

SOPER SPRINGS SECONDARY PLAN

TRANSPORTATION AND FUNCTIONAL SERVICING STUDY REPORT

DRAFT INTERIM REPORT • NOVEMBER 2020

REPORT PREPARED FOR



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EXECUTIVE SUMMARY

To be completed at the conclusion of the study

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CONTENTS

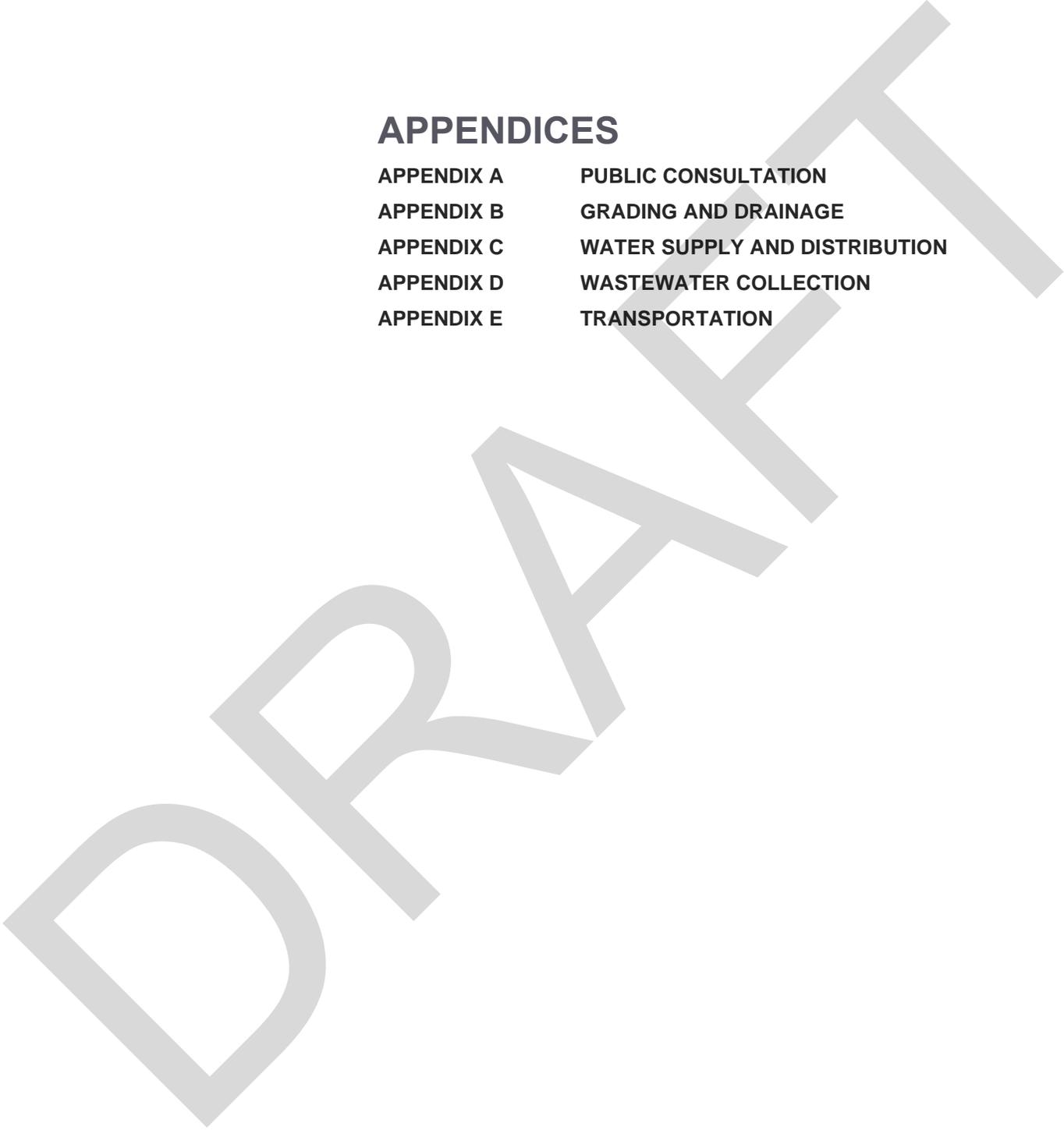
1	INTRODUCTION	1
2	BACKGROUND	2
2.1	Relevant Studies.....	2
2.1.1	Soper Creek Subwatershed Study (SCSWS).....	2
2.1.2	Planning Study	2
2.2	Municipal Class Environmental Assessment Process.....	3
2.2.1	Integrated Approach with the Planning Act	4
3	EXISTING CONDITIONS	6
3.1	Land Use	6
3.2	Archaeology and Cultural Heritage.....	6
3.2.1	Archaeology	6
3.3	Topography and Drainage	7
3.4	Soils and Groundwater	7
3.4.1	Surficial Geology	7
3.4.2	Hydrogeology	8
3.4.3	Water Budget	8
3.4.4	High Volume Recharge Areas	10
3.5	Surface Water	11
3.5.1	Fluvial Geomorphological Assessment	11
3.5.2	Hydrology, Hydraulics and Flood Plain Mapping.....	15
3.6	Natural Environment	16
3.6.1	Aquatic Habitat.....	16
3.6.2	Vegetation	16
3.6.3	Wildlife.....	17
3.6.4	Species at Risk	17
3.6.5	Overall Natural Heritage System	18
3.7	Water Supply and Distribution	20
3.7.1	Existing Water Distribution Infrastructure	20
3.7.2	Planned Water System Improvements	22
3.8	Sanitary Infrastructure	25
3.8.1	Existing Sanitary Services.....	25
3.8.2	Planned Sanitary System Improvements	27
3.9	Transportation	29
3.9.1	General Road Network Description	29
3.9.1	Existing Area Road Network	29
3.9.2	Existing Area Intersections.....	32
3.9.3	Existing Traffic Volumes.....	33
3.9.4	Existing Intersection Analysis.....	34
3.9.5	Active Transportation	34
3.9.6	Transit Services	36
3.9.7	Study Area Road Network Improvements	42

4	PLANNED DEVELOPMENT	43
4.1	Land Use and Transportation Alternatives	43
4.2	Evaluation of Alternatives	43
4.3	Preferred Land Use and Transportation Alternative	43
5	PROPOSED SERVICING	44
5.1	Grading	44
5.2	Watercourse Crossings	44
5.3	Water Supply and Distribution	44
5.3.1	Design Criteria	44
5.3.2	Water Supply and Boundary Conditions	45
5.3.3	Model Development	45
5.3.4	Model Results	45
5.4	Wastewater	45
5.4.1	Design Criteria	45
5.4.2	Proposed Sanitary Servicing Plan	47
5.5	Stormwater	47
5.5.1	Applicable Criteria	47
5.5.2	Stormwater Management Approach	47
5.5.3	Stormwater Management Plan	47
5.5.4	Stormwater Management Facilities	47
5.6	Water Budget	47
5.7	Transportation	47
5.7.1	Travel Demand Forecasts	47
5.7.2	Future Total Traffic Volumes	47
5.7.3	Future Road Network	47
5.7.4	Proposed Collector Road Right-of-Way	47
5.7.5	Road Network Phasing	47
5.7.6	Future Traffic Conditions	47
5.7.7	Transit Plan	47
5.7.8	Active Transportation	47
5.7.9	Transportation Demand Management	47
5.7.10	Summary of Transportation Assessment	47
5.7.11	Future Transportation Studies Considerations	47
6	PHASING AND IMPLEMENTATION	48
7	PUBLIC CONSULTATION	49
7.1	Consultation Approach	49
7.2	Notice of Commencement and Public Information Centre # 1	49
7.3	Public Information Centre # 1	49
7.4	Public Information Centre # 2	49
7.5	Notice of Study Completion	49
7.6	Consultation with Indigenous Communities	49
7.7	Other Stakeholder Consultation	49

8 SUMMARY 50
9 REFERENCES 51

APPENDICES

APPENDIX A	PUBLIC CONSULTATION
APPENDIX B	GRADING AND DRAINAGE
APPENDIX C	WATER SUPPLY AND DISTRIBUTION
APPENDIX D	WASTEWATER COLLECTION
APPENDIX E	TRANSPORTATION



TABLES

Table 3-2 Soper Creek Erosion Sites	12
Table 3-1 Meander Belt Delineation.....	14
Table 3-3 Species at Risk	17
Table 3-4 Bowmanville DC Projects - Water	22
Table 3-5 Bowmanville DC Projects - Sanitary	27
Table 3-6 Historic Traffic Data	33
Table 5-1 Watermain Design Criteria.....	44
Table 5-2 Water Model Output Summary	45
Table 5-3 Wastewater Design Criteria	46

DRAFT

FIGURES

Figure 1-1	Study Area.....	1
Figure 2-1	Municipal Class EA Planning Flow Chart.....	5
Figure 3-1	Composite Archaeological Potential	7
Figure 3-3	Average Annual Actual Evapotranspiration.....	9
Figure 3-4	Annual Average Runoff.....	9
Figure 3-5	Average Annual Groundwater Recharge.....	10
Figure 3-6	High Volume Recharge Areas	11
Figure 3-6	Geomorphic Assessed Reaches in the Study Area.....	12
Figure 3-7	Erosion Sites and Maintenance Issues	13
Figure 3-8	Erosion Hazards	15
Figure 3-9	Regulatory Flood Plain	16
Figure 3-10	SAR Observation Locations	18
Figure 3-11	Natural Heritage Features.....	19
Figure 3-12	Natural Heritage System, Including VPZ’s and Linkages.....	19
Figure 3-10	Existing Water Infrastructure	21
Figure 3-11	Region of Durham – DC Water Projects	24
Figure 3-12	Existing Sanitary Sewer Infrastructure.....	26
Figure 3-13	Region of Durham – DC Sanitary Projects	28
Figure 3-13	Study Area Road Network.....	29
Figure 3-14	Durham Region Official Plan Road Network (Schedule C)	30
Figure 3-15	Municipality of Clarington Official Plan Transportation Network (Map J).....	31
Figure 3-16	Liberty Street North and Concession Road 3	32
Figure 3-17	Mearns Avenue and Concession Road 3.....	32
Figure 3-18	Lambs Road and Concession Road 3	33
Figure 3-19	Existing and Proposed Cycle and Trail Network, CTMP	34
Figure 3-20	Existing Trail Network.....	35
Figure 3-20	Pre-Covid-19 Durham Region Transit Bus Operations	37
Figure 3-21	Existing Durham Region Transit Bus Operations – Effective September 2020	38
Figure 3-22	Existing GO Transit Bus Operations – Lakeshore East Routes	39
Figure 3-23	Existing GO Transit Bus Operations	40
Figure 3-24	Future GO Transit Rail Expansion, Alignment Options Reviewed.....	41
Figure 3-25	Future GO Transit Rail Expansion, Option 2 Alignment	41
Figure 4-1	Preferred Land Use Plan	43

DRAFT

1 INTRODUCTION

The Soper Springs Secondary Plan (SSSP) area is identified as a new development area in the Municipality of Clarington’s Official Plan. The SSSP area general extends from Concession Road 3 north to the Bowmanville Urban Boundary, and from Liberty Street North east to Lambs Road. The study area is illustrated in **Figure 1-1**.

Figure 1-1 Study Area



While the SSSP area is designated as ‘Urban Residential’ in the Clarington Official Plan, the type and distribution of land uses through the area have yet to be finalized, and the means by which the planned development will be serviced have not been established.

The Municipal Infrastructure Group (TMIG) was retained by the Municipality of Clarington to prepare a Transportation Study and Functional Servicing Report for the SSSP area. The Transportation and Functional Servicing Study Report (TFSSR) has been prepared to demonstrate how the planned SSSP area can be efficiently and sustainably serviced, including transportation, water supply and distribution, wastewater and stormwater. This study has been fully integrated with and completed as part of the overall SSSP planning study.

The investigations and analyses completed for this TFSSR have also been closely co-ordinated with the separate but parallel Soper Creek Subwatershed Study (SCSWS). The SCSWS examines the entire Soper Creek watershed, but focusses on the planned Soper Hills and Soper Springs development areas in Bowmanville. The SCSWS study includes assessments of hydrology, hydrogeology, fluvial geomorphology and aquatic and terrestrial habitat. The overall planning study, SCSWS and other relevant completed and ongoing studies relevant to the SSSP area are described in **Section 2**.

2 BACKGROUND

2.1 Relevant Studies

The SSSP is identified as a new development area in Clarington's Official Plan, and a number of studies have been completed or are underway to support the planning and development of the SSSP. These studies are briefly described in the following sections.

2.1.1 Soper Creek Subwatershed Study (SCSWS)

The overall goal of the SCSWS is development of a management plan that allows sustainable urban growth, while ensuring maximum benefits to the natural and human environments of the corresponding watershed.

The subwatershed study is undertaken in three phases as follows:

Phase 1: Subwatershed Characterization

Phase 2: Subwatershed Management Strategies

Phase 3: Implementation and Monitoring Plans

The subwatershed study will satisfy Phases 1 and 2 of the Municipal Class Environmental Assessment process.

As of date, Phase 1 of the subwatershed study has been undertaken, which investigates and inventories the natural resources which could potentially be impacted by future urban development. Along with characterization of natural resources this study identifies preliminary constraints and opportunities which will be considered as the SSSP is developed.

Findings from the Phase 1 study relevant to the SSSP area are summarized in **Section 3**.

2.1.2 Planning Study

A Secondary Plan is a framework for managing new growth and determines where land use designations, such as residential and commercial uses, will be located within the bounds of the Secondary Plan area. It also establishes the general alignments of the major road networks needed to move people and goods within, to and from the area, considering both vehicular and active forms of transportation. Usually, these primary road networks also provide the spine of the water, wastewater and storm drainage systems needed to service the Secondary Plan area.

This TFSSR has been prepared in support of the SSSP, and has been fully integrated with the planning study underway to establish the land use plan and policies for the SSSP area. The planning study is a four phased process that began in mid-2019 and will ultimately lead to a Secondary Plan, and zoning by-law, for the area. These phases are:

- Phase 1: Public Input and Technical Analyses
- Phase 2: Urban Design and Sustainability Principles, Criteria and Alternative Land Use Plans
- Phase 3: Preferred Land Use Plan
- Phase 4: Final Secondary Plan and Zoning By-Law

This Draft Interim TFSSR commenced in the Phase 1 of the planning study and will be updated throughout the study. The transportation and servicing needs and constraints will be considered in the development and evaluation of alternative land use plans, and the final TFSSR will present and justify the transportation network and water, wastewater and storm drainage infrastructure needed to adequately and efficiently service the preferred land use plan.

2.2 Municipal Class Environmental Assessment Process

The planning of major municipal projects or activities is subject to the Ontario Environmental Assessment (EA) Act, R.S.O. 1990, and requires the proponent to complete an Environmental Assessment, including an inventory and description of the existing environment in the area affected by the proposed activity.

The Municipal Class EA process was developed by the Municipal Engineers Association and approved by the Ministry of the Environment, now Ministry of the Environment, Conservation and Parks (MECP), as an alternative method to Individual Environmental Assessments for recurring municipal projects that were similar in nature, usually limited in scale and with predictable ranges of environmental effects which were responsive to mitigating measures. The latest Municipal Class EA document (October 2000, amended 2007, 2011 & 2015) has been used for this study.

The Class EA provides for the following designations of projects depending upon potential impacts:

- Schedule A:** Projects are limited in scale, have minimal adverse environmental effects and include a number of municipal maintenance and operational activities. These projects are pre-approved. Schedule A projects generally include normal or emergency operational and maintenance activities.
- Schedule A+:** Projects are within existing buildings, utility corridors, rights-of-way, and have minimal adverse environmental effects. These projects are pre-approved; however, the public is to be notified prior to project implementation.
- Schedule B:** Projects have the potential for some adverse environmental effects. The proponent is required to undertake a screening process, involving mandatory contact with directly affected public and relevant review agencies, to ensure they are aware of the project and that their concerns are addressed. If there are no outstanding concerns, then the proponent may proceed to implementation.
- Schedule C:** 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 be prepared and filed for review by the public and review agencies.

The water, wastewater and storm drainage infrastructure needed to service the SSSP area are expected to be classified as Schedule A, A+ or B projects, while the major roads proposed in the SSSP area are expected to be classified as Schedule C activities.

The Municipal Class EA document outlines 5 phases of project planning and implementation. These are

- Phase 1:** Identify the problem (deficiency) or opportunity.
- Phase 2:** Identify and evaluate alternative solutions to address the problem or opportunity by taking into consideration the existing environment, and establish the preferred solution taking into account public and review agency input.
- Phase 3:** Identify and evaluate the design alternatives for implementing the preferred solution by considering the net positive and negative effects of each alternative design concept including mitigation measures.
- Phase 4:** Prepare the Environmental Study Report (ESR) for review by agencies and the public.
- Phase 5:** Complete contract drawings and documents, and proceed to construction and operation; monitor construction for adherence to environmental provisions and commitments. Where special conditions dictate, also monitor the operation of the completed facility.

A flow chart describing the Class EA planning and design process is shown in **Figure 2-1**.

Schedule B projects must satisfy Phases 1 and 2 before proceeding to construction (Phase 5), while Schedule C projects must satisfy all 4 phases prior to construction. This TFSSR has been prepared to fulfill

Phases 1 and 2 of the Municipal Class EA process, such that Schedule B projects identified through this study can proceed to construction, while Schedule C projects will need to satisfy Phases 3 and 4 of the process during as part of future studies.

Proposed amendments to the Municipal Class EA were posted on the Environmental Registry on July 8, 2020 for a 45 day commenting period, and are expected to be approved later in 2020. When approved, the amendments allow new arterial and collector roads within new development areas to be considered Schedule A (pre-approved) projects, subject to a number of conditions. The road must be identified in a Transportation Master Plan, specified in a planning application such as a Secondary Plan or Draft Plan of Subdivision, and details of the roadway including the right-of-way limits and typical cross sections need to be reviewed by the public and agencies during the planning process. In addition, alternative alignments must be considered and environmental impacts need to be assessed and mitigated during the preparation of the Planning Act application.

