Final Environmental Study Report (ESR) - Volume 1

City of Kitchener
Biehn Drive Municipal Class Environmental Assessment

December 2025, Revision 1

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December 2025, Revision 1

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Revision Table

Revision	Date	Comments	Response
Ministry of Natural Resources			
1	February 26, 2025	**<u>Fish and Fish Habitat</u>** • This reach of Strasburg Creek has a cold-water thermal regime and is known to support the following fish species: Blacknose Dace, Brook Trout, Creek Chub, Fathead Minnow, Goldfish, Longnose Dace, Mottled Sculpin, Pumpkinseed, Rock Bass and White Sucker. We also have records of Brook Trout spawning areas in Strasburg Creek and its tributaries immediately downstream of this site.	Refer to Section 3.1.2.
		• Brook Trout is considered an important biological indicator of aquatic ecosystem health due to its reliance on clean, cold, well-oxygenated water that's needed to support its various life stages. The presence of Brook Trout spawning areas suggests that important groundwater upwellings are located within the general vicinity of this site. Care should be taken not to impact groundwater or surface flows in this area. It will also be important to avoid/ mitigate where possible any thermal impacts or impacts from sedimentation on the adjacent watercourse when completing the detailed designs and during construction.	Refer to Table 9, Item no. 2.1 and 2.2.
		• Restricted activity timing windows are applied to protect fish from impacts of undertakings in and around water during critical life cycle stages. The recommended timing restrictions for Strasburg Creek and its tributaries in this area is October 1st to June 30th of the following year (Note: dates represent when in-water work should be avoided).	Added text to Table 9 Item 2.1.

Revision	Date	Comments	Response
		• MNR would recommend that the city consider incorporating designs in the culvert to maintain groundwater upwellings if those features are present within the footprint of the proposed crossing site.	Added text to Table 9 Item 2.4.
		Wetlands • Limits of construction should be clearly marked to ensure impacts to wetlands are kept to a minimum.	Added text to Table 9, Item No. 2.7.
		• MNR would be supportive of incorporating wildlife passages to facilitate wildlife movement across the wetland and surrounding landscape.	Noted.
3		**Fish and Wildlife Conservation Act** Please note that should the project require: • The relocation of fish outside of the work area, a Licence to Collect Fish for Scientific Purposes under the Fish and Wildlife Conservation Act will be required. • The relocation of wildlife outside of the work area (including amphibians, reptiles, and small mammals), a Wildlife Collector's Authorization under the Fish and Wildlife Conservation Act will be required.	Noted Added to Table 9 Item 2.4
Ministry of Citizenship and Multiculturalism			
2	February 26, 2025	**Archaeological Resources** Section 3.2.2 of the ESR describes the Archaeological Assessments (AAs) that have been carried out within the study area, however the information provided in this section is incomplete. A Stage 1-2 AA was carried out for western portion of the study area under Project Information Form (PIF) #P007-1187-2021. Our records indicate that this report has been entered into the Ontario Public Register of Archaeological Reports ('the Register'). The report recommended the portion	Revised Sections 3.2.2 to include a summary of previous work. Revised Section 7.4.2.1 and Table 9 Item 3.1.

Revision	Date	Comments	Response
		of the subject lands assessed within the report did not require further assessment, but noted that the remainder of the subject lands would require additional assessment if they are included within the limits of a plan of subdivision and unless draft plan conditions and/or zoning prohibit development in which case, such documentation shall be provided prior to subdivision registration, servicing or site alteration associated with the remainder of the subject lands. The ESR also notes that the eastern portion of the study area was assessed in a Stage 1-2 AA in 2009 under PIF #P013-519-2009. Our records indicate that a Stage 3 AA was carried out within the study area under the same PIF number, and that Stage 4 AA was carried out for a registered archaeological site within the study area under PIF #P123-042-2010. All three associated reports have been entered into the Register, however no information regarding the Stage 3 and Stage 4 AA is included in the ESR. Given the limited information provided in the ESR, it is not possible to determine if the entirety of the study area has been cleared of archaeological potential. We also note that the eastern portion of the study area was assessed in 2009, and there have been changes in legislation relating to archaeological assessment since that time, notably the adoption of the Standards and Guidelines for Consultant Archaeologists (2011). Based on a review of our records, it appears that some portions of the study area have not been assessed for archaeological potential according to present standards. MCM recommends that the ESR be revised to clearly articulate the results of all archaeological assessments carried out within the study area, and to clearly identify all areas of the study area that have been previously subject to an archaeological assessment. If portions of the study area have not been assessed, a new Stage 1 AA shall be undertaken by an archaeologist licenced	

Revision	Date	Comments	Response
		under the Ontario Heritage Act (OHA), who is responsible for submitting the report directly to MCM for review, during this phase of the EA.	
		Built Heritage Resources and Cultural Heritage Landscapes As described in Section 3.2.1 of the ESR, the MCM Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes checklist was completed for the study area. The completed checklist is included as Appendix F. Section 3.2.1 notes that completion of the checklist did not identify any properties within the study area that are 'recognized as a heritage property or to have cultural heritage value'. This statement is somewhat vague and should be revised to clarify if the study area was also screened for potential built heritage resources and cultural heritage landscapes (i.e., those that do not have an existing level of heritage recognition). In addition, built heritage resources, cultural heritage landscapes, and archaeological resources are all considered to be 'cultural heritage resources'. As archaeological resources are addressed in the following section, we recommend that the title of Section 3.2.1 be revised to "Built Heritage Resources and Cultural Heritage Landscapes". As a general comment, the responsibility for administration of the Ontario Heritage Act and matters related to cultural heritage have been transferred from the Ministry of Heritage, Sport, Tourism, and Culture Industries (MHSTCI) to the Ministry of Citizenship and Multiculturalism (MCM) since Fall 2022. References to the ministry should be revised throughout the ESR.	Revised Section 3.2.1. Revised Revised
Grand River Conservation Authority			
3	March 3, 2025	Ecology	

Revision	Date	Comments	Response
		3. Final sizing, design, and number of crossings for the provision of wildlife passage under the Biehn Drive extension in the area of the Strasburg Creek PSW will need to be defined. The culvert design process should ensure appropriate sizing and siting to allow for water flow and wildlife movement.	Refer to Table 9, Item 2.4.
		1. Details on the compensation for wetland loss, including: a) 10:1 tree replacement on adjacent Lands (Developer's approval required). b) 1:1 wetland replacement (on-site)	To be determined during detail design.
		4. Per the hydrogeological assessment, construction dewatering is recommended to lower the groundwater table within the excavation area and to ensure dry working conditions during installation of linear infrastructure. Details on the dewatering procedures will be required.	To be determined during detail design.
		5. Per the hydrogeological assessment, "the existing Hearthwood Park SWM facility can be used to provide stormwater quantity and quality control for the section of the Biehn Drive extension between Station 10+000 and Station 10+255. A storm sewer can be extended to direct the runoff up to the 100- year design storm flow to the SWM wetland." This should be detailed in a Storm Water Management Report.	Added to Table 9 Item 2.2.
		6. Wetland boundaries were verified by the GRCA in 2021. Depending on project timelines, a follow-up site visit may be necessary to confirm that wetland boundary has not changed.	Added to Table 9 Item 2.7.
		Water Resource Engineering	
		7. The SWM report should clarify how the catchment areas EX1 and EX2 shown on Figure 2 (Existing Catchments), provided in Appendix G were delineated (based on the previous studies or the existing contour lines).	Lindar data was used to delineate the existing catchments.

