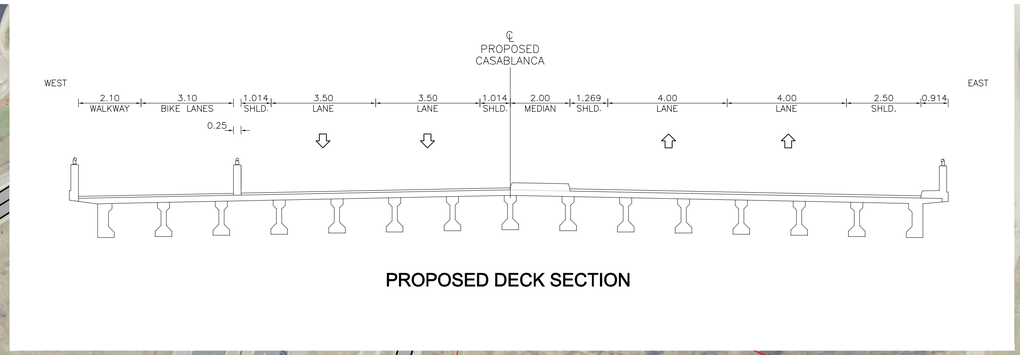
Utility Owner	Description/Location
Bell Canada	• Underground cable – east side • Combined aerial along the North Service Road
Cogeco Cable	• Combined aerial line on the north side of the North Service Road.
Grimsby Power	• Underground hydro east and west sides of Casablanca Boulevard through interchange • Aerial on west side through interchange • Underground hydro on south side of the North Service Road • Combined aerial on north side of the North Service Road
Niagara Regional Broadband Network	• Aerial along the North Service Road
Rogers	• Combined aerial along the North Service Road
Town of Grimsby	• Watermain, sanitary sewer and storm sewer along the North Service Road

8.2.10 Construction Staging and Traffic Management

Construction staging and traffic management plans for the new interchange and QEW structural modifications (identified in **Section 8.2.3**) will be developed during Detailed Design. It is anticipated that the ramp works will be completed over a number of stages involving some short periods of ramp closures to construct the new ramp alignments, shift traffic to the new ramps and install the traffic signals.

8.2.11 Maintenance Responsibilities

The new ramps and ramp intersections (including signals) will be owned by MTO and maintained by the Region, subject to a legal agreement between MTO and Niagara Region. It is anticipated that Niagara Region will be responsible for snow clearing operations on Casablanca Boulevard (including the multi-use pathway) within the interchange which will be coordinated through an agreement between MTO and Niagara Region, continuing from the present-day operations. The Town of Grimsby will be responsible for the traffic signals at Casablanca Boulevard and North Service Road.



PROPOSED DECK SECTION

CASABLANCA INTERCHANGE

SCALE
10m 0 20m
Horizontal

NOTES/LEGEND

1 THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWER AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

2 PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.

NO.	REVISION	DATE	INIT.
0	ISSUED FOR	YYYY-MM-DD	XXX

DRAFTING	SMP
DESIGN	SMP
CHECKED BY	DPM
APPROVED BY	PAM

Niagara Region
PUBLIC WORKS

PREFERRED DESIGN

CASABLANCA/QEW INTERCHANGE

CONSULTANT FILE No.	18-7650
DATE	2019-02-22
SCALE	AS SHOWN
REF. No.	#
DWG No.	8-1
REV.	0

DRAWING FILE: C:\projectwise\working directory\projects 2018\20gcc\dms73795\187650-Casablanca Boulevard_Trumpet Lt Revised Location.dwg PLOTTED: Feb 22, 2019 - 9:32am PLOTTED BY: 20gcc

8.3 Casablanca Boulevard (South of QEW to South of the South Service Road) and the South Service Road

8.3.1 South Service Road Intersection

The recommend lane arrangements for the Casablanca Boulevard/South Service Road intersection are shown in **Figure 8-5** and further illustrated on **Drawing 8-2**.

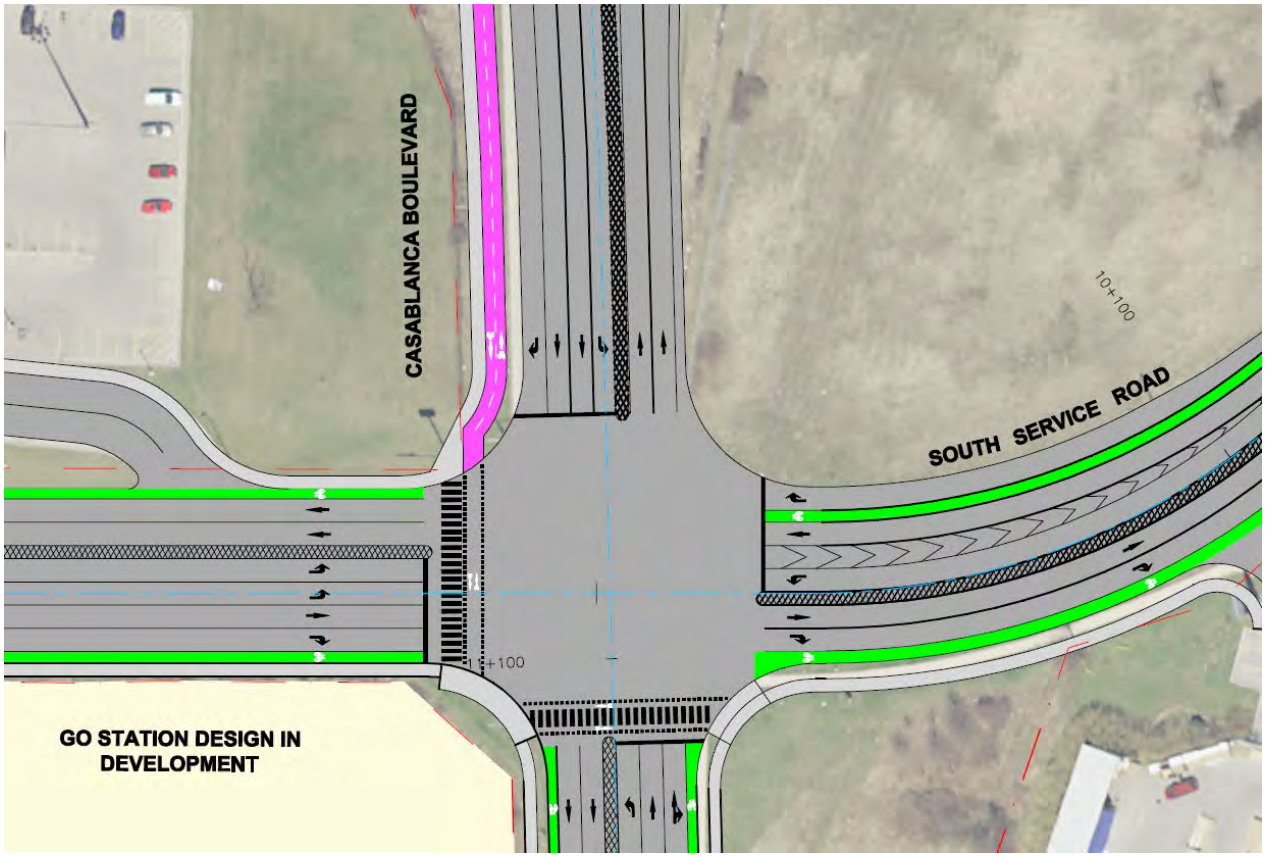


Figure 8-5 Casablanca Boulevard/South Service Road Intersection

8.3.2 South Service Road/GO Transit Station Access

In the southbound direction, south of the South Service Road, a possible third lane is being planned to provide additional queuing for vehicles stopped during train crossings at the rail line. This additional lane consideration is a requirement of MTO and is considered a future facility only, which should be protected for. Its implementation may be necessary based on the results of monitoring the extent of queues and whether they back up to the interchange ramp terminal area and adversely impact interchange operations. Initial stage works will include two southbound lanes south of the South Service Road with the third southbound lane on the north side becoming a right turn lane. It is also recommended to provide a double left-turn lane for the west-north movement to accommodate traffic from the future GO Transit Station heading to the QEW.

8.3.3 South Service Road - West of the GO Transit Station Access

A two-stage plan for providing access to the new GO Transit Station is proposed. Initially, a signalized intersection with a dedicated left-turn lane would be provided for vehicles entering the Station off of South Service Road. It is anticipated that the existing bus loop will be maintained for GO Bus pick-up and drop-off in the short term (**Figure 8-6**).

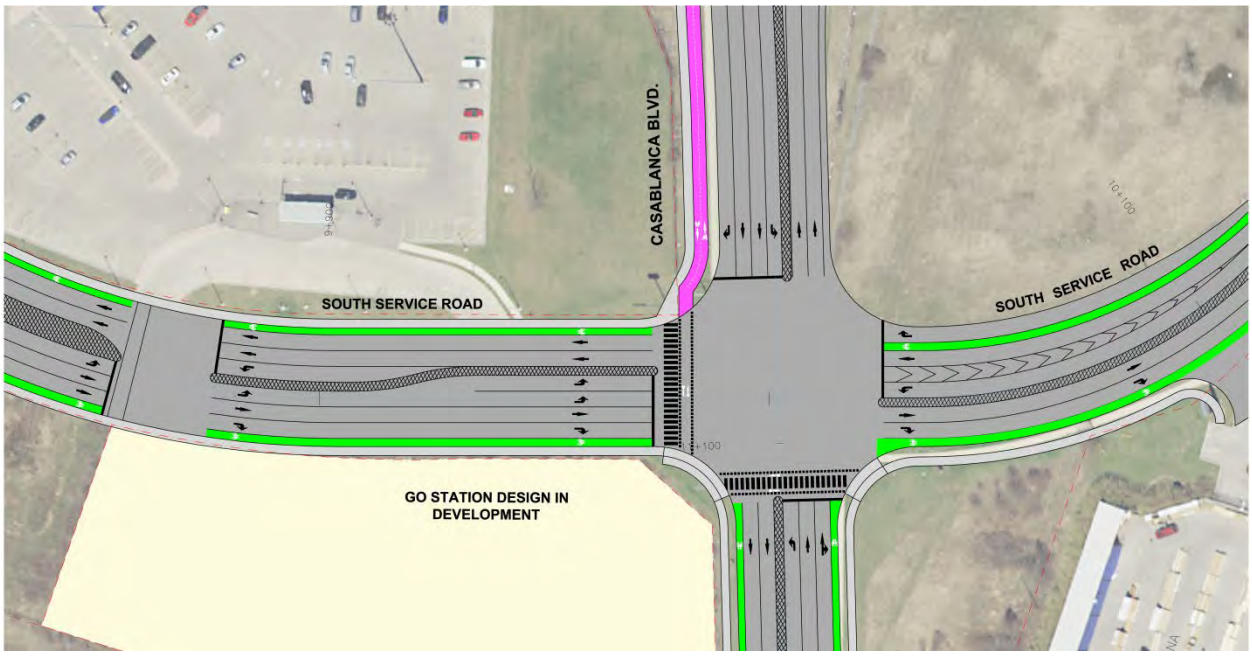


Figure 8-6 Interim Treatment for GO Transit Station Access on South Service Road

In the longer term, the existing bus loop would be re-configured to also accommodate passenger vehicles, and signage provided to direct motorists into the loop and then around to a signalized intersection where both buses and vehicles could enter the GO Transit Station (**Figure 8-7**). This configuration eliminates the need for accommodating westbound left-turns on the South Service Road into the GO Transit Station and will reduce the potential for traffic queues to back up to the Casablanca intersection and potentially affecting operations of the QEW/ramp intersections. This treatment would also allow for the provision of a longer, dual, left-turn storage lane for traffic leaving the GO Transit Station heading to the north.

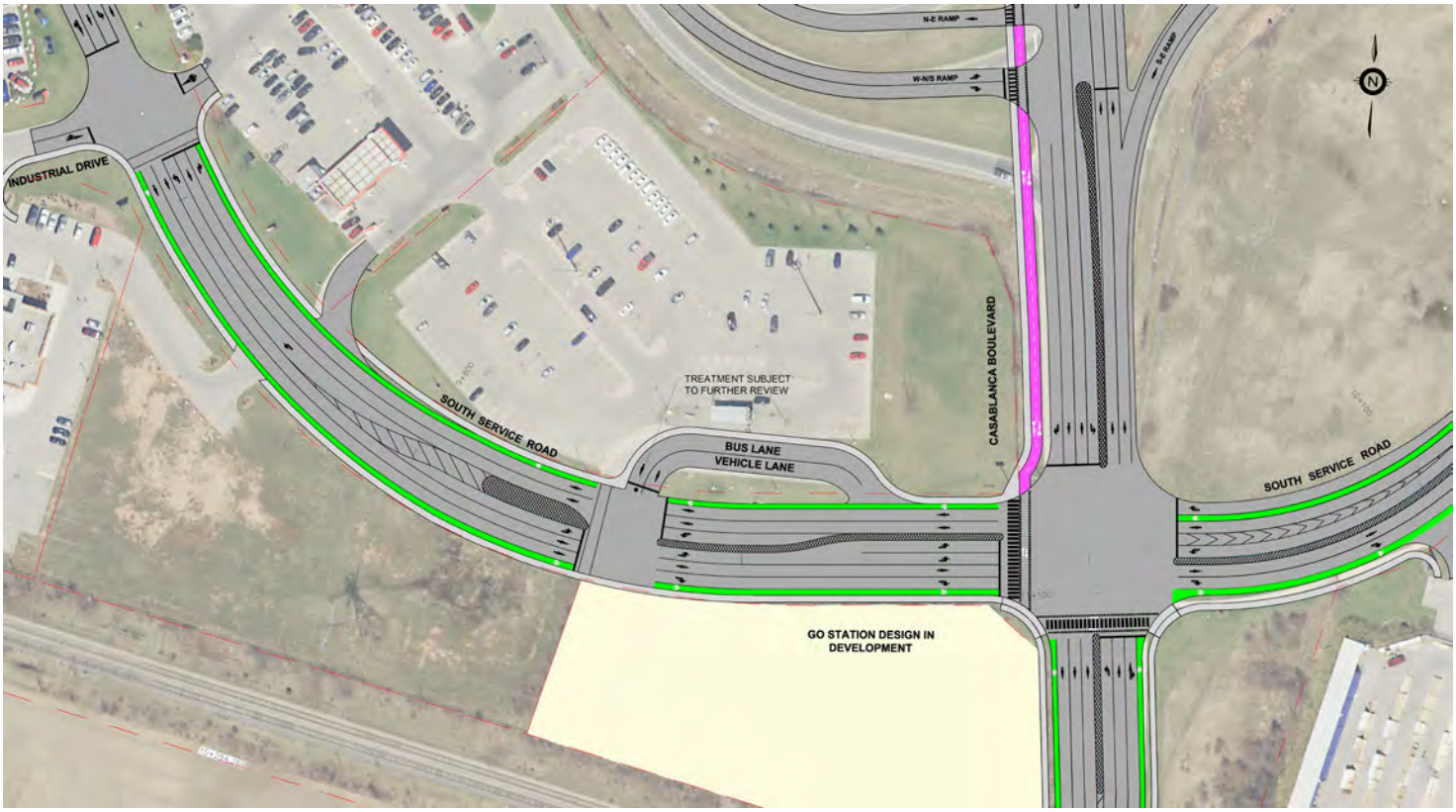


Figure 8-7 Ultimate Treatment for GO Transit Station Access on South Service Road

It should be noted that the installation of traffic signals is also recommended at Industrial Drive and Casablanca Boulevard.

8.3.4 South Service Road East of Casablanca Boulevard

East of Casablanca Boulevard, the South Service Road tapers back to a basic two-lane road further to the east and the on-road cycling lanes are discontinued. A sidewalk is provided on the south side only. The east leg of the intersection has a north-side right turn lane and south-side right turn lane to access the commercial property on the south side of the road. A separate left-turn lane is provided for westbound traffic turning south onto Casablanca Boulevard.

8.3.5 Active Transportation

On-road cycling lanes are provided in each direction of the South Service Road with sidewalks on both sides. Cyclists and pedestrians going to the north will be directed to the west side multi-use pathway. No active transportation facilities will be provided on the east side of Casablanca Boulevard north from the South Service Road. Crosswalks will be provided on the west and south legs of the intersection only.

8.3.6 Electrical and Illumination

Full illumination will be provided along this section of Casablanca Boulevard and the South Service Road. A review of all existing illumination, warrants and determination of illumination recommendations will be completed during Detailed Design.