The rationale included with the proposed amendments suggest that the use of this approach to classify a new road as a Schedule A project is most appropriate where “the new/expanded road is reasonably short and constructed primarily to service adjacent development.”

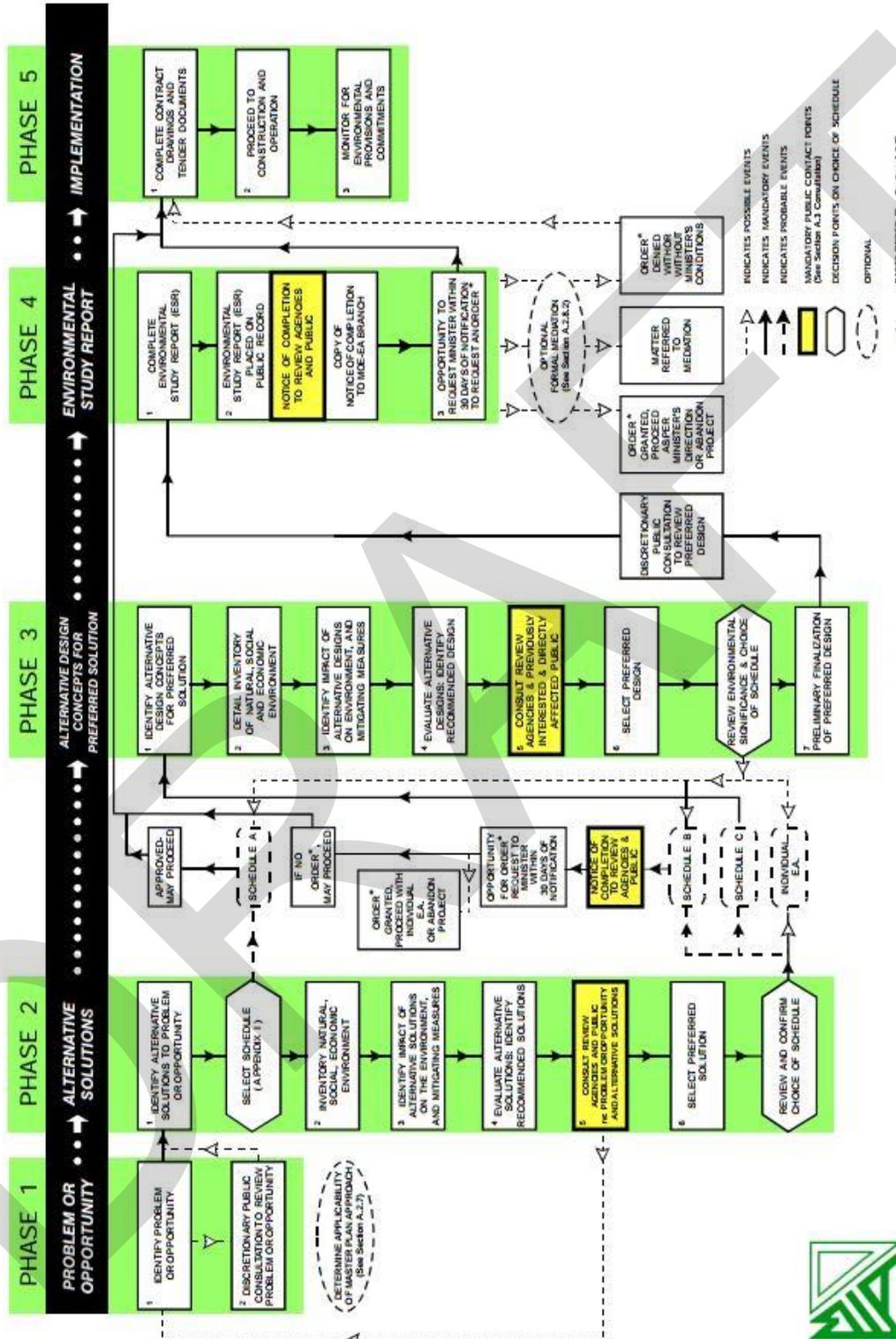
Application of the proposed clause to approve new arterial and collector roads through the Secondary Plan and exempt them from a Schedule B or C Municipal Class EA will be explored further with the Municipality of Clarington following provincial approval of the amendments to the Municipal Class EA.

2.2.1 Integrated Approach with the Planning Act

At this time, the study is proceeding on the basis of completing Phases 1 and 2 of Municipal Class EA process for all Schedule B and Schedule C transportation and servicing projects required for the SSSP area.

There are several points in the Municipal Class EA process where consultation with the public and relevant agencies is required, and the Municipal Class EA document outlines an approach of integrating the Planning and EA processes. To date, this TFSSR has followed the integrated process, where notices and public information centres have satisfied the requirements of both the Municipal Class EA and Planning Act, and the development and evaluation of alternative transportation and functional servicing strategies have been fully integrated with the corresponding alternative land use plans. More information on the stakeholder notifications and consultations can be found in **Section 7**.

Figure 2-1 Municipal Class EA Planning Flow Chart



3 EXISTING CONDITIONS

3.1 Land Use

Land use in the study area is primarily agricultural, with a number of wooded areas associated with Soper Creek and its tributaries. There are several residential properties in the study area, with access from Liberty Street, Mearns Avenue and Lamb's Road. A telecommunications tower is also located within the study, with access from the north limit of Mearns Avenue, and a gas pipeline traverses the north-east corner of the study area.

The lands surrounding the study area are primarily residential and agricultural. Estate residential homes are located off of Rebecca Court, Pamela Court and Sydel Court west of Liberty Street, and a newer residential development is located on the south side of Concession Road 3 between Liberty Street and Mearns Avenue. East of Mearns Avenue, the lands south of Concession Road 3 and east of Lamb's Road are predominantly agricultural.

The Clarington Official Plan designates the lands in the SSSP area as 'Urban Residential', with significant portions of the study area associated with Soper Creek and its tributaries designated as Environmental Protection Area. A Community Park is also indicated on the Official Plan, located at the north-east corner of Liberty Street and Concession Road 3. The Clarington Official Plan designates Liberty Street, Concession Road 3 and Lamb's Road as Type 'B' arterials. It also shows Mearns Avenue extended north and then west to intersect with Liberty Street as a new Type C arterial, and a new east-west Type C arterial road at the north limit of the study area, connecting Bowmanville Avenue to Lamb's Road.

The Durham Region Official Plan designates Liberty Street, Concession Road 3 and Lamb's Road as Type 'B' Arterials. Similar to the Clarington Official Plan, the Durham Official Plan shows the extension of Mearns Avenue northward into the study and then westward to connect to Liberty Street as a future Type C arterial, , and a future Type C arterial road across the north limit of the study area from Bowmanville Avenue to Lamb's Road. The road designations are discussed further in **Section 3.9**.

3.2 Archaeology and Cultural Heritage

3.2.1 Archaeology

A Stage 1 Archaeological Assessment (AA) was completed for the SSSP study area (ASI, 2020). The background review determined that approximately 38% of the study area is covered by previous Stage 1 and Stage 2 AA's, and the study concluded that almost all of the remaining areas have potential for Indigenous and/or Euro-Canadian archaeological resources.

Previous archaeological assessments have identified an Early Woodland registered site and 3 Euro-Canadian registered sites within the study area, and 5 additional registered sites within 1 km of the study area. Of the four registered sites within the study area, 2 have been deemed free of further archaeological concern, while Stage 3 investigations have been initiated for the remaining 2 sites.

The Stage 1 AA recommends that Stage 2 AA's be completed prior to development of any of the remaining lands not covered by the previous assessments. **Figure 3-1** illustrates the previously assess areas and areas requiring further Stage 2 assessments within the SSSP area.

Figure 3-1 Composite Archaeological Potential



From ASI, 2020

3.3 Topography and Drainage

The study area is located within Soper Main subwatershed of Soper Creek Watershed. Land surface topography of the study area varies from 125 m to 150 m above sea level (masl) and generally slopes from north to south.

The main branch of Soper Creek is located within and near the east edge of the SSSP area, generally flowing in a north to south direction. Within the study area, several tributaries flow in a south-easterly direction and join the main branch of Soper Creek. These tributaries convey drainage from the study area as well as external areas to the north and west of the study area.

3.4 Soils and Groundwater

The following sections summarize the findings from the SCSWS related to soil and groundwater conditions in the SSSP study area.

3.4.1 Surficial Geology

The study area is located within Iroquois Shore physiographic region and is covered by sandy beach deposits which are remnants of Glacial Lake Iroquois. The surficial geology of the study area mainly consists of

Glaciolacustrine Sand and Gravel. There is a band of organic deposit wetlands along the banks of a reach of Soper Creek, on the east of the study area. There is also a patch of older fluvial alluvium on the southeast of the study area.

3.4.2 Hydrogeology

There are four main aquifers in the study area as follows:

Blue Mountain Formation Shale aquifer: The Blue Mountain shales may act as a weak aquifer where the upper surface is weathered and fractured, however there is limited water supply potential in this unit.

Thornccliffe and Scarborough sands and silts: This aquifer is the lower aquifer in the study area, is laterally extensive and generally thick under the study area and appears to be fully confined in the study area. Groundwater flow in the aquifer reflects regional flow patterns emanating from the Oak Ridges Moraine.

Oak Ridges Aquifer Complex: This is the upper aquifer in the study area. While this aquifer is thick to the west, it is not entirely present on the east and is only present in some areas. Water levels reflect this variability and suggest that ORAC discharge can significantly support streamflow. ORAC streamflow reflects longer intermediate scale flow paths from the ORM and would likely appear as cold water upwelling.

Surficial Aquifer System: Iroquois Beach Sands: This is the surficial aquifer system in the study area. The surficial sands and gravels of the Iroquois Beach deposits provide a significant but seasonally intermittent groundwater resource. The sands likely saturate with spring snowmelt, and locally discharge this water through the remainder of the year.

Within the study area, groundwater flow generally follows the surface topography in a north-west to south-easterly direction. A considerable amount of groundwater from the study area is expected to emerge as groundwater discharge in the main branch of Soper Creek at the east edge of the study area.

3.4.3 Water Budget

A fully distributed hydrologic model was developed for the study area (EarthFX, 2008, and EarthFX, 2011). This model provides estimates of the components of the water budget. The major components of the water budget are shown in **Figure 3-2** through **Figure 3-4**. The maps show the distribution of the key components.

Figure 3-2 Average Annual Actual Evapotranspiration

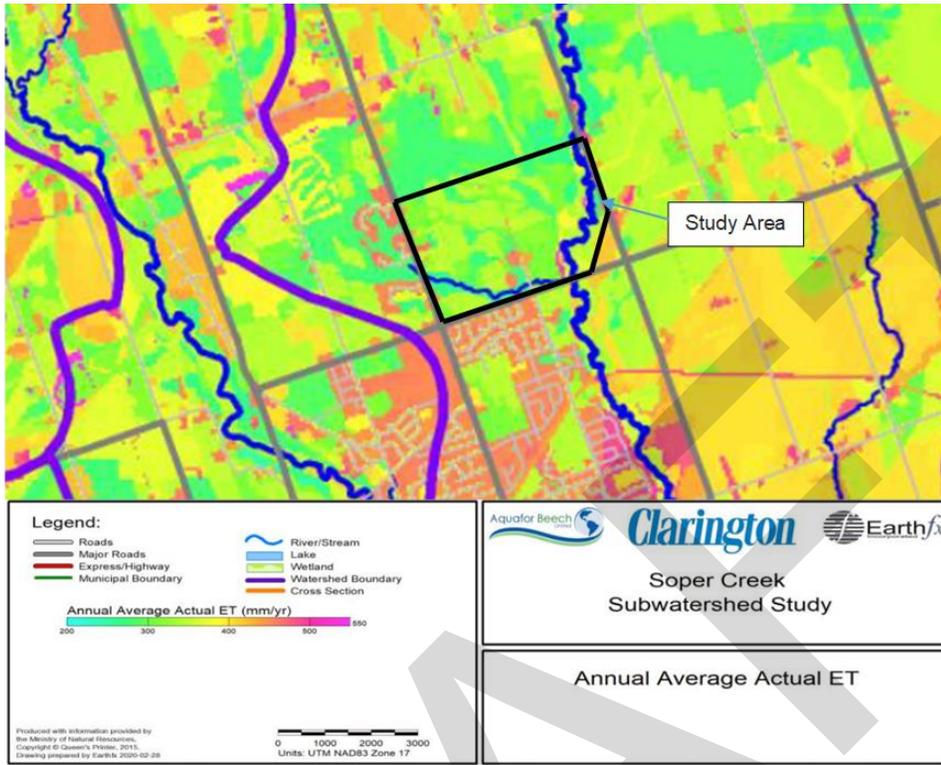


Figure 3-3 Annual Average Runoff

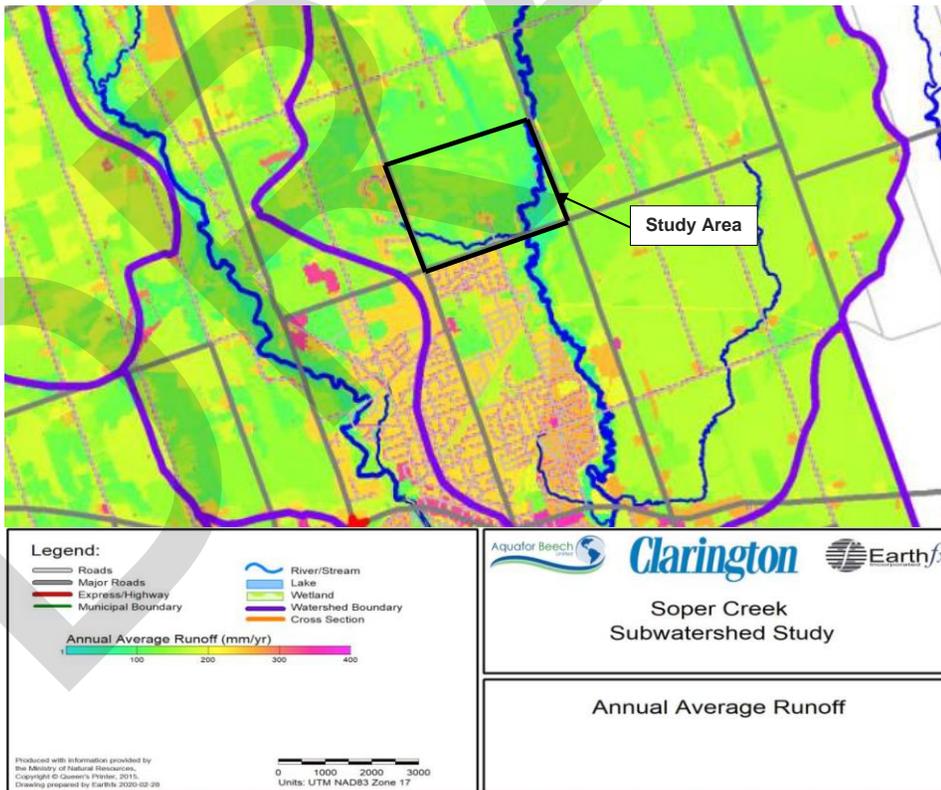
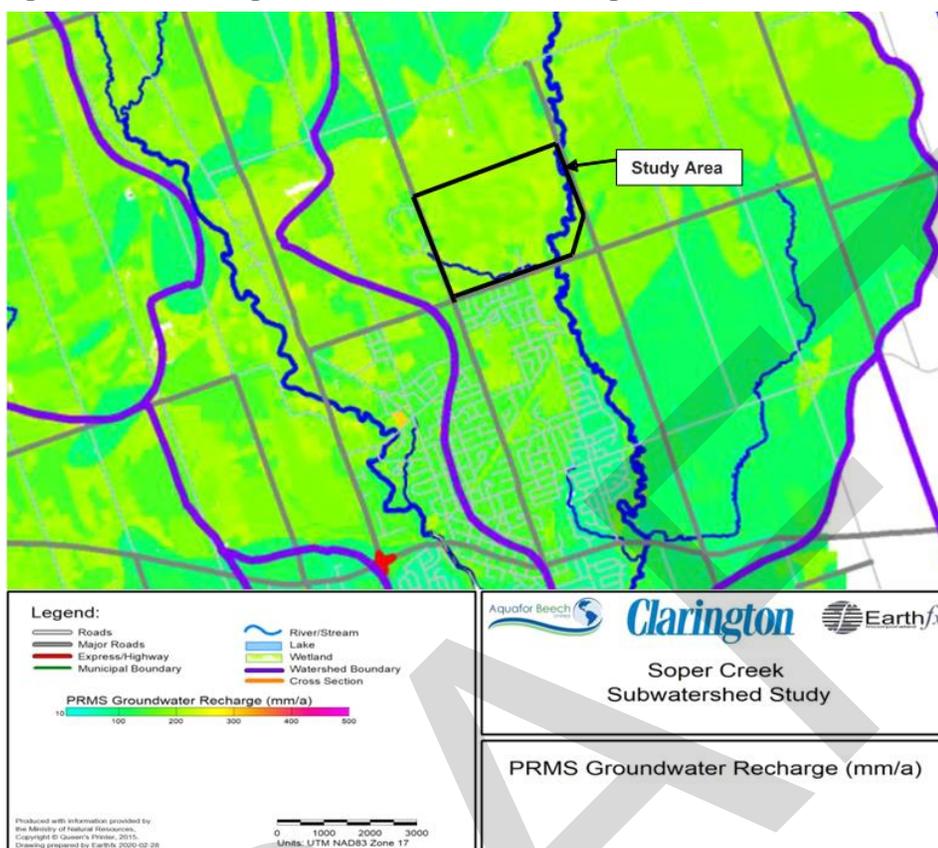