Revision	Date	Comments	Response
		8. Appendix G (Technical Memorandum Biehn Drive Extension Drainage and Stormwater Management, Appendix G - Volume 2)) stated that "Catchment EX1 drains directly to the provincially significant wetland, while Catchment EX2 drains to the outlet to the PSW via the existing Hearthwood stormwater management facility." The design should review and confirm that the proposed Biehn Drive right-of-way will not be an obstacle to the natural drainage path.	The city will be providing culverts to ensure drainage. To be reviewed during detail design.
		9. Appendix G identified that the 100-year storm will be captured within the Biehn Drive right-of-way (Station 10+000 to Station 10+300) and conveyed to the existing Hearthwood stormwater management facility via a 600mm storm sewer. a) The design should confirm if the existing Hearthwood stormwater management facility was designed to accept higher flows from Biehn Drive right-if-way and provide SWM control. b) Confirmation of how the Reginal Storm flows will be safely conveyed will be required.	a) The Regional storm event is smaller than the 100-year storm event and both will be directed to the pond. b) The design has been confirmed and will be checked during detail design. Added to Table 9 Item 2.7.
		10. Figure 6 (Station 10+300 to Station 10+532) in Appendix G shows that the storm flows will be conveyed within the proposed Biehn Drive right-of-way via the proposed 300mm storm sewer, further conveyed via a 600mm storm sewer to the proposed OGS and ultimately conveyed to the wetland. However, based on Figure 19 (Typical Cross Section Through Wetland) provided in the Final Environmental Study Report (ESR) - Volume 1, this may not be a feasible option as the proposed section of the road is superelevated. In addition, there is no proposed storm sewers	Following the completion of the SWM Report the drainage was modified to reflect public comments to minimize work below the ground water table in the PSW.

Revision	Date	Comments	Response
		shown on the preliminary drawing road design drawings (C-005 to C-008) provided in the Final Environmental Study Report (ESR) - Volume 1. This should be reviewed and clarified.	The Recommended Plan has open drainage through the PSW but it will still be directed to the Oil Grid Separator (OGS). No revision to Appendix G.
		11. In Appendix G, for Station 10+300 to Station 10+532, the report states, "There is no opportunity to provide stormwater quantity control for this road segment." c) Potential impacts due to increased storm flows to the wetland (e.g., post-development and pre-development flow comparison, increased flow volume to the wetland) should be evaluated. d) Demonstration of how Regional Storm flows will be conveyed to the wetland should be provided. e) We note that the report also states "However, it may be possible to provide additional storage and infiltration under the road." It is requested that the design consider and discuss quantity control and infiltration feasibility, considering all limiting factors.	The city commits to reviewing stormwater quantity control during detail design. Carry out equivalent Best Management Practices
		12. There is discrepancy within the text (Appendix G). In the 'Stormwater Management Measures' Section, the consultant refers to Station 10+000 to Station 10+300 while in the 'Conclusions and Recommendations' Section, reference is made to Station 10+000 to Station 10+255. This discrepancy should be clarified and revised.	Revised
		13. The 1m x 1m box culvert (wildlife crossing) is proposed above the water level. The design should confirm if additional opening(s) are required to ensure wetland connectivity and equalization.	To be reviewed during detail design.

Revision	Date	Comments	Response
			Added to Table 9 Item 2.4.
		General	
		14. The prior issuance of a permit from the GRCA under Ontario Regulation 41/24 will be required for the construction of the Biehn Drive extension with GRCAs regulated area.	Revised Table 9 Item 2.12
		The following detailed plans will be required to support a permit from the GRCA: a) Detailed engineering design Drawings, including: i. vegetation clearing ii. grading and construction iii. erosion and sediment control iv. construction sequencing, staging, and access v. dewatering vi. landscaping b) Functional Servicing Report and/or SWM Report c) Plans and Reports to be signed and stamped by a professional engineer d) Pursuant to GRCA policy 8.4.7, a scoped EIS will be required to demonstrate how the hydrologic functions of the wetland will be maintained or restored.	Revised Table 9 Item 2.12
Ministry of Environment Conservation and Parks			
4	March 21, 2025	<u>Notice of Completion</u> 1. The Notice of completion and any follow- up correspondence should be included in the final Environmental Study Report. The Notice of Completion was not included in the final ESR	All correspondence received has been added to Appendix C, Select Correspondence.

Revision	Date	Comments	Response
			The Notice of Study Completion can be found in Appendix B1, Record of Consultation, page 207 of the Technical Appendices.
		4. The above dewatering assessment report provided detailed hydrogeologic information including dewatering calculations and assumptions for dewatering calculations. The report also discusses the possible dewatering permits (i.e., EASR verses Category 3 PTTW Application) to be required during construction phases. The dewatering assessment report provides Dewatering Estimates for 50 m Trench segment and Receiving Pit, where maximum dewatering volume is estimated to be less than 125,000 l/day with a zone of influence of 70 m. A safety factor of 2 was applied and the estimated dewatering rate per each receiving pit (i.e., 50 m trench) is estimated at 235,000 L/day or 2.72 L/sec. However, the safety factor 2 and projected dewatering rate was not considered for the predicted ZOI (i.e., 70 m). The report considers overland flow to natural environment as a possible dewatering discharge option, which needs to consider treatment of groundwater due to exceedance of several metals including arsenic comparing PWQO. The dewatering assessment was not added to the ESR, just the cover page, so I am not sure it they updated the information according to the comment or not.	Dewatering Assessment, Biehn Drive Extension Report, Page 18: If dewatered groundwater is to be discharged as overland flow, the concentration of total suspended solids (TSS) should not exceed 25 mg/L concentrations. Standard discharge mitigation plan for TSS (discharge running through fine mesh filter bags) must be utilized during construction as TSS is expected to be very high due to the type of construction activities at the site.

Revision	Date	Comments	Response
		Species at Risk 7. Though the ESR provides information on Black Ash and some mitigation information, further action should be considered to avoid impacts to Black Ash within the development footprint. Please refer to the Black Ash assessment guidelines to ensure proper actions are taken to avoid contravening the ESA, 2007. No further mitigation measures have been added.	Refer to Table 9, Item 2.5
		8. The assessment of Black Ash was conducted in December, which is outside of the appropriate window for a full health evaluation. Ideally, this should have been done between late spring and early fall when the trees are in leaf, and key health indicators are visible. A follow-up assessment during the growing season would provide a more accurate evaluation of the trees' condition. There was no mention of a re-evaluation	Refer to Sect 3.5.2 Black Ash Tree Identification
		9. Butternut has been identified as a species at risk within the study area; however, no further information or mitigation measures are provided in the ESR. It is recommended that butternut surveys be conducted by a qualified Butternut Health Expert (BHE) during the appropriate timing window to confirm the absence or presence of this species. Please refer to the Butternut assessment guidelines. Butternut trees were not mentioned in the ESR, therefore implying that no surveys have been completed and no mitigation measures have been put in place.	Vegetation surveys were carried out by others. No Butternut trees were identified and no mitigation required. Partial report attached to Appendix E. Added new Section 3.5.4.
		11. The document touches on long-term monitoring to assess the effectiveness of bat mitigation measures but does not give much detail. MECP would expect ongoing monitoring to ensure that the mitigation strategies, like the installation of roosting structures, are	To be determined during detail design.

