



Study Design Report, Revision 1

Biehn Drive Municipal Class

Environmental Assessment

November 2021

Submitted by:

BT Engineering Inc.
509 Talbot Street
London, ON N6A 2S5



Table of Revisions

No.	Date	Revision
1	April 30, 2021	Section 4.3.2.1.7 Cultural Environment revised to: Potential Built Heritage Resources and Cultural Heritage Landscapes will be evaluated for the entire study area prior to the selection of preferred alternatives and summarized in the ESR. This review will identify all known or potential built heritage resources and cultural heritage landscapes (BHR/CHLs). If resources are present, a cultural heritage assessment report will be completed with the potential project impacts to BHR/CHLs identified and strategies will be provided to mitigate identified impacts. These mitigation measures will inform project planning and design. An Archaeological assessment (AA) will be undertaken by an archaeologist licenced under the <i>Ontario Heritage Act</i>, who is responsible for submitting the report directly to the Ministry of Heritage Sport, Tourism and Culture Industries (MHSTCI). A Stage 1 AA consists of a review of geographic, land use and historical information for the property and the relevant surrounding area, a property visit to inspect its current condition, and contacting MHSTCI to find out whether there are any known archaeological sites on or near the property. Its purpose is to identify areas of archaeological potential and determine whether additional archaeological assessment is necessary (e.g. Stages 2, 3, and 4).
2	June 7, 2021	Section 5.0 and 5.1 to add Alternative 4.
3	June 7, 2021	Section 1.1 revised to include a local and broader Study Area.
4	June 7, 2021	Section 2.1 revised to: Future development within the Doon South and Brigadoon communities requires a defined alignment for the extension of Biehn Drive to Robert Ferrie Drive as part of the area road network. In order to determine the road alignment, this Study will consider the natural, social environments and the future land use in the Study Area. The extension of Biehn Drive and the associated municipal servicing has been a longstanding part of the integrated plan for the Brigadoon neighbourhood. The planned extension will improve local access to Strasburg Road to safely and reliably accommodate all modes of transportation including vehicular, pedestrians, and cyclists, and provide access to potential future transit. By defining the future road and municipal servicing plans, the subsequent land use plans can be completed by developers.
5	June 7, 2021	Section 2.2 revised to: ... The extension of Biehn Drive, in conjunction with the extensions

		of Robert Ferrie Drive and Strasburg Road, will result in a more balanced distribution of the existing neighbourhood traffic, increasing the traffic volumes along a short section of Biehn Drive while reducing the volumes that are currently using other neighbourhood streets. The EA will undertake community consultation and mitigating measures will be developed to reduce the impacts on the community and control traffic speeds...
6	June 7, 2021	Section 2.3 revised to: • Reduced traffic demand on other neighbourhood streets including Biehn Drive (to the north), Caryndale Drive and Marl Meadow Drive/ Teeplewood Drive resulting in reduced community disruption and improved road safety;
7	July 11, 2021	Section 4.2.3.1.6 Natural Environment revised to include a detailed Terms of Reference (TOR).
8	November 2, 2021	Section 6.0 Schedule updated.

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1.0 Introduction

The City of Kitchener (City) has initiated a Class Environmental Assessment (EA) Study to develop a transportation plan for the extension of Biehn Drive westerly to the Robert Ferrie Drive extension. The Biehn Drive extension will include municipal services including a trunk sanitary sewer, storm sewer/ditches and watermain. The focus of the Study will be to consider alternatives for the alignment of the Biehn Drive extension, intersection locations and designs and municipal services while minimizing environmental, social, and cultural impacts of the project.

This report, the initial public document for the Municipal Class Environmental Assessment, presents a description of the work plan, preliminary alternatives, consultation plan and overall study process. It outlines the EA planning process and describes the key activities required to complete the Study. The Study Design will be circulated to various agencies and the Study's Technical Advisory Committee (TAC) and is available to the public on the City's website for review and comment.

Note: At the time of release of the Study Design Report, the Province of Ontario has implemented restrictions on public gatherings to deal with the COVID-19 pandemic, and as such the distribution of materials is relying on web-based communications with the public. Subsequent stages of the study may revert to conventional public events to review the sequential planning decisions of the study.

1.1 Study Area

The Study Area is located in the City of Kitchener and is illustrated on **Figure 1**.

The Local Study Area extends from the current terminus of Biehn Drive, approximately 60 m west of Spencer Court, southerly to the future Robert Ferrie Drive Extension.

Based on comments from the public at the Community Café and Public Information Centre No. 1, the Study Area was expanded to a Broader Study Area to consider traffic effects in adjacent neighbourhoods.