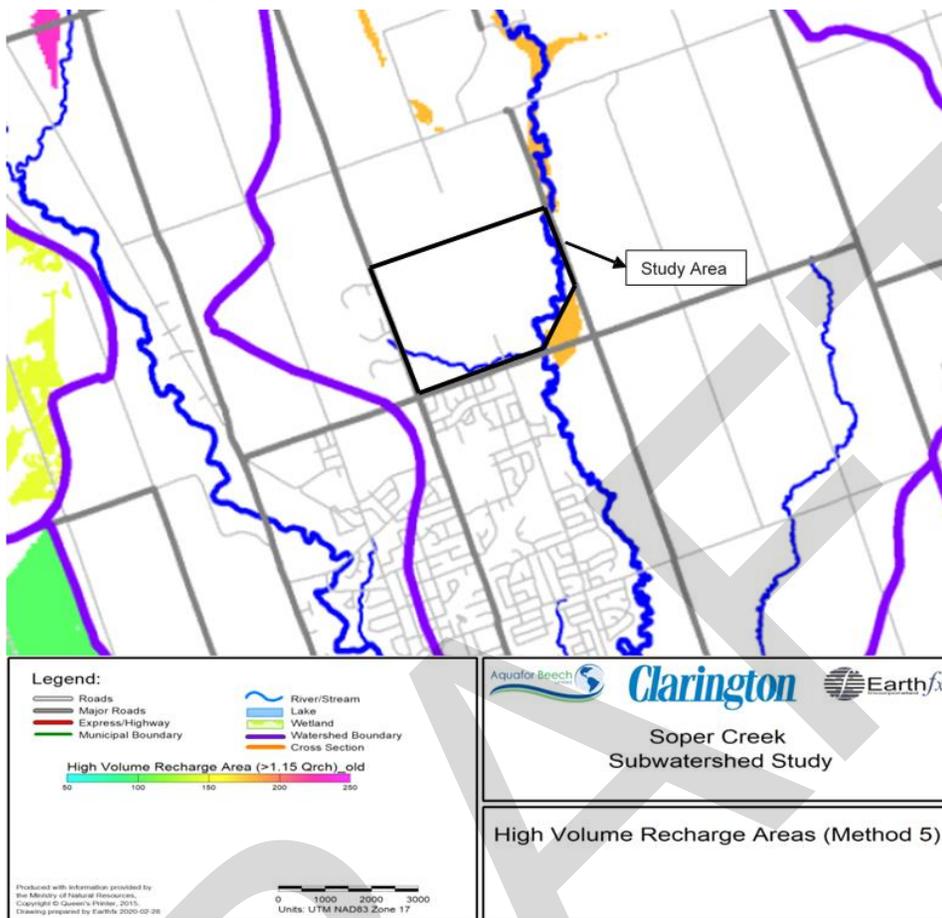
Figure 3-4 Average Annual Groundwater Recharge



3.4.4 High Volume Recharge Areas

The SCSWS included an assessment of high volume recharge areas in the watershed. Consistent with the approach used for the Source Water Protection Plan, high volume recharge areas are defined as areas where the local recharge estimates exceed 1.15 times the average recharge over the sub-watershed. **Figure 3-5** shows that there are no high volume recharge areas in the SSSP area, although a high volume recharge area was identified immediately adjacent the SSSP, between the main branch of Soper Creek and Lamb's Road.

Figure 3-5 High Volume Recharge Areas



3.5 Surface Water

The following sub-sections summarize the findings from the SCSWS related to surface water resources in the SSSP study area. This includes flood and erosion hazard considerations for the streams as well as restoration opportunities

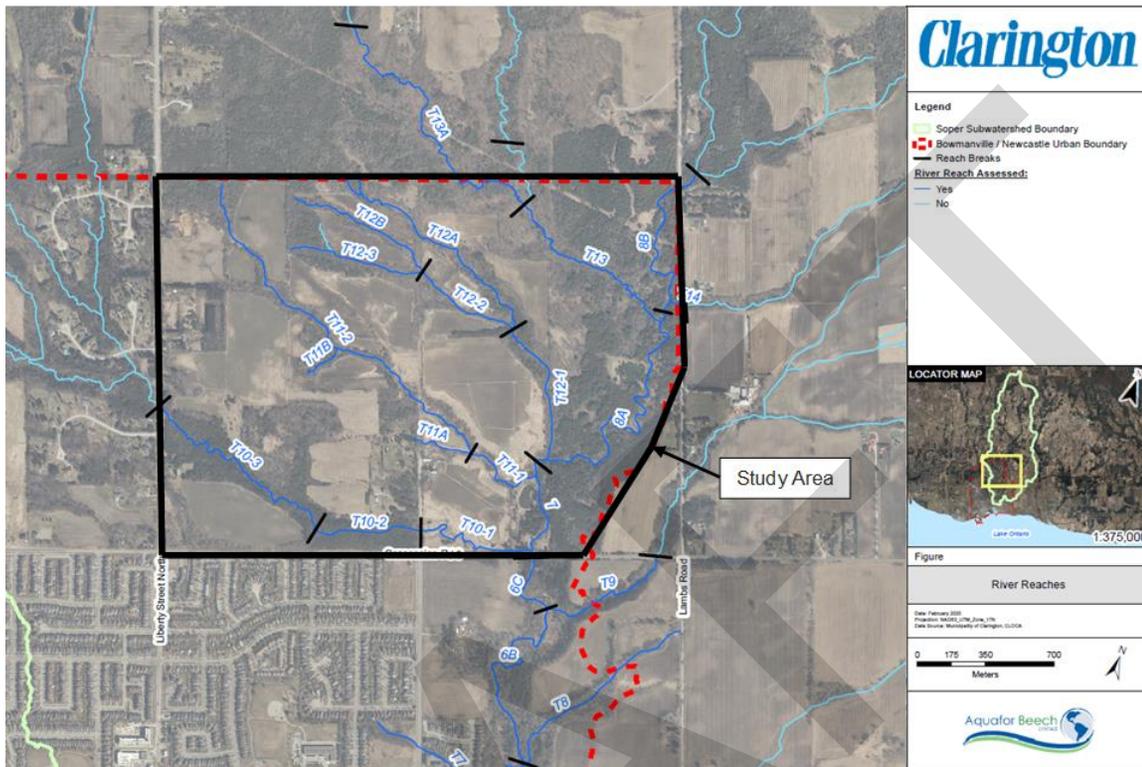
3.5.1 Fluvial Geomorphological Assessment

The fluvial geomorphological investigations completed for the SCSWS included desktop analyses to define stream reaches, followed by field investigations to characterize creek morphology and sediments. These included Rapid Geomorphic Assessments, measurements of channel dimensions and the identification and characterization of erosion sites. The different reaches through the study area are illustrated in **Figure 3-6**.

3.5.1.1 Rapid Geomorphic Assessments

A Rapid Geomorphic Assessments (RGA) is a standardized method to help determine if a watercourse is stable or in adjustment (i.e. eroding or filling with sediment). RGA's were completed the main branch of Soper Creek (Reaches 7 and 8) as well as Tributaries 10 and 13 within the study area. All of the assessed reaches in the study area were classified as being transitional with the dominant adjustment processes being Aggradation for the main branch and Tributary 13, and Widening for Tributary 10.

Figure 3-6 Geomorphic Assessed Reaches in the Study Area



3.5.1.2 Erosion Sites

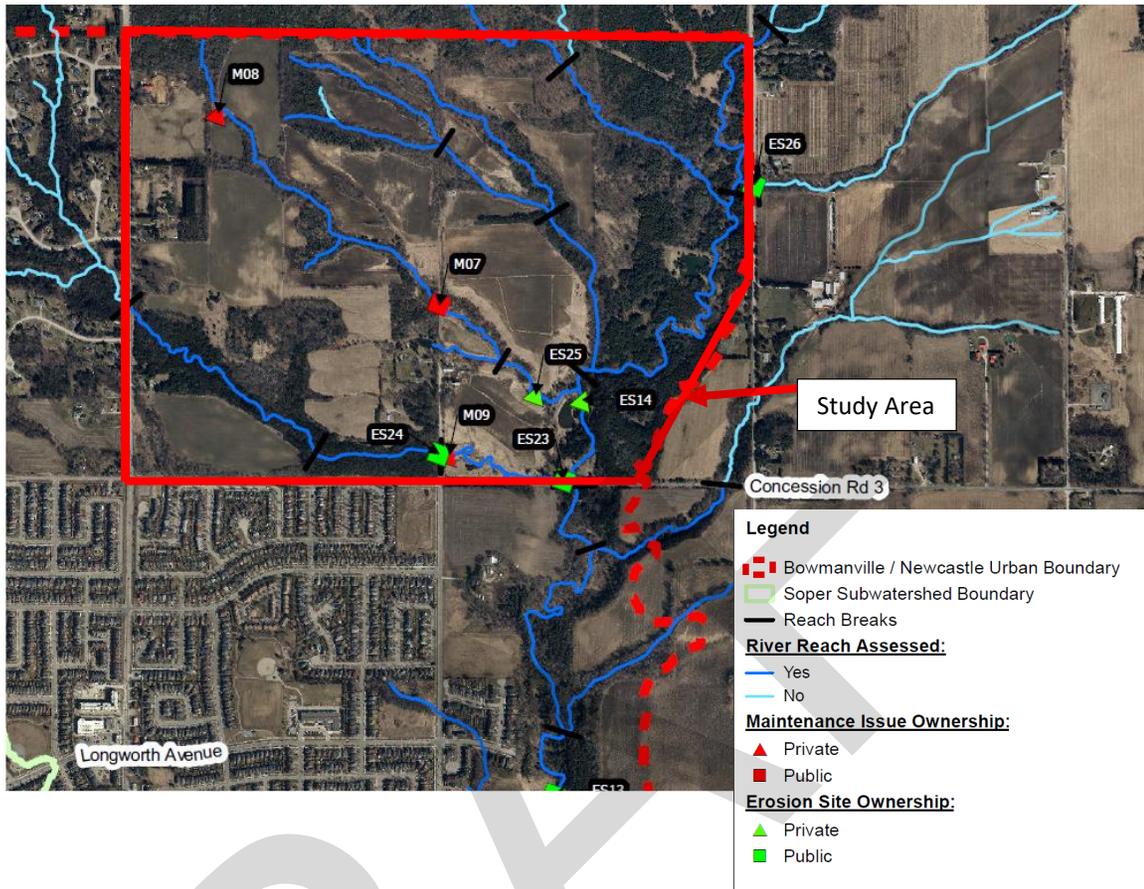
The fluvial geomorphology field investigations identified erosion sites through the study area. These are locations where erosion is threatening infrastructure or public health and may require mitigation. Four erosion sites were identified in the SSSP area, of which two are considered high priority for mitigation. The locations of the erosion sites are shown on **Figure 3-7** and the issues are summarized on **Table 3-1**.

Table 3-1 Soper Creek Erosion Sites

Erosion Site	Channel Reach	Property Ownership	Description of Issue
ES14	7	Private	Grade control structure is causing potential fish passage barrier.
ES23 *	T10-1	Public	Bank erosion is posing risk to guardrail and road
ES24 *	T10-2	Public	Road embankment is failing, culvert inlet is outflanked.
ES25	T11-1	Private	Channel is confined to small culvert

* Priority Erosion Site

Figure 3-7 Erosion Sites and Maintenance Issues



3.5.1.3 Erosion Hazard Assessment

The erosion hazard limit is established through a combination of a meander belt assessment and a geotechnical slope stability assessment, where warranted.

Meander Belt Assessment: For the SCSWS, meander belt widths were estimated using Procedure 3 from the TRCA Belt Width Delineation Protocol (2004), including a 20% factor of safety to account for future erosion. The results of the meander belt delineation are summarized in **Table 3-2** and illustrated in **Figure 3-8**.

Table 3-2 Meander Belt Delineation

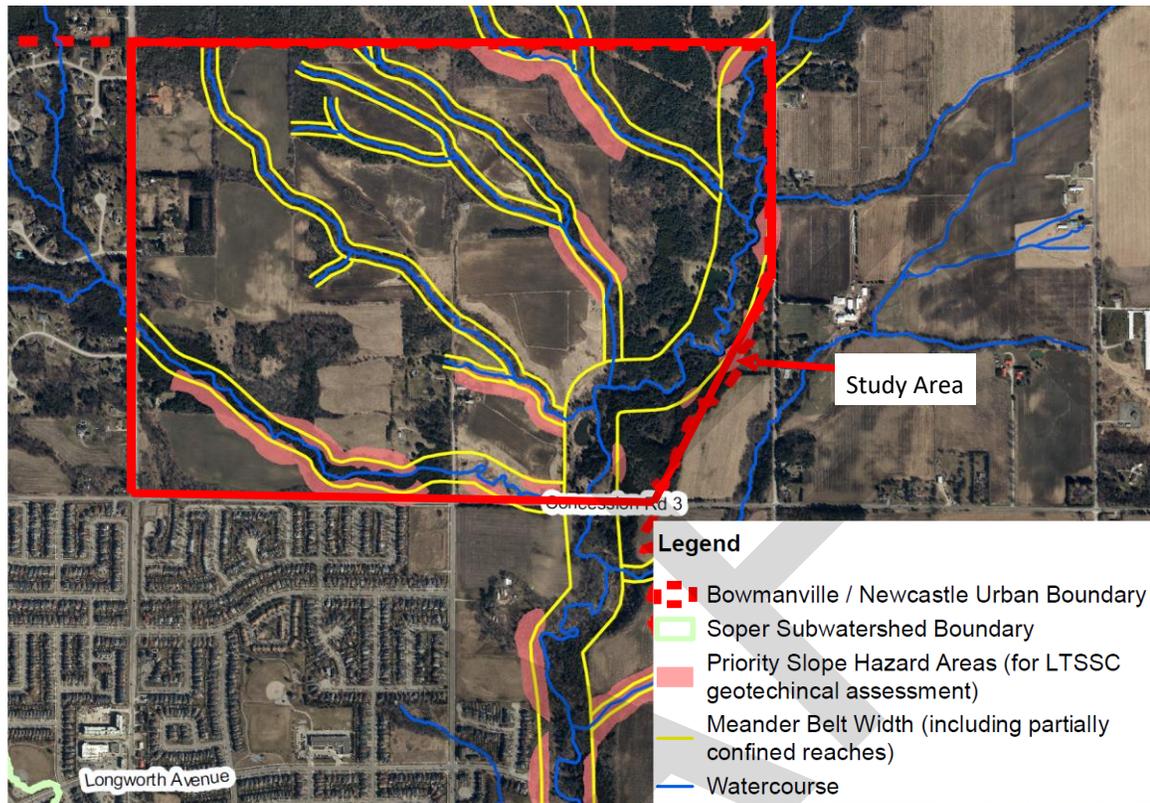
Channel Reach	Preliminary Belt Width (m)	Bankfull Width (m)	Existing Belt Width (m)	Final Belt Width (m)	Slope Hazard Present
7	51	11	113	136	Yes
8A	50	9	109	131	Yes
8B	50	9	109	131	No
T10-1	30	4	64	77	Yes
T10-2	25	4	54	65	Yes
T10-3	20	4	44	53	Yes
T11-1	15	2	32	38	Yes
T11-2	15	2	32	38	No
T11A	-	-	-	30	Yes
T11B	-	-	-	30	No
T12-1	17.5	2	37	44	Yes
T12-2	15	2	32	38	No
T12-3	-	2	-	30	No
T12A	15	2	32	38	No
T12B	-	-	-	30	No
T13-1	17.5	4	39	47	Yes
T13-2	17.5	4	39	47	No

*Bankfull width was estimated from aerial imagery
 Includes erosion allowance of existing belt width x 1.20*

Erosion Hazard Long-Term Stable Slope Allowance: While the erosion hazards for unconfined systems can be defined based solely on meander belt delineation or similar techniques, confined systems require greater effort to include geotechnical assessments of the valley walls to establish the erosion hazards. The SCSWS did not carry out the detailed geotechnical investigations, but identified priority stable slope hazard areas where detailed assessments will be required to delineate the final erosion hazard limit as part of future development applications. These are defined by reaches where the channel is within 15 m of the toe of the valley slope for embankments with slopes steeper than 15% and heights greater than 3 metres (MNR, 2002).

The areas where detailed slope stability assessments will be required to establish the erosion hazard limit are illustrated in **Figure 3-8**.