Revision	Date	Comments	Response
		effective in supporting SAR bats and that adaptive management strategies are in place to address any unforeseen impacts. 3.1.2 describes the endangered bat habitats and why there is an increasing loss of this habitat, a roosting structure like the one shown in Figure 21 is proposed to be built in the southwestern corner of the wetland, no ongoing monitoring is mentioned.	
		17. During construction, erosion and sedimentation measures are required and are noted in the ESR. The concentrations of most metals, including zinc, thallium, lead, nickel, iron, cadmium, arsenic, and silver in the unfiltered groundwater sample exceeded the PWQO values. A discharge and sampling program was recommended including a limit of total suspended solids (TSS) of 25 mg/L. Nothing regarding the concentration of most metals exceeding the PWQO values was mentioned in the report. Only road salt management.	
		18. As part of the Permit to Take Water application, or any EASR registration, confirmation of hydrogeologic conditions, sedimentation and erosion controls in a discharge plan, and exact design of the compensative wetland should be provided. GRCA's concurrence on the compensation wetland will be required. A monitoring and sampling plan should be created to ensure there is no discharge to the natural environment of groundwater with metals exceeding the PWQO. The above has not been addressed in the ESR.	To be determined during detail design.
		19. Stormwater quality control will be provided with the existing stormwater management pond as well as an oil grit separator at the northern outlet to the PSW. Current and future drainage volumes to be accommodated by the new road were not described, but Item 2.2	

Revision	Date	Comments	Response
		of Table 9 Effects and Mitigation notes stormwater management plan is being developed to reduce chloride loading into the watercourse and to cool stormwater prior to its outlet. It is not clear where this stormwater pond outlets into and could be clarified to ensure all required measures are taken. The ESR includes the Integrated Stormwater Management Master Plan which recommends control of the 25-year and 100-year storm events post-development volumes and peak flows to pre-development levels, and notes enhanced (Level 1) water quality protection for the watershed. All these stormwater works will require MECP approval since they outlet to the natural environment. Where the stormwater pond outlets into was not clarified in Table 9 No. 2.2.	The stormwater pond outlet is shown in **Section 8.0** Sheet C-009 Refer to Section 8 Plate C-009
		General comments:	
		The Appendices themselves are not included in the report, just their title pages, I'm not sure if this is how it is supposed to be.	Yes the appendices are a separate document.
		The length of the final report is significantly shorter that the 2024 revision 1 report.	Noted.
	Thursday November 27, 2025	Inclusion of Indigenous Peoples Select Correspondence Appendix B2	Added

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EXECUTIVE SUMMARY

ENVIRONMENTAL ASSESSMENT PROJECT

The City of Kitchener (City) has undertaken a Schedule C Class Environmental Assessment (EA) Study to develop a transportation plan for the extension of Biehn Drive westerly to the Robert Ferrie Drive extension in the City of Kitchener. The Biehn Drive extension will include municipal services including a trunk sanitary sewer, storm sewer/ditches and watermain. The Study has developed and evaluated alternatives for the alignment of the Biehn Drive extension, intersection locations/type and municipal services while minimizing environmental, social, and cultural impacts of the project. Biehn Drive is a Major Collector Road in the City of Kitchener Official Plan. The previous sanitary sewer network has been constructed to accommodate the future service areas to connect directly to Biehn Drive. No other alternative exists for the sanitary sewer network other than to connect to Biehn Drive. The study determined the need for the road, confirming its inclusion in the OP and transportation master plan.

Problem and Opportunity Statement

The planned extensions of Strasburg Road and Robert Ferrie Drive combined with new development will result in changes to the traffic demands and patterns within the Doon South and Brigadoon communities. To address those changes, the City of Kitchener Transportation Master Plan and Official Plan have identified an extension of Biehn Drive from its current terminus to Robert Ferrie Drive. The Study has revisited the need for an extension of Biehn Drive and evaluated potential alignment alternatives if an extension of Biehn Drive is still recommended. The Study has considered the natural, social environments and the future land use in the Study Area. The study is assessing the road network to provide safe, reliable transportation access to communities within Doon South and Brigadoon considering vehicular, pedestrian, cycling and truck routes. The road project is being completed as a Schedule C undertaking.

The Project provides 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 infrastructure requirements to be defined prior to developing the land use plan.

In parallel, the City is planning for new municipal services that are required to serve future development to the south. The future watermain and sanitary trunk sewer crossing of the Provincially Significant Wetland (PSW) from the existing services at the end of Biehn Drive are being completed as a Schedule B project.

Study Area

The study area is illustrated in **Figure E-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. The “Broader Study Area” includes the surrounding areas to

consider traffic effects in adjacent neighbourhoods as well as broader alternatives through adjacent neighbourhoods.

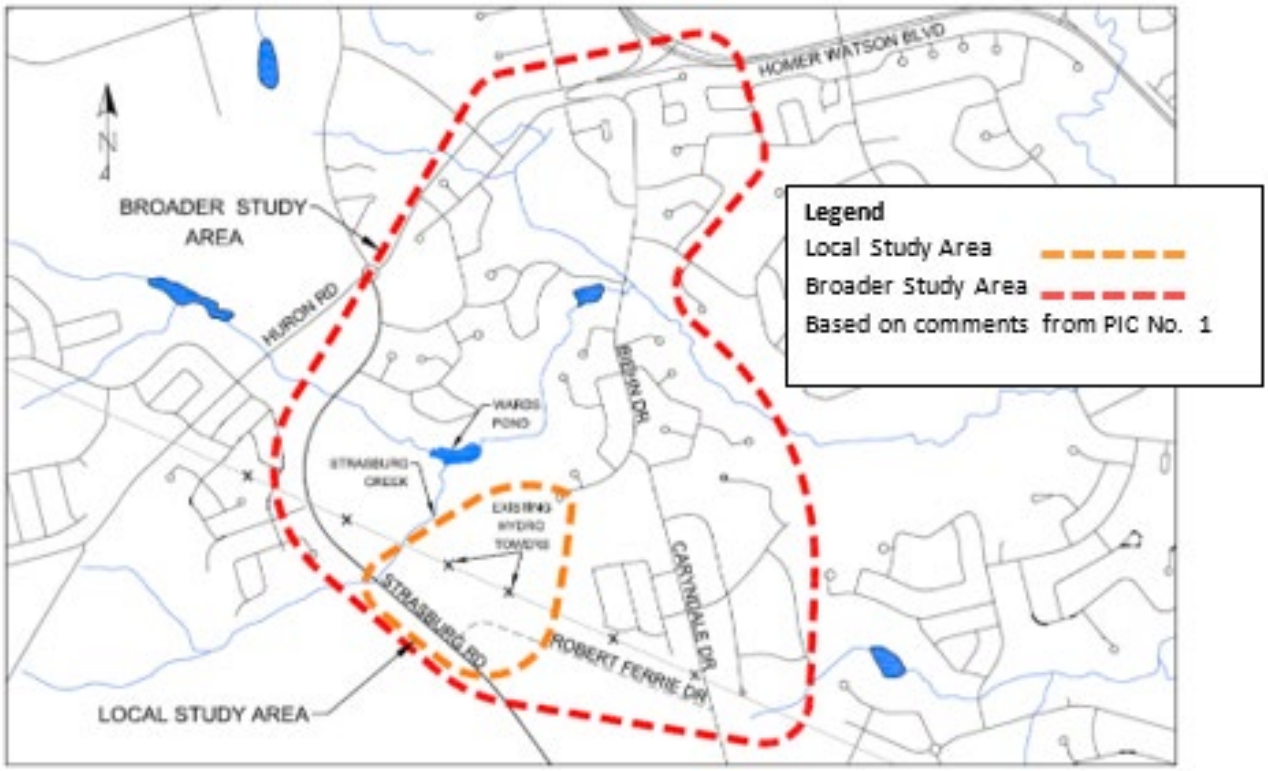


Figure E-1: Study Area

MUNICIPAL CLASS EA PROCESS

This project was undertaken to satisfy the Provincial EA Act following the "Municipal Class Environmental Assessment" process for a Schedule C project as amended by the Municipal Class EA 2015. This document specifies the procedures required to plan specific road projects according to an approved planning process.