Traffic signals will be provided at the following locations:

- Revised at Casablanca Boulevard and the South Service Road
- New at the South Service Road and the GO Transit Station entrance
- New at the South Service Road and Industrial Drive

8.3.7 Property

Generally, all proposed, new facilities in this section can be constructed within existing property limits with the following exceptions:

- Property protection for an additional southbound rail crossing queuing lane (from the south side of the South Service Road to south of the rail crossing) will require a west side widening of the Casablanca Right-of-Way by 3.5 m for the full extent of the queuing lane
- The recommended, off-road, north side, bus and vehicle turning lane to the new GO Transit Station will be situated on the GO Transit current bus loop, adjacent to the MTO's car pool parking lot

Of note is that the recommended initial stage facilities in this section utilize the majority of the available property along the south side of the South Service Road and the west side of

Casablanca Boulevard. Future work related to the GO Transit Station will have to recognize this as a constraint should, for example, GO Transit Station lot grading require adjustment to existing grades at the perimeter.

8.3.8 Utilities

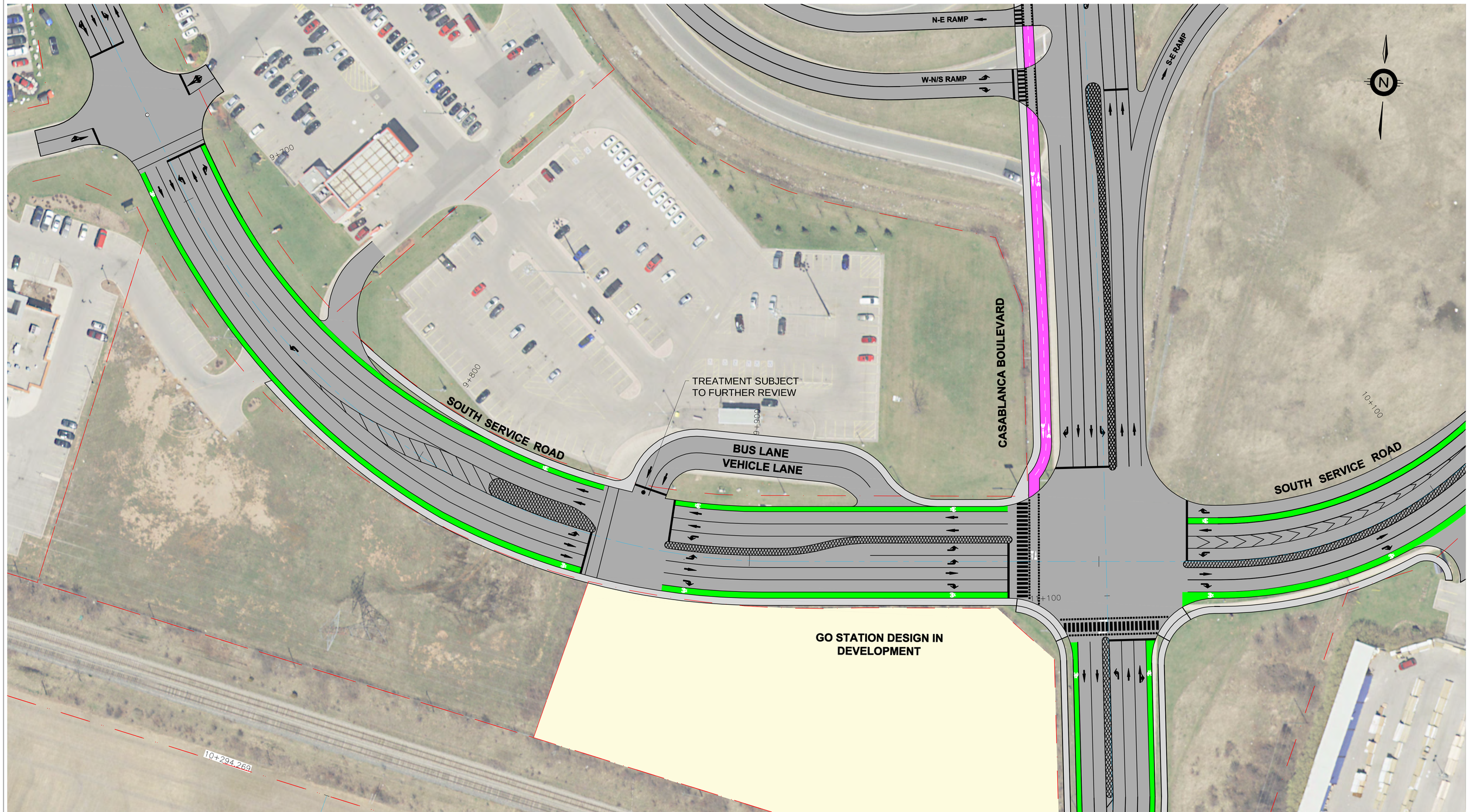
Existing utilities in the Casablanca Boulevard Corridor (South of QEW to South of the South Service Road) and the South Service Road are summarized in **Table 8-2**. Conflicts with the proposed construction will be identified and any necessary utility relocation will be determined during Detailed Design.

Table 8-2 Utilities in the Casablanca Boulevard Corridor (South of QEW to South of the South Service Road) and the South Service Road

Utility Owner	Description/Location
Bell Canada	• Underground cable – east side of Casablanca (multiple lines) • Underground cable – south side of the South Service Road, east of Casablanca
Enbridge Gas Distribution	• Underground gas main – east side of Casablanca south of the South Service Road • Underground gas main – south side of the South Service Road
Grimsby Power Incorporated Niagara Regional Broadband Network	• Underground hydro – west side of Casablanca south of the South Service Road and along both sides north of the South Service Road • Aerial – south side of the South Service Road
Town of Grimsby	• Watermain – east side of Casablanca south of the South Service Road; south side of the South Service Road • Sanitary sewer – east side of Casablanca, south of the South Service Road; south side/under South Service • Storm sewer – north side of the South Service Road west of Casablanca • Underground hydro – east side of Casablanca north of the North Service Road
Niagara Region	• 450 mm storm sewer located along the north side of the South Service Road (flowing to the west) west from Casablanca Boulevard

8.3.9 Construction Staging and Traffic Management

Construction staging and traffic management plans for the roadworks in this section will be developed during Detailed Design. It is expected that construction of the road widening along both Casablanca Boulevard and the South Service Road can be achieved while maintaining one lane of traffic in each direction. Periodic, short closures may be required for certain construction operations but these will be kept to a minimum. With the extent of widening proposed, the new road sections can be constructed while maintaining traffic on available pavement and then switching traffic to the new pavement section to continue construction. Initial construction will likely involve utility relocations and the construction of the Casablanca Boulevard's new storm sewer and stormwater management facility. Coordination with other area construction projects that may be proceeding at the same time will be required including the GO Transit Station works and the Town's new watermain.



SOUTH SERVICE ROAD/CASABLANCA BOULEVARD INTERSECTION

SCALE
5m 0 10m
Horizontal

0	ISSUED FOR	YYYY-MM-DD	XXX
NO.	REVISION	DATE	INIT.

NOTES/LEGEND

1 THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWER AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

2 PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.

DRAFTING	SMP
DESIGN	SMP
CHECKED BY	DPM
APPROVED BY	PAM

Niagara Region
PUBLIC WORKS

PREFERRED DESIGN

CASABLANCA BOULEVARD (SOUTH OF QEW TO SOUTH OF SOUTH SERVICE ROAD) AND SOUTH SERVICE ROAD

CONSULTANT FILE No.	18-7650
DATE	2019-02-22
SCALE	AS SHOWN
REF. No.	#
DWG No.	8-2
REV.	0

DRAWING FILE: C:\projectwise\working directory\projects 2018\20gcc\dms73795\187650-Casablanca Boulevard_Trumpet Lt Revised Location.dwg PLOTTED: Feb 22, 2019 - 9:31am PLOTTED BY: 20gcc

8.4 Casablanca Boulevard (South of the South Service Road to North of Livingston Avenue)

8.4.1 Proposed Roadworks

Proposed work in this section will include the following:

- Lowering the existing road south of the rail crossing (by approximately 1 m) to facilitate area drainage;
- Widening of Casablanca Boulevard to two travel lanes in each direction (with property protection on the west side for a possible future southbound rail crossing queuing lane);
- Addition of a centre turning lane to facilitate property access on the east side of Casablanca Boulevard;
- Provision of an east-side access road/entrance roadway for the three properties closest to the CN Railway crossing;
- Dedicated cycling lanes and sidewalks on both sides of the street;
- Urbanization of the road corridor, adding a storm sewer to replace existing open ditches, and consolidation of utility poles; and
- Low-level landscaping along the road corridor.

Drawing 8-3 provides the more detailed layout for this section of road corridor. **Figure 8-8** illustrates a closer look at the proposed road elements in this section of the corridor.

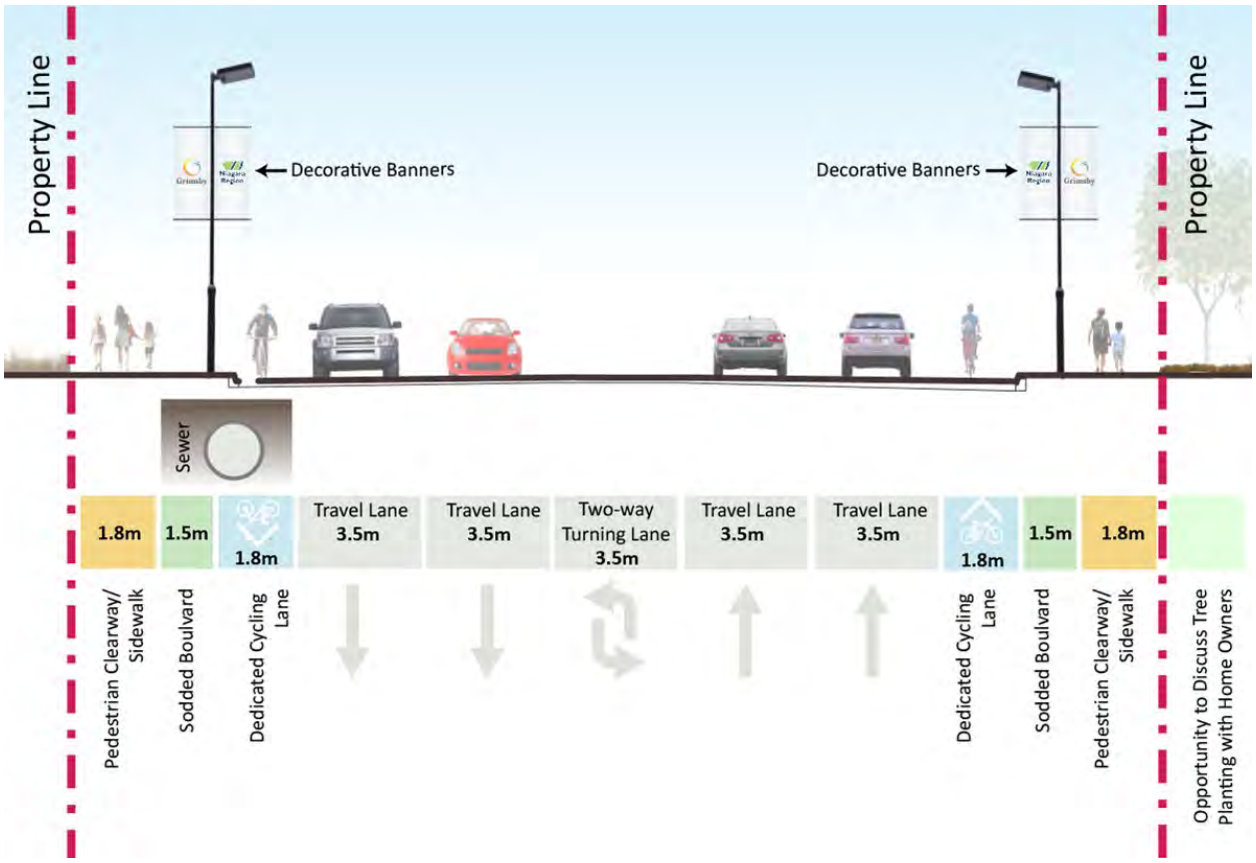


Figure 8-8 Typical Casablanca Boulevard Cross Section (north of Livingston Avenue)

The proposed 1200 mm storm sewer is recommended to be located under the new west side curb line. With the lowered gradeline, all adjacent properties will be able to drain to the roadway and into the sewer. The road profile will require matching the rail elevation in the vicinity of the crossing and auxiliary road ditches and catchbasins will be required to handle the surface runoff in the area near the rail crossing.

A small section of an east side entrance roadway is recommended south of the rail crossing (see **Figure 8-9**). This driveway consolidation will service three properties and will facilitate access to and from these residents during train crossings. Currently vehicle queues can restrict access.

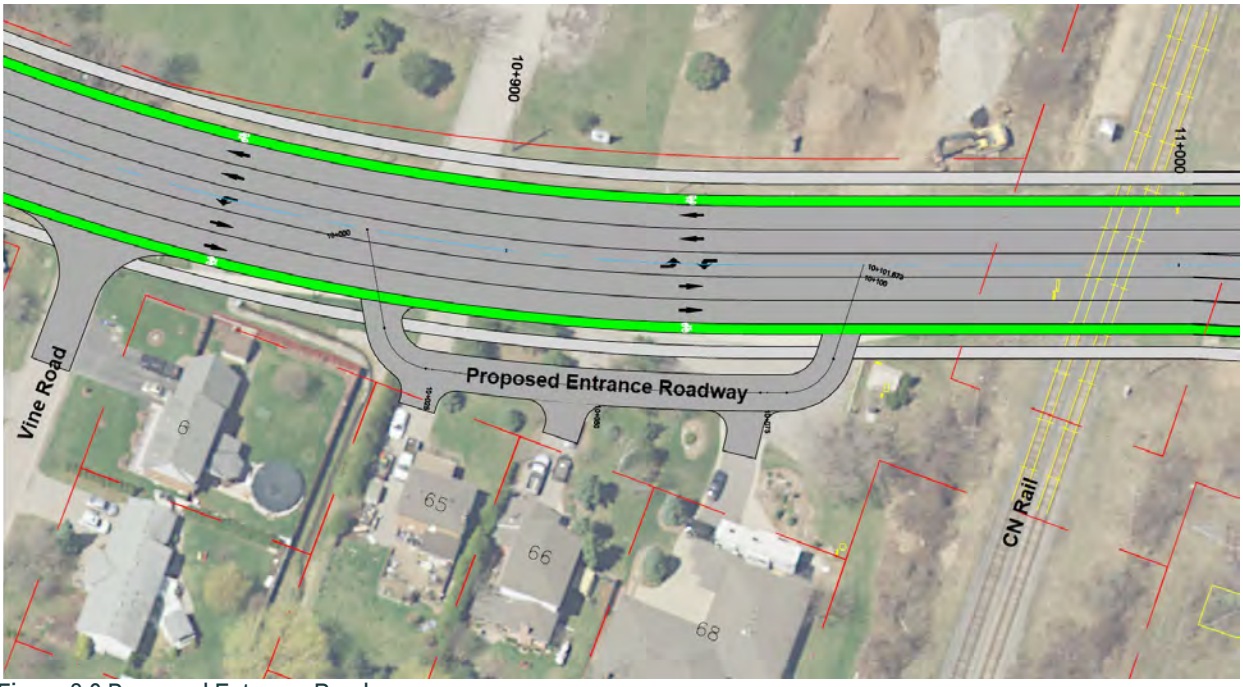
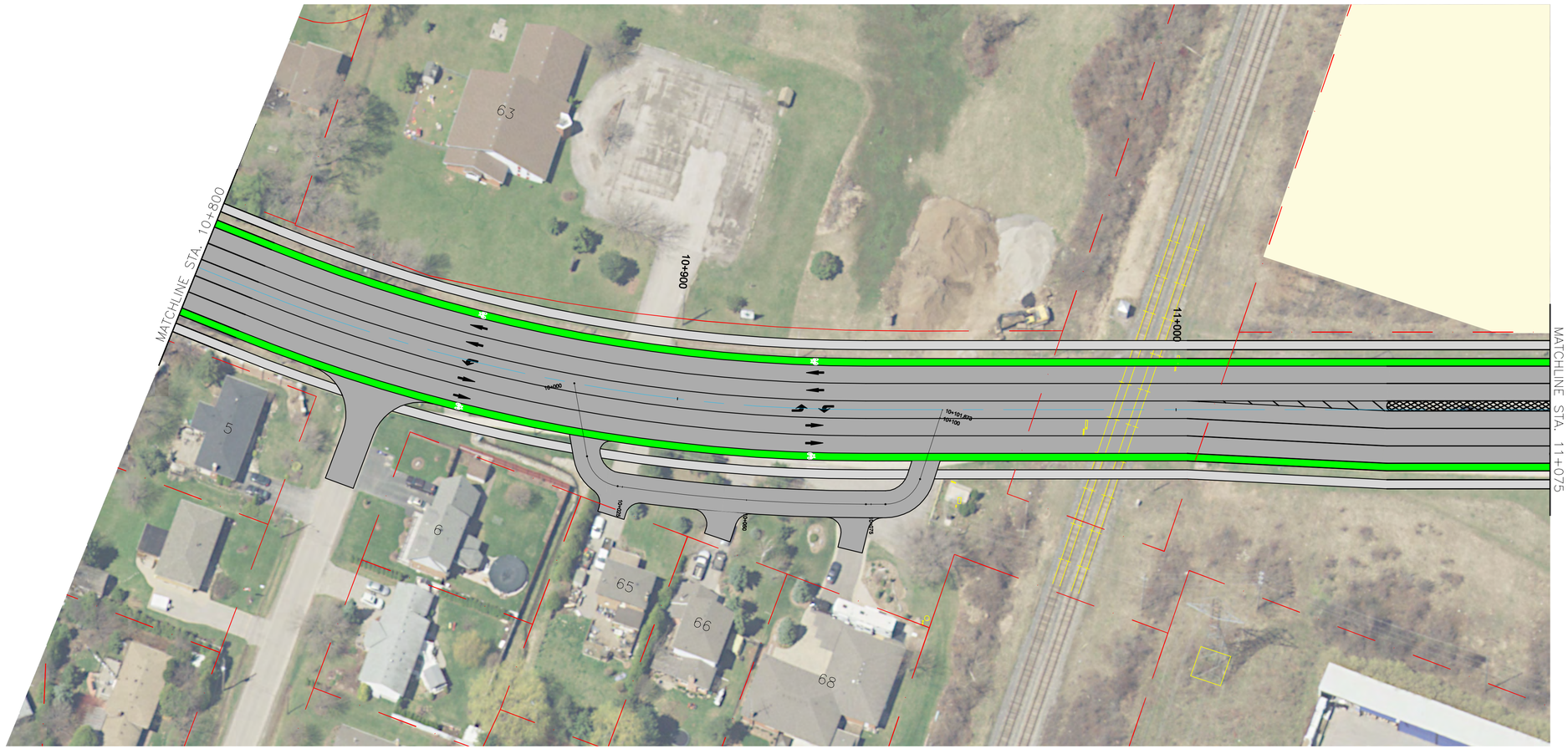