Figure 3-8 Erosion Hazards

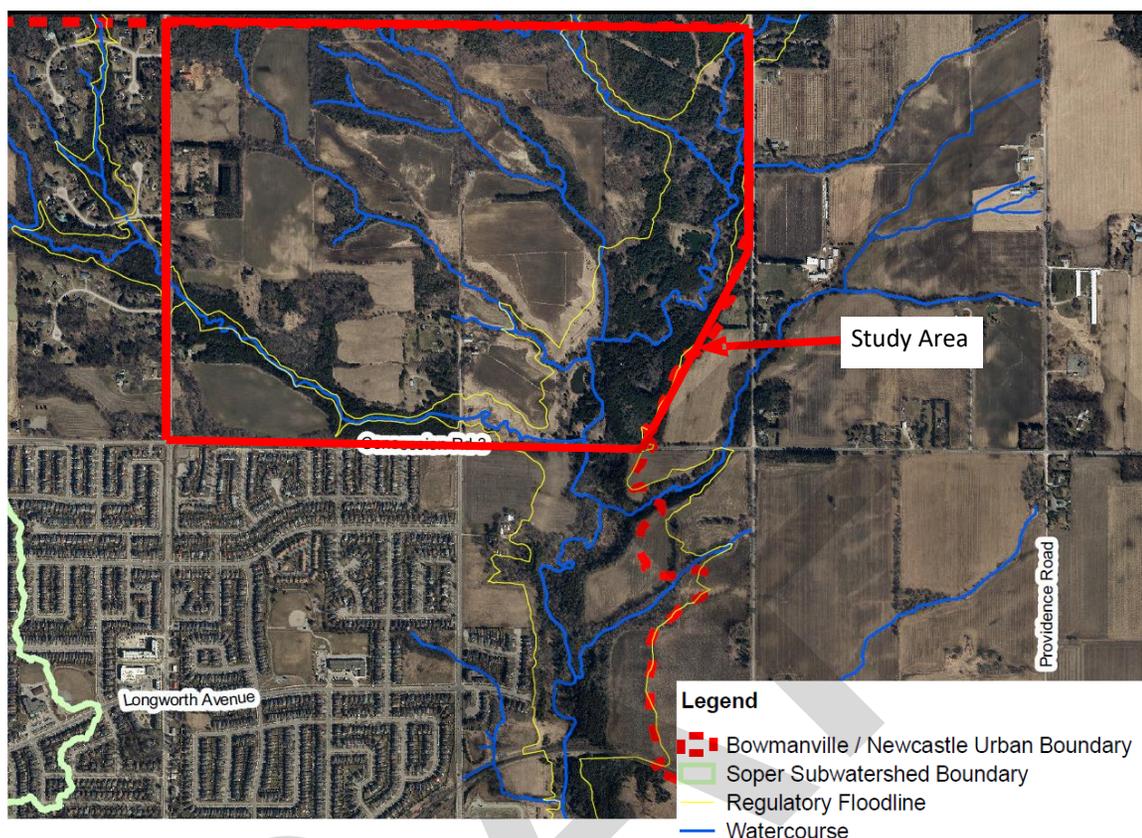


3.5.2 Hydrology, Hydraulics and Flood Plain Mapping

CLOCA maintains hydrologic and hydraulic modelling for the Soper Creek subwatershed, and this modelling was relied upon for the SCSWS existing conditions analyses. The hydrologic modelling was developed by ABL as part of the Bowmanville Creek and Soper Creek Floodplain Mapping Study in 2009, and subsequently refined by CLOCA in 2011. The existing conditions hydrology model simulated using both the 12 hour Chicago and 24 hour SCS storm distributions to establish the flow rates for the 2 year through 100 year return period storm events, and using Hurricane Hazel to establish the Regional storm flow rates. The Regional Storm generally produces higher flows than the 1:100-year storm and is used as the regulatory event by CLOCA.

The 2009 ABL study also prepared hydraulic models and flood plain mapping for the Soper Creek watershed. The hydraulic models and flood plain mapping were developed in accordance with provincial guidelines, and the topographic mapping information was augmented with field measurements of bankfull channel dimensions and bridge and culvert surveys. The resulting Regulatory flood plain through the study area is illustrated in **Figure 3-9**.

Figure 3-9 Regulatory Flood Plain



3.6 Natural Environment

The natural environment through the Soper Creek watershed was inventoried through a desktop review of available resources, followed by field investigations on lands where permission to access was granted.

Aquatic habitat as assessed using standard habitat mapping techniques, fish and benthic sampling and identification of barriers to fish movement.

Botanical inventories were completed to establish the vegetation through the watershed, which were categorized using the Ecological Land Classification (ELC) system. Breeding bird and amphibian surveys were completed and augmented with incidental sightings to determine wildlife species present in the study area, and potential salamander habitat was established by identification of vernal pools and egg mass surveys.

A brief summary of the findings are included in the following sections.

3.6.1 Aquatic Habitat

Detailed field investigations were completed at two sites along the southern tributary of Soper Creek within the study area (Tributary T10 on **Figure 3-6**). The tributary was found to have permanent flow, and the presence of rainbow trout in this tributary confirms that it provides habitat for sensitive coldwater species, despite potential barriers to fish passage at Mearns Avenue and Liberty Street.

3.6.2 Vegetation

Vegetation communities through the study area were inventoried and classified using the ELC system. All of the ELC communities are considered common and secure. No significant wetlands were observed in the SSSP area.

Most individual species observed are common and secure, although 35 species were observed in the SCSWS study area that are locally significant, and 17 of those are considered rare in Durham Region.

Finally, a number of Butternut trees were observed in the study area. Butternut is an endangered species and protected under Species at Risk (SAR) legislation.

3.6.3 Wildlife

A large number of bird species were recorded during the breeding bird surveys. The majority of these species are provincially common, but seven SAR bird species were recorded during the surveys, and an additional two SAR bird species were observed during other ecological fieldwork.

Very low numbers of amphibians were recorded during the calling surveys, which is not surprising given the lack of extensive wetland areas or ponds in the SSSP area.

Other common insect, mammal and amphibian species were observed or were evident in the study area.

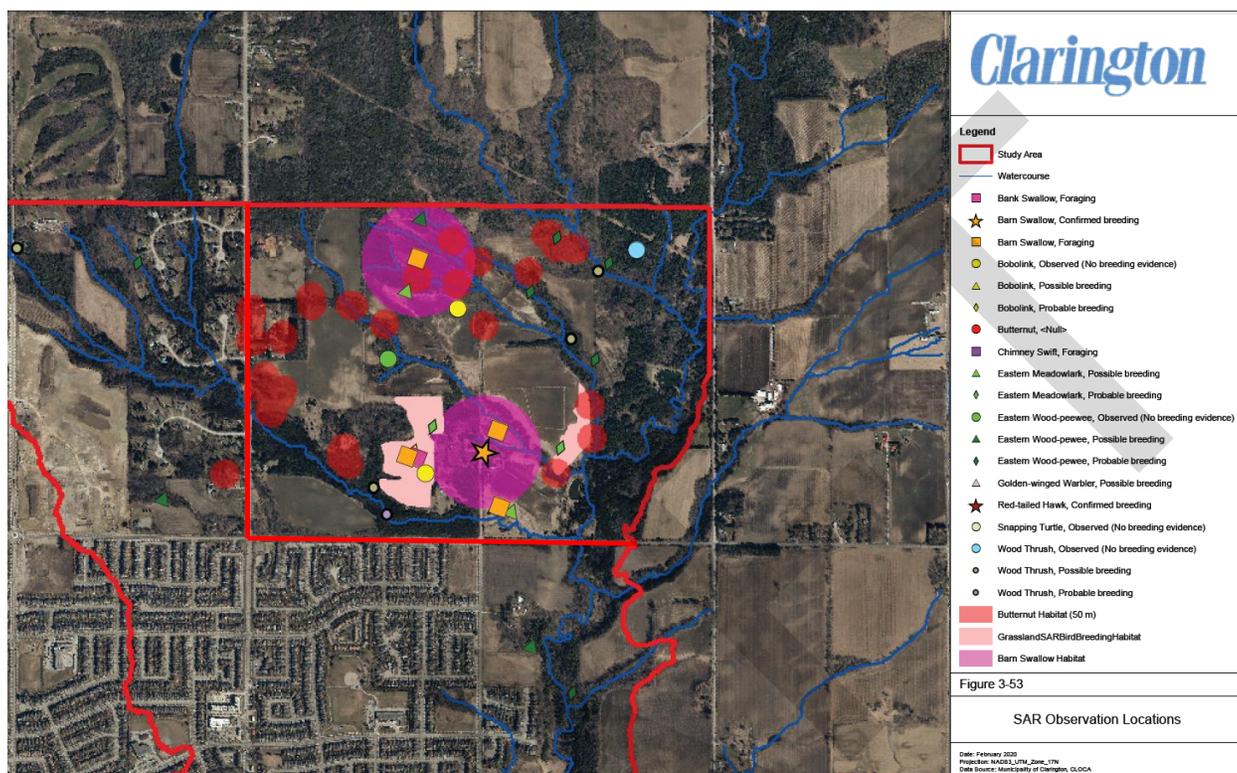
3.6.4 Species at Risk

A number of Species at Risk were observed in the SSSP area, as noted in the sections above. The species present or potentially present in the study area are listed in **Table 3-3** and illustrated in **Figure 3-10**.

Table 3-3 Species at Risk

Species	Status
Bank Swallow	Threatened
Barn Swallow	Threatened
Bobolink	Threatened
Eastern Meadowlark	Threatened
Eastern Wood-pewee	Special Concern
Wood Thrush	Special Concern (ESA), Threatened (SARA)
Monarch	Special Concern
Butternut	Endangered

Figure 3-10 SAR Observation Locations



3.6.5 Overall Natural Heritage System

The findings from the background review and field investigations were used to establish the existing Natural Heritage System through the SSSP area. The Natural Heritage System and its components are defined in the Clarington Official Plan, and include natural heritage features, hydrologically sensitive features and linkages.

The range of features in the study area that meet the criteria for inclusion in the Natural Heritage System are illustrated in **Figure 3-11**. The overall Natural Heritage System, including Vegetation Protection Zones, Linkages and Restoration Opportunities is illustrated in **Figure 3-12**.

Figure 3-11 Natural Heritage Features

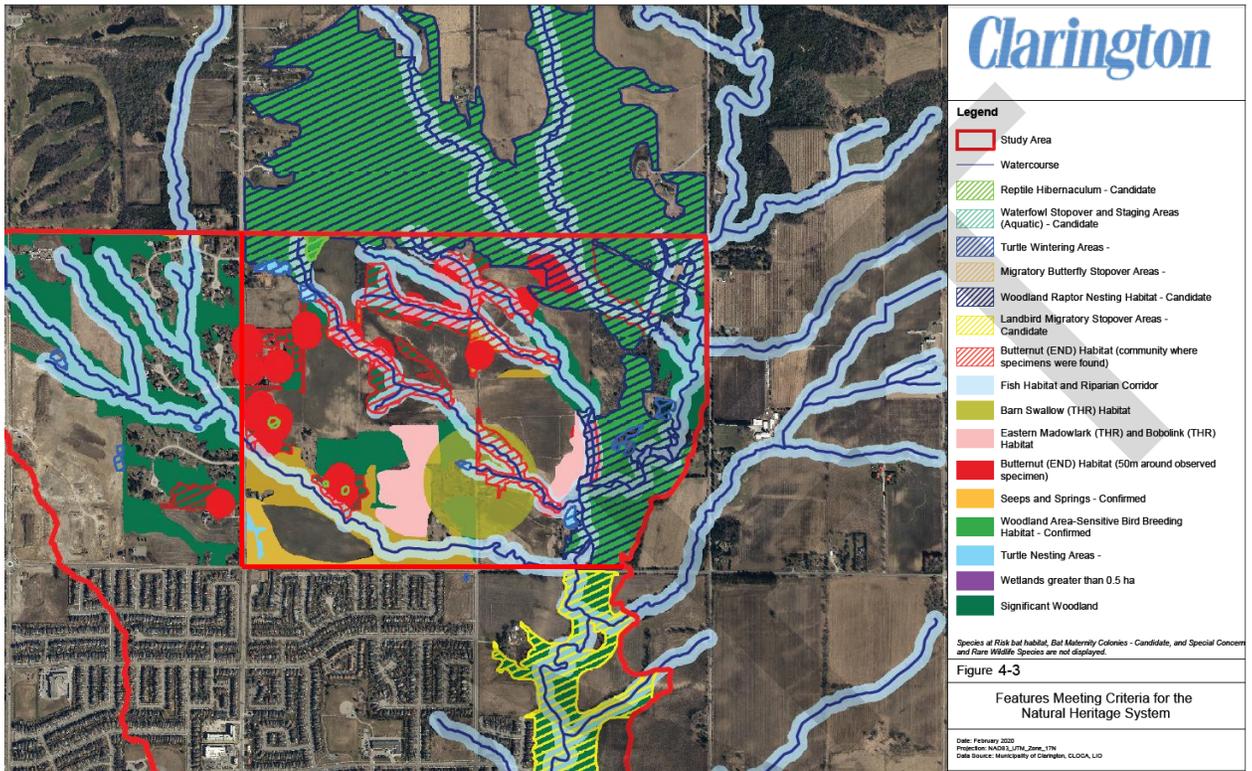
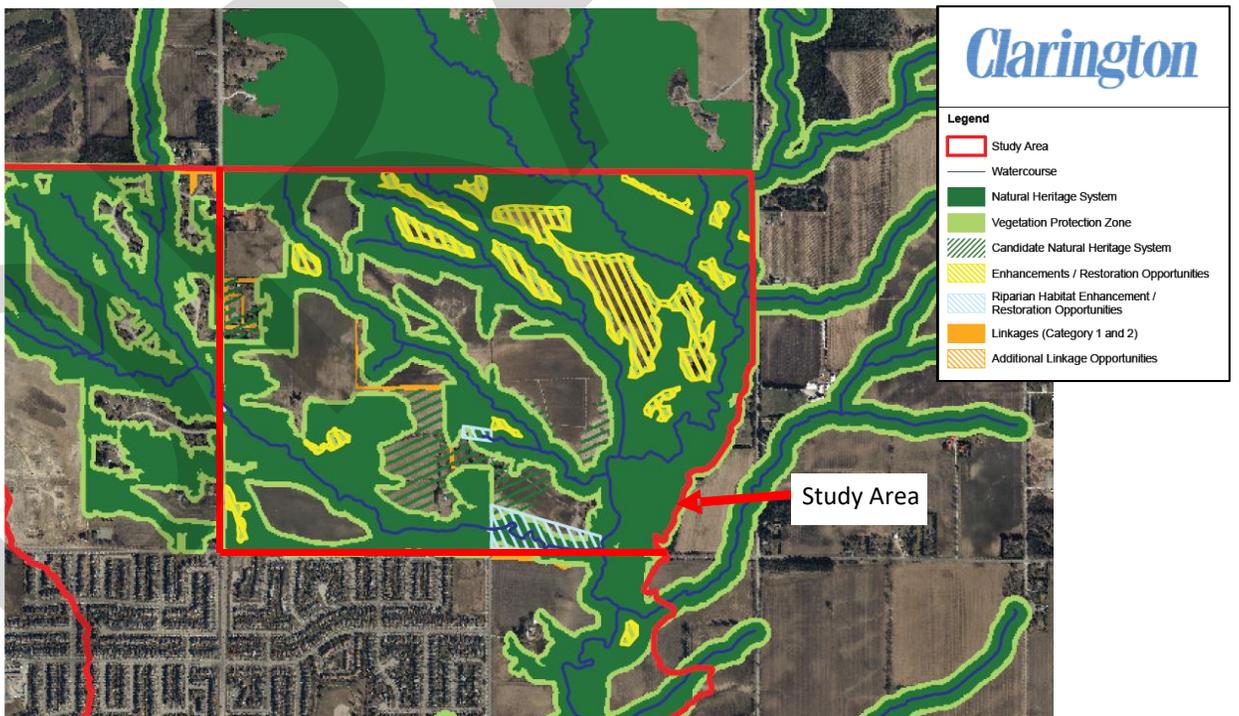


Figure 3-12 Natural Heritage System, Including VPZ's and Linkages



3.7 Water Supply and Distribution

The Bowmanville Drinking Water System provides potable water to consumers in Town of Bowmanville in the Municipality of Clarington. There is one water supply plant (Water Treatment Plant) with an approved capacity of 36,368 m³/day. This plant feeds a Distribution system and trunk distribution system. This system and plant are owned and operated by Regional Municipality of Durham. The source water for this plant is drawn from Lake Ontario.

3.7.1 Existing Water Distribution Infrastructure

The current water network covers the developed area of Bowmanville. There is an existing watermain (300mm diameter) along Liberty St North, adjacent to the study area. The existing Bowmanville Zone 2 reservoir is located northwest of the study area near Liberty St North and Concession Rd 4.

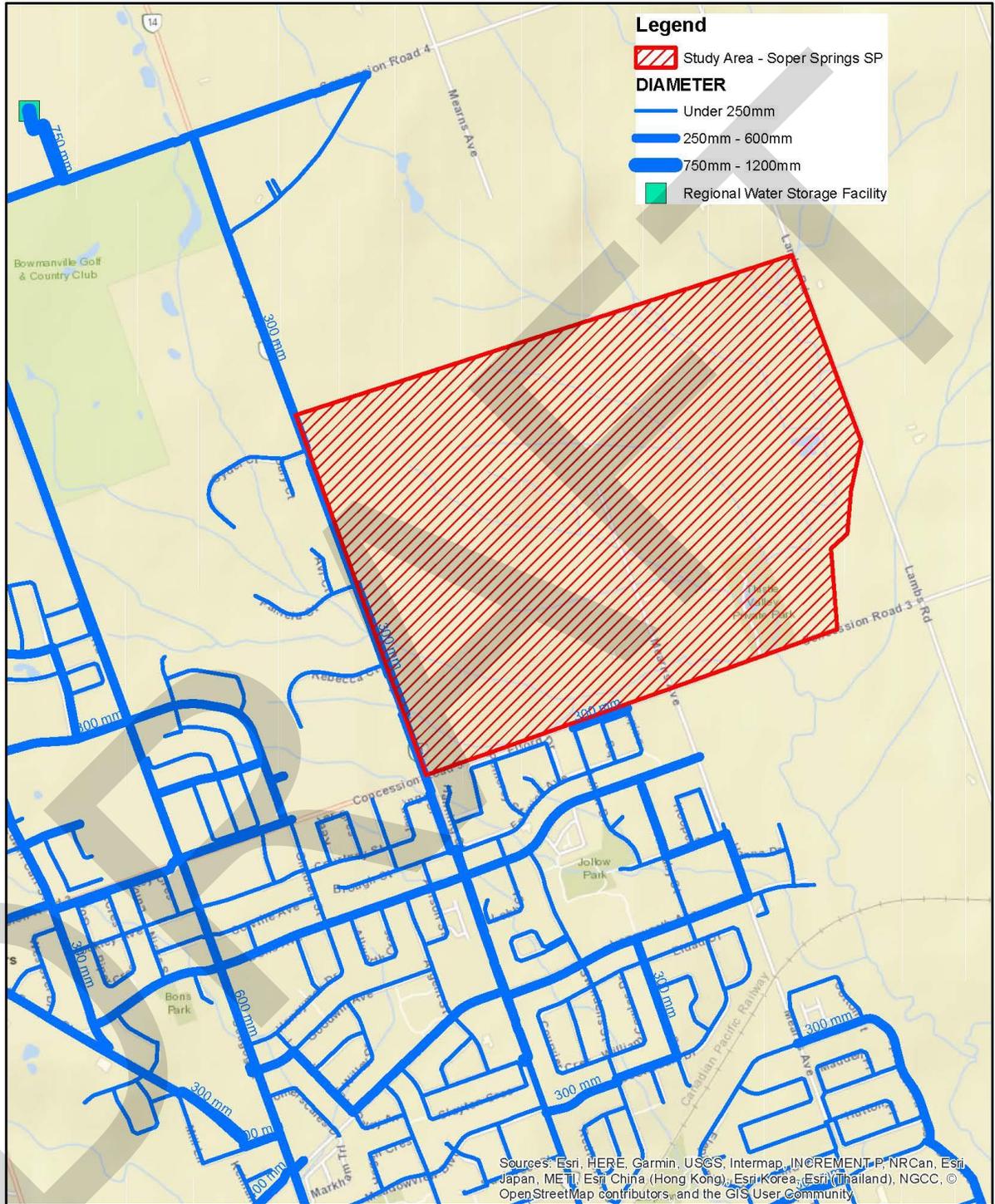
The water system in Bowmanville has two zones. Everything south of the railway is serviced via Pressure Zone 1. As the entirety of the Study Area is north of the railway, it is assumed that the Zone 2 hydraulic grade line will be appropriate for the entire SSSP area. According to Durham Region, the Zone 1 top water level is 150 m and the maximum ground elevation for Zone 1 service is 120 m +/- . The Zone 2 top water level is 180 m and the maximum ground elevation for Zone 2 service is 150 m +/- .