The Class EA process was undertaken in a series of phases commencing with problem identification and culminating in the filing of this ESR.

The Class EA process includes an evaluation of all reasonable alternatives and the selection of a preferred alternative(s) with acceptable effects (including avoidance and mitigation of any residual adverse effects) on the natural and social/cultural environments. The Municipal Class EA process entails five phases:

Phase 1: Identify the Problem
Phase 2: Alternative Solutions
Phase 3: Alternative Design Concepts for the Preferred Solution
Phase 4: Environmental Study Report (ESR)
Phase 5: Implementation

CONSULTATION

The public consultation approach used several techniques to proactively involve the public. The study was carried out in consultation with staff from the City of Kitchener, external agencies, stakeholders and the public.

The EA process included circulating a draft Study Design describing the proposed methodology for the Class EA at the start of the study. The draft Study Design was circulated to external agencies and was available to the general public through posting on the City website. The final Study Design is included in **Appendix A**. The Study Design circulation was completed as a discretionary public consultation, Step 1.2 of the Municipal Class EA Planning and Design Process.

A combined Community Café/Public Information Centre Event and a Public Information Centre were held during the study to present the project, the assessment of alternatives and the Technically Preferred Plan. These meetings were an integral component of the study – seeking input and comments from the local community/stakeholders. As a result, the following two major community issues were raised during the Study.

1) Community disruption (vehicular traffic) to existing residents.

   Based on community input, an additional alternative using Caryndale Drive was added and carried forward through the evaluation. The study has evaluated the effect of community traffic accessing the arterial road network using either the Biehn Drive or the Caryndale Drive route. Based on the Caryndale Drive route being designated a minor collector and having an elementary school along this route, the study recommendation is to maintain the Official Plan transportation system and utilize Biehn Drive (Major Collector) for the link to the arterial road network for the community. There will be minor effects for residents currently living at the end of Biehn Drive; however, these residents previously purchased properties on a designated Major Collector that was illustrated in the City's Official Plan.

2) Environmental effects to the Provincially Significant Wetland (PSW).

   The EA has documented the need for an infrastructure link across the PSW. The length of the crossing has been minimized in the selection of the corridor and the cross section and right-of-way width have been reduced to minimize the environmental effects of the project. The EA commits to these measures when the project is implemented through Detail Design and Construction.

Indigenous Peoples engagement was undertaken as part of the study. The Indigenous consultation (Rightsholders identified by MECP to be contacted) between the Study Team and the respective individual indigenous communities and their responses/ requests have been tracked by means of an Excel spreadsheet. A separate spreadsheet has been created for field visits involving Indigenous communities requesting to be involved. The engagement included sharing archaeological studies and a field review of the final Recommended Plan with Six Nations of the Grand River. The City respects that this consultation is a Nation-to-Nation

contact with the City representing the Crown. The First Nations are Rights Holders and are separate and distinct from Public Stakeholders.

All Indigenous communities listed in the previously mentioned spreadsheet will be sent notification of the Notice of Study Completion and the 30-day review period. The contact and any response will be used to update the spreadsheet. The spreadsheet will continue to be updated into and during the next phases of Detail Design and construction regarding their notification of future permits that have the potential to affect their interests. The City commits to continued liaison with the Six Nations Grand River which has identified an interest in the project and the environmental mitigation plan. No other community identified themselves during the consultation to date.

Council Resolution

Council endorsed the expansion of Biehn Drive to Robert Ferrie Drive on December 16, 2024. Biehn Drive is Identified as a major collector in the City's Official Plan and the extension will expand the transportation network in the Doon South and Brigadoon neighbourhoods. The Biehn Drive project will include a trunk sanitary sewer, storm sewers, ditches and a watermain. This expansion of this water and sanitary infrastructure will meet the immediate and future needs of a rapidly growing community.

The Council Resolution is found in **Appendix M**.

ANALYSIS AND EVALUATION

The evaluation of alternatives was completed in a two-step process. The initial step was to consider and validate previous decisions of the Transportation Master Plan as alternative planning solutions. For this study, the alternative planning solutions included:

- Alternative 1 - Do Nothing
- Alternative 2 - Transportation Demand Management (TDM)
- Alternative 3 - Use of Existing Local Roads
- Alternative 4 - Limit Land Use Development
- Alternative 5 - Extend Biehn Drive

Based on the preliminary review of Alternative Planning Solutions, Use of Existing Local Roads and Extend Biehn Drive were recommended for further evaluation. Transportation Demand Management was not carried forward as a standalone solution but will be incorporated with the preferred alternative as part of the recommended plan.

Generation of Preliminary Design Alternatives

A "long list" of preliminary design alternatives was generated, based on identified needs, to ensure consideration of a wide range of transportation alternatives (i.e. all reasonable alternatives are considered). The preliminary alternatives were categorized under 3 groups:

a. Alignment Alternatives (road and sanitary sewer and municipal services)
b. Cross Section Alternatives
c. Intersection Alternatives

Preliminary design alternatives were developed for each group of alternatives. These alternatives were presented to the public at the PIC's and was expanded based on comments received from the public. Alternatives are described in **Section 6.0**.

The Project Team participated in and reviewed the analysis and evaluation for all alternatives. The Technically Preferred Alternative (TPA) was presented to the public at the second PIC.

RECOMMENDED PLAN

Following PIC No.2, the TPA was subject to refinements based on community input as described in **Section 6.5**.

The recommendations from the EA have included three aspects to the project being carried forward including:

- Design of municipal services (trunk sanitary sewer and watermain) on an alignment which will extend services on Biehn Drive to service development lands to the south.
- Extension of an active transportation multi-use pathway (MUP) and sidewalk linking Biehn Drive southerly to the planned community development to the south and creation of a connection to Strasburg Road and Robert Ferrie Drive.
- Extension of a roadway link southerly from Biehn Drive providing improved access to the existing and planned development.

The environmental assessment and preliminary design have included supporting studies for traffic, geotechnical investigations and environmental design to support these three components. A key aspect of the project is that the lands are currently under private ownership and part of future development. The EA is seeking environmental clearance for the following:

- Acquisition of private property for the extension of Biehn Drive,
- Integration of the development lands to the south for the creation of a collector road corridor within the development (Biehn Drive extension),
- New roundabout intersection control on the future Robert Ferrie Drive,
- Improve the distribution of traffic within the local neighbourhoods, and
- To improve accessibility, particularly for pedestrians and cyclists.

The primary aspects of the Biehn Drive extension has been to design a new utility and transportation corridor as shown in **Figure E-2** which has been located along the eastern edge of a large Provincially Significant Wetland (PSW) complex while minimizing the severance of the PSW. Design mitigation for the project within the wetland will include:

- Microtunnelling or directional drilling of the trunk sanitary sewer and watermain under the wetland area with launch and exit shafts reducing changes to the groundwater table and disturbance to subsurface soils.
- Modifying the City's collector road standard to reduce the cross-section width through the PSW to minimize loss within the PSW.
- Bio-engineering of wetland restoration areas to offset the loss to the PSW from the new street alignment at a 1:1 ratio (minimum).