Figure 8-9 Proposed Entrance Roadway



CASABLANCA BOULEVARD

5m 0 10m
Horizontal

NO.	REVISION	DATE	INIT.
0	ISSUED FOR	YYYY-MM-DD	XXX

NOTES/LEGEND

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DRAFTING	GCC
DESIGN	SMP
CHECKED BY	SMP
APPROVED BY	PAM

Niagara Region
PUBLIC WORKS

DILLON CONSULTING

PREFERRED DESIGN

CASABLANCA BOULEVARD (SOUTH OF SOUTH SERVICE ROAD TO NORTH OF LIVINGSTON AVENUE)

CONSULTANT FILE No.	18-7650
DATE	2019-01-07
SCALE	AS SHOWN
REF. No.	#
DWG No.	8-3
REV.	0

DRAWING FILE: C:\projectwise\working directory\projects 2018\20gcc\dms42232\187650 - Casablanca and Livingston Corridor Option 1_V4.dwg PLOTTED: Jan 07, 2019 - 10:17am PLOTTED BY: 20gcc

8.4.2 At-Grade CN Rail Crossing

Two treatments have been developed at the CN Rail crossing, with and without the added southbound queuing lane, as shown on **Figures 8-10 and 8-11**. The timing of implementation of the additional queuing lane will be based on monitoring of the southbound vehicle queuing on the two available lanes. If traffic backups create unacceptable queuing, adding the additional lane should be considered. Traffic simulations of the rail crossing with various future train combinations (GO train and freight train) have indicated that additional lane capacity is appropriate at the crossing to accommodate future traffic volumes and resulting traffic queues. An additional 3.5 m of property will need to be protected for the future queuing lane.

The existing signal control and crossing treatment at this location will need to be revised as part of the new GO Transit Station works. This work should incorporate the modified road cross section and lane/active transportation components into the new crossing treatment. Ongoing coordination with Metrolinx and CN Rail will be required.

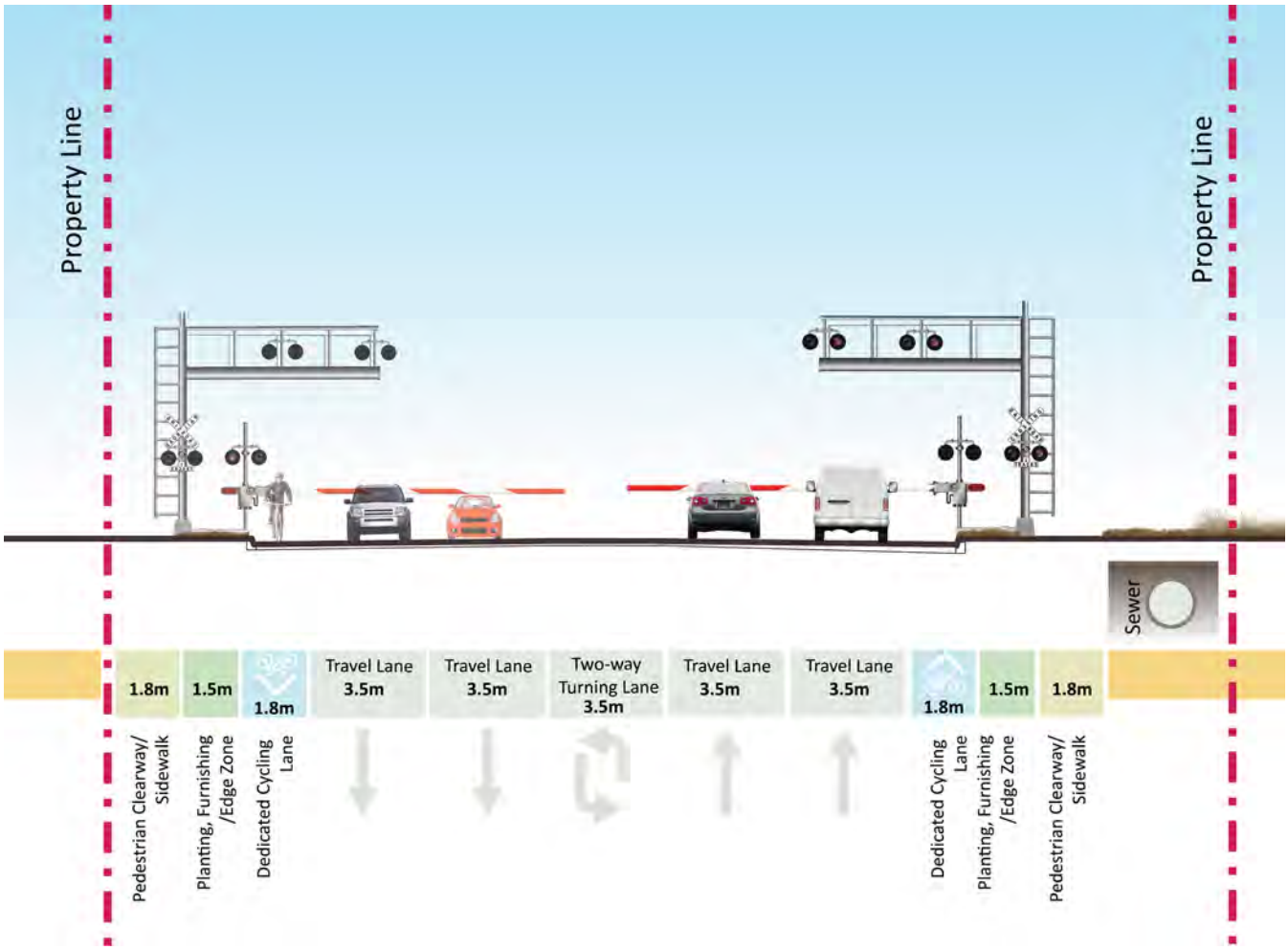


Figure 8-10 Initial Stage Cross Section - Casablanca Boulevard at the CN Rail Crossing

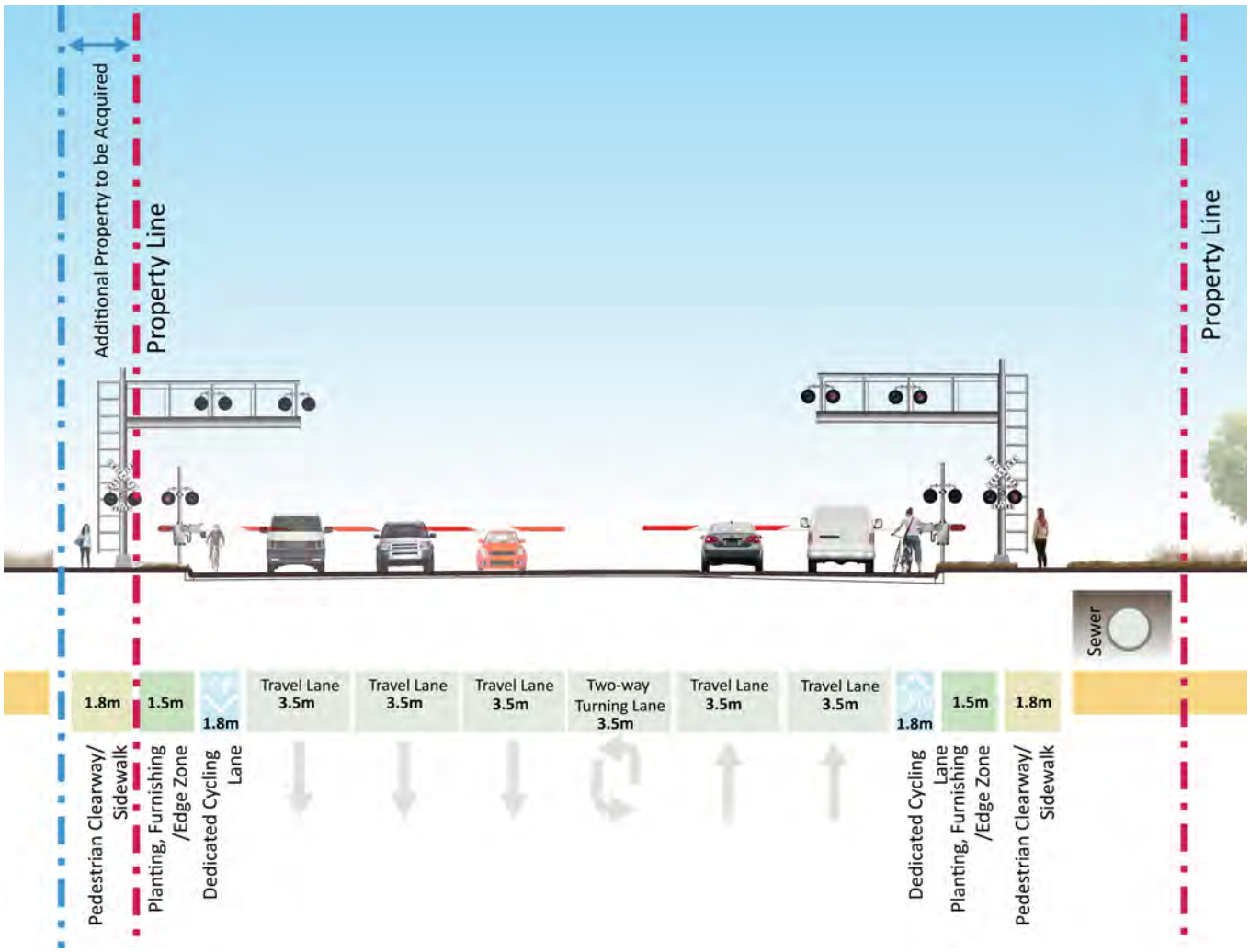


Figure 8-11 Future Stage Cross Section - Casablanca Boulevard at the CN Rail Crossing

8.4.3 Active Transportation

Active transportation components in this section include the following:

- On-road cycling lane in each direction; and
- Outside sidewalks on each side separated from the cycling lanes by a boulevard

8.4.4 Electrical and Illumination

Full illumination will be provided along this section of Casablanca Boulevard. A review of all existing illumination, warrants and determination of illumination recommendations will be completed during Detailed Design.

8.4.5 Property

Generally, all proposed, new facilities in this section can be constructed within existing property limits with the following exception:

- Property protection for an additional southbound rail crossing queuing lane (from the south side of the South Service Road to south of the rail crossing) will require a west side widening of the Casablanca Right-of-Way by 3.5m for the full extent of the queuing lane. This lane will taper out at the north end of this section (at approximately opposite Vine Street)

The recommended, east-side access road/entrance roadway treatment for the three properties closest to the CN Railway crossing can be constructed within available Region property limits due to the wide Right-of-Way on the east side of the road in this location.

8.4.6 Utilities

Existing utilities along the Casablanca Boulevard Corridor (South of the South Service Road to North of Livingston Avenue) are summarized in **Table 8-3**. Conflicts with the proposed construction will be identified and any necessary utility relocation will be determined during Detailed Design.

Table 8-3 Utilities in the Casablanca Boulevard Corridor (South of the South Service Road to North of Livingston Avenue)

Utility Owner	Description/Location
Bell Canada	• Underground cable – west side of Casablanca Boulevard (two lines) • Underground cable – along rail corridor (multiple lines)
Enbridge Gas Distribution	• Underground gas main – east side of Casablanca Boulevard • Underground gas main – along rail corridor.
Hydro One	• East-west transmission tower line north of the rail
Rogers	• Underground cable (multiple lines) along rail corridor
Town of Grimsby	• Watermain – east side of Casablanca Boulevard (multiple lines) • Sanitary sewer – east side of Casablanca Boulevard • Storm sewer – short section on east side just north of Livingston
Grimsby Power	• North-south aerial poles – east side of Casablanca Boulevard

8.4.7 Construction Staging and Traffic Management

Construction staging and traffic management plans for the roadworks in this section will be developed during Detailed Design. As before, it is expected that construction of the road widening, lowering and storm sewer works along Casablanca Boulevard can be achieved while maintaining one lane of traffic in each direction. Periodic, short closures may be required for certain construction operations but these will be kept to a minimum. With the extent of widening proposed, the new road sections can be constructed while maintaining traffic on available pavement and then switching traffic to the new pavement section to continue construction. Initial construction will likely involve utility relocations and the construction of the Casablanca Boulevard's new storm sewer and potential stormwater management facility. Coordination with the Town's new watermain in this section will be required.

8.5 Future Casablanca Boulevard/CN Rail Grade Separation

The need for a grade separated crossing at the CN Rail on Casablanca Boulevard was reviewed as part of the identification of problem/needs/opportunities (see **Section 5.4** for a discussion of grade separation rail crossing warrant aspects).

8.5.1 Proposed Roadworks

Drawing 8-4 illustrates the recommended treatment for the rail underpass. **Figure 8-12** shows the recommended road cross section at the crossing.