Existing ground elevations range from a high of approximately 150 m at the north-west corner study area to a low of approximately 100 m in the Soper Creek valley at Concession Road 3.

The water in Bowmanville and the Municipality of Clarington is supplied from Lake Ontario through the Bowmanville Water Treatment Plant and a network of transmission and supply mains.

Figure 3-13 shows existing water infrastructure near the Soper Springs Secondary Plan area. The information shown on the figure is from GIS files provided by the Region.

Figure 3-13 Existing Water Infrastructure



3.7.2 Planned Water System Improvements

3.7.2.1 Durham Region Capital Projects

The Region of Durham updated its Development Charge (DC) Background Study in 2018. This study is to establish the future development-related capital projects. Several projects were identified in the Town of Bowmanville. The Bowmanville DC water projects are summarized below in **Table 3-4** and shown in **Figure 3-14**.

Table 3-4 Bowmanville DC Projects - Water

ID	Description	Year Construction is to Commence									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
300	Expansion to Bowmanville WSP					X		X		X	
301	New Liberty St. N. Zone 1 Reservoir and demolish existing tank ⁽¹⁾		X								
302	Expansion of Zone 2 Reservoir								X		
303	Expansion of Concession St Zone 2 PS							X		X	
304	New Zone 2 PS at Zone 1 Reservoir							X		X	
305	Zone 1 Feedermain from Bowmanville WSP to Baseline Rd.							X		X	
306	Zone 1 Feedermain on Baseline Rd from Wharf St to Mearns Ave.									X	
307	Zone 1 Feedermain on Hwy 2 (King St), Lambs Rd, Third Concession Rd to Liberty Zone 1 Reservoir		X								
308	Zone 1 Feedermain on Baseline Rd from Liberty St to RR 57			X		X					
309	Zone 2 Feedermain from Zone 2 PS to Zone 2 Reservoir							X		X	
310	Zone 2 Feedermain on Concession Rd 3 from Middle Rd/Scugog St to Mearns Ave (Region Share)	X									

Project 301 is shown in two locations on the DC Figure. The northern-most point (Liberty Street, at the limit of the Urban Boundary) is the proposed new reservoir location. The point in Central Clarington (south of the railway) is the existing elevated tank, which will ultimately be demolished. Through discussion with the Region, it appears that Project 301 and Project 304 are active and ongoing.

The Study Area is surrounded by various DC Projects. Project 307 is adjacent to the southern limit of the study area along Concession Rd 3 and north along Liberty St (western limit to the study area). This DC project is a

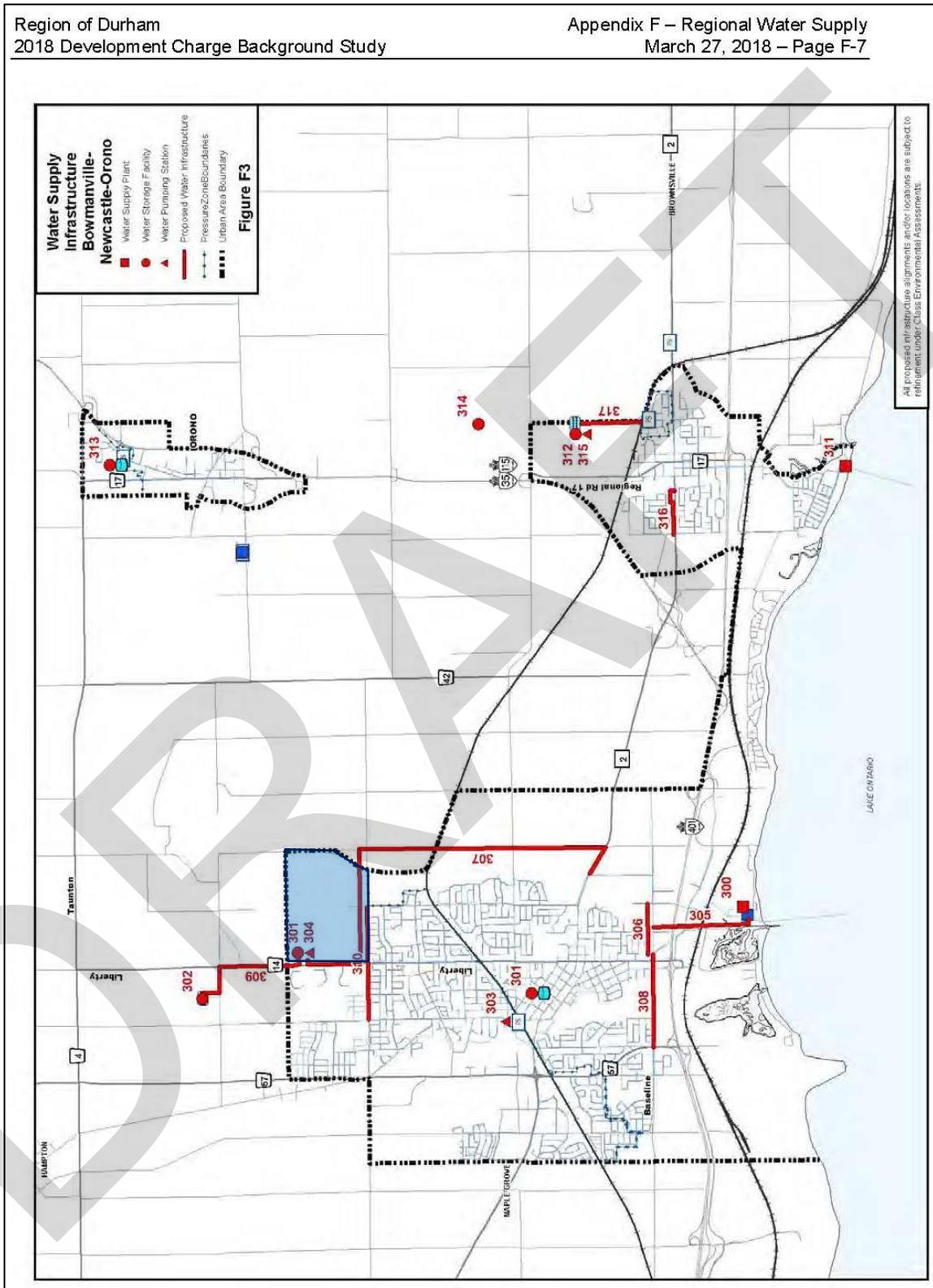
feedermain to the Zone 1 reservoir. From the 2018 Study report, this project was scheduled for 2019 and would bring water to the study area adjacent to the Soper Springs Secondary Plan Area along Liberty St N and Concession Rd 3.

Along Liberty St N, is project 301, 304 and 309. Project 301 includes constructing the Zone 1 Reservoir on Liberty St N and demolish the existing elevated tank. This project is scheduled for 2019. Project 304 involves a new Zone 2 pumping station at the Zone 1 Reservoir and is schedule for 2024 and 2026. Project 309 involves construction of a Zone 2 feedermain from the Zone 2 Pumping Station to the Zone 2 reservoir. This project is schedule for 2024 and 2026.

Based on information supplied by the Region, the design for the Zone 1 works to extend the watermain (DC project 307) to the Liberty St Reservoir has been completed, although the exact timing of the construction is still undecided. The design on the Liberty St Reservoir has just begun in 2020.

There will be more than sufficient water available for the SSSP area based on the proximity with existing water storage facilities and feeder mains. Additional looping through the Secondary Plan area would ultimately fortify the water servicing network.

Figure 3-14 Region of Durham – DC Water Projects



3.8 Sanitary Infrastructure

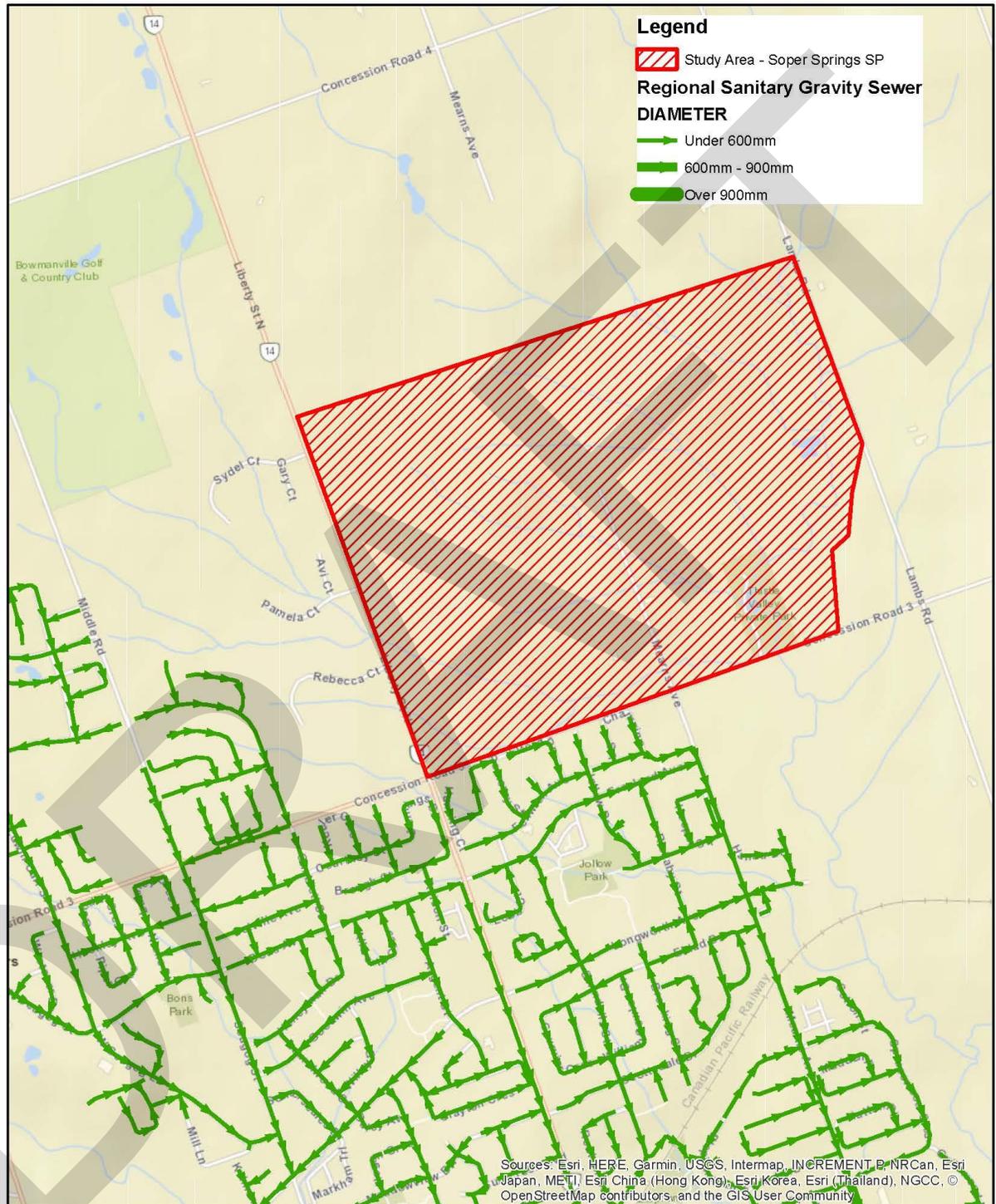
3.8.1 Existing Sanitary Services

The current sanitary sewer network covers the developed area of Bowmanville, with sanitary sewers only extending as far north as the existing residential developments south of Concession Road 3. These systems converge and continue south in a trunk sewer aligned within the Mearns Avenue right-of-way. We are also aware of a sanitary pumping station located on the west side of Liberty Street approximately 200 m north of Concession Road 3, which services the estate residential areas on the west side of Liberty Street.

Figure 3-15 shows existing sanitary infrastructure near the SSSP study area. The information shown on the figure is from GIS files provided by the Region.

DRAFT

Figure 3-15 Existing Sanitary Sewer Infrastructure



3.8.2 Planned Sanitary System Improvements

3.8.2.1 Durham Region Capital Projects

The Region of Durham updated its Development Charge Background Study in 2018. This study is to establish the future development-related capital projects. Several projects were identified in the Town of Bowmanville. The Bowmanville DC sanitary projects are summarized below in Table 3-5 and shown in **Figure 3-16**.

Table 3-5 Bowmanville DC Projects - Sanitary

ID	Description	Year Construction is to Commence									
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
300	Northeast SSPS, forcemain allowance									X	
301	Twinning of trunk sewer Spry Ave, from Baseline Rd to N/L Spry Ave										X
302	Baseline Rd trunk sewer from Simpson Ave to Bennett Rd (Region share)			X		X					
303	Bennett Rd trunk sewer from Baseline Rd to Highway 2 (Region share)										X
304	Soper Creek trunk sewer on Mearns Ave from Freeland Ave to Concession Rd 3, and on Concession 3 from Mearns Ave to 450m west of Mearns Ave (Region share)								X		
305	Port Darlington Rd trunk sewer from Baseline Rd to existing easement			X		X					

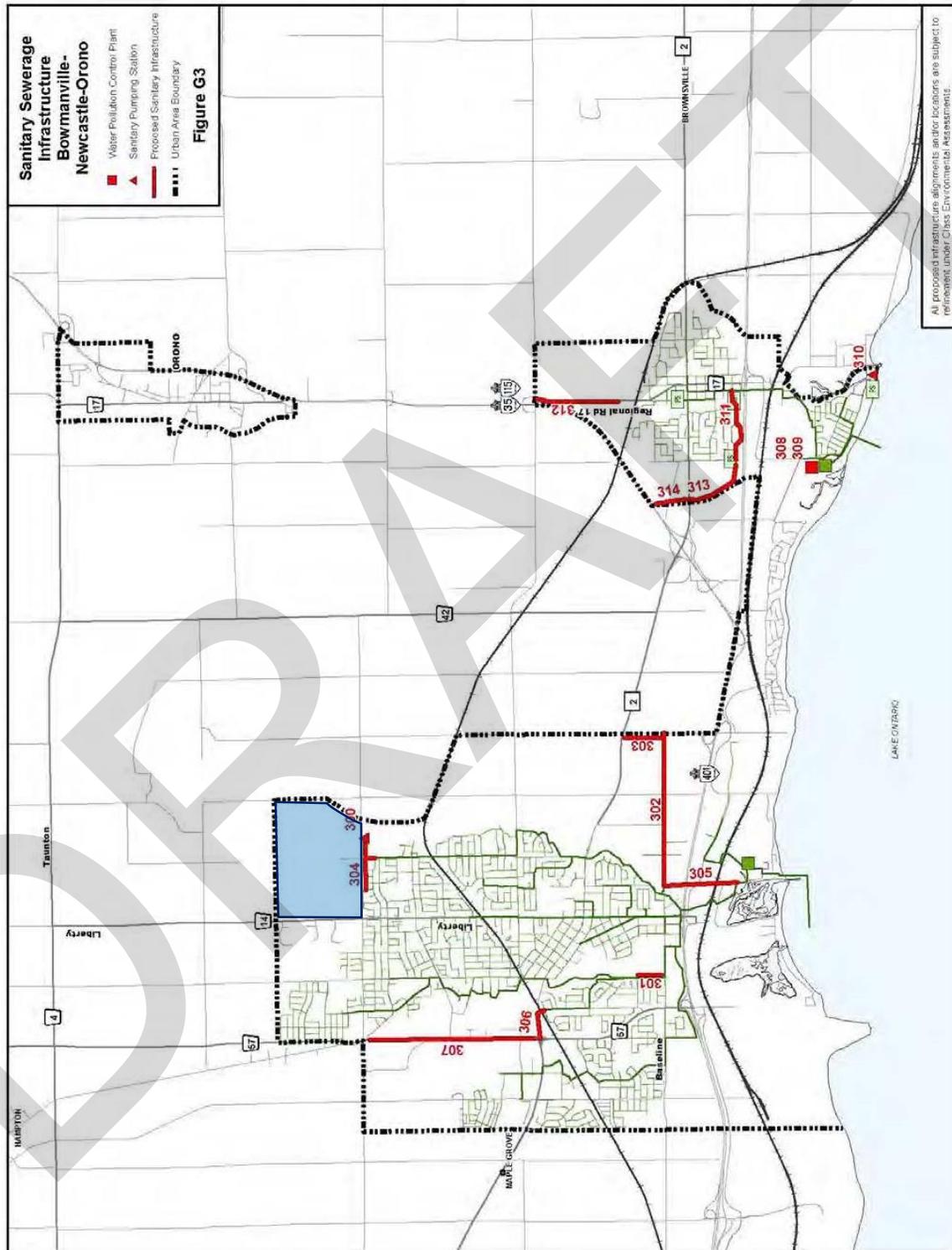
Project 304 is located adjacent to the southern limit of the study area. This project will construct the Soper Creek trunk sewer, culminating at the proposed sanitary pumping station (Project 300). These projects are scheduled for 2025. The proposed sanitary pumping station will require a Class Environmental Assessment. Through the 2020 Durham Region budget, this design is forecasted for 2028.