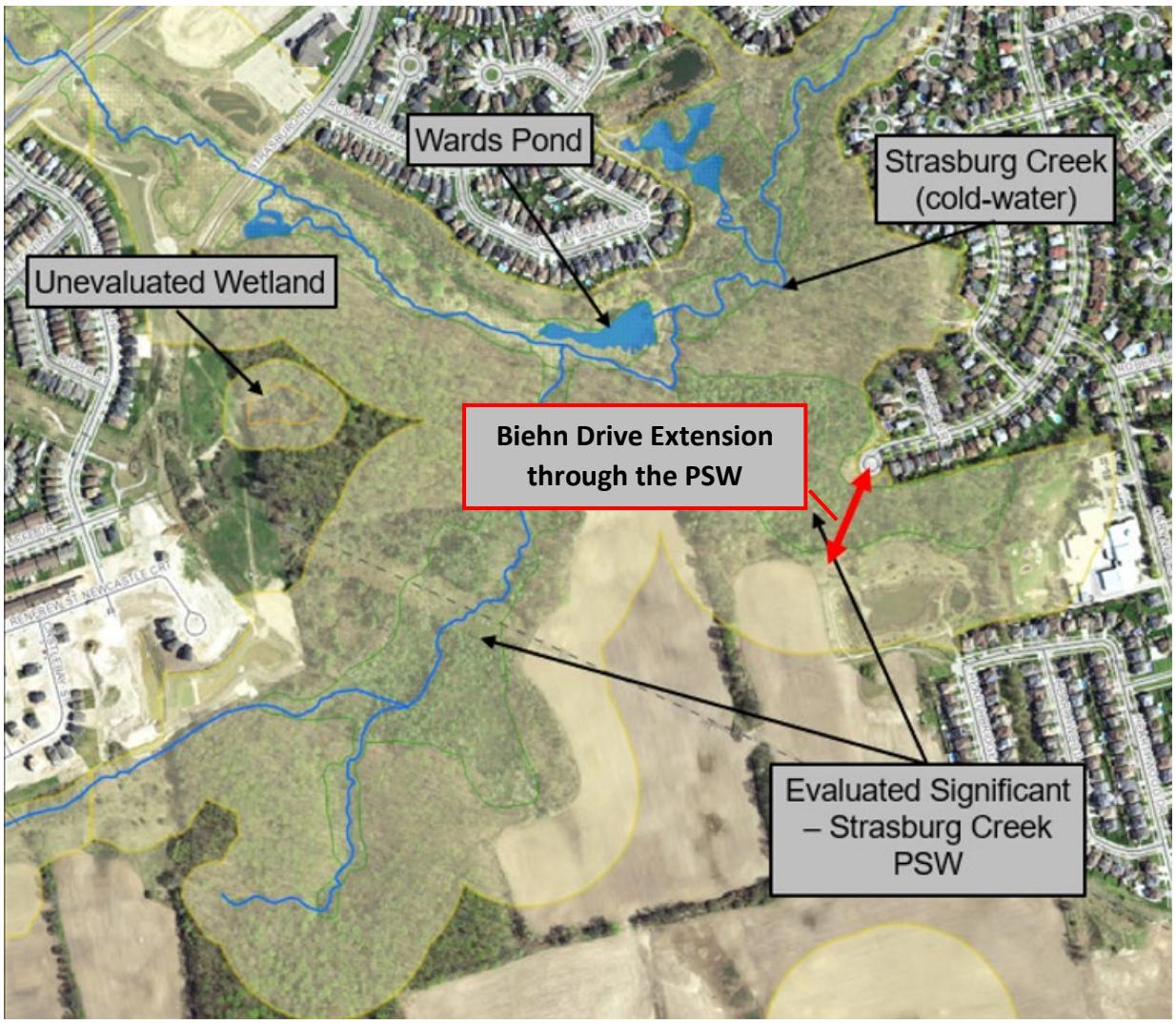


Figure E-2: Location Plan Biehn Drive Extension

The need and justification for the project is two-fold:

1) The new street connection will share the traffic demand from existing neighbourhoods. Longer range development to the south will generate more trips to/from the south than occur today. The transportation plan includes future roads such as the extension of Strasburg Road, Robert Ferrie Drive and the future Dundee Road crossing of Highway 401 (as defined in the Region of Waterloo Transportation Master Plan). There will be significantly more development (population and employment) to the south, including within the City of Cambridge/Municipality of North Dumfries. The province has established a 2051 Plan (legislation) that the Region and City must meet these population and employment targets, and much of this growth is going to be to the south and west (as defined in the Provincial Places to Grow Plan). What does this mean? If existing neighbourhoods have 4 collector streets to exit and enter the communities (as proposed) there will be less traffic on anyone single street. If Biehn Dive is extended, then both it and Caryndale Drive will share the traffic demand for trips towards the west/south. This may

add a modest volume of traffic on Biehn Drive but this has been planned as a major collector as part of the Official Plan. This transportation plan has been in place for over 30 years before any of the property owners purchased houses on this street.

2) The new municipal corridor will provide the distribution network for a watermain and trunk sanitary sewer that will also be necessary for future development. This development is required by the Province's Place to Grow Plan.

   The extension of Robert Ferrie will be a necessary part of the transportation plan. However, it will not replace the need for the Biehn Drive link because it does not serve the same trip origins and destinations.

   With respect to the sensitivity of crossing a PSW the final recommendations included several mitigation measures including: an alignment as close to the eastern boundary of the PSW as possible, narrowing the width of the road within the PSW to reduce disturbance, providing a wildlife passage under the road, using microtunnelling of municipal services to avoid changes to the water table and an innovative road design which will float the new road on top of the existing wetland using geotextile and geogrid. Organic soils as defined by the geotechnical boreholes will be salvaged and replaced in areas of wetland restoration. The design will be a demonstration project for best practices of environmental engineering. The Provincial Policy Statement of the Province may preclude development within PSW's but there is an exemption for road and utility infrastructure were justified by an Environmental Assessment.

   One of the most significant changes that has occurred over the last 30 years is to change the alignment of the Biehn Drive crossing from proceeding directly westerly from Biehn Drive across the larger wetland complex to Strasburg Road. It has been modified to cross the most eastern boundary possible as illustrated in **Figure E-2.** Doing so avoids the large centroid of the wetland complex.

The profile of the new road is proposed to be elevated to be above the ground water to avoid affecting the water table near adjacent houses. During the detail design temporary dewatering will be defined based on microtunnelling or direct drilling exit and entry shafts minimizing impacts to adjacent houses.

Further mitigation for the road extension will be the removal of the existing cul-de-sac to reinstate PSW in this area and the creation of wetland restoration on the south side of the wetland to provide a 1:1 (or greater) replacement of wetland loss.

The Biehn Drive Extension Recommended Plan includes:

- New 2-lane road connecting the current Biehn Drive terminus to the future Robert Ferrie Drive
  - Alignment will be east of the Hydro Tower
  - Cross section will include 3.3 m lanes with curb/gutter (0.5 m)

- Active transportation improvements will include:
  - 3.0 m MUT on the east side and a 1.5 m sidewalk on the west of the road from Robert Ferrie Drive to existing terminus of Biehn Drive.
  - Boulevard (varying width, minimum 1.0 m)
  - Potential pedestrian crossing at the south edge of the wetland:
- Roundabout at the intersection of Biehn Drive and Robert Ferrie Drive (per the recommendations of the Robert Ferrie Drive Environmental Assessment)
- Installation of municipal services beneath the road alignment including:
  - Sanitary trunk sewer (500-525 mm diameter)
  - Storm sewer
  - Watermain (300 mm diameter)
- Natural environment mitigation including:
  - Construction of one box culvert for the provision of wildlife passage under the Biehn Drive extension in the area of the Strasburg Creek PSW (final sizing, design and number of crossings to be defined in detail design). The Biehn Drive Wildlife Crossing Technical Memorandum is included in **Appendix E.**
  - Implementation of permanent wildlife fencing (to be confirmed by scoped EIS during detail design).
  - Stormwater quality control using the existing stormwater management pond as well as an oil grit separator at the northern outlet to the PSW.
  - Target desirable compensation for wetland loss including:
    - 10:1 tree replacement on PSW Adjacent Lands (Developer's approval required)
    - 1:1 wetland replacement (on-site), refer to **Appendix E**.
    - 2:1 wetland replacement (off-site) (not required)

The feasibility for compensation to be reviewed with the future determination of the offsets from the PSW to development lands as an opportunity for naturalization and well as the re-naturalization of the removal of the existing cul-de-sac on Biehn Drive.