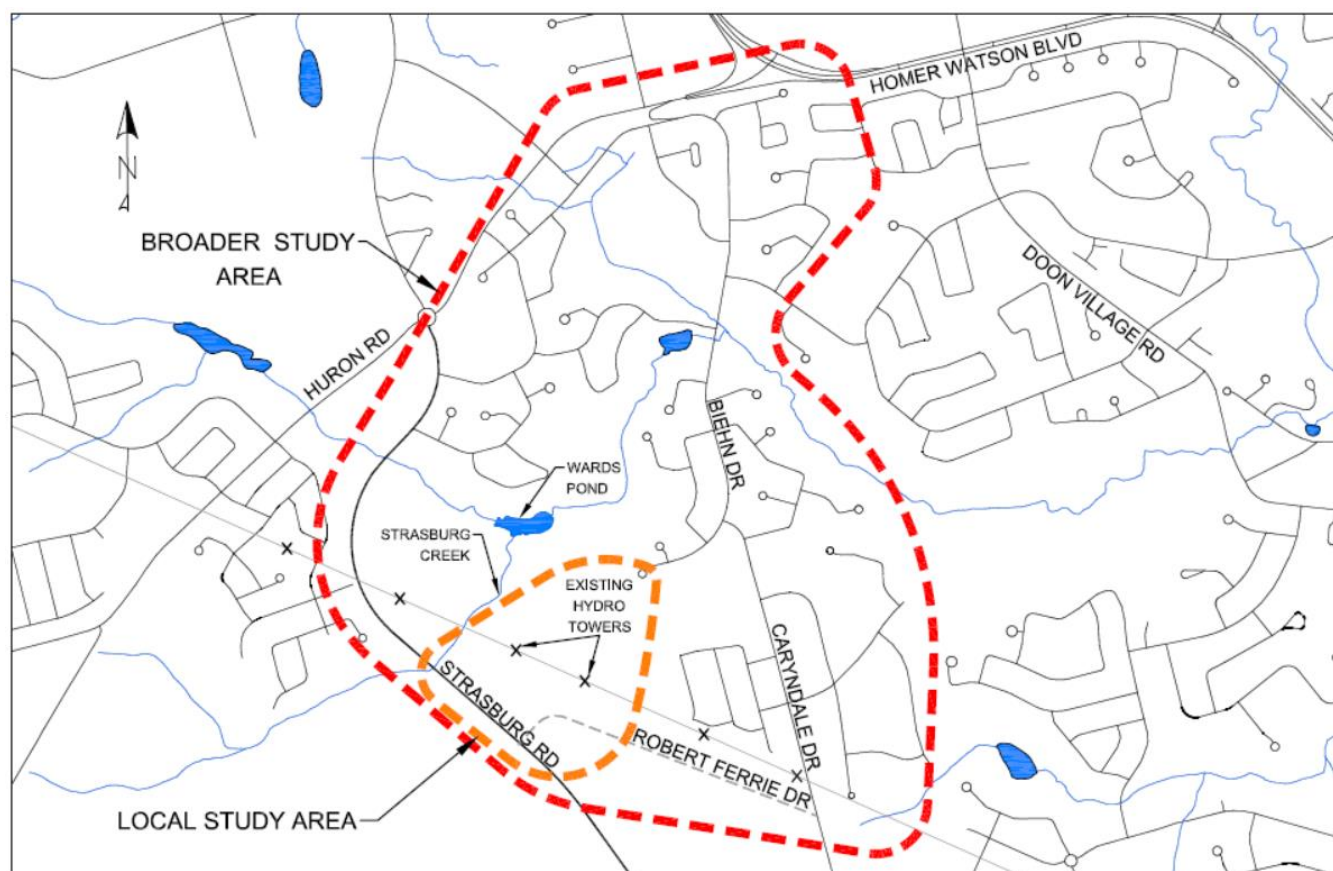


Figure 1: Study Area

1.2 Study Background

Since the mid-2000's the road network and municipal servicing for the Doon South and Brigadoon areas in the City of Kitchener have planned for area development and evolving transportation needs. Several planning documents including the Official Plan and Transportation Master Plan (TMP) have identified the need to extend Biehn Drive westerly to the Robert Ferrie Drive extension and ultimately to Strasburg Road. The Biehn Drive Extension would be a major collector road, as identified in Schedule B of the City of Kitchener's Official Plan Amendment. This link would accommodate vehicles to and from the Brigadoon community, and would help mitigate cut-through traffic on local streets within the community. A collector road collects traffic from local roads within the community and provides connectivity to high tier arterial roads including Strasburg Road.

1.2.1 Background Studies

Background Studies have been completed within the Study Area to document the proposed land uses, transportation networks and existing issues. These reports are summarized in the following sections.

1.2.1.1 Official Plan and Land Use

The City of Kitchener Official Plan (2014) documents the policies for growth, development, and land use within the City. Map 3 of the Official Plan identifies the land in the Study Area as Natural Heritage Conservation and Low-Rise Residential:

- Natural Heritage Conservation: This land use designation is used to protect and/or conserve natural heritage features and their ecological functions. This designation includes Provincially Significant Wetlands.
- Low-Rise Residential: This land use designation accommodates a range of low-density housing types including single detached dwellings, semi-detached dwellings, townhouses, low-rise multiple dwellings etc.

In addition to the general land use classifications, there is a Specific Policy Area (SPA) along the hydro corridor in the Brigadoon subdivision (SPA 45). This SPA states:

“Notwithstanding the Open Space land use designation and policies on the Hydro Corridor in the Brigadoon Subdivision (30T-88006) shared uses on hydro rights-of-way including open space links, parking lots or other uses accessory to adjacent land uses in accordance with Policy 14.C.1.37 and Policy 15.D.10.1 i) will be permitted.”

1.2.1.2 City of Kitchener Transportation Master Plan

The Kitchener Integrated TMP (2013, IBI Group) identifies the need to extend Biehn Drive from its current terminus. The TMP recommended that Biehn Drive be extended westerly to Strasburg Road. This recommendation was modified in subsequent planning documents and EAs to recommend connection to the Robert Ferrie Drive extension instead, with the final determination to be defined by an EA (the current study).

1.2.1.3 Region of Waterloo Transportation Master Plan

The Region of Waterloo’s Moving Forward 2018 Master Plan (IBI Group, 2019) outlines the needs for active transportation, transit and Regional roads. This report identifies Biehn Drive as an Existing Local Route for Grand River Transit; however, the 2021 GRT System Transit Map no longer includes this link (Route 16 Stasburg-Belmont follows Biehn Drive from Old Huron Road to Black Walnut Drive).

1.2.1.4 Kitchener Growth Management Plan (KGMP)

The Kitchener Growth Management Plan (KGMP) (2019) provides a framework to ensure that the City has “direct proper and orderly development within the boundary”. The Plan prioritizes areas for development based on the supply of developable lands and existing infrastructure.

The extension of Biehn Drive, including a sanitary sewer, is identified in the Plan as a major remaining initiative for the Brigadoon community. There are two developments planned/proposed within this area (see **Figure 2**). A requirement for development of the lands, labelled 33 and 34 on **Figure 2**, is the extension of sanitary services and the Biehn Drive connection.

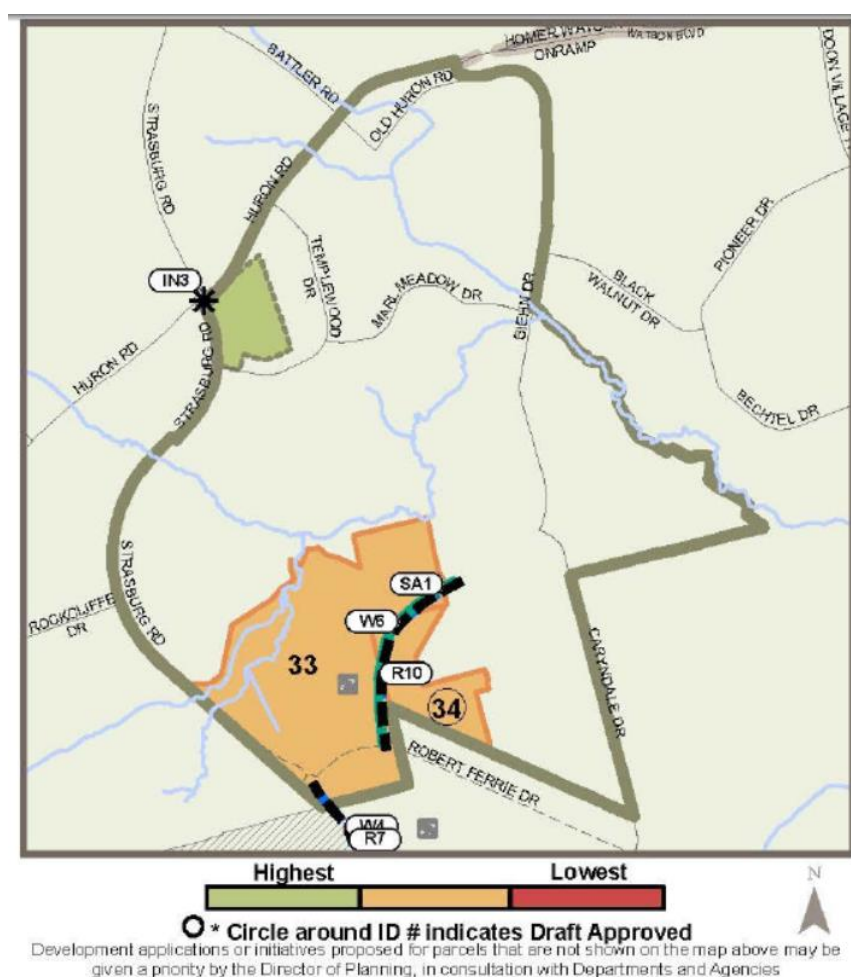


Figure 2: Growth Area Subplan for Brigadoon (Kitchener Growth Management Plan, 2019)

1.2.1.5 Brigadoon Community Plan

The Brigadoon Community Plan (2004) documents the principles for the development of the Brigadoon Community. This plan identifies that the development of lands east and west of the

future Biehn Drive extension “shall require the construction of Strasburg Road and the Biehn Drive extension”.