The SSSP area will be serviced via the proposed Soper Creek Trunk Sewer on Mearns Avenue. The SSSP area will direct all wastewater flow to the Soper Creek Trunk Sewer and the Region will advise of capacity. As part of the SSSP, a review of the grading within the site is required to determine if a pumping station would be required or if the entire site can be serviced by gravity to the proposed Soper Creek Trunk Sewer. This is investigated further in **Section 5.4**.

Figure 3-16 Region of Durham – DC Sanitary Projects

Region of Durham
 2018 Development Charge Background Study

Appendix G – Regional Sanitary Sewerage
 March 27, 2018 – Page G-7



3.9 Transportation

3.9.1 General Road Network Description

The existing transportation network surrounding the SSSP area consists of rural roads which access agricultural lands and large residential frontage properties. It is bordered by the Liberty Street N to the west, Lambs Road to the east and Concession Road 3 to the south.

Figure 3-17 below illustrates the existing road network in the SSSP area.

Figure 3-17 Study Area Road Network



3.9.1 Existing Area Road Network

Within the study area boundary, there are four existing roadways. These roadways are described as follows:

Liberty Street North is an existing north-south rural Type B arterial road with two-lane cross-section (one lane per direction). Intersection at Concession Road 3 is un-signalized and stop-controlled with free flow condition along Liberty Street North. No sidewalks or bike lanes are provided along Liberty Street North. Liberty Street North is under the Regional Municipality of Durham and operates with a posted speed limit of 70 km/h north of Concession Road 3, within the study area.

Lambs Road is an existing north-south rural Type B arterial road within the study area that operates with a two-lane cross-section (one lane per direction). The roadway spans from Concession Road 4, terminating slightly north of Highway 401. Intersection at Concession Road 3 is un-signalized and stop-controlled with free flow condition along Concession Road 3. No sidewalks or bike lanes are provided along Lambs Road. Lambs Road is under the jurisdiction of the Municipality of Clarington and operates with a posted speed limit of 60 km/h within the study area.

Concession Road 3 is an existing east-west rural Type B arterial road that operates with a two-lane cross section (one lane per direction) from Bowmanville Avenue to Darlington Clarke Townline. Intersections at

Liberty Street North, Mearns Avenue and Lambs Road are all un-signalized and stop-controlled. Concession Road 3 is under the jurisdiction of the Municipality of Clarington and operates with a posted speed limit of 60 km/h within the study area.

Mearns Avenue is an existing north-south rural Type C arterial road that operates with a two-lane cross section (one lane per direction). Intersection with Concession Road 3 is stop-controlled with free flow condition along Concession Road 3. Bike lanes are provided on both side of Mearns Avenue south of Concession Road 3. Mearns Avenue is under the jurisdiction of the Municipality of Clarington and operates with a posted speed limit of 50 km/h within the study area.

Figure 3-18 and **Figure 3-19** illustrate the existing Road Network classifications, as per the Region of Durham and Municipality of Clarington Official Plans, respectively.

Figure 3-18 Durham Region Official Plan Road Network (Schedule C)

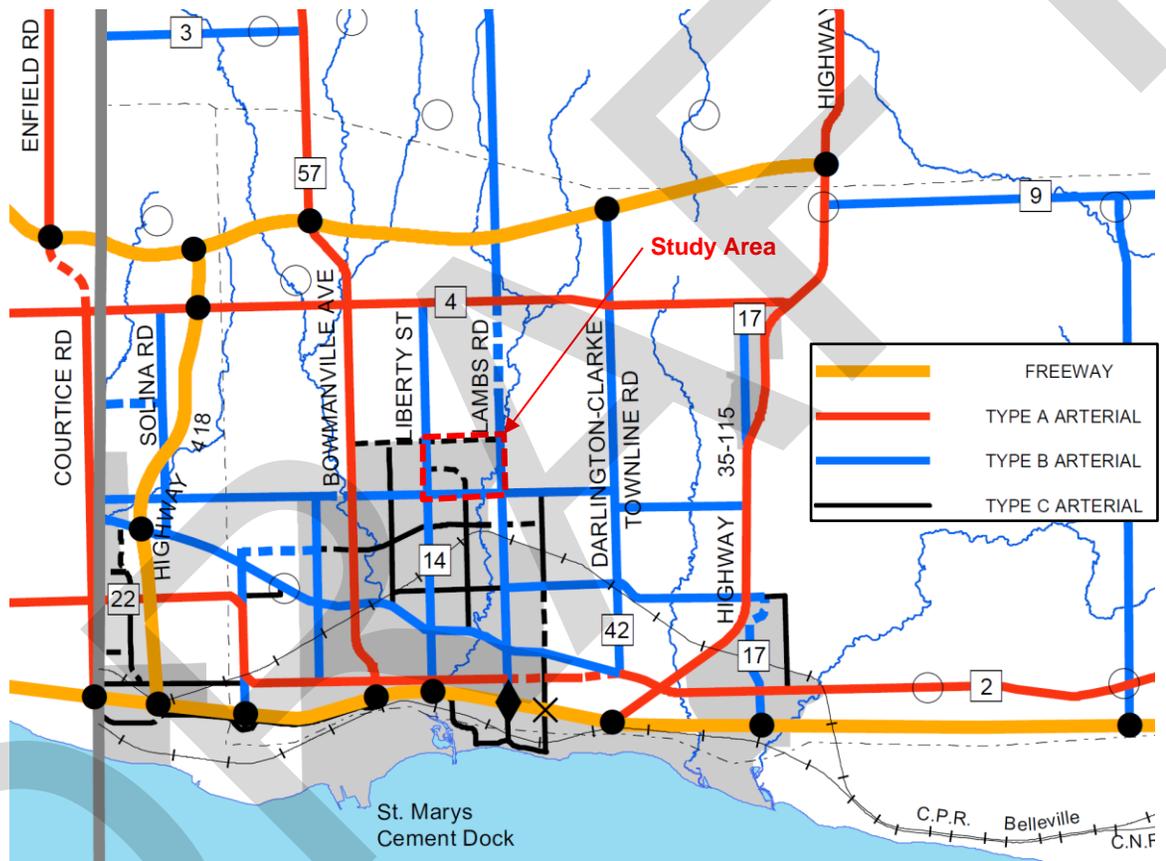
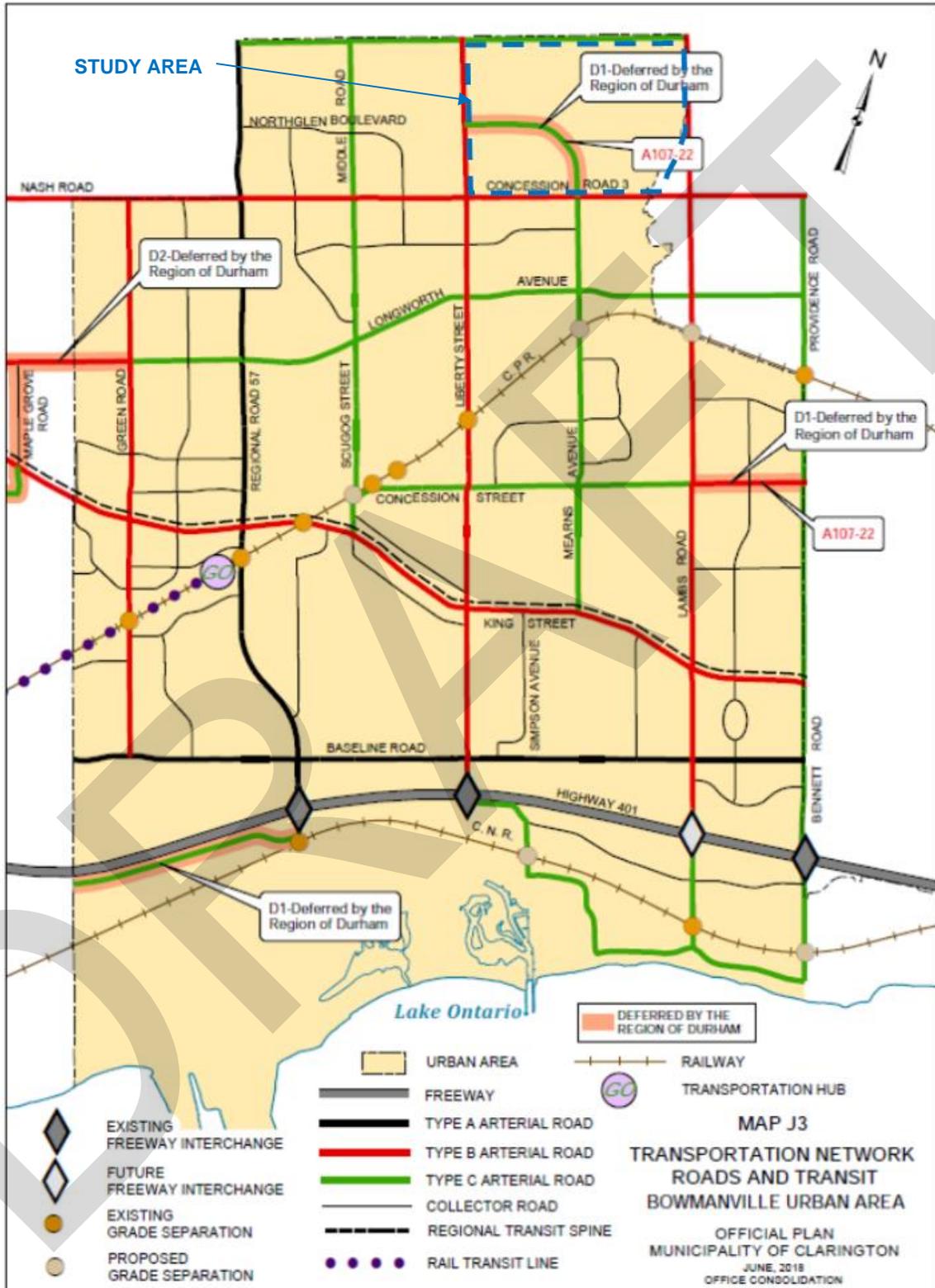


Figure 3-19 Municipality of Clarington Official Plan Transportation Network (Map J)



3.9.2 Existing Area Intersections

Within the study area boundary, there are three major intersections. These intersections are described as follows:

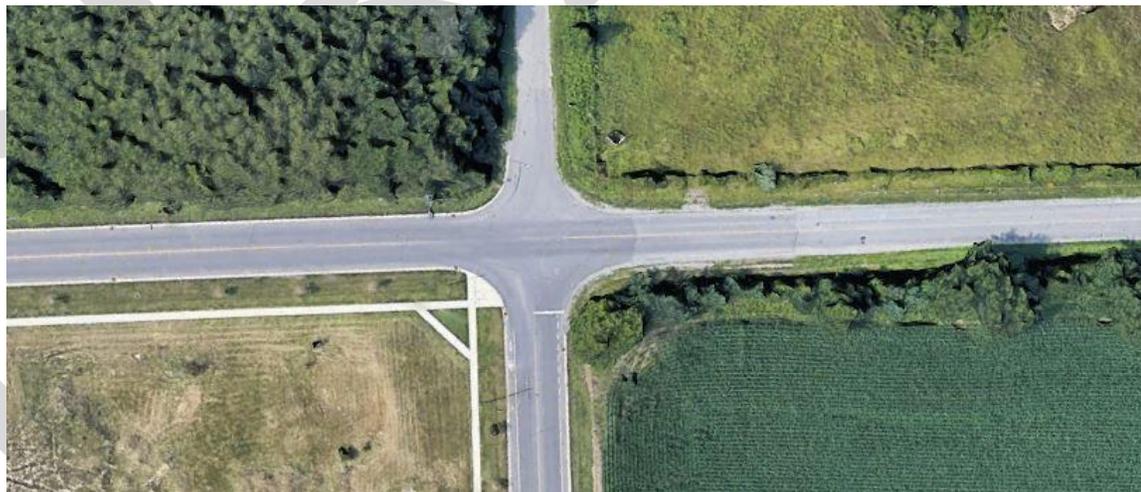
Liberty Street North and Concession Road 3 is a four-legged side-street stop-controlled intersection with free flow condition along Liberty Street North. An aerial photo of the intersection is provided in **Figure 3-20**.

Figure 3-20 Liberty Street North and Concession Road 3



Mearns Avenue and Concession Road 3 is a four-legged side-street stop-controlled intersection with free flow condition along Concession Road 3. An aerial photo of the intersection is provided in **Figure 3-21**.

Figure 3-21 Mearns Avenue and Concession Road 3



Lambs Road and Concession Road 3 is a four-legged side-street stop-controlled intersection with free flow condition along Concession Road 3. An aerial photo of the intersection is provided in **Figure 3-22**.

Figure 3-22 Lambs Road and Concession Road 3



In addition to the above 3 major intersections, there three smaller intersections where Sydel Court, Pamela Court and Rebecca Court meet Liberty Street North. Each of these three-legged intersections are side-street stop-controlled intersections with free flow condition along Liberty Street North. Similarly, the small three-legged intersection of Concession Road 3 and Jollow Drive is a side-street stop-controlled intersections with free flow condition along Concession Road 3.

Extending beyond the study area, intersections along Concession Road 4 at Liberty Street North, Mearns Avenue North, and Bethesda Road, will be considered for inclusion in the traffic study.

3.9.3 Existing Traffic Volumes

Historic traffic data was obtained from the Municipality of Clarington and the Region of Durham, as shown in **Table 3-6**. Unfortunately, with the exception of the intersection of Concession Road 3 and Liberty Street North, the historical traffic data was deemed unacceptable as the data was collected more than two years prior. While traditionally the data could be grown to 2020 existing conditions using background corridor growth rates, the existing data was collected before the extension of Highway 407 to Bowmanville. With the dramatic changes that follow a highway expansion, it is inaccurate to utilize the historic data.

Table 3-6 Historic Traffic Data

Intersection Name	Intersection Type	Date Counted
Concession Road 3 and Liberty Street North	Un-signalized	September 2019
Concession Road 3 and Lambs Road	Un-signalized	June 2017
Concession Road 4 and Bethesda Road	Un-signalized	May 2018
Concession Road 4 and Liberty Street North	Un-signalized	May 2018

Subsequently, new turning movement counts were not obtained due to the abnormal road conditions at the time of this study caused by the COVID-19 pandemic. At such time when road conditions are deemed to be relatively normal by the municipality, or as close to the “new-normal” as possible, and when it is safe to do so, TMIG will obtain new turning movement counts. Traffic data will be obtained for weekday a.m. and p.m. peak periods for each of the study intersections.

3.9.4 Existing Intersection Analysis

An existing intersection analysis could not be completed due to the lack of reliable and accurate existing traffic data. When new traffic data is able to be obtained in a safe manner following the COVID-19 pandemic, or when deemed appropriate by the municipality, the traffic study will resume and an analysis of existing conditions will be thoroughly developed, including a capacity and queuing analysis for existing 2020 traffic conditions.

3.9.5 Active Transportation

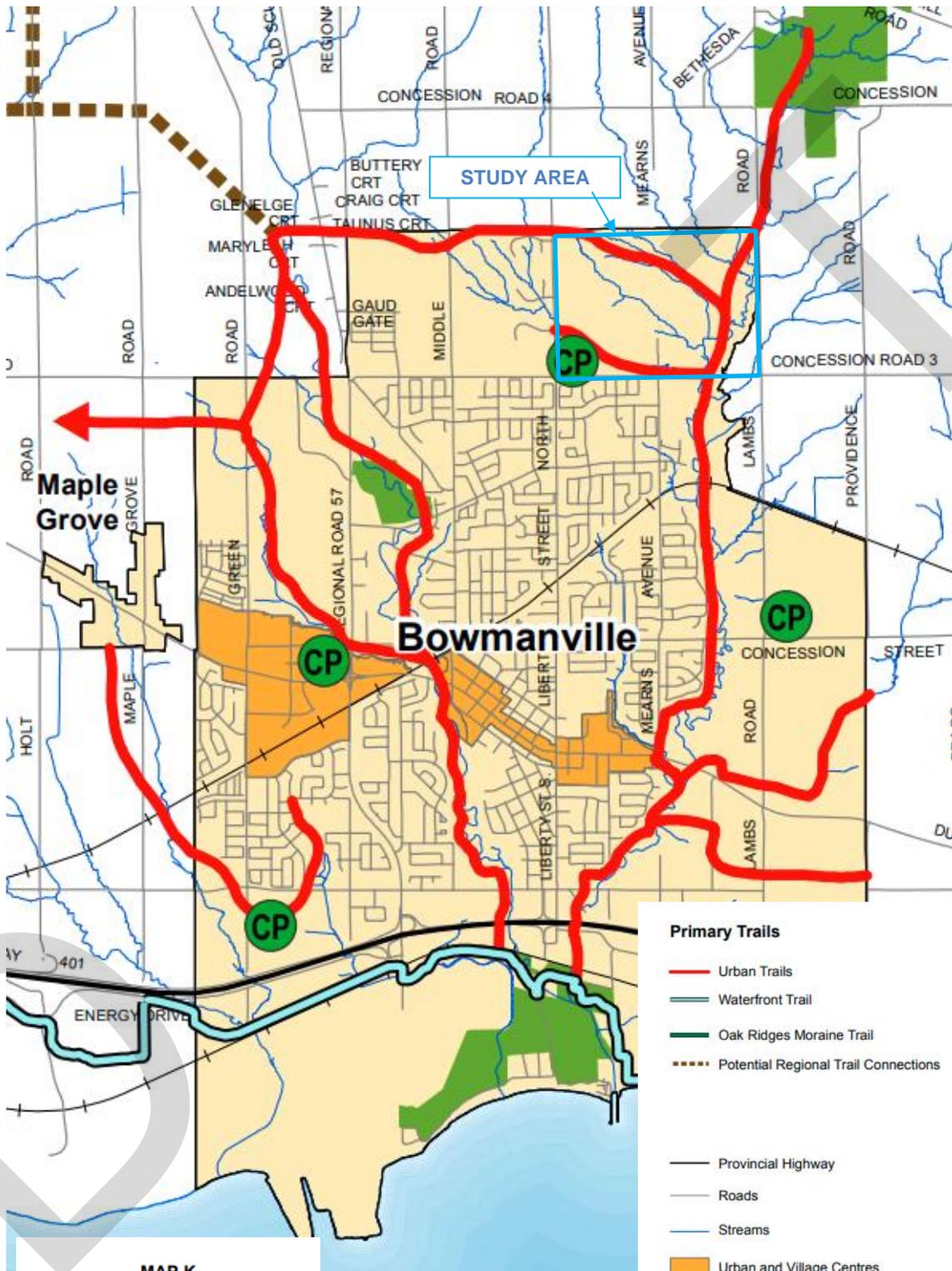
The Region of Durham’s Regional Cycling Plan (2012) and Municipality of Clarington’s Transportation Master Plan outline a series of recommendations for a region-wide cycling network and implementation strategy. Within the hierarchy of facilities identified in the plan, there are Primary Cycling Network (Spines), Regional Trail Network (Trails), and Secondary Cycling Network (Local Routes). “Spines” are routes which are planned to connect major centres, inter-modal facilities and key destinations which are typically located within arterial road corridors. “Trails” are regional scale multi-use routes typically located off-road and used for recreational purposes. “Local routes” connect neighbourhoods enabling short distance trips, and provide access from neighbourhoods to the Primary Cycling Network.