The Recommended Plan is illustrated in **Figure E-3.** It incorporates Preliminary Design mitigation measures for the project which are described in **Section 7.0**.

The timeline for implementation of the project is expected to be within the 5-year capital program.

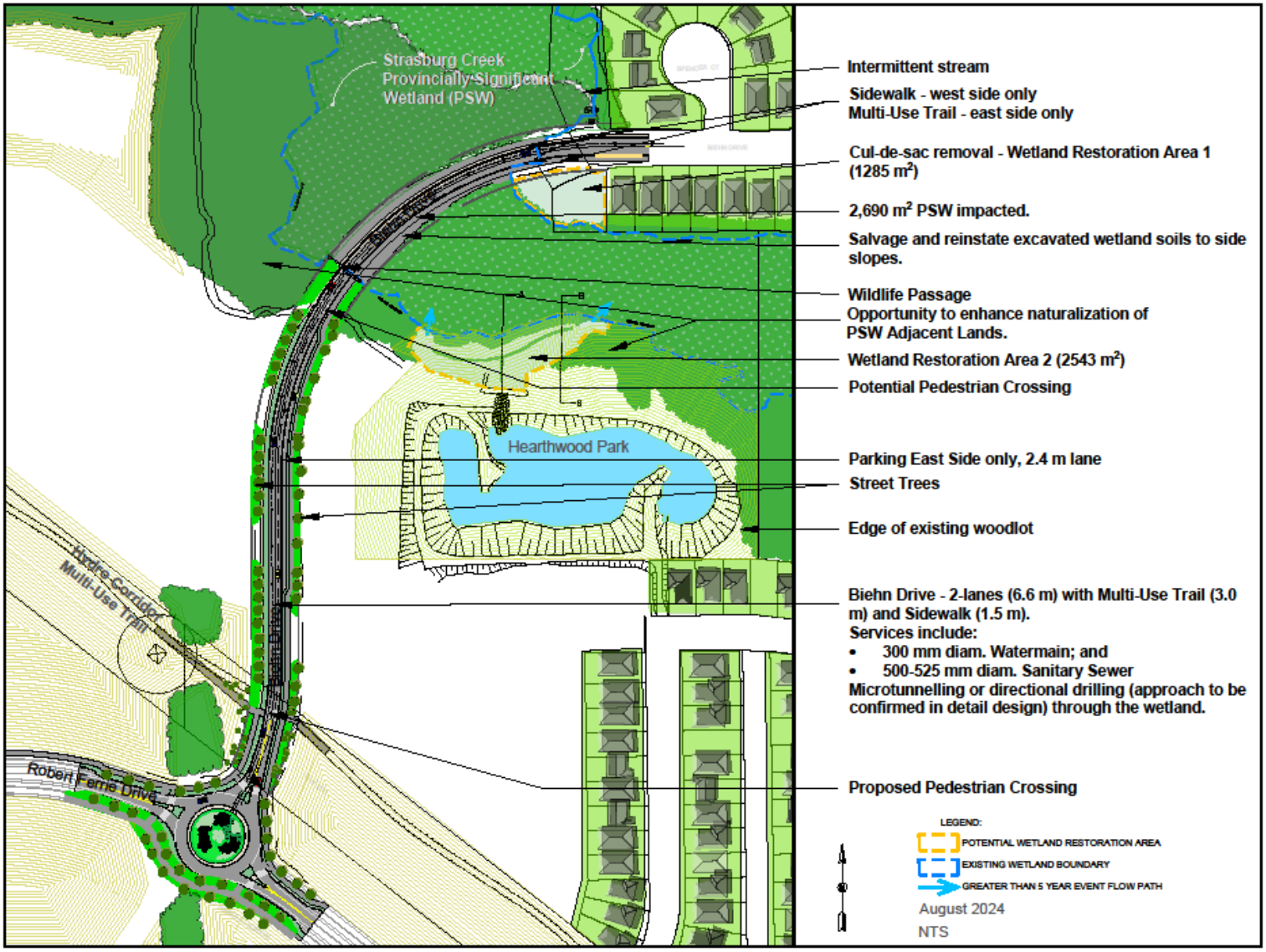


Figure E-3: Recommended Plan

1.0 INTRODUCTION

The City of Kitchener (City) has undertaken a Schedule C Class Environmental Assessment (EA) Study to develop a transportation plan for the extension of Biehn Drive westerly to the Robert Ferrie Drive extension in the City of Kitchener. This is following the identification of this roadway in the City's Transportation Master Plan (TMP) and Official Plan (OP). The Biehn Drive extension will include municipal services including a trunk sanitary sewer, storm sewer/ditches and watermain. The Study has developed and evaluated alternatives for the alignment of the Biehn Drive extension, intersection locations/type and municipal services while minimizing environmental, social, and cultural impacts of the project. Biehn Drive is a Major Collector Road in the City of Kitchener Official Plan. The previous sanitary sewer network has been constructed to accommodate the future service areas to connect directly to Biehn Drive. No other alternative exists for the sanitary sewer network other than to connect to Biehn Drive.

This Environmental Study Report (ESR) documents the transportation/servicing need and the Recommended Plan to address current and future operational needs, considering all modes of travel and incorporating environmental mitigation measures as required. The road extension will be a key link in the Brigadoon community transportation/servicing network and will provide all users (pedestrians, bicycles, and vehicular traffic) with a safe and efficient route to travel from neighbourhoods to the arterial road network now that Strasburg Road has been constructed to the planned extension of Robert Ferrie Drive.

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. Following 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 as well as broader alternatives that had not been originally considered in the Draft Study Design.

1.2 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 and municipal servicing needs. Several planning documents including the Official Plan and Transportation Master Plan (TMP) have identified the need to extend Biehn Drive southerly to the Robert Ferrie Drive extension and ultimately to Strasburg Road for use as both a collector road and for municipal services. The Biehn Drive Extension would be a major collector road, as identified in Schedule B of the City of Kitchener's Official Plan. This link would accommodate vehicles to and from the Brigadoon community and would help reduce traffic on other local streets within the community (Caryndale Drive and the northern section of Biehn Drive). A separate Biehn Drive Traffic Calming Study was completed in 2021.