1.2.1.6 Sanitary Sewer Master Plan

The City of Kitchener is currently completing a Sanitary Sewer Master Plan.

1.2.1.7 Integrated Stormwater Management Master Plan (ISWM-MP)

The City of Kitchener’s Integrated Stormwater Management Master Plan (ISWM-MP) (Aquafor Beach, 2016) identifies the prioritization of works for the City’s overall stormwater master plan. This report identifies that the Study Area is located within the Strasburg Creek subwatershed. This was identified as a Priority 4 subwatershed, which is an area where intensification should provide sufficient buffers to maintain the natural hydrologic cycle.

1.2.1.8 Additional Reports

Additional background reports that will be reviewed as part of the study will include, as a minimum:

- City of Kitchener Standard Specifications
- City of Kitchener Standard Drawings
- Region of Waterloo and Area Municipalities Design Guidelines and Supplemental Specifications for Municipal Services
- Strasburg Road Extension Environmental Study Report
- South Strasburg Gravity Trunk Sanitary Sewer Project File
- East Side Lands Sanitary Servicing Environmental Study Report
- Doon South Pumping Station Draft Environmental Study Report
- Robert Ferrie Drive Extension Environmental Study Report
- Biehn Drive Extension and Need Justification Review
- Doon South Community Plan
- Huron Community Plan
- Southwest Kitchener Urban Area Studies - Community Master Plan
- Doon South - Brigadoon Transportation Network and Corridor Study
- Doon South Community and Broader Study Area Traffic Impact Study
- City of Kitchener Cycling and Trails Master Plan
- Huron Industrial Development Transportation Planning and Engineering Study
- Strasburg Creek Flood Control Environmental Study Report
- State of the Watershed (SOW) Report Upper Blair Creek
- Cumulative Effects Monitoring – Blair Creek Case Study
- Revised Final Stormwater Management Report Doon Creek – Robert Ferrie Drive Extension
- City of Kitchener Stormwater Management Facility Retrofit, Class EA and Preliminary Design Brief
- Upper Blair Creek (Kitchener) Functional Drainage Study Final Report

2.0 Need and Justification

2.1 Problem and Opportunity Statement

Future development within the Doon South and Brigadoon communities requires a defined alignment for the extension of Biehn Drive to Robert Ferrie Drive as part of the area road network. In order to determine the road alignment, this Study will consider the natural, social environments and the future land use in the Study Area. The extension of Biehn Drive and the associated municipal servicing has been a longstanding part of the integrated plan for the Brigadoon neighbourhood. The planned extension will improve local access to Strasburg Road to safely and reliably accommodate all modes of transportation including vehicular, pedestrians, and cyclists, and provide access to potential future transit. By defining the future road and municipal servicing plans, the subsequent land use plans can be completed by developers.

The Study will provide the opportunity to: improve accessibility to the local community by providing additional network links; define a multi-modal transportation plan to support travel within the local neighbourhoods and; allow development to proceed on lands that currently require the roadway plan to be defined prior to developing the land use plan.

2.2 Key Issues and Constraints

Key issues and constraints that will be addressed as part of this study include:

- **Impacts on the Existing Community:** The existing Brigadoon community is an established residential area with low ambient sound levels and low traffic volumes on Biehn Drive. The extension of Biehn Drive, in conjunction with the extensions of Robert Ferrie Drive and Strasburg Road, will result in a more balanced distribution of the existing neighbourhood traffic, increasing the traffic volumes along a short section of Biehn Drive while reducing the volumes that are currently using other neighbourhood streets. The EA will undertake community consultation and mitigating measures will be developed to reduce the impacts on the community and control traffic speeds. Measures may include traffic calming measures, pedestrians/cyclist facilities, and mitigation for noise impacts.
- **Natural Environment:** The EA will investigate the protection of surrounding terrestrial and aquatic habitat and will establish mitigation for any potential impacts to the natural environment. There is potential for Species at Risk (SAR) to be present in the adjacent woodlots and the Strasburg Creek Provincially Significant Wetland (PSW). Additionally, two cold-water systems (Strasburg Creek and Blair Creek) flow to the north of south of the Study limits. The provision of wildlife passage will be a key consideration for this work, as will mitigation of potential stormwater impacts to the Strasburg Creek system.

- **Transportation:** The EA will determine a preferred road corridor that will address long-term municipal infrastructure requirements and safely accommodate road users. In addition, the EA will need to consider the proximity to adjacent intersections on Robert Ferrie Drive and the need to accommodate trucks through the roundabout.
- **Active Transportation:** Active modes of transportation will need to be accommodated with separate facilities to provide the highest level of service and safety (multi use pathways, sidewalks, bicycle lanes and/or raised cycle tracks).
- **Planned/Proposed Development:** The extension of Biehn Drive will need to consider any proposed plans of subdivision and the potential network of future local streets.

2.3 Opportunities

The benefits from the completion of the EA study will include:

- Improved emergency service access to local community;
- Reduced traffic demand on other neighbourhood streets including Biehn Drive (to the north), Caryndale Drive and Marl Meadow Drive/ Teeplewood Drive resulting in reduced community disruption and improved road safety;
- Provision of active transportation linkages; and
- Establish the future road location which will allow planning and approvals for subdivisions.

3.0 Study Process

This Study will complete the remaining phases of the Municipal Schedule C Class EA Study which was initiated by the TMP. The Study will meet all requirements of the Municipal Class EA by establishing the need and justification for the project, considering all reasonable alternatives with acceptable effects on the natural, social and cultural environments, and proactively involving the public in defining a Recommended Plan. The study will culminate in the filing of an Environmental Study Report (ESR) and provide environmental clearance to the City to proceed with the project, subject to permits and approvals that will occur during the future detail design stage of the project.

3.1 Guiding Principles

The study approach reflects the following the Ministry of the Environment, Conservation and Parks (MECP) five guiding principles for EA studies, namely:

- Consider all reasonable alternatives;
- Provide a comprehensive assessment of the environment;
- Utilize a systematic and traceable evaluation of net effects;
- Undertake a comprehensive public consultation program; and

- Provide a clear and concise documentation of the decision-making process and the public consultation program.