Figure 3-23 maps the existing and proposed cycling and trail routes around the Region of Durham in the vicinity of the study area. **Figure 3-24** presents Schedule K from the Clarington Official Plan which illustrates an updated snapshot of the *existing* trail system in Clarington since the TMP, including new trail connections within the SSSP study area.

Figure 3-23 Existing and Proposed Cycle and Trail Network, CTMP



Figure 3-24 Existing Trail Network



**MAP K
 TRAILS
 CLARINGTON**
 OFFICIAL PLAN
 MUNICIPALITY OF CLARINGTON
 JUNE, 2018
 OFFICE CONSOLIDATION

3.9.6 Transit Services

The ongoing Covid-19 pandemic has dramatically impacted the continuity of transit services and operations across the Region since March of 2020. In the short term, existing transit services have been redefined to meet the changing needs of riders and levels of ridership. It should be noted that while future network improvements have not yet changed, the uncertainty of the pandemic may result in changes to medium and long-term service enhancements and network expansions not currently discussed in this report. Regardless, there exists an ongoing commitment from the Province of Ontario, Metrolinx, and Durham Region Transit to support transit riders in Clarington and across the Region.

3.9.6.1 Existing Transit Services

The Municipality of Clarington Official Plan designates King Street / Regional Highway 2 as a Regional Transit Spine, through the Bowmanville Urban Area and terminating at Highway 35/115. Accordingly, a number of local and regional transit routes feed and connect to Regional Highway 2, as detailed below. While these routes have now changed in 2020 due to the Covid-19 pandemic, the DRT services which existed at the start of this year may be routes which return in the medium-term as transit ridership rebounds in the coming years. Therefore, both pre-pandemic and pandemic transit realities are described below.

Durham Region Transit – Prior to Covid-19

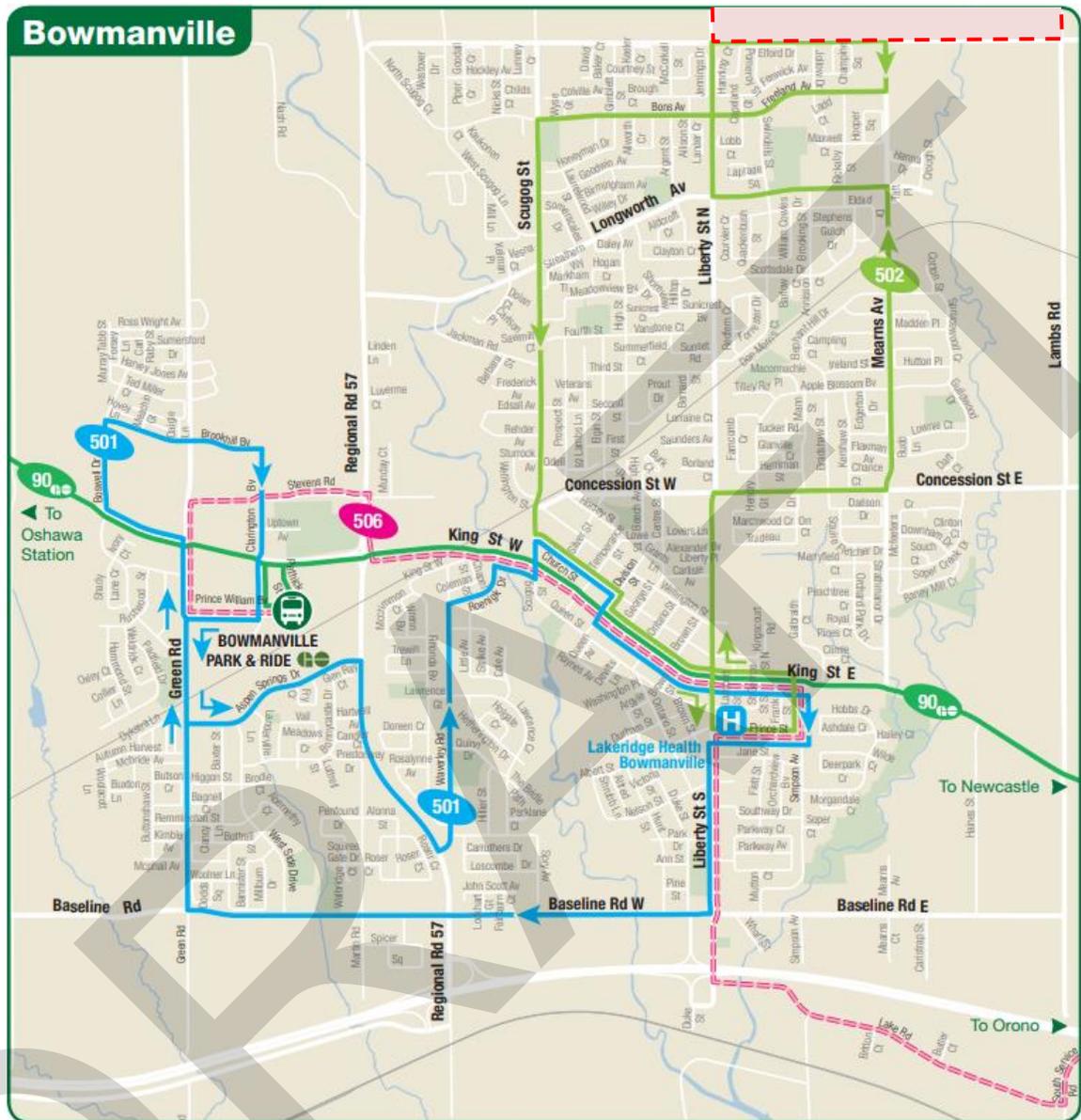
Before the Covid-19 pandemic, Durham Region Transit services were provided in the vicinity of the site via Routes 501, 502 and 506, with the nearest cluster of bus stops located at the intersections of Freeland Avenue and Jollow Drive, approximately 275 m from the subject site, and at Freeland Avenue/Bons Avenue and Liberty Street North, approximately 350 m from the intersection at Concession Road 3 and Liberty Street North. **Figure 3-25** maps the routes of these Durham Region Transit bus services, located south of the subject site.

- **Route 501** bus route provides primarily east-west service along a series of local and main roads. Route 501 connects west to the Bowmanville Park & Ride GO Transit facility, serving the Bowmanville community located south of Regional Highway 2, and connecting to the regional network. Route 501 operates approximately every 30 minutes on weekdays between 6:30am to 7:00pm and every hour on weekends from 8:00am to 6:00pm on Saturdays and 10:00am to 5:00pm on Sundays.
- **Route 502** bus route provides north-south service along a series of local and main roads. Route 502 runs north of Regional Highway 2, serving residential communities up to Concession Road 3 where it also loops back around to Regional Highway 2. Route 502 operates approximately every 30 minutes on weekdays between 6:34am to 7:34pm and every hour on weekends between 7:47am to 6:47pm on Saturdays and 9:47am to 5:47pm on Sundays.
- **Route 506** bus route provides east-west service along a series of local and main roads. Route 506 runs from the Bowmanville Park & Ride, along Regional Highway 2 before turning south, crossing Highway 401, and continuing east to Newcastle and north to Orono. In Newcastle, Route 506 connects with the terminal stop for GO Transit's Route 90 and Route 91 bus services. Route 506 operates only on weekdays with only two stops at 11:50pm and 3:50pm going westbound from Bowmanville GO Park & Ride.

While Route 506 does not service the subject site, riders transferring from Route 502 may benefit from the easterly connections to and from Newcastle via this route.

All Durham Region Transit buses are designated *accessible* with low-floor access as well as priority and courtesy seating. Buses are also equipped with bike racks. Durham Region Transit also offers 2-hour transfers, providing unlimited travel in any direction, including return trips, and are automatically added to Presto cards. Specialized services including on demand services are available.

Figure 3-25 Pre-Covid-19 Durham Region Transit Bus Operations



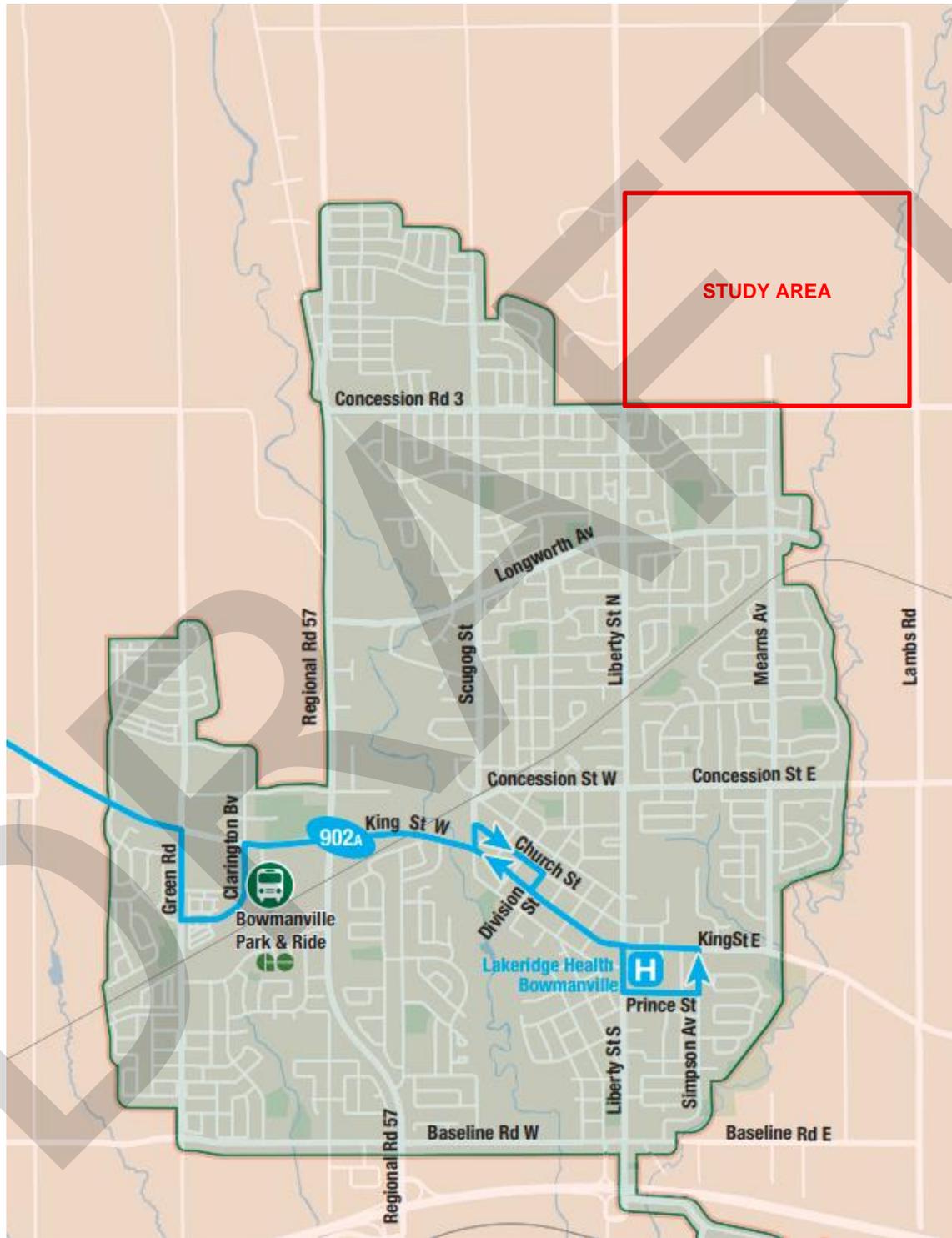
Durham Region Transit – Effective September 2020

As a result of the Covid-19 pandemic, local bus routes which have been experiencing low ridership have been replaced by new **On Demand** service across Durham Region, extending throughout Clarington and connecting Bowmanville to Oshawa. The new On Demand Service offers riders in these areas with bus service when and how they need it: stop-to-stop within a zone, facilitating connections to frequent and grid routes, or to the local GO station or bus terminal.

To support these service changes and provide riders with a modern and seamless experience, the DRT launched “a new, interactive, mobile app solution that will allow customers to plan and book their trips in real-time right from their mobile device at their convenience. Two apps are required to use On Demand: Transit app (called “Transit” in the App Store and Google Play) and DRT On Demand. Alternatively, customers can still call in to speak with a booking agent to book their trip.”

Based on ridership trends, a new **Route 902A King** will provide east-west service along King Street, connecting Clarington to Oshawa. This route will include stops at the Bowmanville GO Park & Ride, and Lakeridge Health Bowmanville Hospital, as shown in **Figure 3-21**, below.

Figure 3-26 Existing Durham Region Transit Bus Operations – Effective September 2020



GO Transit

Currently, there are GO Bus operations in the vicinity of the site. The existing Bowmanville Park-and-Ride GO Station is located approximately 5 kilometers from the intersection of Concession Road 3 and Liberty Street North. There are transit services provided by GO Bus lines via Route 88 (Oshawa to Pickering), Lakeshore East Route 90 (Newcastle to Oshawa) and Route 91 (Newcastle to Oshawa Express, with the nearest bus stops for all routes located 250 meters or less from the intersection at Regional Highway 2 and Mearns Avenue as well as at Regional Highway 2 and Simpson Avenue. **Figure 3-282** and **Figure 3-23** show the locations of existing GO Transit bus stops along Regional Highway 2.

Due to Durham Region Transit service changes, detailed above, service to GO Bus Route 90 is now reduced to avoid duplication of transit along King Street. On weekdays, service will run hourly during the rush hours and every two hours in the midday and evening on weekdays. On weekends, service will run every two hours.

All GO Transit Buses are designated *accessible* with low-floor access as well as priority and courtesy seating. All GO Transit Trains have a Customer Service Ambassador located in the middle of the train, where all trains are designed *accessible* with a ramped mini-platform for boarding and exiting, as well as priority seating. The GO Transit Service also offers 3-hour transfers, providing unlimited travel in any direction, including return trips, and are automatically applied to Presto cards.