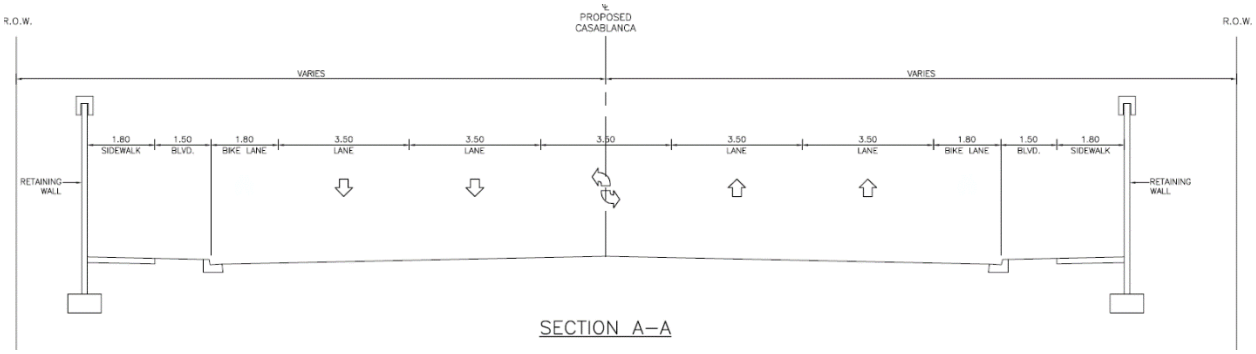


Figure 8-12 Cross Section of Casablanca Boulevard at the Future CN Rail Crossing

Rail grade separation treatment components of note include the following:

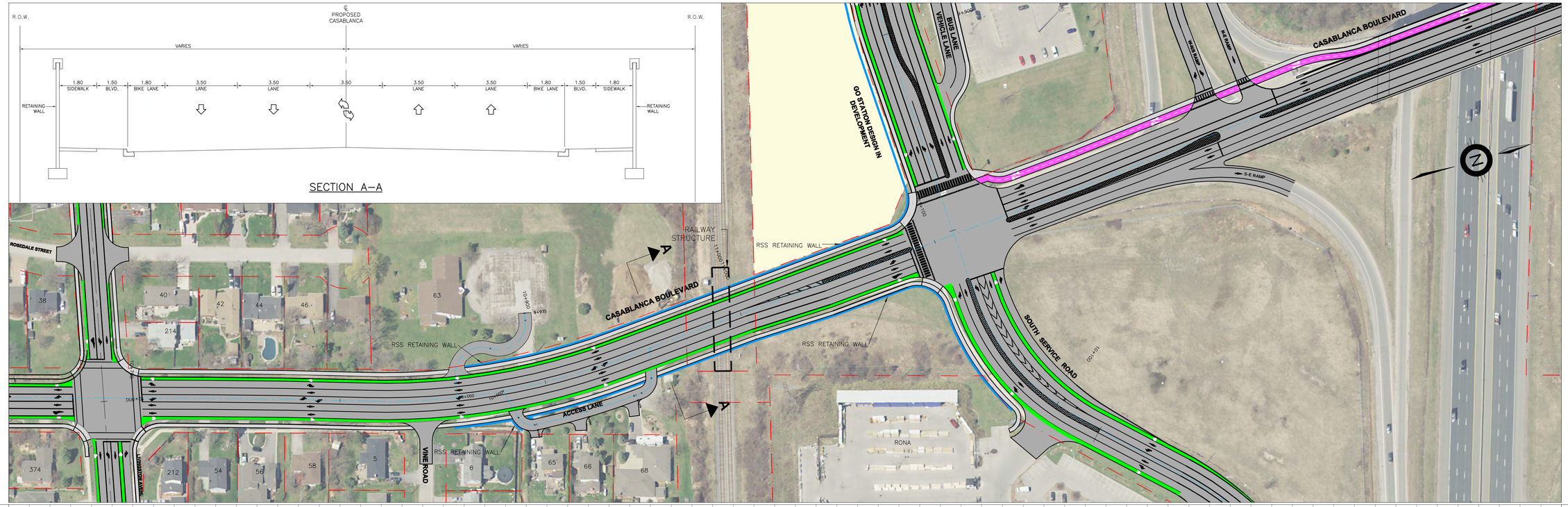
- Road grade lowering to achieve the required underpass profile will begin just south of Vine Road which will require a 5% grade to pass under the rail with a clearance of 5.4 m to underside of the new rail deck. On the north side the road grade has been kept to 3.0% due to the intersection with the South Service Road;
- Road lowering of up to approximately 7.0 m will be required;
- The installation of significant lengths of retaining walls will be necessary throughout the lowered section from just north of Vine Road to the South Service Road and along the south side of the South Service Road. Impacts to adjacent properties will result from wall construction, notably to the new GO Transit Station as excavation requirements will extend east and west of the current road property limits;
- At the South Service Road grade lowering of approximately 3.0 m will be required necessitating re-construction along the service road both east and west of Casablanca Boulevard;
- The east-side access road/entrance roadway for the three properties closest to the CN Railway crossing will require reconstruction;
- West side access to the former church property will be restricted to the south end of the property where appropriate grades can be achieved. A driveway grade of 6.0% minimum will be required;

- A pumping Station will need to be implemented with the underpass to drain the low point, outletting to the north; and
- It is recommended to maintain the on-road cycling lanes and outside sidewalks through the underpass.

Provision of this underpass will be a significant project with considerable construction cost. It is recommended that the underpass alternative as detailed be protected for and the operations of the at-grade treatment be monitored to identify any operations issues or concerns. The possible, future provision of the additional southbound queuing lanes should serve to delay the grade separation's implementation, if required, well into the future.

8.5.2 Construction Staging and Traffic Management

A long-term closure of Casablanca Boulevard will be required to construct the underpass. A minimum of 18 months closure period is likely. Construction of the new rail bridge will also likely require the implementation of a south side rail diversion which will affect the new GO Transit Station platforms and may impact GO Transit Station operations during its use.



NO.	REVISION	DATE	INIT.
1	ISSUED FOR STAKEHOLDER REVIEW	2018–09–18	PAM

NOTES/LEGEND

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PRELIMINARY ONLY

DRAFTING
SMP
DESIGN
SMP
CHECKED BY
SMP
APPROVED BY
PAM

Niagara Region
PUBLIC WORKS

DILLON
CONSULTING

PREFERRED DESIGN

FUTURE CASABLANCA BOULEVARD
CN RAIL GRADE SEPARATION

CONSULTANT FILE No. 18–7650
DATE 2019–02–22
SCALE AS SHOWN
REF. No.
DWG No. 8-4
REV. 0

DRAWING FILE: C:\projectwise\working directory\projects 2018\20gcc\dms39814\187650-CNR Grade Separation Plan and Profile V3.dwg PLOTTED: Feb 22, 2019 – 3:20pm PLOTTED BY: 20gcc

8.6 Casablanca Boulevard (North of Livingston Avenue to Main Street West)

8.6.1 Roadworks, Frontage/Access Treatments and Property Requirements

Proposed work in this section will include the following also depicted on **Drawing 8-5**:

- Lowering the existing road from just north of Main Street northerly (by approximately 1 m) to facilitate area drainage;
- Reconfigure the existing Casablanca/Livingston intersection by providing the following:
    - Five-lanes on the northern leg (southbound right turn lane, southbound lane, southbound left-turn lane, two northbound lanes);
    - Four-lanes on the southern leg (southbound lane, northbound left-turn lane, northbound lanes, northbound through/right turn lane);
    - Three-lanes on the west leg (westbound lane, eastbound left-turn lane, eastbound through/right turn lane); and
    - Four-lanes on the east leg (westbound right turn lane, westbound through lane, westbound left-turn lanes, eastbound lane).
- Elimination of the right turn island for westbound to northbound trips. This right turn will now take place from a separate right turn lane. This will improve conditions for northbound cyclists on Casablanca Boulevard;
- Providing one travel lane in each direction on Casablanca Boulevard south from Livingston Avenue with a continuous, two-way left-turn lane;
- Dedicated cycling lanes and sidewalks on both sides of the street;
- Urbanization of the road corridor, adding a storm sewer to replace existing open ditches, and consolidation of utility poles. A rural treatment will be required approaching Main Street West to transition to the existing ditch section at the south end; and
- Comprehensive vegetation in the east side planting zone from Main Street West north to Livingston Avenue where property is available along the east side, adjacent to the property line.

Figure 8-13 illustrates the existing road cross section and **Figure 8-14** the proposed cross section and recommended road elements in this section of the corridor. Similar to the section to the north, a proposed 1200 mm storm sewer is recommended to be located under the new west side curb line. With the lowered gradeline, all adjacent properties will be able to drain to the roadway and into the sewer. The road profile will require matching the existing elevation at Main Street West and auxiliary road ditches and catchbasins will be required to handle the surface runoff in the area near the crossing.

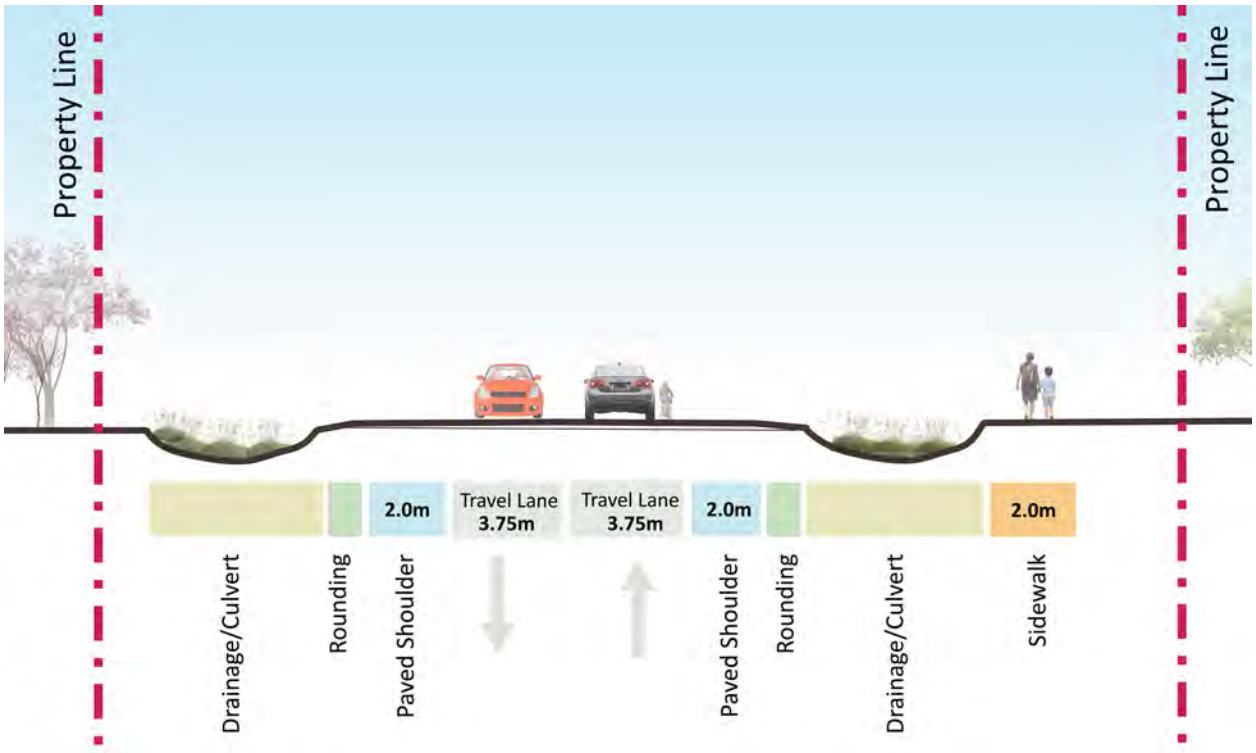

Figure 8-13 Existing Casablanca Boulevard Cross Section (south of Livingston Avenue)

The new east side sidewalk will be approximately 2.5 m closer to the property line than the current sidewalk. Removal of the east and west side ditches will result in a significant change through this section of road corridor. Removal of existing, mature trees will be required, notably along the east side of the road. Tree removal will be kept to a minimum. A planting zone has been identified along the east side for re-planting. This available zone exists from Main Street West to just south of Livingston Avenue. The width of the planting zone varies but is generally approximately 5m wide which will allow for the establishment of more comprehensive plantings and vegetation.

Driveways will be adjusted/re-graded to fit the lowered road grade.

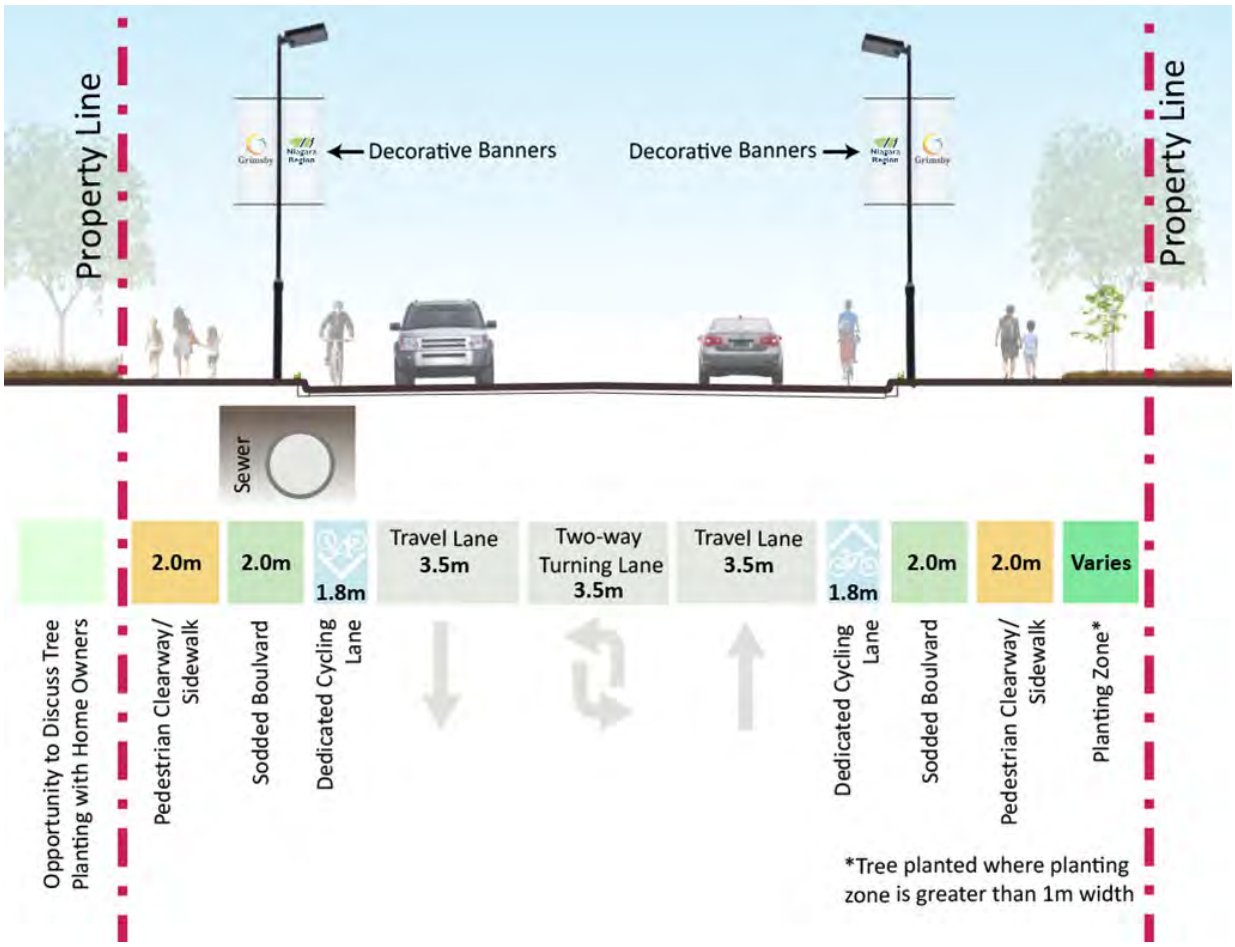

Figure 8-14 Typical Proposed Casablanca Boulevard Cross Section (south of Livingston Avenue)

8.6.2 Active Transportation

Active transportation components in this section include the following:

- On-road cycling lane in each direction; and
- Outside sidewalks on each side separated from the cycling lanes by a boulevard.

8.6.3 Electrical and Illumination

Full illumination will be provided along this section of Casablanca Boulevard. A review of all existing illumination, warrants and determination of illumination recommendations will be completed during Detailed Design.

Traffic signals will be provided at the following locations:

- Casablanca Boulevard at Livingston Avenue; and
- Casablanca Boulevard at Main Street West.

8.6.4 Property

Generally, all proposed, new facilities in this section can be constructed within existing property limits with the following exceptions:

- Additional daylighting property triangles will be required at the following locations:
  - Northwest quadrant of the Main Street West intersection (12 m x 12 m); and
  - Southwest, northwest and southeast quadrants of the Livingston Avenue intersection (8m x 8 m).
- An additional, short 3.2 m wide section of property will be required on the west side of the road at the extreme south end of the project north of Main Street west where the cross section transitions to a full urban cross section.

8.6.5 Utilities

Existing utilities in the Casablanca Boulevard Corridor (South of Livingston Avenue are summarized in **Table 8-4**. Conflicts with the proposed construction will be identified and any necessary utility relocation will be determined during Detailed Design.