3.2 Environmental Assessment Act Requirements

The Environmental Assessment will follow the Class EA process, thereby meeting the requirements of the Municipal Class Environmental Assessment (2000 as amended in 2007, 2011 and 2015). The Study is being initiated as a Municipal Schedule C project based on the range on anticipated effects and capital cost of the project.

The Schedule C project will include two public meetings (a combined Community Café Event/Public Information Centre (PIC No. 1 and a second PIC) and conclude with the preparation of an ESR. The public will be provided with a 30-day ESR review period at the Study conclusion.

As the initial step in the Class EA process, this Study Design Report is being made available to the public. This is a discretionary Step of the Municipal Class EA process, as illustrated in **Figure 3** following Phase 2 of the Class EA process. This additional step is similar to the Step 1.2 activity in that it provides the context for a project where there has been a lag in time since the TMP was completed. The public and agencies will have this initial opportunity to comment on the proposed approach and previous TMP recommendations. The Class EA process does not have a public review period for TMP's following Phase 2, and this current study provides an opportunity for project specific comments.

3.3 EA Phases

The Municipal Class EA Process is illustrated in **Figure 3**. The following is the breakdown of tasks, by phase, for a Municipal Schedule C project:

Phase 1: Identify the Problem (completed as part of the City's TMP)

- Step 1: Identification and description of the problem or opportunity.
- Step 2: Discretionary public consultation.

Phase 2: Alternative Solutions (Steps 1 to 8 completed as part of the City's TMP)

- Step 1: Identification of alternative solutions to the problem.
- Step 2: Identify the study area and a general inventory of the natural, social and cultural environments.
- Step 3: Identification of the net positive and negative effects of each alternative solution.
- Step 4: Review and validation of alternative solutions.
- Step 5: Identification of reasonable design alternatives for the preferred solution.
- Step 6: Public consultation

- Step 7: Confirmation of design alternatives, finalization of Study Design for work program, and refinements to or addition of design alternatives to be carried forward to Phase 3.
- Step 8: Selection of the preferred solution
- Step 9: Study Design available on the City's website – added activity to initiate this current study.
- Step 10: Initial Community Café/PIC No. 1 added activity under this study to review/validate previous TMP recommendations and present preliminary design alternatives for public and agency comment before Phase 3 activities are initiated.

Phase 3: Alternative Design Concepts for the Preferred Solution

- Step 1: Identification of alternative designs.
- Step 2: Preparation of a detailed inventory of the natural, social and economic environments.
- Step 3: Identification of the potential impacts of the alternative designs.
- Step 4: Evaluation of the alternative designs.
- Step 5: Selection of preferred design.
- Step 6: Public consultation at PIC No. 2.

Phase 4: Environmental Study Report (ESR)

- Step 1: Completion of the ESR.
- Step 2: 30-day public review period.
- Step 3: Filing of the ESR and Notice of Completion.

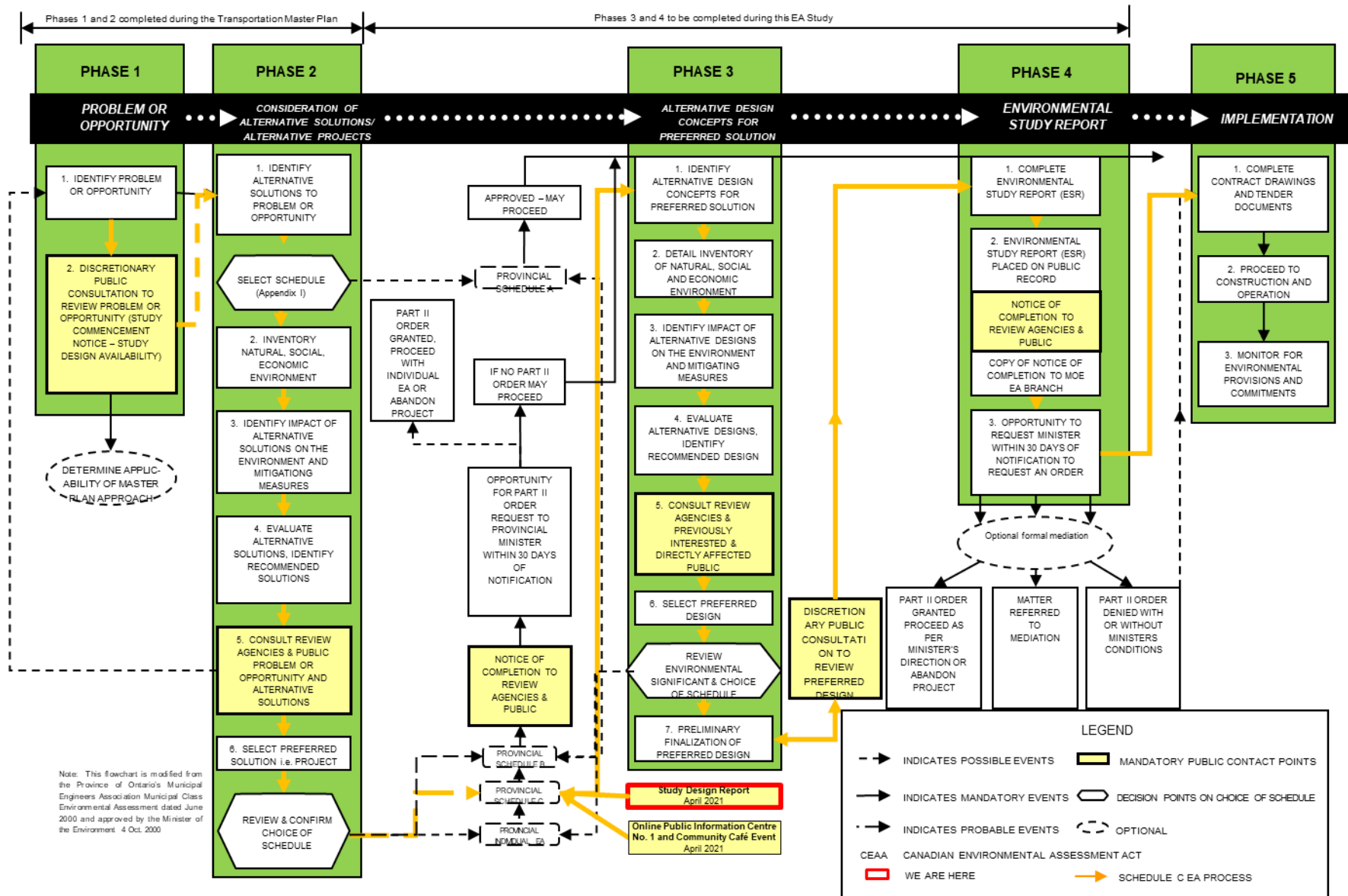


Figure 3: Municipal Class EA Process

4.0 Study Approach

Over the course of the study, input will be solicited from the public, stakeholders, agencies and Indigenous Communities. Input will be gathered through meetings, the project website, and discussions/communication with interested parties. The approach is to work collaboratively with interested parties to address issues and reach a consensus on the Recommended Plan.