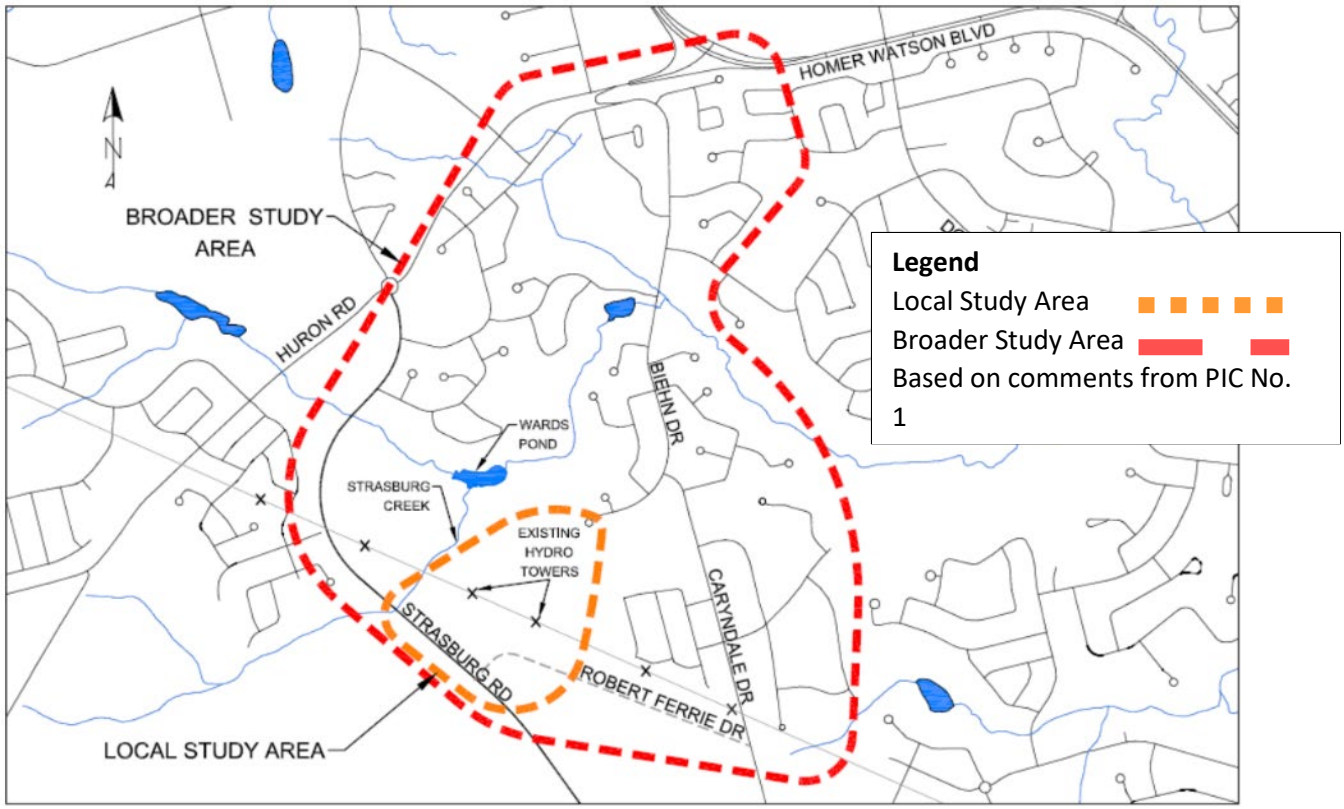


Figure 1: Study Area

A collector road collects traffic from local streets within the community and provides connectivity to high tier arterial roads including Strasburg Road.

Background studies have previously been completed within the Study Area to document the proposed land uses, planned transportation networks, sanitary master plan and existing issues. These reports are summarized in the following sections.

1.2.1 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 (PSW).
- 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."

1.2.2 City of Kitchener Transportation Master Plan

The Kitchener Integrated Transportation Master Plan (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). The current study has validated the previous TMP conclusions and recommendations of the transportation need for the Biehn Drive extension.

1.2.3 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.

1.2.4 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.

The Sanitary Master Plan (August 2024) was updated at the conclusion of the EA study.

1.2.5 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".

1.2.6 Integrated Sanitary Master Plan (ISAN-MP)

The City of Kitchener completed the Integrated Sanitary Master Plan in August 2024. All previous construction of the sanitary network has been built to accommodate the future services areas to connect directly to Biehn Drive. No other alternative exists for the sanitary network other than to connect to Biehn Drive.

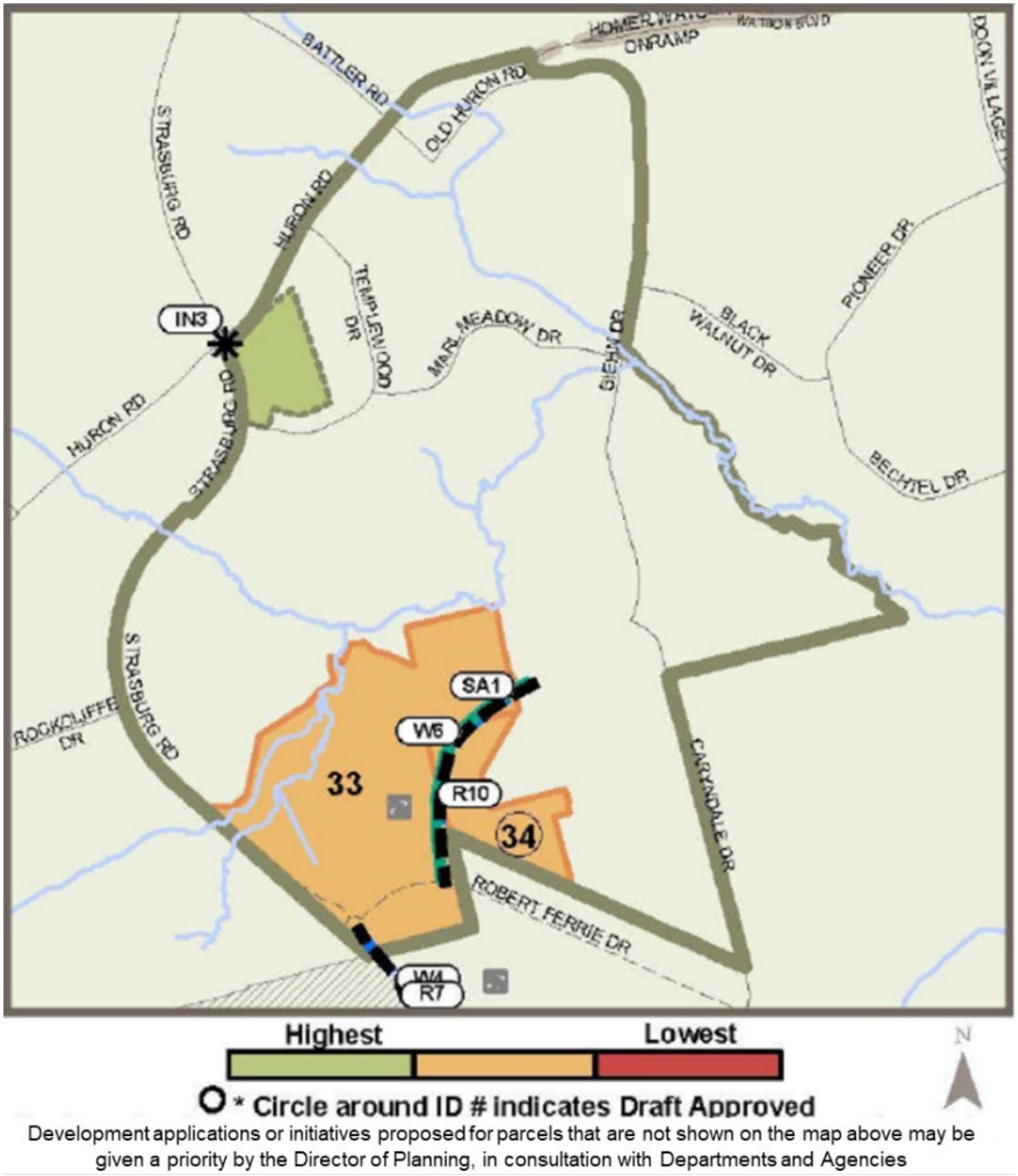


Figure 2: Growth Area Subplan for Brigadoon (Kitchener Growth Management Plan, 2019)

1.2.7 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 indicates 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.