Table 8-4 Utilities in the Casablanca Boulevard Corridor (South of Livingston Avenue)

Utility Owner	Description/Location
Bell Canada	• On combined aerial line east side between the existing road and sidewalk from Main Street West to Livingston Avenue • On combined line north side along Main Street at Casablanca Boulevard intersection
Enbridge Gas Distribution	• Underground gas main – west side 200 m north • Underground gas main – east side just inside the east property line from Main Street West to Livingston Avenue
Grimsby Power Incorporated	• On combined aerial line east side between the existing road and sidewalk from Main Street West to Livingston Avenue • On combined line north side along Main Street at Casablanca Boulevard intersection
Cogeco Cable	• On combined aerial line east side between the existing road and sidewalk from Main Street West to Livingston Avenue • On combined line north side along Main Street at Casablanca Boulevard intersection
Town of Grimsby	• Watermain – under road from Main Street to Livingston Avenue (swings to east side just south of Livingston Avenue • Sanitary sewer – east side of Casablanca • Storm sewer – short section on east side just north of Livingston

8.6.6 Construction Staging and Traffic Management

Construction staging and traffic management plans for the roadworks in this section will be developed during Detailed Design. As discussed before, it is expected that construction of the road widening, lowering and storm sewer works along Casablanca Boulevard can be achieved while maintaining one lane of traffic in each direction. Periodic, short closures may be required for certain construction operations but these will be kept to a minimum. Initial construction will likely involve utility relocations and the construction of the Casablanca Boulevard's new storm sewer and potential stormwater management facility.

CASABLANCA BOULEVARD

10+000

10+100

10+200

10+300

CASABLANCA BOULEVARD

10+000

MAIN ST. WEST
REGIONAL ROAD 81

ELGIN STREET

MATCHLINE STA. 10+400

CASABLANCA BOULEVARD

ROSEDALE STREET

MATCHLINE STA. 10+400

CASABLANCA BOULEVARD

10+500

10+600

38

40

42

44

46

214

CASABLANCA BLVD

10+700

000+00

MATCHLINE STA. 10+800

JAMES STREET

374

LIVINGSTON AVENUE

212

54

56

58

CASABLANCA BOULEVARD

5m 0 10m
Horizontal

NOTES/LEGEND

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NO.	REVISION	DATE	INIT.
0	ISSUED FOR	YYYY-MM-DD	XXX

DRAFTING	GCC
DESIGN	SMP
CHECKED BY	SMP
APPROVED BY	PAM

Niagara Region
PUBLIC WORKS

DILLON CONSULTING

PREFERRED DESIGN

CASABLANCA BOULEVARD (NORTH OF LIVINGSTON AVENUE TO MAIN STREET WEST)

CONSULTANT FILE No.	18-7650
DATE	2019-01-07
SCALE	AS SHOWN
REF. No.	#
DWG No.	8-5
REV.	0

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8.7 Livingston Avenue (Casablanca Boulevard to West of Emily Street)

8.7.1 Proposed Roadworks

Proposed work in this section will include the following:

- Lowering the existing road to facilitate urbanization and local drainage;
- Reconfigure the existing local intersections at the following locations:
  - Rosedale Street; and
  - Emily Street.
- Provide for a two-lane road plus continuous left-turn lane;
- Extend Livingston Avenue west of the existing section along the full frontage of Niagara Region's existing property parcel to the west;
- Dedicated cycling lanes and sidewalks on both sides of the street;
- Urbanization of the road corridor, adding a storm sewer to replace existing open ditches, and consolidation of utility poles; and
- The outlet sewer for the new Casablanca Boulevard storm sewer will be placed under Livingston Avenue from Casablanca Boulevard to the new SWM facility to the west.

Figure 8-15 illustrates the existing road cross section and **Figure 8-16** the proposed cross section and recommended road elements for Livingston Avenue. With a lowered gradeline, all adjacent properties will be able to drain to the roadway and into the sewer. The preferred design of this section of the roadway is illustrated in Drawing 8-6.

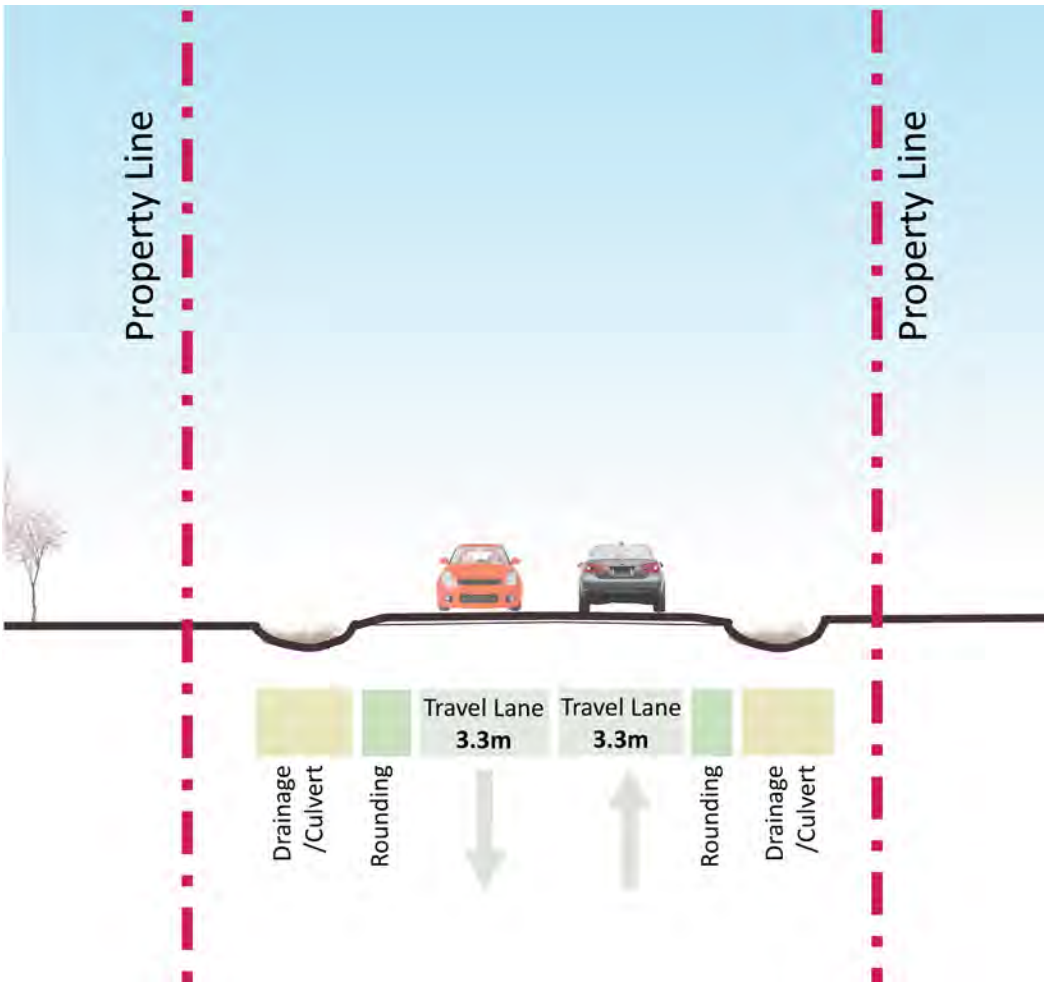


Figure 8-15 Existing Livingston Avenue Road Cross Section form Casablanca Boulevard to West of Emily Street

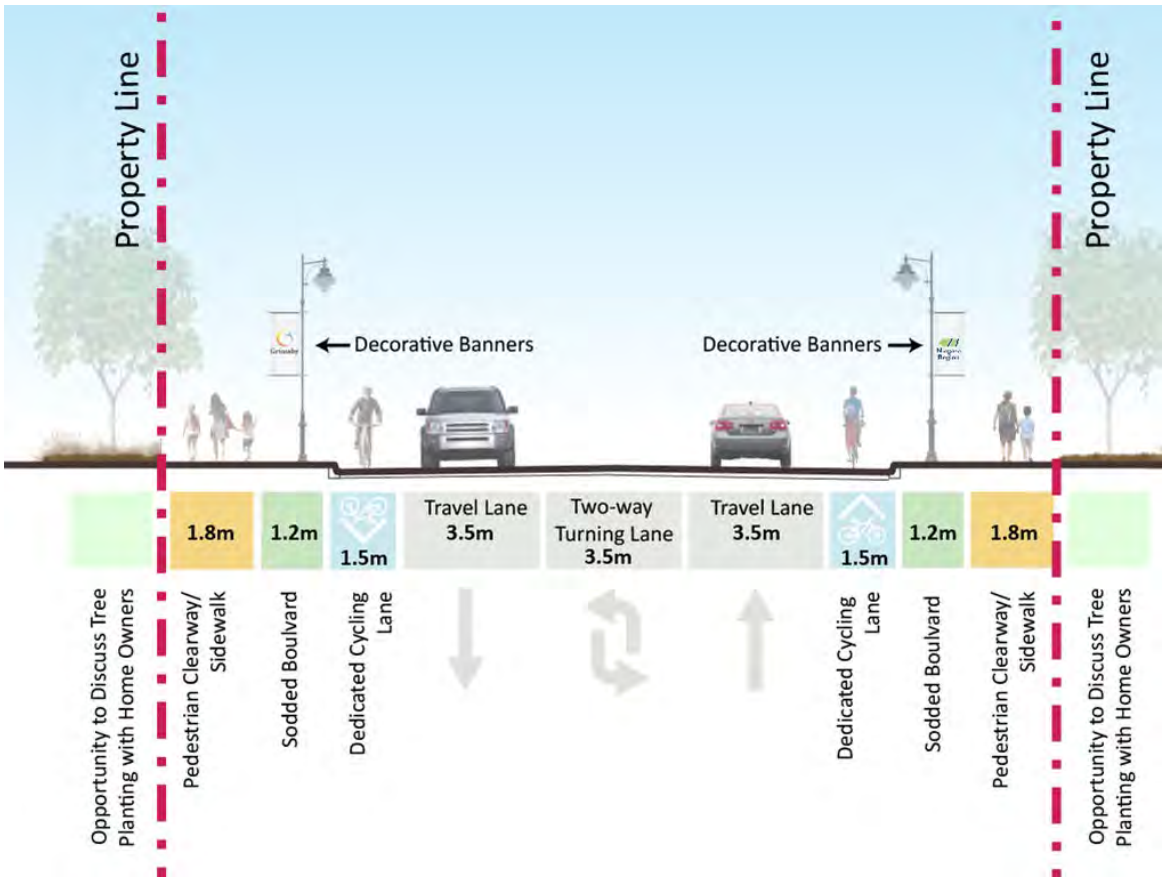


Figure 8-16 Proposed Livingston Avenue Road Cross Section form Casablanca Boulevard to West of Emily Street

8.7.2 Active Transportation

Active transportation components in this section include the following:

- On-road cycling lane in each direction; and
- Outside sidewalks on each side separated from the cycling lanes by a boulevard.

8.7.3 Electrical and Illumination

Full illumination will be provided along this section of Livingston Avenue. A review of all existing illumination, warrants and determination of illumination recommendations will be completed during Detailed Design.

8.7.4 Property

All proposed, new facilities along Livingston Avenue can be constructed within existing property limits.

8.7.5 Utilities

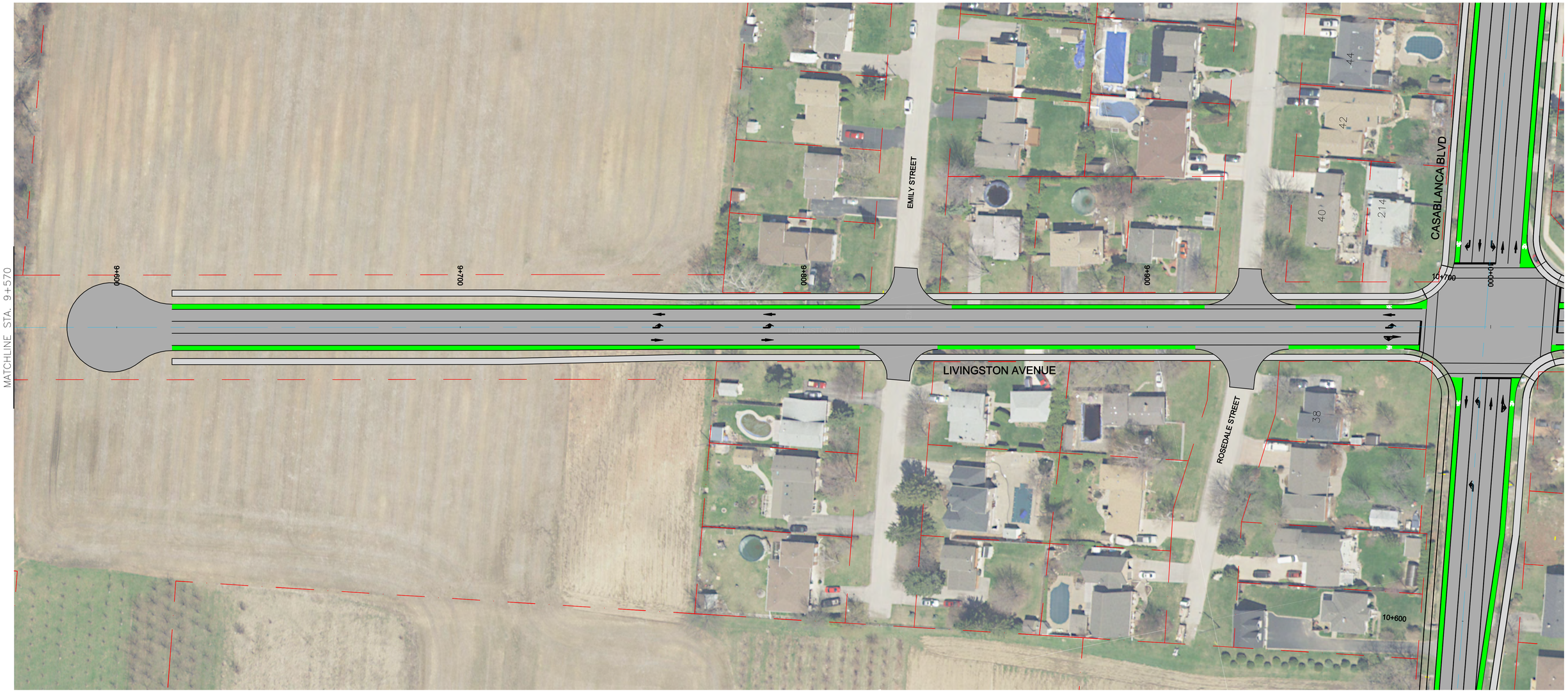
Existing utilities in the Livingston Avenue corridor west of Casablanca Boulevard are summarized in **Table 8-5**. Conflicts with the proposed construction will be identified and any necessary utility relocation will be determined during Detailed Design.

Table 8-5 Utilities in the Livingston Avenue Corridor (West of Casablanca Boulevard)

Utility Owner	Description/Location
Bell Canada	• On combined aerial line south side between Emily Street and Casablanca • Underground line north of road
Enbridge Gas Distribution	• Underground gas main – north side
Grimsby Power Incorporated	• On combined aerial line south side between Emily Street and Casablanca
Cogeco Cable	• On combined aerial line south side between Emily Street and Casablanca
Town of Grimsby	• Watermain – under road north side • Sanitary sewer – generally south of the road

8.7.6 Construction Staging and Traffic Management

Construction staging and traffic management plans for the roadworks in this section will be developed during Detailed Design. It is expected that construction of the road widening, lowering and storm sewer works along Livingston Avenue can be achieved while maintaining one lane of traffic in each direction. Periodic, short closures may be required for certain construction operations but these will be kept to a minimum. Initial construction will likely involve utility relocations and the construction of the new storm sewer and stormwater management facility.



LIVINGSTON AVENUE

NOTES/LEGEND

1 THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWER AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

2 PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.

NO.	REVISION	DATE	INIT.
0	ISSUED FOR	YYYY-MM-DD	XXX

DRAFTING	GCC
DESIGN	SMP
CHECKED BY	SMP
APPROVED BY	PAM

Niagara Region PUBLIC WORKS

DILLON CONSULTING

PREFERRED DESIGN

LIVINGSTON AVENUE (CASABLANCA BOULEVARD TO WEST OF EMILY STREET)

CONSULTANT FILE No.	18-7650
DATE	2019-01-07
SCALE	NTS
REF. No.	#
DWG No.	8-6
REV.	0

DRAWING FILE: C:\projectwise\working directory\projects 2018\20gcc\dms42232\187650 - Casablanca and Livingston Corridor Option 1_V4.dwg PLOTTED: Jan 07, 2019 - 10:44am PLOTTED BY: 20gcc

8.8 Drainage

8.8.1 Background

There are three principle drainage catchment areas and outlets from which runoff from the new facilities will be directed (see **Figure 8-17**). Catchment Area 1 drains to Outlet No. 9, Catchment Area 2 drains to Outlet No. 10 and Catchment Area 3 drains to Outlet No. 11. The Casablanca Boulevard/QEW interchange is located in Catchment Areas 1 and 2 and discharges runoff to Lake Ontario at Outlets 9 and 10. Three QEW cross culverts are located in these catchment areas conveying flows under the QEW from the south to the north. Roadway expansion works associated with this project within Catchment Areas 1 and 2 will add minimal additional new pavement areas and, as a result, peak flows to the three QEW culverts and at the two outlets at Lake Ontario are not expected to increase measurably.