4.1 Consultation Program

The Consultation Program identifies the opportunities for the Technical Advisory Committee (TAC) to discuss the Study with the public/stakeholders, agencies and Indigenous Communities. This Study will use several processes to engage with interested parties and provide an opportunity for input. The Consultation Program will include:

- Notices published in local newspapers, issued as media releases and directly mailed/mailed to the study mailing list at key points over the course of the study including:
 - Notice of Study Commencement at the study start-up
 - PIC No. 1/Community Café and PIC No. 2
 - Notice of Study Completion to announce the start of the 30-day public review period
- Communication and coordination with agencies/consultants to obtain background information for input into the study and to obtain required approvals/permits
- Study updates on the project webpage located on the City's website
- Project Team Meetings with City staff
- Meetings with affected property owners, local residents, businesses and Indigenous Communities

4.1.1 Public Consultation

The study will use several techniques to proactively involve the public including a Community Café event, PIC and meetings with external stakeholders. Meetings will be organized with the stakeholders and may include adjacent landowners and other affected businesses or associations. These meetings will include representatives from the City and the consultant team.

Two public meetings will be held. The first public meeting will be a combined Community Café event and PIC No. 1. This event will follow the principles of the World Café philosophy and will engage the public and stakeholders in discussion on their perspectives and interests in the study. The Community Café is a simple yet effective conversational method for fostering dialogue, accessing collective intelligence, and creating innovative possibilities for action. The

Café will be an informal event facilitating conversation by providing participants with a comfortable and welcoming environment.

The second public meeting will be PIC No. 2, which will present the evaluation of design alternatives and the Technically Preferred Alternative (TPA) for the Study Area. Council members will be provided PIC materials in advance of the meeting and the consultant will be available to present to Council in advance of the public meeting.

The public meetings will be an integral component of the study - seeking input and comments from the public and stakeholders. There will be an opportunity for the public to comment on the study at any time. All information will be collected in accordance with the *Municipal Freedom of Information and Protection of Privacy Act* (2009). Anyone interested in the study will be added to the study mailing list upon request.

4.1.2 Agency Consultation

Agencies/Ministries will be contacted at the start of the study to inform them of Study Commencement and to circulate this Study Design. As the study progresses, meetings will be held with select agencies (as required) to review the study and obtain approvals in accordance with the Municipal Class EA. Agencies will include:

- Ministry of the Environment, Conservation and Parks
- Ministry of Natural Resources and Forestry
- Ministry of Indigenous Relations and Reconciliation
- Ministry of Heritage, Sport, Tourism and Culture Industries
- Infrastructure Ontario
- Department of Fisheries and Oceans
- Grand River Conservation Authority
- Transport Canada
- Emergency Services
- School Boards/Bus Services
- Other Stakeholders (as identified)

4.1.3 Indigenous Peoples Consultation

The City of Kitchener has a constitutional duty to consult with Indigenous Peoples with traditional land use or interests within the Study Area. Clear, effective and timely consultation with Indigenous Peoples is essential to ensure the success of the project. This will include:

- Identification of interested/affected Indigenous Peoples early in the decision-making process;

- Distribution and notification of relevant project-related information, including the Class EA process, environmental inventories and potential alternatives/impacts;
- Early identification of concerns/issues;
- Understanding of potential risk and impacts of the Study on Indigenous Peoples interests;
- Development of mutually acceptable solutions involving Indigenous Peoples; and
- Ensuring regulatory compliance throughout the Class EA process.

Indigenous Peoples will be consulted throughout the duration of the Study.

4.2 Work Program

The major elements of the work program are described in the following sections.

4.2.1 Phase 1: Identify the Problem

This phase of the Study will include: establishing the Study scope, schedule and approach with the Project Team and agencies; issuing the Notice of Study Commencement; the collection and organization of background information; reviewing and documenting existing conditions; and the transportation analysis to identify operational, safety and traffic concerns.

In addition, the following Community Engagement tools will be undertaken to proactively engage stakeholders early in the Study:

- **Study Design:** This Study Design presents: the Problem/Opportunity Statement; the consultation plan; project schedule; and identifies the scope of the Study's technical requirements, design standards and proposed evaluation criteria. This document is available for public/agency review and will help establish the foundation for all remaining environmental planning and public consultation processes.

After the first PIC and based on comments received, the draft Study Design Report will be finalized and placed on the City's website as the Final Study Design Report.

- **Community Café/ PIC No. 1:** This event will be a collaborative community involvement tool that goes beyond the conventional information exchange at public meetings. The event will focus on listening to the community in small group discussions (without the study team in the dialogue) to build consensus on the issues and desires of the community.

4.2.2 Phase 2: Alternative Planning Solutions

The consideration of all reasonable alternatives is a guiding principle for EA studies. The Biehn Drive extension, sanitary sewer alignment, cross section, and intersection alternatives will be generated through discussions with the City, agencies and the general public.

The analysis and evaluation process involves a 2-step decision-making process. Initially the study documents the analysis and evaluation of Alternatives to the Undertaking (alternative project types or alternative strategies to address the problem) followed by the subsequent assessment of preliminary design alternatives.

The City of Kitchener TMP previously identified the extension of Biehn Drive as a City Street Capacity Improvement. This TMP completed Phase 1 and 2 of the Class EA process, including the evaluation of Alternative Planning Solutions. The TMP recommended this project as the “implementation of new streets in southwest Kitchener Urban Areas Study Community Master Plan, including extension of Biehn Drive between Biehn Drive and Robert Ferrie Drive”.

4.2.3 Phase 3: Alternative Design Concepts for the Preferred Planning Solution

Preliminary Design Alternatives will be generated for the Preferred Alternative Planning Solution (Biehn Drive Extension) based on an inventory of the natural, social and cultural environment and results of technical investigations.

4.2.3.1 Environmental Inventories and Technical Investigations

Environmental inventories and technical investigations will be completed to assess the impacts of alternative design concepts. These investigations are described in **Sections 4.2.3.1.1 to Section 4.2.3.1.7**.

4.2.3.1.1 Transportation and Traffic

Transportation/traffic analysis will be completed using a Complete Streets approach considering the needs of pedestrians, cyclists, motorists, goods movement including farm vehicles (if applicable) and transit services. The traffic analysis will assess existing and future traffic demand to the end of the Official Plan horizon. The study will provide recommendations for: intersection control (roundabout vs. signalized), pedestrian crossings, spacing of intersections with local streets and roadway cross section requirements (lane requirements, sidewalks and/or multi-use paths, continuation of existing bicycle lanes or transition to raised cycle tracks and potential traffic calming measures).