Figure 3-27 Existing GO Transit Bus Operations – Lakeshore East Routes

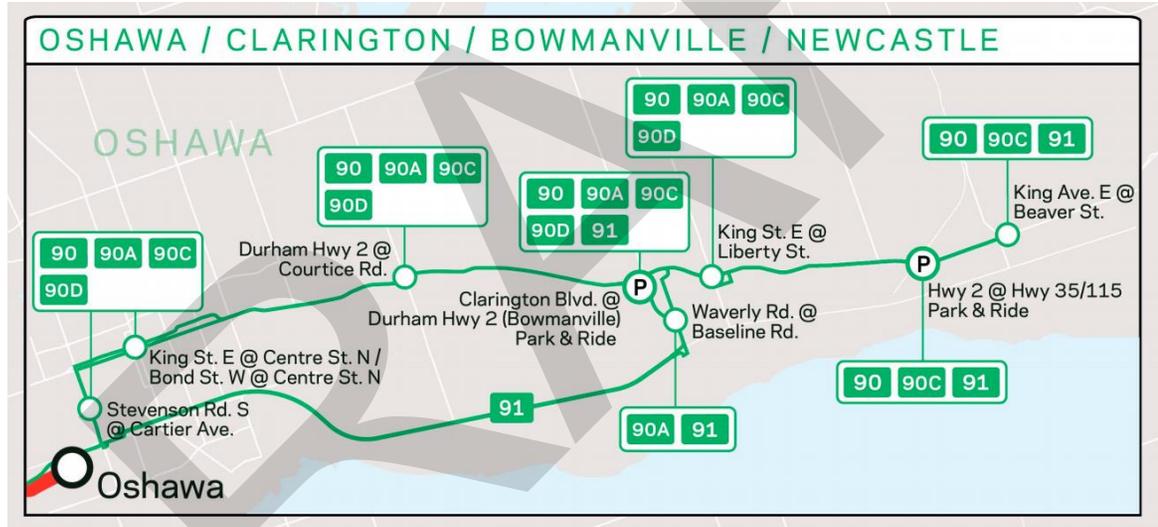


Figure 3-28 Existing GO Transit Bus Operations

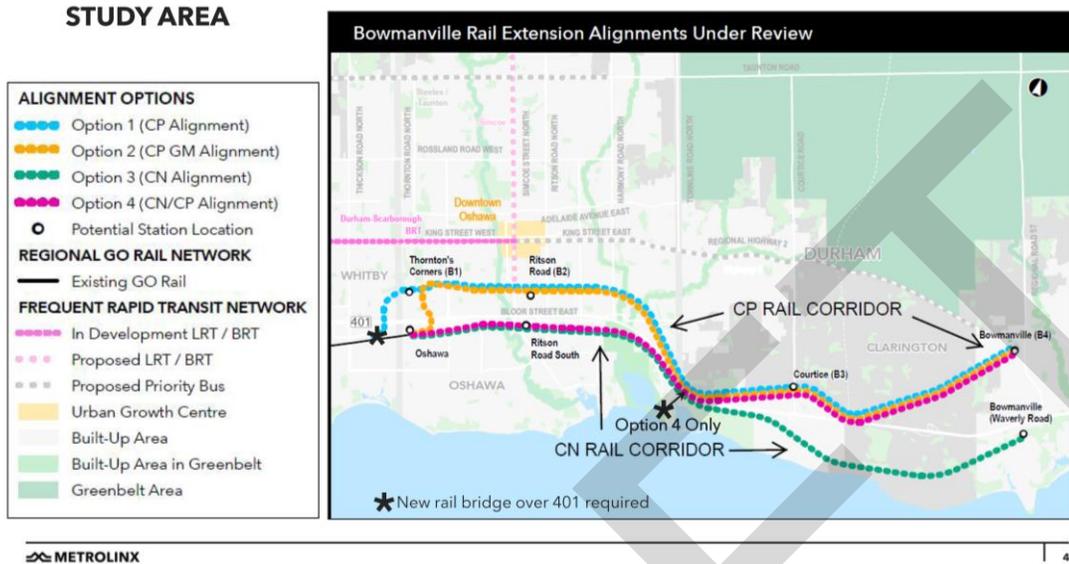


3.9.6.2 Future Transit Network Plans

GO Transit

Looking forward, there are plans in development by Metrolinx, for a GO Transit rail expansion east of Oshawa to Martin Road in Bowmanville. This service expansion would provide Durham Region with more direct connections to downtown Toronto and the larger GO Transit network through proposed two-way all-day service to Bowmanville. The rail expansion was initially scheduled to run rush-hour service only, but has since been revised by the Province, which may considerably enhance access to and from the SSSP area and the Greater Toronto Area. **Figure 3-29** depicts the four options which have been considered for this expansion.

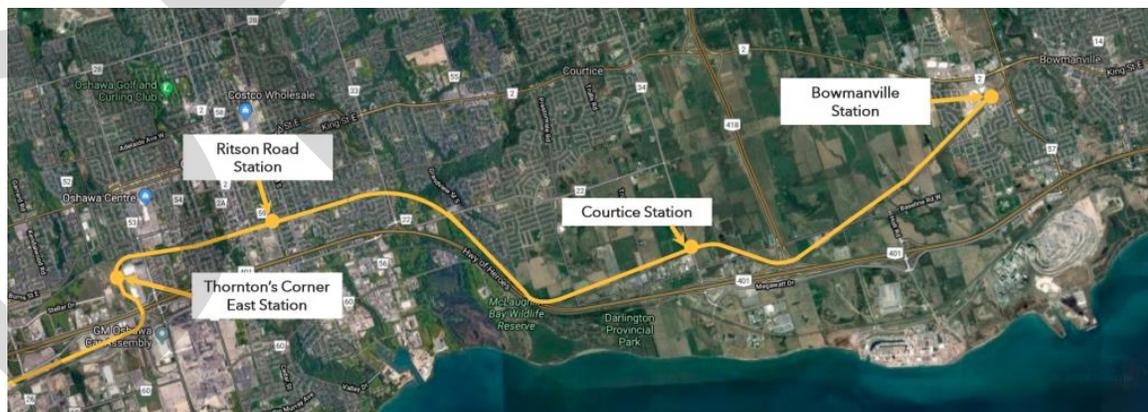
Figure 3-29 Future GO Transit Rail Expansion, Alignment Options Reviewed



The four alignments were reviewed by the Province of Ontario, with three of four options terminating near the existing Bowmanville Park & Ride facility, which as determined above, is accessible via local transit’s Route 502 connecting to Route 501 or Route 506 from the SSSP area. The fourth alignment option would terminate south of Highway 401 at Waverley Road, which is not currently served by local transit. Irrespective of the alignment chosen, the potential future presence of a GO Transit rail station would likely serve as a catalyst for local transit expansion and development, potentially benefitting the SSSP area by proximity.

Metrolinx has now completed an Initial Business Case for the Bowmanville Rail Service Expansion, which recommended that Option 2 “with a two-way, all-day service pattern be advanced to the PDBC stage and be further evaluated on the basis that it balances ridership, benefits, and overall project costs.” The Option 2 alignment, shown in **Figure 3-25**, was explored and presented in an Initial Business Case: Bowmanville Rail Service Expansion update, dated February, 2020, approved by the Board at Metrolinx. The Option 2 alignment study and will now advance through a Preliminary Design Business Case (PDBC), with a decision on the PDBC and a submission to the Treasury Board anticipated in the fall of 2020.

Figure 3-30 Future GO Transit Rail Expansion, Option 2 Alignment



3.9.7 Study Area Road Network Improvements

A few network improvements are proposed in the vicinity of the Soper Springs Secondary Plan. The Region of Durham's Transportation Master Plan (TMP) 2017 does not identify any specific improvements to the boundary road network around the SSSP area, however, Liberty Street North is marked for road improvements between Highway 401 and King Street. Of note, the Liberty Street North and Concession Road 3 intersection is planned to be reconstructed as a roundabout to improve local operations.

South of the study area, intersection improvements are planned by the Region at Regional Highway 2 and Lambs Road, planned for 2023, with details yet to be determined. In addition, Regional Highway 2 is planned to be widened between Mearns Avenue and Highway 35/115 from 2 to 4 lanes beyond 2031.

The Clarington Transportation Master Plan (TMP) indicates the expansion of transit and active transportation facilities to the areas north of Concession Road 3, including the study area, which are highlighted as Growth Areas in the plan. Geometric/operational upgrades are proposed for Concession Road 3 from Mearns Avenue to west of Jollow Drive, with corridor protections identified for part of the road to protect for future improvements beyond 2031. In the long term, Lambs Road is proposed to be extended to Bethesda Road, and an interchange is proposed to connect Lambs Road to Highway 401.

Additionally, a new connection is proposed from Concession road 3, through the SSSP study area and left to Liberty Street North. This proposed extension of Mearns Avenue, per the Municipality of Clarington's Official Plan, will cross multiple natural features and will be assessed in detail for the most appropriate location through the study area. It should be noted that the Clarington Official Plan previously included the area of Mearns/Concession as a 'Neighbourhood Centre' for which a public square shall be constructed "with the right of the public to access by appropriate means". Clarington OPA 107 eliminated the explicit inclusion of this and all other Centres within the Plan, however if future developments were to create a Neighbourhood Centre in this study area, public square access via transportation improvements would be required.

The Durham TMP and Clarington TMP also propose plans to implement infrastructure to promote active modes of transportation. These include a Regional Cycling Plan Network which will expand to include Liberty Street North, south of Concession Road 3, connecting to the existing municipal cycling facilities along Lambs Road, connecting through Bennett Road. Additional cycling network connections will be made to the Greenbelt Cycling Route, as it passes in proximity to the study area. Project implementation phasing is planned between 2017 and 2032; thus, falling within the horizon year.

4 PLANNED DEVELOPMENT

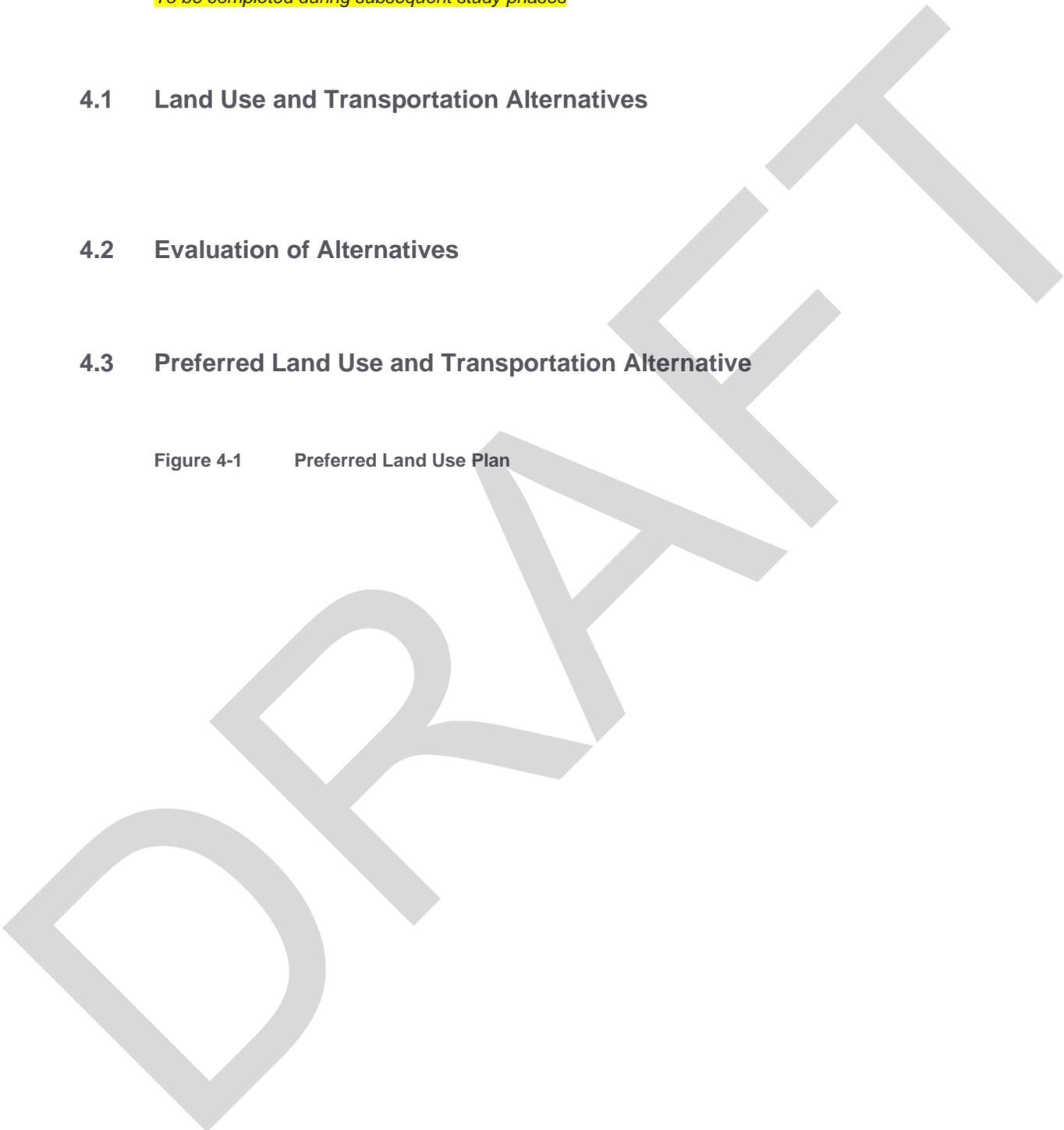
To be completed during subsequent study phases

4.1 Land Use and Transportation Alternatives

4.2 Evaluation of Alternatives

4.3 Preferred Land Use and Transportation Alternative

Figure 4-1 Preferred Land Use Plan



5 PROPOSED SERVICING

5.1 Grading

5.2 Watercourse Crossings

5.3 Water Supply and Distribution

5.3.1 Design Criteria

The water distribution system for Bowmanville and within the Municipality of Clarington was designed according to the most recent version of the Region of Durham's Design Specifications for Watermains (April 2019) and relevant MECP criteria. Relevant criteria from the Region's standards are summarized in **Table 5-1**.

Table 5-1 Watermain Design Criteria

Domestic Average Day Demand	364 Lpcd
Maximum Day Demand	550 Lpcd
Commercial generation rate	Shopping centres= 2500-5000 L/day/1000m Hospitals = 900-1800 L/bed/day Schools = 70 – 140 L/student/day
Institutional generation rate	45 m ³ /ha/day – 90 m ³ /ha/day
Minimum Required Fire Flow for single family, detached dwellings	4,500 L/min (75 L/s)
Hazen-Williams 'C' Factor	150mm: C=100 200mm to 300mm: C=110 350mm to 600mm: C=120 Over 600mm: C=130
System Pressure Range under Normal Condition	275 kPa (40 psi) – 700 kPa (100 psi)
Minimum System Pressure under Maximum Day Demand	140 kPa (20 psi)

*Based on Region of Durham's Design Specifications for Watermains (April 2019)

5.3.2 Water Supply and Boundary Conditions

5.3.3 Model Development

5.3.4 Model Results

Table 5-2 Water Model Output Summary

Scenario	Minimum Water System Requirements	Modeling Results within SSSP
Maximum Day	550 Lpcd	
Peak Hour		
Max Day + Fire (Pressure > 20 psi)	Residential Fire Flow = 4,500 L/min	
	Commercial Fire Flow = Fire Underwriters Survey (FUS)	

5.4 Wastewater

5.4.1 Design Criteria

The sanitary sewer systems in Bowmanville and within the Municipality of Clarington were designed according to the most recent version of the Region of Durham’s Design Specifications for Watermains (April 2019) and relevant MECP criteria. Relevant criteria from the Region’s standards are summarized in **Table 5-3**.

Table 5-3 Wastewater Design Criteria

Average Domestic Flow	364 Lpcd
Infiltration Rate	22.5 m ³ /gross ha/day (0.26 L/s/day) when foundation drains are not connected to the sanitary sewer; 45.0 m ³ /gross ha/day (0.52 L/s/day) when foundation drains are connected to the sanitary sewer
Peaking Factor	Harmon
Population densities – Detailed information not available	Single Family Dwelling – 60 p/ha Townhouse – 125 p/ha Apartment: Low-density (62 u/ha) – 150 p/ha Med-low density (86 u/ha) – 210 p/ha Med density (124 u/ha) – 300 p/ha High density (274 u/ha) – 600 p/ha
Population densities – Detailed information is known	Single Family Dwelling – 3.5 p/unit Townhouse/stacked townhouse – 3.0 p/unit Apartment: 1 bedroom – 1.5 p/unit 2 bedroom – 2.5 p/unit 3 bedroom – 3.5 p/unit 4 bedroom – 4.5 p/unit
Undeveloped land	Future land use and population based on Region of Durham Official Plan and Secondary Plans of the local municipalities
Commercial	180 m ³ /gross floor area / day (2.08 L/s/day), including infiltration and peaking Floor space index: 0.50 of gross lot area unless otherwise on approved plan
Industrial	180 m ³ /gross floor area / day (2.08 L/s/day), including infiltration and peaking effect for local sanitary sewers 90 m ³ /gross floor area / day (1.04 L/s/day), including infiltration and peaking effect for trunk sanitary sewer
Schools and Institutions	112 m ³ /gross ha/day, including peaking effect

**Based on Region of Durham's Design Specifications for Sanitary Sewers (April 2019)*

Other key criteria from the Design Specifications for Sanitary Sewers are that sanitary sewers are required to maintain a minimum slope of 0.5% for all local sewers, and 1.0% on the first upstream run. Flow velocities are to be no less than 0.6 m/s and no more than 3.65 m/s. The minimum pipe size is specified at 200 mm and the minimum depth to the sewer obvert from the road centerline is 2.75 m in all residential areas.

5.4.2 Proposed Sanitary Servicing Plan

5.5 Stormwater

5.5.1 Applicable Criteria

5.5.2 Stormwater Management Approach

5.5.3 Stormwater Management Plan

5.5.4 Stormwater Management Facilities

5.6 Water Budget

5.7 Transportation

As per comments received from the Municipality of Clarington's Planning, Community Planning Branch following the 1st submission of the Soper Springs Secondary Plan – Background and Technical Reports (Draft FSR), a meeting is required with the Region of Durham regarding the following Table of Contents before any additional work may be completed.

5.7.1 Travel Demand Forecasts

5.7.2 Future Total Traffic Volumes

5.7.3 Future Road Network

5.7.3.1 Intersection Spacing

5.7.4 Proposed Collector Road Right-of-Way

5.7.5 Road Network Phasing

5.7.6 Future Traffic Conditions

5.7.7 Transit Plan

5.7.8 Active Transportation

5.7.9 Transportation Demand Management

5.7.10 Summary of Transportation Assessment

5.7.11 Future Transportation Studies Considerations

6 PHASING AND IMPLEMENTATION

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7 PUBLIC CONSULTATION

7.1 Consultation Approach

As outlined in **Section 2.2.1**, this study has followed the 'Integrated Approach' from the Municipal Class EA, where study notices and public consultation have satisfied the requirements of both the Municipal Class EA and Planning Act.

7.2 Notice of Commencement and Public Information Centre # 1

A combined Notice of Commencement and Notice of Public Information Centre (PIC) # 1 was advertised in Clarington This Week for 2 consecutive weeks, first issued on May 23, 2019. The notice was also mailed to residents in and near the study area and relevant agencies and posted on the Municipality of Clarington website.

7.3 Public Information Centre # 1

PIC#1 took place on June 4, 2019 at the Bowmanville Older Adult Association Recreation Centre on Beech Avenue in Bowmanville. The meeting was drop-in format, where attendees could view information boards and ask questions of municipal staff and the consulting team. Information was presented regarding the study area and the processes for both the Secondary Plan and Municipal Class EA.

More information on PIC # 1 can be found in Appendix A.

7.4 Public Information Centre # 2

To be completed

7.5 Notice of Study Completion

To be completed

7.6 Consultation with Indigenous Communities

To be completed

7.7 Other Stakeholder Consultation

To be completed

- Steering Committee Meetings
- Meetings with Durham Region

8 SUMMARY

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