Flow increases will be essentially restricted to Catchment Area No. 3 where most of the expanded facilities in the widened Casablanca Boulevard corridor are situated (i.e. from Main Street West to just north of the South Service Road). Catchment Area 3 drains to a separate outlet to the east referred to as Outlet No. 11. The drainage channel associated with Outlet No. 11 passes under the QEW through an existing concrete box culvert just north of the South Service Road. As indicated previously, the stormwater management systems and facilities put in place for development along the South Service Road within Catchment Area 3 and draining to Outlet No. 11 have been designed assuming no-net impact on flow regime within the receiving water system. As a result, flow increases resulting from the roadway expansion will require management to limit the potential for flow increases along the channels and culverts associated with Catchment Area 3.

The main drainage channel in Catchment Area 3 starts as a north-south roadside ditch along Casablanca Boulevard (both sides) north from Main Street West and outlets the corridor north of Vine Road, flowing from west to east, crossing Casablanca Boulevard through an existing corrugated steel pipe culvert, continuing east along the rear-yards of residential properties on Vine Road and Walnut Street. The intermittent watercourse eventually crosses the CN Rail corridor approximately 200 m east of Casablanca Boulevard From the rail corridor the watercourse flows north through the South Service Road Rona/Superstore commercial development, the QEW corridor and the undeveloped lake-front property north of the North Service Road. The intermittent watercourse provides an outlet to several Town of Grimsby local storm sewer systems along Gage Street and Magnolia Crescent as well as the existing Casablanca Boulevard corridor. The immediate area along the intermittent watercourse from Vine Road to the CN Rail corridor exhibits local flooding and ponding due to restricted conveyance and therefore this area would be sensitive to any flow increases.

Figure 8-17 Drainage Catchment Areas and Outlets

The proposed improvements to the Casablanca Boulevard and Livingston Avenue corridors impacting the components of existing drainage system are as follows:

- Widening of Casablanca Boulevard from a 2-lane rural cross-section to a 4-lane plus two-way left turn lane north from Livingston Avenue with fully urban cross-section including grass boulevard areas and sidewalks/cycle allowances;
- Improvements to Livingston Avenue from Casablanca Boulevard to west of Emily Street with an urban cross-section including general intersection improvements, the addition of auxiliary turn lanes, grass boulevards and sidewalks/cycle allowances;
- Intersection improvements at Casablanca Boulevard and the South Service Road, including the addition of grass boulevards and sidewalks;
- Reconfiguration of the Casablanca Boulevard/QEW interchange treatment over the existing bridge to accommodate ramp and speed-change-lane improvements and to incorporate a wide multi-use pathway along the west side; and
- Elimination of roadside ditches flanking Casablanca Boulevard south of the CN Rail corridor and the installation of a storm sewer system capable of draining the proposed paved surfaces within the Right-of-Way and conveying external drainage area flows to the appropriate receiving water system.

8.8.2 Stormwater Management Design Criteria

General stormwater management design criteria, related to the proposed improvements to Casablanca Boulevard and Livingston Avenue corridors, have been based on a review of available background documents including the local MTO QEW Stormwater Management Report (1995) dealing with the interchange area, the Town of Grimsby Stormwater Management Masterplan Strategy (2016) and site specific design constraints. The general project stormwater management design criteria adopted for this project includes the following:

1. The alteration of hydrologic characteristics, resulting from the increase in imperviousness within the Casablanca Boulevard and Livingston Avenue Road corridors, should have no-net-impact on the rate of stormwater runoff discharged to any given receiving water system. This includes changes in flow regime for design flows up to and including the ‘Major’ storm event (100-year return period).
2. The proposed improvements should not increase the risk of flooding within any one of the receiving water systems, particularly the Vine Road intermittent drainage channel which has been previously identified as having limited capacity to convey ‘Major’ storm events.
3. Alteration of the hydrologic characteristics within the impacted road corridors should not result in a reduction in the level of service of existing MTO drainage infrastructure, specifically the freeboard and clearance of the QEW culverts that facilitate drainage to Outlet No. 9, 10 and 11 should not be negatively impacted.

4. Quality control and enhancement of stormwater runoff should be provided to meet the MOEE 'Normal' level of treatment prior to discharging to existing intermittent and permanent watercourse receiving water systems. Although the existing receiving water system have been identified as having limited fish and fish habitat resources, 'Enhanced' level of stormwater quality control treatment should be considered given the proximity of the study area to Lake Ontario.

As part of the preliminary design process several overall drainage and stormwater management strategies have been developed to address the change in hydrologic characteristics that will result from improvements within the Casablanca Boulevard/Livingston Avenue corridor south of the CN Rail corridor, in Catchment Area 3. The key drivers behind the development of the stormwater management strategy include:

- The need to effectively collect and convey stormwater runoff from the roadway corridor and direct runoff to an outlet with sufficient capacity for post-improvement design flows;
- The need to control post-improvement runoff rates to a level that does not worsen flooding concerns within the Vine Road rear-yard intermittent drainage channel, specifically in the areas that the drainage channel is located on private property;
- The need to convey major and minor flows in a way that does not negatively impact the level of service of the roadway during extreme rainfall events and accommodates the potential future grade separation at the CN Rail corridor. Considerations include the location of a storm sewer crossing the railway at a sufficient offset from the road so as not to impact the retaining wall systems associated with the possible future grade separation;
- Establishing a roadway profile on Casablanca Boulevard that efficiently conveys major overland flow to a location that it can be controlled or conveyed to an appropriate outlet and minimizes the drainage area associated with the final grade separation roadway drainage areas, therefore optimizing the size of a potential future stormwater pumping Station;
- Accommodating future drainage improvements on the Region's property parcel located south of the proposed GO Transit Station site; and
- Developing an overall stormwater management strategy that is both cost effective and constructible considering development limitations with the 'Greenbelt' area, limited physical space within the existing Casablanca Boulevard road corridor and making the best use of green-space within the Casablanca Boulevard/QEW interchange area.

In addition to the anticipated changes to the Casablanca Boulevard corridor south the of CN Rail corridor, the preliminary design includes minor changes to the configuration of the road network north of the railway, most notably the addition of traffic lanes on the South Service Road. The changes to the roadway configuration are geared primarily towards accommodating additional capacity and dedicated turning movements. The anticipated changes to the lane configurations along Casablanca Boulevard and the Service Roads represent relatively small changes to the overall level of imperviousness within the interchange drainage areas, most notably the south-

east quadrant. With targeted over-control of runoff from the southerly portion of the study area it is anticipated that the area north of the rail corridor will be allowed to drain without previsions for quantity control. Where possible, roadside ditch enhancements such as widening with 1-2 m flat bottoms will be implemented to provide some additional runoff storage within the conveyance system, prior to discharging to respective receiving water systems. Final hydrologic modelling of the watershed area will demonstrate no-net increase in stormwater flows, particularly to the QEW culvert located along Outlet No. 11, the ultimate receiving water system for a majority of the Casablanca Boulevard corridor in the Study Area.

Providing a stormwater management (SWM) facility within the unused MTO lands in the south-east quadrant of the QEW/Casablanca interchange was developed as an initial alternative. However, consultation with MTO noted that the agency would prefer to protect these lands for future uses, with the consideration that the interchange lands would be unsuitable for a SWM facility.

Throughout the preliminary design process, the stormwater management strategy for the Casablanca Boulevard corridor evolved considerably. During the early phases of preliminary design significant effort was undertaken to identify design constraints and opportunities to develop a holistic drainage strategy that would both meet the necessary environmental commitments of the overall project but also address existing drainage deficiencies along the existing corridor. Consideration was given to develop a holistic stormwater management solution for the corridor, the Region's future GO Transit Station related infrastructure along Livingston Avenue, as well as the Metrolinx development site on the north side of the CN Rail corridor, but coordination of all projects proceeding on different time lines meant that a 'stand-alone' solution had to be developed to address the needs of the Casablanca Boulevard widening and Livingston Avenue improvement project.

A conveyance system stormwater management control strategy was identified as the preferred drainage solution, in order to minimize the property implications along the Casablanca Boulevard corridor while incorporating a new storm sewer outlet that diverts surface water away from the Vine Road intermittent flow channel. The improved Casablanca Boulevard corridor would be serviced with a new trunk storm sewer capable of conveying runoff generated by the corridor and external drainage areas for both major and minor storm events (see **Figure 8-18**). Similar to previous options, the proposed trunk storm sewer would intercept surface water runoff from the residential areas directly adjacent to the road corridor. The trunk storm sewer would be extended westerly on Livingston Avenue, intercepting the external drainage area flow conveyed by the existing undefined major overland flow route and would convey runoff back to the Casablanca corridor. The trunk storm sewer would be sized to provide control of stormwater flows, by way of storage and attenuation, from the Casablanca Boulevard road corridor. The 'Super-Pipe' system would incorporate an outlet control system such that post-improvement peak runoff rates are reduced to pre-improvement levels and allow runoff to be discharged to Outlet No. 11 just upstream of the QEW culvert.

The 'Super-Pipe' system would provide online storage of surface water runoff either throughout its length or centralized in one (or several) key storage node(s) along the Casablanca Boulevard corridor. The degree of over-control of post-improvement flows is a balance of the capital cost of storage provided by the 'Super-Pipe' system and the system flows downstream of the online or centralized facility. A large storage volume would result in a significant reduction in overall system flows discharged to the QEW culvert, whereas minimal storage volumes would result in the need for a larger diameter storm sewer system to convey post-development flows to the ultimate outlet at the QEW culvert (just north of South Service Road) and only have a small influence on the overall system flows. **Table 8-6** identifies the relationship between storage volume and the net impact on system flows discharged to the Outlet No. 11 drainage channel upstream of the QEW culvert.

Table 8-6 SWM Facility Storage/Downstream Flow and Sewer Requirements

Proposed System Flow (Casablanca Road Improvements)	Storage Volume	System Flow Rate at QEW Culvert	Overall Impact on System Flow
7.43 cms	0	7.55 cms	+0.122 cms
7.43 cms	2,500	6.31 cms	-1.12 cms

As indicated in the table, an estimated 'Super-Pipe' storage volume of 2,500 cubic meters is sufficient to reduce post-improvement peak flows to approximately 1.0 cms below the estimated existing conditions flow at the QEW culvert. An approximate 1.0 cms reduction of flows was identified given that only limited modelling was undertaken north of the CN Rail corridor, and therefore this estimate would allow for some flexibility to discharge a portion of the drainage area, north of the CN rail corridor in an uncontrolled manner and still achieve no-net-increase in post-improvement flowrates.

As a key objective of the drainage strategy is at minimum to achieve no-net-increase in post-improvement flowrates, the specific required storage volume to achieve this objective will be identified through the detailed design process with additional modelling to be undertaken. As previously noted the storage volume could be integrated into the overall conveyance system as a continuous 'Super-Pipe' or provided in an underground storage system located at one or more 'nodes' along the corridor. The parcel of property immediately east of Casablanca and south of South Service Road is considered an ideal location for a single storage node. Both fully online and a node-type stormwater management system will be considered as part of the detailed design of the Casablanca Boulevard and Livingston Avenue corridors.

The noteworthy benefits of the recommended stormwater management alternative include:

- Potential to integrate required stormwater management storage system into the design of the Casablanca Boulevard and Livingston Ave corridors, avoiding the need for additional property.
- Opportunity to utilize property (if available from Metrolinx) immediately north of the CN rail corridor for a single storage location making it considerably more cost-efficient than providing online storage.
- Diverts significant area from the existing drainage outlet along Vine Road addressing flood risk by way of removing stormwater discharge from the Casablanca Boulevard and shifting the outlet to a location downstream of the existing drainage channel located on private property.
- Has minimal impact on MTO lands within the Casablanca Road/QEW interchange area.
- Can accommodate a future grade separation at the existing CN Rail at-grade crossing location.
- Does not impact the Region's ability to development a parking/bus facility on the Region's property south of the rail corridor.

Possible concerns associated with the recommended stormwater management alternative include:

- Additional storm sewer infrastructure required to convey external drainage area flows from Livingston to Casablanca Boulevard.
- Complexities in integrating 'Super-Pipe' system within the roadway cross-section in terms of required offsets to other underground utilities and potential conflicts with sanitary services.
- Limited potential to integrate Metrolinx site stormwater management requirements into a 'centralized' stormwater management facility, should that be required.
- Requires that the future south side GO station access/transit facility include a stand-alone site stormwater management system.

Although construction of a 'Super-Pipe' stormwater management system presents a range of challenges from a constructability standpoint, minimizing property impacts by implementing a corridor-based strategy has a significant benefit to the overall project schedule. For the reasons noted this option is considered the preferred stormwater management strategy for the improved Casablanca Boulevard corridor.

Consideration will be given to the location of online or node-based storage in order optimize the configuration of the storm sewer crossing the CN rail corridor, accommodate the future grade separation at the railway, and make use of available lands immediately adjacent to the Casablanca Boulevard corridor. At the preliminary design phase, it is estimated that approximately 2,500 cubic meters of online or node-based storage is required to achieve the necessary reduction of post-improvement (widening) stormwater runoff rates. The diversion of stormwater runoff from the Vine Road drainage system addresses flooding concerns of the lands

immediately upstream of the existing 1800 mm CSP crossing the CN rail corridor while the proposed storage volumes and resultant runoff rates will be equal or less than existing flow rates, therefore meeting the general stormwater management objectives identified for the project.

Figure 8-18 Recommended Drainage Strategy

8.9 Consultation Input on Preferred Alternative

8.9.1 Public Information Centre #2

The second PIC was held at the Casablanca Winery Inn and Spa in Grimsby, Ontario on January 16th, 2019, from 5:30pm – 8:30pm. The purpose of the event was to present the results of background studies, the conclusions from the evaluation of Alternative Designs, and seek feedback on the preferred design. A total of 39 people signed the register of attendance. Representatives from the Region, Dillon, and Metrolinx were in attendance to deliver the presentation and consult with the public.

The format of the event mimicked that for the first PIC, with an open house followed by a presentation with a question and answer session, after which attendees could return to the display boards and discuss any remaining questions or comments with the Study team. A number of the comments provided were recorded to be carried forward into the Detailed Design stage of the Study, as included in **Appendix A**.

Key themes from the comments included:

- Need for traffic calming and control of speeding, to be investigated through the refinement of the roadway design;
- Noise and property security concerns due to the road widening and completion of the active transportation network, to be considered in the roadway design;
- Concerns about the loss of mature trees, to be managed through a mitigation strategy and planting plan;
- Signage to aid travelers in navigating the access to the GO Transit Station and on the QEW Interchange, to be provided through a signage strategy;
- Concerns over the placement of utility poles, to be addressed through the development of the detailed roadway design; and
- Need for signal coordination with intersections and the CN Railway, to be addressed through the signals and illumination strategy.

9.0 Anticipated Impacts, Proposed Mitigation and Benefits

9.1 Introduction

The mitigation of potential negative effects was considered throughout the EA process. Avoiding or minimizing impacts to significant/sensitive features in the Study Area was included in the development of the alternatives and in the selection of the preferred alternative design – as previously described in **Section 7.0.** Despite efforts to reduce effects, not all negative effects can be avoided. As such, mitigation measures are recommended for inclusion as part of the development of the project in Detailed Design, during construction, and for operations and maintenance activities.

This section describes the potential effects of the preferred design, as described previously in **Section 8.0**, and recommends mitigation measures to reduce the effects. Also described are the anticipated project benefits. It is expected that the recommended mitigation measures would be further refined during project Detailed Design. The description of net effects is based on a similar set of environmental and technical considerations used to evaluate the alternatives including:

- Transportation;
- Socio-economic;
- Natural Environment;
- Cultural; and
- Engineering.

9.2 Consultation Input

9.2.1 Public Input

The key feedback received in at PIC#2 related to the Preferred Alternative is summarized in **Section 8.9**. The key project impacts that would need to be addressed as part of the Detailed Design and Construction process are identified below:

Construction Impacts

- Noise mitigation and disturbance to residents in the area;
- Safety for pedestrians and cyclists, as well as for families with children; and
- Tree planting in consultation with adjacent property owners and efforts to reduce removal of mature trees wherever possible.