The traffic report will also provide recommendations on the timing of the improvements. This analysis will be used to identify the preliminary design level of geometric needs of the various alternatives (i.e. storage lengths, auxiliary lanes, signal/traffic controls, etc.) and in addition, will be used to evaluate the impacts/benefits of the various competing alternatives for the horizon years.

4.2.3.1.2 Sanitary Sewer

The Project Team will develop the design of the trunk sanitary sewer in conjunction with the alternative road extension alternatives. It is noted that some of the alternative alignments for

the trunk sewer may diverge from the road alignment alternatives. The Class EA process for extension of the sanitary sewer is a Schedule B process. However, the EA for the road and sanitary sewer will be combined into a single document and will be documented in an ESR. This EA is being undertaken concurrently with the Sanitary Sewer Master Plan.

The preliminary design tasks will include preliminary design of the trunk sanitary sewer, including confirmation of drainage areas and design flows; drainage design, including hydraulic design of the crossings; and stormwater management design, including 30% design of stormwater management facilities and Low Impact Development measures.

4.2.3.1.3 Stormwater Management and Municipal Servicing

The Project Team will undertake a Stormwater Management (SWM) Plan and Report taking into consideration previously completed studies including the Strasburg Creek Flood Control Environmental Study Report and the Upper Blair Creek Functional Drainage Study. The work will include preliminary hydrologic and hydraulic modelling of the existing and proposed conditions and development of a SWM strategy in sufficient detail to satisfy regulatory concerns and obtain approvals in concept.

The preliminary design tasks will include: drainage design, including hydraulic design of the crossings; and stormwater management design, including 30% design of stormwater management facilities and Low Impact Development measures.

4.2.3.1.4 Geotechnical and Hydrogeological

Geotechnical information and published geological data from the area will be reviewed. In addition, three boreholes will be advanced along the proposed extension alignment. A soil investigation program will be completed to determine a soil characterization.

Geotechnical information and published geological data from the area will be reviewed. A geotechnical assessment of the alternatives will be completed.

4.2.3.1.5 Social Environment

An inventory of existing land uses within the Study Area will be undertaken. This will include documentation of agricultural/residential development (access, emergency services, trails, etc.) and utility corridor land uses. The inventory will also include consideration and identification of future land uses such as developments, right-of-way requirements, future transit and transportation facilities and development that could be implemented complying with existing planning documents. Any land use changes that have occurred will be documented.

In addition, an acoustical assessment for this project will be completed to determine the effects of the project beyond the local Study Area and will reflect traffic volume increases forecast along the existing Biehn Drive corridor. The assessment will determine existing daytime and

nighttime sound level contours and future sound levels associated with the road extension for areas within existing residential (noise sensitive) land uses.

4.2.3.1.6 Natural Environment

The natural environmental team will review desktop/background information to identify any known natural features and complete field investigations in the spring and summer of 2021 to document existing conditions in the Study Area. A detailed Terms of Reference (TOR) is described below and will be submitted to the Grand River Conservation Authority for their review and comment. These TOR are based on a preliminary field visit conducted with the landowner.

A field visit was completed in the spring of 2021 with the landowner's environmental consultant (WSP) to determine what environmental inventories have been completed for the Study Area and to walk the proposed alignments for the Biehn Drive extension. Comprehensive surveys have been conducted over a number of years and the following information will be made available to BTE in support of the MCEA process:

- Wetland delineation GPS coordinates/shapefiles;
- Significant Wildlife Habitat (SWH) identified in the study area;
- Species at Risk (SAR) habitats and screening; and
- Ecological Land Classification (ELC) mapping.

Based on conversations with WSP and GRCA, the wetland delineation has not been field verified by GRCA staff. As such, a site visit will be scheduled for the summer of 2021 to stake the portion of wetland within the Biehn Drive extension Study Area in cooperation with WSP and GRCA. A digital file showing the approved wetland limits will be provided to GRCA and will form the basis for comparison of alternatives from a natural environmental perspective. Field work conducted in the summer of 2021 will also document the locations of Black Ash (*Fraxinus nigra*), a species soon to be listed under the *Endangered Species Act* (ESA) and identify future requirements for surveys during Detailed Design.

A Terrestrial and Aquatic Existing Conditions report will be prepared based on the 2021 field investigations and work previously completed by WSP in the Study Area. In addition to describing existing conditions, the report will quantify the anticipated extent of disturbance to the surrounding Provincially Significant Wetland (PSW) based on each alternative alignment of the roadway and/or sewer.

4.2.3.1.7 Cultural Environment

Potential Built Heritage Resources and Cultural Heritage Landscapes will be evaluated for the entire study area prior to the selection of preferred alternatives and summarized in the ESR.

This review will identify all known or potential built heritage resources and cultural heritage landscapes (BHR/CHLs). If resources are present, a cultural heritage assessment report will be completed with the potential project impacts to BHR/CHLs identified and strategies will be provided to mitigate identified impacts. These mitigation measures will inform project planning and design.

An Archaeological assessment (AA) will be undertaken by an archaeologist licenced under the *Ontario Heritage Act*, who is responsible for submitting the report directly to the Ministry of Heritage Sport, Tourism and Culture Industries (MHSTCI). A Stage 1 AA consists of a review of geographic, land use and historical information for the property and the relevant surrounding area, a property visit to inspect its current condition, and contacting MHSTCI to find out whether there are any known archaeological sites on or near the property. Its purpose is to identify areas of archaeological potential and determine whether additional archaeological assessment is necessary (e.g. Stages 2, 3, and 4).

4.2.3.2 Evaluation of Alternatives

Preliminary Design Alternatives will be evaluated using a qualitative evaluation process. Through this process, evaluation criteria will be identified including potential factors such as roadway level of service, traffic safety, accessibility, property impacts, socio-economic environment, natural environment, cultural heritage, technical aspects/construction complexity and implementation.

The evaluation and analysis will identify all improvement alternatives and associated cost estimates including lifecycle costs, alternative construction/material options, proposed timeline and innovative solutions. This document will be presented to the public for input at PIC No. 2. Following the PIC, refinements will be made to the Technically Preferred Alternative (TPA) (if applicable) and the refined alternative will become the Recommended Plan.

4.2.4 Phase 4: Environmental Study Report (ESR)

The preparation of the draft and final EA report will follow the format and content for an ESR as required by the Municipal Class EA document. The ESR will document the study methodology, findings, public involvement and recommendations. The report will provide recommendations on the phasing of the proposed works and preliminary cost estimates. The public will be notified of the availability of the ESR for a 30-day public review period.

5.0 Preliminary Design Alternatives

This Section describes Preliminary Design Alternatives for the extension of Biehn Drive. As an initial step in the generation of alternatives this Study has identified the groups of alternatives below.

Three alternatives were presented at Public Information Centre (PIC) No. 1 and to residents at the Community Café event. Based on comments received from attendees at the Community Café, a fourth alternative has been added for the subsequent evaluation. Alternative 4 will use existing collector roads to move vehicular traffic within the Doon South and Brigadoon communities. The project will include an extension of Biehn Drive for a maintenance road for the new sanitary sewer extension and an active transportation link as per the Official Plan.