Detailed Design Considerations

- Traffic calming and control of speeding, to be investigated through the refinement of the roadway design;
- Noise and property security concerns due to the road widening and completion of the active transportation network, to be considered in the roadway design (e.g. landscaping);
- Mitigation of visual distractions or other sightline impacts from streetscaping elements (e.g. roadside banners and signage);
- Development of a Signage Strategy to improve laneway legibility and direct drivers to appropriate lanes on the QEW Interchange and at the GO Transit Station access on the South Service Road;
- Utility pole placement relative to residences, with mitigation to keep poles as removed from residences as possible; and
- Development of a Signals and Illumination Strategy to coordinate signal timing for intersections and the CN Rail crossing on Casablanca Boulevard.

9.3 Summary of Project Effects and Mitigation Measures

The following section provides a description of the potential effects and mitigation of the project by major project component. **Table 9.1** provides a summary of the project effects and mitigation.

Table 9-1 Summary of Project Effects and Mitigation

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[2]	Net Effect
TRANSPORTATION			
Potential for impact on traffic operations during construction.	Project construction could lead to traffic delays through the corridor particularly for the construction of new travel lanes, and intersection improvements including turning lanes.	As part of Detailed Design, prepare a construction phasing plan/detour plan as required to minimize delays to through movement of traffic.	Some temporary delays to traffic movement through the corridor.
Potential for conflicts with driveways and other entrances.	During construction there could be obstruction to entrances, including residential properties, along the corridor. The possible long term implementation of a grade separated crossing of the rail corridor could block entrances to residences along the east side of the corridor.	Property owners to be informed of any temporary entrance restrictions in advance. Restrictions to entrances to be minimized as much as possible. Alternative parking to be provided in the event that entrances are blocked during construction. In regards to the CN Rail crossing, an alternative driveway/entrance to be provided for residences along the east side of the corridor as per the design.	Some short term entrance restrictions may occur during construction.

[2] Mitigation to be refined during Detailed Design phase.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[2]	Net Effect
Potential to accommodate school buses and waiting students.	Potential for some delay to school bus travel through the corridor during construction. Potential for disturbance/safety issues to students waiting for school bus during construction.	Project constructor to be made aware of school bus activity and location of school bus stops prior to construction. Use of heavy equipment in vicinity of school bus stop locations to be minimized during student pick-up and drop-off periods. Project constructor to inform school boards/transportation provider of construction phasing and activities in advance.	Some temporary minor disturbance to students during construction.
Potential for impact on response times/access for Emergency Vehicles during construction.	Project construction could lead to delays in response times of emergency access vehicles.	Consult with emergency service providers during Detailed Design and development of the construction phasing plan to seek their input. Keep emergency response providers aware of construction phasing and any roadway lane closures.	Minimal delay to emergency response times.

ENGINEERING CONSIDERATIONS

Impact to existing and planned servicing and utilities (e.g. hydro poles) within the corridor.	Depending on the project area location and proposed improvement, there is the potential need for the relocation of below/above ground utilities (power, communications, TV, municipal) as previously described in Section 8.0 of the ESR.	Need for relocations to be confirmed during detailed design. Consultation with utilities companies and the Town of Grimsby to be undertaken as part of Detailed Design to confirm utility relocations.	Some short-term service interruption possible during construction. Long-term effects to utilities or service levels are not expected.
Impact on existing	The project will require alteration to	Finalize new drainage system/underground	With implementation of

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[2]	Net Effect
drainage related infrastructure.	drainage infrastructure to accommodate the widened footprint of the roadway. This will include the change from the Casablanca Boulevard rural ditch based system to an urban drainage system that includes the installation of an underground storm sewer.	pipe as part of Detailed Design.	recommended drainage infrastructure corridor drainage system(s) will function more efficiently.
Increase in stormwater run-off (water quantity).	The additional roadway lanes and cycle facilities will result in an increase in the impervious area in the corridor. This will lead to an increase in the area of imperviousness and result in a greater amount of runoff.	The upgraded drainage and stormwater management system will need to accommodate the additional amount of run-off as a result of the additional roadway lanes.	With implementation of recommended drainage and stormwater management infrastructure and improvements, impacts to existing storm systems are anticipated to be minor. No flooding issues are anticipated. With the new system in place the potential for flooding to properties along the Vine Road ditch east of Casablanca Boulevard is reduced.
CULTURAL ENVIRONMENT			
Potential for impacts to registered archaeological sites and undisturbed lands.	As a result of road widening and wider/relocated pathway, there could be some impact to undisturbed lands with archaeological potential.	Conduct Stage 2 Archaeological Assessment on planned extension to Livingston Ave. Pending results of Stage 2 work, additional archaeological investigations may be warranted.	No net adverse effects anticipated through following of provincial archaeological assessment protocol.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[2]	Net Effect
Potential to impact known built heritage resources (i.e. listed/designated under Part IV or Part V of the Ontario Heritage Act and/or identified as culturally significant).	There are no cultural heritage features along Casablanca Boulevard The closest cultural heritage building, 400 Main Street West, is approximately 400m away from Casablanca Boulevard and is not expected to face any impacts as a result of this project.	No specific mitigation required due to absence of cultural heritage features within or in vicinity of the project area.	No net adverse effects to cultural heritage resources.
SOCIO-ECONOMIC ENVIRONMENT			
Requirement for property and/or easement acquisition(s) and impacts to buildings.	Buildings are generally well set back from the edge of roadway/Right-of-Way. For the most part the project will not require further acquisition of property. Relatively minor property widenings will be required at the Casablanca intersections at Livingston Avenue and at Main Street West. The exception would be if a third south bound (SB) lane (3.5 m) is provided between the South Service Road and north of Livingston Ave. If a third SB lane is included, property would be required from a few landowners. It is recommended that this widening be protected for.	If implemented in the longer term, landowners will be compensated at fair market value for the required property.	With provision of compensation to property owners for required property, not adverse net effects are anticipated.
Air emission/quality effects to residents and business during	Temporary air emission effects to residents and businesses from construction equipment operation and soil disturbance.	• Develop and implement a dust control plan. • Apply water and dust suppressants during	Some short-term air quality nuisance effects (e.g. dust) may occur for some receptors during construction. With

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[2]	Net Effect
construction.		construction to protect air quality due to dust. • Contractors are required to keep idling of construction equipment to a minimum and maintain equipment in good working order to reduce emissions from the construction activities. Air quality related complaints received by the public (e.g. dust) will be monitored by the proponent and/or the project constructor. Follow up action will be taken where appropriate.	monitoring and follow-up/mitigation to any received complaints, the effects should be minimized.
Noise disturbance effects to residents and business during construction.	There are no businesses located along Casablanca Boulevard. There is potential for temporary noise effects to residents from construction equipment operation.	• Develop and implement noise control plan. • Contractor operational constraints related to construction noise will be incorporated into the contract documents. • Construction activities throughout the project will conform to current Municipal noise by-laws giving due consideration to such factors as the time of day, proximity and size of equipment and type of operation. • Contractors are required to keep idling of construction equipment to a minimum and maintain equipment in good working order to reduce noise from the construction	Some short-term noise effects may occur for some receptors during construction. With mitigation and the monitoring and follow-up to any received complaints, the effects should be minimized.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[2]	Net Effect
		activities. • Noise related complaints received by the public will be monitored by the proponent and/or the project constructor. Follow-up action will be taken where appropriate.	
Change in noise levels during operations	More vehicles will be attracted to the corridor as a result of roadway improvements and changing land use in the area. This will result in increased noise levels to surrounding residents. The noise modelling undertaken (see **Appendix K**), shows that noise level increases will be less than 5 dB and are not considered to be significant.	No mitigation recommended.	No significant noise impacts are predicted to result from the project.
Disruption in access to residential property and local businesses.	Very low potential for temporary access restrictions to property during construction. No long-term access restrictions.	Contractor to minimize access restrictions as much as possible. Landowners to be notified of any access restrictions in advance.	Minimal to no restrictions to/from property access are expected.
Impacts on farm operations/Removal of agricultural land.	The Livingston Avenue Right-of-Way is owned by the Region. Agricultural land will not be removed for the extension of Livingston Ave. This land has been fallow for several years and is no longer designated for long term agricultural use.	The area of impact is owned by the Region and is intended for a long-term transit facility.	No specific mitigation warranted.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[2]	Net Effect
NATURAL HERITAGE FEATURES			
Potential impacts to terrestrial vegetation and wildlife habitat.	There are minimal natural features located within the project footprint/along Casablanca Boulevard. Notable effects include the removal of the ditch along the west side both sides of Casablanca Boulevard The drainage feature ditch on the west side is covered by emergent vegetation throughout and shaded by trees for approximately 30% of the area. The banks of this drainage feature do not contain significant wildlife habitat. Vegetation cover along a portion of South Service Road consists of Dry - Fresh Mixed Meadow/ Gray Dogwood Deciduous Shrub Thicket complex which will be impacted. There is also the potential for the removal of about up to 40-45 individual trees of varying levels of maturity. The final number to be removed will be confirmed during Detailed Design.	• Develop a tree compensation/re-planting plan during Detailed Design to compensate for tree removals. • Establish Tree Protection Zones (TPZs) during Detailed Design and show the TPZs on the contract drawings adjacent to proposed work areas in the Study Area to protect vegetation to be retained. Tree protection fences/barriers demarcate TPZs and protect existing trees along cut lines from equipment damage. • Avoid vegetation clearing during sensitive timing windows for nesting birds. • Plant replacement trees during/following construction. Areas to be planted to be determined with input from landowners, local Municipalities and (Niagara Peninsula Conservation Authority) NPCA.	With the implementation of the mitigation measures and re-planting of replacement trees and/or habitat, net impact will be minimal.
Potential impact to fisheries and fish habitat.	The results of the assessment indicated that the main west-side drainage feature along Casablanca Boulevard is used for flow conveyance and does not provide suitable fish habitat. As such, it is not	• No specific mitigation other than those noted below with respect to mitigating potential for alteration to water quality.	No significant impacts to fish or fish habitat are anticipated from the project.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[2]	Net Effect
	anticipated that the proposed road widening activities at Casablanca Boulevard and proposed entrapment replacement of the drainage feature with a storm sewer will cause serious harm to fish or fish habitat as per Section 35 of the Fisheries Act.		
Potential to impact to Species at Risk (SAR).	The potential for SAR and SAR habitat has been assessed. While no SAR were observed in association with the 2018 field investigations, it was determined that the Study Area has the potential for the following species to be present: • Barn Swallow (THR) • Eastern Meadowlark (THR) • Bobolink (THR) • Monarch Butterfly (SC) None of these species have regulated habitat under Ontario Regulation 242/08.Potential impacts to the above SAR as a result of the project include: • Potential removal of habitat; • Potential encroachment of SAR habitat; • Potential to kill harm or harass the species during construction.	• Future follow-up work is recommended to confirm the presence or absence of species (and/or habitat) at the Detailed Design stage. • If necessary, develop species specific mitigation plans. • Review species specific seasonal timing windows to avoid sensitive periods for species. • If necessary, conduct wildlife sweeps prior to the commencement of work activities to determine if SAR (or other wildlife) are present at the site and engaged in critical life processes (e.g. nesting, etc.). • Potential impacts to these species and their habitat should be identified as early as possible. Depending on the extent of work proposed and the potential impact, targeted surveys may be required to confirm presence of these species and identify any permitting requirements under the ESA 2007. It is recommended that if	With implementation of the mitigation measures, impacts to SAR are anticipated to be minimal.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[2]	Net Effect
		permits are required, the process be initiated as early as possible, as permitting can take significant time and potentially affect the project delivery schedule. Many infrastructure rehabilitation and replacement works proposed by MTO can be addressed under Section 23.18 of the Ontario Regulation 242/08 "Threats to Health and Safety, Not Imminent", which should be reviewed as part of the impact assessment during the Detailed Design phase.	
Potential for wildlife disturbance during construction.	While the surrounding lands do not contain significant wildlife habitat, there is potential for some species (e.g. birds) to be present. As such, there is some potential for temporary disturbance to wildlife due to noise, dust and habitat encroachment during construction.	• Conduct wildlife sweeps prior to the commencement of work activities to determine if or other wildlife are present at the site and engaged in critical life processes (e.g. nesting, etc.). • Following the wildlife sweep, the area of activity is to be isolated to wildlife from entering the work space area. • Develop and implement a dust control plan.	Some temporary disturbance to wildlife is possible although species are likely habituated to road noise etc. With mitigation effects expected to be minimal.
Potential for alteration to surface water quality	The project area includes a ditch/drain that runs parallel to the corridor and empties into Lake Ontario to the north of the project area.	• Develop and implement an effective erosion and sediment control plan (ESCP) to prevent migration of loose soils and accumulated sediment into local drains and downstream areas.	During construction some increase in sedimentation levels in local watercourses may occur. With the implementation mitigation,

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[2]	Net Effect
	During construction there is the potential for alterations to surface water quality due to sedimentation and the introduction of deleterious substances to watercourses. Sources may include fuel leaks from construction equipment, entry of sediment or stockpiled materials into the watercourses. With the installed stormwater management controls, surface water resources are not expected to be impacted.	• Include measures for managing water flow onto the site, as well as water being pumped/diverted from the site such that sediment is filtered out prior to the water entering the drain. • Handling of fuel, excess materials and debris will be properly managed on-site and removed as per standard construction practices necessary to protect watercourses. • Develop a spills response plan. • All materials used or generated (e.g. organics, soils, woody debris, temporary stockpiles, construction debris, etc.) will be temporarily stored, handled and disposed of during site preparation, construction and clean-up in a manner that prevents entry into watercourses. • Erosion and sediment control measures are inspected and maintained on a regular basis during drainage works. • Any damages to erosion and control measures are to be repaired immediately. • Removal of non-biodegradable erosion and sediment control materials once site has been stabilized. • During operations, monitor effectiveness of the SWM facility. Monitoring program to	adverse effects are anticipated to be temporary and minimal.

Potential Impact	Description of Potential Impact	Mitigation/Monitoring[2]	Net Effect
		be determined during detailed design. ….	
Potential for impact to groundwater resources.	During construction, uncontrolled runoff could potentially result in contamination of groundwater through infiltration of potential contaminants, and/or infiltration of contaminated surface water. Local water resource/supply impacts are not anticipated as residents are serviced by Town piped water.	• Implement best management practices (BMPs) as noted above in regards to potential impacts on surface water quality. If groundwater dewatering is required during construction, then dewatering should be conducted in accordance with applicable procedures including determination of the need for a Permit to Take Water (PTTW) from MECP. Give regard to and implement measures required to meet source water protection policies – to be defined during Detailed Design.	During construction there is some potential for effects to groundwater resources in the local area (primarily in the vicinity of lands requiring dewatering). With the implementation mitigation, adverse effects are anticipated to be temporary and minimal.

9.4 Detailed Description of Project Effects and Mitigation Measures

This section provides a description of potential effects of the proposed improvements to the following roadway sections: Casablanca Boulevard (North Service Road to Main Street West, including the QEW interchange), to the South Service Road (extending east and west of Casablanca Boulevard), and the Livingston Avenue partial extension as previously described in **Section 8**.

9.4.1 Transportation Effects

The project has the potential to impact the transportation system during the construction of this project. There are not adverse effects of the project on the Transportation system during the operations period – effects will be positive.

9.4.1.1 South Service Road Improvements

As noted in **Section 8.3**, changes occurring to the South Service road include the development of a Loop Access Road that would run parallel of the South Service Road and allow for west-bound access to the GO Transit Station. As this Loop Access Road can largely be constructed outside of existing travel lanes, disruptions to traffic will be minimal. However, other improvements to this section of the roadway including the provision of turning lanes would result in temporary interruptions and delays to vehicular traffic along this roadway.

The implementation of the intersection improvements and addition of left-turn lanes could affect traffic flow including emergency access vehicles. Effects to emergency vehicles will be minimized as much as possible and will be temporary. The Town will consult with emergency service providers during Detailed Design to determine appropriate mitigation measures to minimize disruption during construction. And during the construction period, the project constructor will engage with emergency service providers to ensure that they are aware of construction plans and timing and seek their input where appropriate.

9.4.1.2 Casablanca Boulevard – Widening & Drainage

As reported in **Section 5** of this ESR, it was determined that an additional lane in each direction as well as a centre turning lane would be required between the South Service Road and Livingston Avenue, with the provision addition of only a centre turning lane between Livingston Avenue and Main Street West. Construction staging and traffic management plans for the road works in this section will be developed during Detailed Design. As before, it is expected that construction of the road widening, lowering and storm sewer works along Casablanca Boulevard can be achieved while maintaining one lane of traffic in each direction.