- Road Alignments (see **Figure 4**)
 - Alternative 1: Connect to Robert Ferrie Drive east of Hydro One transmission tower
 - Alternative 2: Connect to Robert Ferrie Drive west of Hydro One transmission tower
 - Alternative 3: Connect directly westerly to Strasburg Road
 - Alternative 4: Use Existing Collector Roads
- Sanitary Sewer Alignments
 - Following the future Biehn Drive alignment
 - Following a separate alignment
- Intersection Type:
 - Conventional signalized
 - Unsignalized
 - Roundabout control
- Cross Section:
 - Urban cross section with sidewalk/multi-use trail (MUT)
 - Semi-urban cross section with MUT
- Traffic Calming Measures
 - Chicanes
 - Medians
 - Narrower driving lanes
 - Median bulb-outs

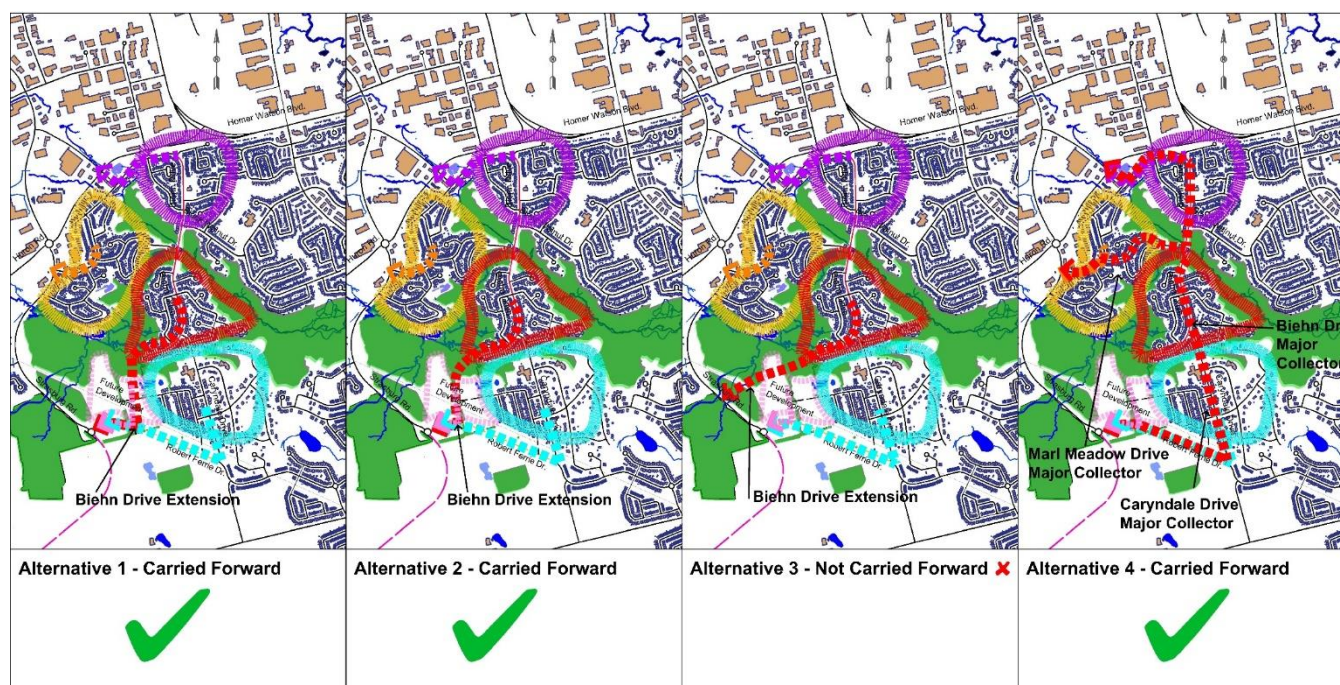


Figure 4: Preliminary Design Alternatives

5.1 Preliminary Coarse Screening of Alignment Alternatives

A coarse screening evaluation of the Preliminary Design Alternatives for the extension of Biehn Drive has been completed to compare the performance, effects and compliance with the City's planning documents, and screen out alternatives which do not address the objectives of the study or are significantly inferior to other competing alternatives.

The evaluation criteria ranking legend is provided below. The evaluation of alternatives is provided in **Table 1**.

x	-	✓
Poor	Fair	Good

Table 1: Evaluation of Preliminary Alignment Alternatives

	Alternative 1: Connect to Robert Ferrie Drive east of Hydro Tower	Alternative 2: Connect to Robert Ferrie Drive west of Hydro Tower	Alternative 3: Connect to Strasburg Road	Alternative 4: Use of Existing Collector Roads
Transportation				
Does this alternative satisfy forecast traffic demand, improve safety, and address all modes of transportation?	✓ This alternative would provide a north-south connection to Robert Ferrie Drive to accommodate all modes. This alternative will accommodate vehicles to/from the Brigadoon community and will reduce cut-through traffic on local roads.	✓ This alternative would provide a north-south connection to Robert Ferrie Drive to accommodate all modes. This alternative will accommodate vehicles to/from the Brigadoon community and will reduce cut-through traffic on local roads.	- This alternative would provide an east-west connection to Strasburg Road to accommodate all modes. This alternative will accommodate vehicles to/from the Brigadoon community.	* This alternative does not provide an east-west connection to Strasburg Road to accommodate vehicular traffic. This alternative will accommodate pedestrians/cyclists to/from the Brigadoon community. A maintenance road will also be constructed to provide access to the municipal services.
Environment				
Does the approach result in significant impacts to the natural environment?	- This alternative will result in minor impacts to the woodlot/wetland.	- This alternative will result in minor impacts to the woodlot/wetland.	* This alternative will result in significant impacts to the woodlot/wetland.	✓ This alternative will have the smallest footprint in the woodlot/wetland.
Affordability				
Is the approach affordable to the City to implement?	- No significant difference.	- No significant difference.	- No significant difference.	✓ This alternative eliminates the collector road resulting in lower capital and maintenance/operation costs.
Compliance with City Planning				

Documents				
Does this alternative comply with the recommendations of the City's planning documents (i.e., TMP, OP, KGMP)	✓ This alternative complies with the recommendations of the City's planning documents.	✓ This alternative complies with the recommendations of the City's planning documents.	* This alternative does not address the recommendations of the Official Plan or Growth Management Plan. This alternative was originally recommended in the City's Transportation Master Plan; however, this recommendation was modified in the Official Plan. Based on the previous design and construction of the Strasburg Road and roundabout within the Study Area, this previous alternative is no longer considered feasible.	* This alternative does not address the recommendations of the Official Plan or Growth Management Plan. This alternative is being considered based on public input provided at Community Café / PIC No. 1.
Recommendation :	✓ Carry forward for further evaluation	✓ Carry forward for further evaluation		✓ Carry forward for further evaluation

Based on the preliminary coarse screening of alternatives, it is recommended that Alternative 3: Connect to Strasburg Road not be carried forward. This alternative would have significant environmental impacts and does not comply with the recommendations of the City's Official Plan or Growth Management Plan. It is recommended that the extension of Biehn Drive only consider connections to the extension of Robert Ferrie Drive.

6.0 Study Schedule

A schedule for this Study is shown below in **Table 2**.

Table 2: Study Schedule

Task	Date
Project Start-Up Meeting	January 2021
Study Commencement Notice	Winter 2021
Information Gathering	Winter 2021
Environmental Review	Winter/Spring 2021
Study Design	March 2021
Public Information Centre No. 1/ Community Café	Spring 2021
Analysis and Evaluation of Alternatives	Summer/Fall 2021
Public Information Centre No. 2	November 2021
Preparation of ESR	Fall/Winter 2021
Municipality Review of ESR	Winter/Spring 2021/2022
30-day Public Review Period	Spring 2022

Glossary of Terms

• AADT	Annual Average Daily Traffic – the average 24-hour, two-way traffic per day for the period from January 1st to December 31st.
• Alignment	The vertical and horizontal position of a road.
• Alternative	Well-defined and distinct course of action that fulfils a given set of requirements. The EA Act distinguishes between alternatives to the undertaking and alternative methods of carrying out the undertaking.
• Alternative Project	Alternative Planning Solutions, see above.
• Bump-Up	The act of requesting that an environmental assessment initiated as a class EA be required to follow the individual EA process. The change is a result of a decision by the proponent or by the Minister of Environment to require that an individual environmental assessment be conducted.
• Canadian Environmental Assessment Act (CEAA)	The CEAA applies to projects for which the federal government holds decision-making authority. It is legislation that identifies the responsibilities and procedures for the environmental assessment.
• Class Environmental Assessment Document	An individual environmental report documenting a planning process which is formally submitted under the EA Act. Once the Class EA document is approved, projects covered by the class can be implemented without having to seek further approvals under the EA Act provided the Class EA process is followed.
• Class Environmental Assessment Process	A planning process established for a group of projects to ensure compliance with the Environmental Assessment (EA) Act. The EA Act, in Section 13 makes provision for the establishment of Class Environmental Assessments.
• Corridor	A band of variable width between two locations. In transportation studies a corridor is a defined area

	where a new or improved transportation facility might be located.
• Criterion	Explicit feature or consideration used for comparison of alternatives.
• Cumulative Effects Assessment	Cumulative Effects Assessment assesses the interaction and combination of the residual environmental effects of the project during its construction and operational phases on measures to prevent or lessen the predicted impacts with the same environmental effects from other past, present, and reasonably foreseeable future projects and activities.
• Detail Design	The final stage in the design process in which the engineering and environmental components of preliminary design are refined and details concerning, for example, property, drainage, utility relocations and quantity estimate requirements are prepared, and contract documents and drawings are produced.
• DFO	Department of Fisheries and Oceans.
• EA	Environmental Assessment
• EA Act	Ontario Environmental Assessment Act, RSO 1990 c. E.18 (as amended July 21, 2020).
• Environment	• Air, land or water, • Plant and animal life, including human life, • The social, economic and cultural conditions that influence the life of humans or a community, • Any building structure, machine or other device or thing made by humans, • Any solid, liquid, gas, odour, heat, sound, vibration, or radiation resulting directly or indirectly from human activities, or • Any part or combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario.

• Environmental Effect	A change in the existing conditions of the environment which may have either beneficial (positive) or detrimental (negative) effects.
• ESR	Environmental Study Report. The final documentation for a Schedule C project, defining the project, consultation process, preferred solution, and mitigation measures.
• Evaluation	The outcome of a process that appraises the advantages and disadvantages of alternatives.
• Evaluation Process	The process involving the identification of criteria, rating of predicted impacts, assignment of weights to criteria, and aggregation of weights, rates, and criteria to produce an ordering of alternatives.
• External Agencies	Include Federal departments and agencies, Provincial ministries and agencies, conservation authorities, municipalities, Crown corporations or other agencies other than MTO.
• Factor	A category of sub-factors.
• General Arrangement	Structural plan of the bridge and proposed works including elevations and cross-sectional views of the bridge.
• GRCA	Grand River Conservation Authority
• Individual Environmental Assessment	An environmental Assessment requiring the submission of a document for approval by the Minister, pursuant to the EA Act and which is neither exempt from the EA Act nor covered by a Class EA approval.
• MECP	Ministry of the Environment, Conservation and Parks.
• MHSTCI	Ministry of Heritage, Sport, Tourism and Culture Industries.
• Mitigating Measure	A measure that is incorporated into a project to reduce, eliminate, or ameliorate detrimental

	environmental effects.
• Mitigation	Taking actions that either remove or alleviate to some degree the negative impacts associated with the implementation of alternatives.
• MNRF	Ministry of Natural Resources and Forestry.
• MTO	Ministry of Transportation Ontario.
• NSA	Noise Sensitive Areas
• OP	Official Plan
• PIC	Public Information Centre
• Planning Alternatives	Planning alternatives are “alternative planning solutions” under the EA Act. Identification of significantly different transportation engineering opportunities while protecting significant environmental features as much as possible.
• Preliminary Design Alternatives	Preliminary Design Alternatives are “alternative methods “ of carrying out the selected planning solution while maximizing social and transportation benefits while protecting significant environmental features as much as possible.
• Project	A specific undertaking planned and implemented in accordance with the Class EA including all those activities necessary to solve a specific problem.
• Proponent	A person or agency that carries or proposes to carry out an undertaking, or is the owner or person having charge, management, or control of an undertaking.
• Public	Includes the public, interest groups, associates, community groups, and individuals, including property owners.
• Realignment	Replacement or upgrading of an existing roadway on a new or revised alignment.
• Recommended Plan	That part of the planning and design process, during

	which various alternative solutions are examined and evaluated including consideration of environmental effects and mitigation; the recommended design solution is then developed in sufficient detail to ensure that the horizontal and vertical controls are physically compatible with the proposed site, that the requirements of lands and rights-of-way are satisfactorily identified, and that the basic design criteria or features to be contained in the design, have been fully recognized and documented in sufficient graphic detail to ensure their feasibility.
• SAR	Species at Risk
• Screening	Process of eliminating alternatives from further consideration, which do not meet minimum conditions or categorical requirements.
• SDR	Study Design Report.
• Sub-factor	A single criterion used for the evaluation. Each sub-factor is grouped under one of the global factors.
• TAC	Technical Advisory Committee. The TAC will include the approving agencies and Consultant. It will act as the decision-making body for the study recommendations.
• TIS	Traffic Impact Study
• TMP	Transportation Master Plan
• TPA	Technically Preferred Alternative
• TPP	Technically Preferred Plan
• Traceability	Characteristics of an evaluation process which enables its development and implementation to be followed with ease.