Also, as part of the undertaking, an Underpass Grade Separation is to be developed in the longer term for the CN Rail corridor crossing on Casablanca Boulevard. These improvements will result in delays to traffic along Casablanca Boulevard during the construction period. For the construction of this grade separated crossing, long-term closure of Casablanca Boulevard will likely be required. A minimum of 18 months closure period is likely, to be confirmed during future Detailed Design work when this grade separated crossing is deemed to be required.

Similar emergency vehicle access impacts could result as described above.

9.4.1.3 Livingston Avenue Improvements

Improvements will be made to the existing Livingston Avenue section west of Casablanca Boulevard. There could be some delay for residents travelling to/from their homes in the local community during construction. Access will be maintained and delays will be minimized as much as possible. The partial extension of Livingston Avenue to the west will not result in traffic impacts as this is a new road extension.

9.4.2 Socio-Economic Effects

A description of baseline or existing socio-economic conditions is previously provided in **Section 4.2**. These conditions were considered in the assessment of potential project effects as described in the following sub-sections.

9.4.2.1 Land Use/Direct Property Impacts

Land use along the corridor includes a mixture of residential, commercial, and agriculture. At the time of preparing this ESR, significant future development is was not expected in the local area or on adjacent land parcels – the exception being the development of the GO Transit Rail Station. As such, the existing socio-economic conditions are expected to be similar to the future conditions.

Based on the preliminary design, the project will not require the displacement of any residences or commercial buildings. The expansion of the roadway to accommodate the proposed corridor improvements brings the road edge closer to existing buildings/residences but will not infringe on property lines as all works, other than minor property widening at the Casablanca intersections at Main Street West and at Livingston Avenue, will be within the existing Right-of-Way. Should a third Casablanca Boulevard southbound lane be deemed necessary south of the South Service Road as previous described in Section 8.4.5, some property impacts to the west are anticipated. This future widening should be protected for.

9.4.2.2 Noise and Air Quality

During the construction phase of the project, noise and air quality effects to local residents and businesses may occur as a result of machinery operation and/or excavation activities. Effects will be temporary in nature and will be variable, depending on the activity and its location. To minimize air and noise construction emissions, standard mitigation including limiting evening/night time work will be employed as described in **Table 9.1**.

Predictive noise modelling work was undertaken for the future condition for 12 representative sensitive receptor locations (residences) along Casablanca Boulevard (see **Appendix K**).

Figure 9-1 identifies the locations of the receptors where the noise modelling was conducted. As shown in the modelling results (**Table 9-2**), the change in noise levels above the ambient, as a result of the undertaking is less than 5 dBA at all the representative receptors. As a result, the traffic noise impact resulting from this project is predicted to be insignificant. However in one receptor, the overall traffic noise impact exceeds the 65 dBA criterion. For the receptor POR9, a single-storey residential dwelling at the northwest corner of Livingston Avenue and Casablanca Boulevard, the predicted overall noise levels for the future “build” scenario (for 2031) is marginally higher than the 65 dBA criterion (i.e. 65.17 dBA for 2031). If predicted noise levels with the undertaking exceed the 65 dBA criterion, the Guide requires investigation of noise control measures. The Guide also requires that mitigation measures, where introduced, should achieve a minimum of 5 dBA attenuation, over the first row of PORs. It should be noted that the exceedance of 0.17 dB is considered negligible and not noticeable by human hearing.

In keeping with the Guide, several modelling iterations were completed to determine effective noise mitigation measures for receptors represented by POR9. Preliminary analysis indicate that in order to achieve a 5 dBA noise reduction at POR9, two noise barrier walls are required to install; one with 2.0 m height and approximately 3 m to 7 m from the north side pavement edge of the Livingston Avenue; and the other with 2 m height and approximately 7 m from the edge of Casablanca Boulevard. However, implementation of noise mitigation measure in the form of a noise barrier wall that can achieve a minimum of 5 dB reduction in receptor noise level may not be possible due to the location of the property (i.e., corner lot) and the orientation of the dwelling (i.e., driveway access off of Livingston Avenue is required). As such, noise mitigation measure for POR9 is not recommended.

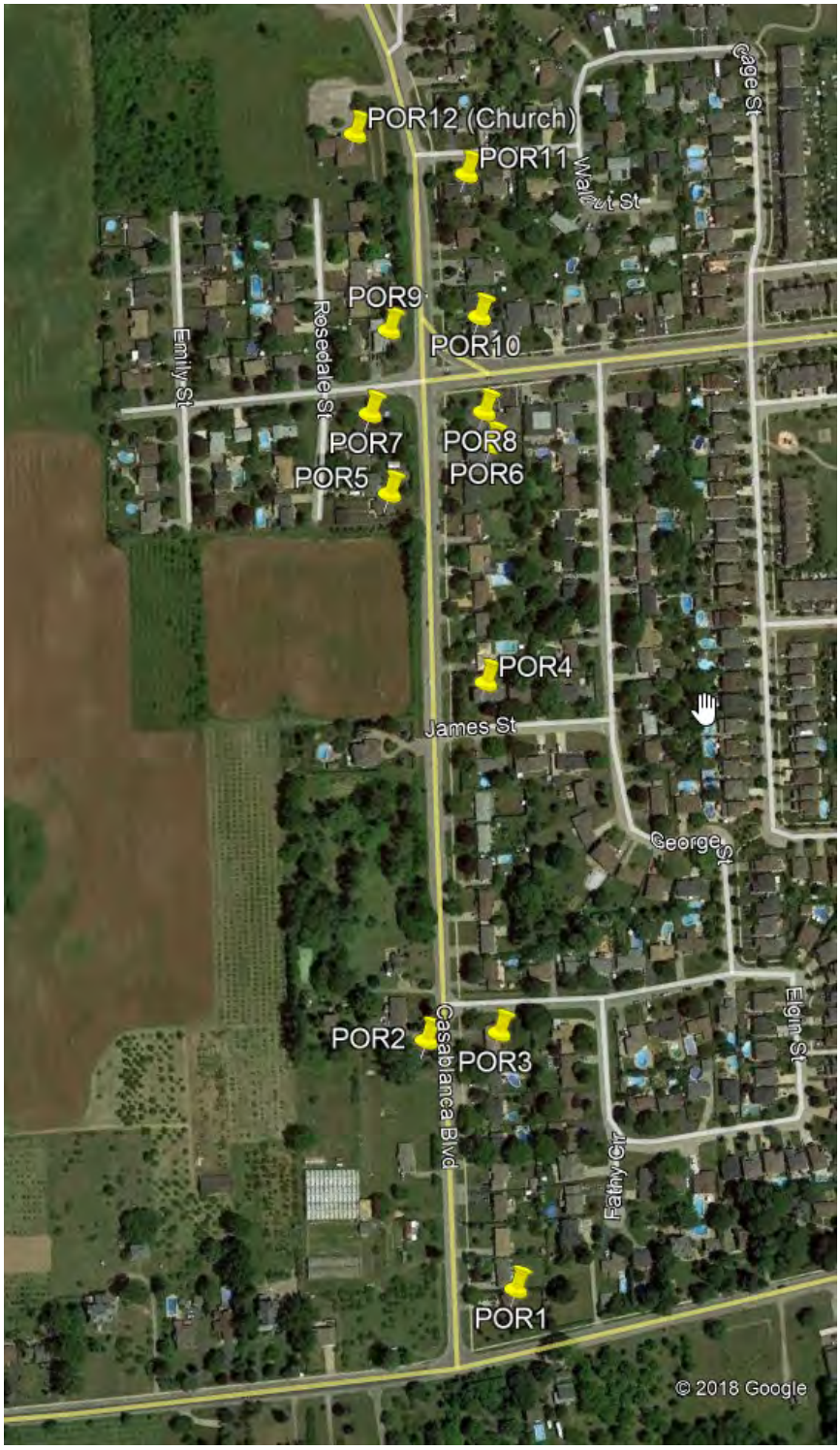


Figure 9-1 Locations of Noise Modelling Receptor Sites Identified in Table 9-2

Table 9-2 Summary Table of Future Noise Levels with and without Proposed Undertaking

POR ID	Ambient Noise Levels "NO BUILD"	Future Noise Levels "BUILD"		Ambient Noise Levels "NO BUILD"	Future Noise Levels "BUILD"	
	Leq (16 hr) dBA	Leq (16 hr) dBA		Leq (16 hr) dBA	Leq (16 hr) dBA	
POR1	61.33	61.76	0.43	61.81	62.28	0.47
POR2	59.66	59.49	-0.17	60.88	60.35	-0.53
POR3	55.49	57.57	2.08	56.38	58.48	2.1
POR4	55.24	56.94	1.7	56.13	57.85	1.72
POR5	56.31	56.38	0.07	57.2	57.25	0.05
POR6	55.75	58.03	2.28	56.65	58.95	2.3
POR7	61.36	61.48	0.12	62.22	62.32	0.1
POR8	61.19	61.69	0.5	62.09	62.58	0.49
POR9	63.1	64.32	1.22	64.05	65.17	1.12
POR10	62.03	62.8	0.77	62.97	63.65	0.68
POR11	62.46	62.5	0.04	63.47	63.45	-0.02
POR12	60.2	59.88	-0.32	61.21	60.75	-0.46

9.4.2.3 Property Access/Entrances

Access to residential and business properties will be maintained as much as possible during construction. However, there could be short-term restrictions to property access. These effects are expected to be very temporary. Landowners would be notified in advance of any periods when access restrictions are in place. In particular, access disruption to retail business operations and greenhouse operations will be minimized as much as possible. If driveway access is not possible for a short period of time, then alternate parking will be provided (e.g. along the roadway).

9.4.2.4 Agricultural Land

Work proposed for the improvement of the South Service Road and Casablanca Boulevard will not have any effect on agricultural land or farm operations. No agricultural land will be removed for the partial extension of Livingston Avenue along the Regional Road Right-of-Way.

9.4.3 Cultural Environment

9.4.3.1 Built and Cultural Heritage Resources

As described previously in **Section 4.6.1** and per the Cultural Heritage Assessment report in **Appendix G**, the closest known heritage property is approximately 400 meters away from Casablanca Boulevard. Due to the distance from the roadway there is no expectation that the building will be impacted by the project, therefore no specific mitigation plans are required.

9.4.3.2 Archaeological Resources

As previously reported in **Section 4.6.2**, a Stage 1 Background Study conducted by ASI is included in **Appendix H**. The conclusions of their research indicated that lands in the vicinity of the South Service Road and Casablanca Boulevard are previously disturbed and do not have archaeological potential. As such, no further archaeological investigation would be required in relation to implementation of improvements along these two roadways. With respect to the partial Livingston Avenue extension west of Emily Street to provide access to the Region-owned lands, there will be a need for a Stage 2 Archaeological Assessment to confirm the absence/presences of archaeological features, as part of Detailed Design.

9.4.4 Natural Environment

9.4.4.1 Fisheries and Aquatic Habitat

There are no aquatic features in proximity to the South Service Road. The drainage feature along the west side of Casablanca Boulevard is used for flow conveyance and does not provide suitable fish habitat. As such, it is not anticipated that the replacement of this ditch with a buried storm sewer will cause serious harm to fish or fish habitat as per Section 35 of the Fisheries Act.

During the construction phases of the project there is a possibility that the effects of erosion or sedimentation could affect areas downstream that contain fish and aquatic life. For mitigation to this possible effect, see **Table 9-1**.

9.4.4.2 Terrestrial Resources

As stated in **Section 4.5.2**, within the Casablanca Boulevard Study Area, there are no significant Natural Heritage Features present. The roadway widening will result in the loss of approximately up to 40-45 trees of varying levels of maturity that will be replaced at a recommended ratio of 3:1 (see **Appendix L** for drawings showing trees potentially to be removed). The number of trees to be removed will be confirmed during Detailed Design.

9.4.4.3 Species at Risk

While no SAR was observed in association with the 2018 field investigations, it was determined that the Study Area contains suitable habitat to support SAR and therefore the potential for the following species to be present:

- Barn Swallow (THR);
- Eastern Meadowlark (THR);
- Bobolink (THR);
- Monarch Butterfly (SC)

Future follow-up work is recommended to confirm the presence or absence of species (and/or habitat) at the Detailed Design stage and if necessary, species specific mitigation plans will be developed.

9.4.4.4 Surface Water/Erosion Control

During construction there is the potential for effects to surface water features that include the drain located to the west of Casablanca Boulevard, and the watercourse located to the west of the Livingston Avenue extension to provide access to the Region-owned lands. These watercourses/drains flow into Lake Ontario. During construction there could be increased sedimentation to drains and/or deleterious substances such as from construction equipment fuel spills. Mitigation including BMPs to minimize effects as outlined in **Table 9.1** will be implemented. With these measures in place, effects to surface water resources are expected to be minimal.

The project design includes a new stormwater management system for the corridor as previously described in **Section 8**. The improvements made to the stormwater system around would result in the elimination of the roadside ditch flanking Casablanca Boulevard south of the CN Rail corridor and the installation of a storm sewer system capable of draining the proposed paved surfaces within the Right-of-Way. This would convey drainage area flows to via a new storm sewer outlet crossing the CN Rail corridor, discharging to Lake Ontario via an outlet just upstream of the QEW culvert. This proposed SWM system would also reduce the risk of flooding within the receiving water systems, particularly the Vine Road intermittent drainage channel which has been previously identified as having limited capacity to convey ‘major’ storm events.

9.4.5 Soil Contamination

There is the potential for soil and groundwater contamination during construction activities (e.g. from fuel spills and/or equipment leaks). **Table 9.1** outlines mitigation to be implemented to minimize the potential for these effects. With this mitigation in place, adverse effects are not anticipated to soil.

9.5 Project Benefits

9.5.1 Casablanca Boulevard Road Widening

The benefits associated with this project primarily relate to the improvement of transportation along Casablanca Boulevard and parts of the South Service Road and Livingston Avenue. The improvements to Casablanca Boulevard through road widening and creation of a complete street will accommodate forecasted future vehicle demands, including those associated with the planned GO Transit Station, and with the included active transportation facilities that will promote more cycling and walking through the corridor.

9.5.2 CN Rail Crossing Treatment

The improvements to the CN Rail crossing on Casablanca Boulevard north of Vine Road will benefit the safety of drivers and reduce the probability of incidents involving train and vehicular conflict.

9.5.3 South Service Road Improvements

Improvements made to the South Service Road will provide for more efficient access into the GO Transit Station for west bound vehicles, and allows for better traffic flow as it provides additional queue storage for vehicles making west bound left-turns into the GO Transit Station and also reduces chances of delay.

9.6 Effects Monitoring

Recommended effects monitoring during the construction period includes:

- Monitoring of traffic flow to ensure the minimization of delays;
- Public complaints monitoring and follow-up regarding construction disturbances;
- Monitoring of vegetation removal; and
- Monitoring of the effectiveness of SWM controls to ensure erosion and sedimentation effects are minimized.

Effects monitoring during the operations phase once the project has been implemented is proposed for the CN Rail crossing, to monitor traffic and queues relevant to the need for a grade separation at this location.

9.7 Permitting

Following the review of background material and the results of the 2018 aquatic assessment, there is strong evidence to suggest that the west-side drainage feature is used strictly for flow conveyance and does not provide suitable fish habitat. As such, it is not anticipated that the proposed road widening activities at Casablanca Boulevard and subsequent proposed entrapment enclosure of the drainage feature will cause serious harm to fish or fish habitat as per Section 35 of the Fisheries Act (R.S.C., 1985, c. F-14). As a result, it is not anticipated that a Fisheries Assessment or a Request for Review under the DFO be required. This will be confirmed during Detailed Design.

As the drainage feature is mapped by the NPCA, additional consultation and permitting may be required under Ontario Regulation 155/06 prior to commencing the proposed road widening activities on Casablanca Boulevard.

Adjacent land-use to the Study Area along Casablanca Boulevard is primarily residential, agriculture and commercial business. There are no natural heritage features located within the Study Area and no species at risk observed during the 2018 field investigations. However, should the construction footprint have potential to impact SAR and/or their habitat, targeted surveys should be conducted as early as possible to confirm the presence/absence of these species. Based on the current understanding of the potential SAR impacts, it is anticipated that impacts may be able to be addressed through a streamlined registration process under the Endangered Species Act. However, if permitting under the Endangered Species Act is required, it can take considerable time and potentially affect the project delivery schedule.