1.2.8 Provincial Policy Statements

The Kitchener Official Plan and subsequent planning studies have been carried out in accordance with the Provincial Policy Statement (PPS) at the time of their creation. Within this Report, **Section 3.4.4** Proposed/Approved Development outlines the undertaking's compliance with the "*A Place to Grow: Growth Plan for the Greater Golden Horseshoe* (2020)". In addition, **Section 3.1.2** Terrestrial and Aquatic acknowledges the Strasburg Creek Provincially Significant Wetland (PSW) complex and the design efforts to minimize the footprint and long-term impact on this PSW complex. Finally, the evaluation process considered the impact on the PSW complex of the various alternatives in arriving at the Recommended Plan.

The Study recommendations are consistent with the PPS which allows infrastructure works within a PSW when there is a demonstrated need for a project following an Environmental Assessment. With the exception of the Do Nothing Alternative, all alternatives require crossing the PSW. The planned sanitary system for all future planned development (south of the PSW) has been planned to outlet on the north side of the PSW at Biehn Drive. The need for the development areas to the south is consistent with the Province's Places to Grow legislation defining growth targets to 2050. The land use plan is documented in the City and Region's Official Plans.

The following insert is the reference from the PPS defining infrastructure as separate and distinct from other forms of development:

> **Development:** means the creation of a new lot, a change in land use, or the construction of buildings and structures requiring approval under the *Planning Act*, but does not include:
> a) activities that create or maintain *infrastructure* authorized under an environmental assessment process;
> b) works subject to the *Drainage Act*; or
> c) for the purposes of policy 2.1.4(a), underground or surface mining of *minerals* or advanced exploration on mining lands in *significant areas of mineral potential* in Ecoregion 5E, where advanced exploration has the same meaning as under the *Mining Act*. Instead, those matters shall be subject to policy 2.1.5(a).

Below is the definition of "infrastructure" in the Provincial Policy Statement:

> **Infrastructure:** means physical structures (facilities and corridors) that form the foundation for development. *Infrastructure* includes: sewage and water systems, septage treatment systems, stormwater management systems, waste management systems, electricity generation facilities, electricity transmission and distribution systems, communications/telecommunications, transit and transportation corridors and facilities, oil and gas pipelines and associated facilities.

The project includes the construction of sewage works (sanitary sewer) and surface transportation access for the community. The project recommendations are to cross the PSW utilizing a reduced cross section and context sensitive design to minimize the residual effects of the project on the PSW.

1.2.9 Additional Reports

Additional background reports that were reviewed as part of the Study include:

- 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

1.3 Problem and Opportunity Statement

The planned extensions of Strasburg Road and Robert Ferrie Drive combined with new development will result in changes to the traffic demands and patterns within the Doon South and Brigadoon communities. To address those changes, the City of Kitchener Transportation Master Plan and Official Plan have identified an extension of Biehn Drive from its current terminus to Robert Ferrie Drive. The Study has revisited the need for an extension of Biehn Drive and evaluated potential alignment alternatives if an extension of Biehn Drive is still recommended. The Study has considered the natural, social environments and the future land use in the Study Area. The study is assessing the road network to provide safe, reliable transportation access to communities within Doon South and Brigadoon considering vehicular, pedestrian, cycling and truck routes. The road project is being completed as a Schedule C undertaking.

The Project provides 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 infrastructure requirements to be defined prior to developing the land use plan.

In parallel, the City is planning for new municipal services that are required to serve future development to the south. The future watermain and sanitary trunk sewer crossing of the Provincially Significant Wetland (PSW) from the existing services at the end of Biehn Drive are being completed as a Schedule B project.

2.0 STUDY PROCESS

The *Environmental Assessment Act* of Ontario (EA Act) provides for "the protection, conservation and wise management in Ontario of the environment"[1]. Municipal infrastructure projects, including road projects, within the Province of Ontario must follow the process prescribed by the EA Act. The EA process includes: the identification of the problem/opportunity; evaluation and selection of the preferred alternative while minimizing environmental effects; and consultation with stakeholders in the decision-making process. This is a self-assessment process that includes mandatory public consultation.

The environmental impacts of municipal projects are varied. Therefore, projects are classified into Schedules based on the scope and complexity of the project as well as the estimated capital cost. This Study was completed to satisfy the Municipal Class EA process for a Schedule

[1] Municipal Class Environmental Assessment, Municipal Engineers Association (2015)

C Study. It reviewed and validated the recommendations from the previous Transportation Master Plan. Schedule C projects generally include the construction or new facilities and major expansions to existing facilities with the potential for significant environmental effects.

At the start of the Study, a Study Design document was prepared that described the previous Master Plan phases, the proposed work plan, public consultation and process to be followed to complete the remaining phases of the Class Environmental Assessment. The Final Study Design report, included in **Appendix A,** was initially circulated in draft form for public and agency comment and revised based on input received.

2.1 Class Environmental Assessment Process

The Class EA document specifies the procedures required to plan specific transportation projects according to an approved planning process. The Study approach included 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 clear and concise documentation of the decision-making process and public consultation program.

The Class EA Process was undertaken in a series of phases commencing with problem identification and culminating in the filing of an Environmental Study Report.

The Planning and Design Process for the Municipal Class EA is illustrated in **Figure 3**. The Class EA process includes an evaluation of all reasonable alternatives and the selection of a preferred alternative(s) with acceptable effects (including avoidance and mitigation of any residual effects) on the natural and social/cultural environments. The Municipal Class EA process entails five phases.

The following is the specific breakdown of tasks by phase for a Class EA 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 all 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 oof 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 Draft Study Design Report 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: Draft Study Design available on the City's website – added activity to initiate this 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. Draft Study Design Report finalized after PIC No. 1.

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: Alternative Design Concepts for the Preferred Solution

Step 1: Completion of the ESR.

Step 2: 30-day public review period.

Step 3: Filing of the ESR and Notice of Completion.

Phase 5: Implementation

Future Phase, After this Study.

The Municipal Class EA process is illustrated in **Figure 3**. This Study has been completed to the end of Phase 4 of the Municipal Class EA process. The project will be approved for design and construction if no written concerns are submitted during the 30-day public review period. Construction will be subject to obtaining permits and approvals during the future Detail Design Phase 5 of the project.

2.2 Description of Planning Alternatives

Planning Alternatives represent alternative ways or methods of addressing the Problem and Opportunity Statement specific to this study. These reflect different strategies and include the "Do Nothing" approach (maintaining the status quo, i.e. not addressing the Problem and

Opportunity Statement). The consideration of all reasonable alternatives is a guiding principle for EA studies.

The analysis and evaluation process involves a 2-step decision-making process. Initially the study documents the evaluation of Planning Alternatives (alternative project types or alternative strategies to address the problem) followed by the subsequent evaluation of preliminary design alternatives. The preliminary Design alternatives include the Biehn Drive extension alignment, sanitary sewer alignment, cross section, and intersection alternatives.

The Planning alternatives were previously considered by the City of Kitchener Transportation Master Plan which identified the extension of Biehn Drive as a City Street Capacity Improvement. This TMP completed Phases 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".

In reviewing this previous decision, the following Planning Alternatives were assessed:

- Do Nothing: This alternative would maintain the existing road network and would not extend Biehn Drive and not provide a bundled sanitary and municipal service corridor.
- Transportation Demand Management (TDM): Reduces vehicular traffic demand (encourages alternative work hours, work at home and active modes of transportation). Does not address the need for a municipal service corridor.
- Use of Local Roads: Encourage the use of other local roads to reduce the need to extend Biehn Drive. Local roads are generally not designed or maintained to accommodate high traffic volumes. This alternative does not address the parallel requirement for a municipal services corridor.
- Limit Land Use Development: Limit any new residential, commercial or industrial development and therefore reduce the generation of new trips. This does not achieve the Provincial mandate of the *Places to Grow Act* which directs the Region and City to create future development lands with specific targets to be achieved.
- Extend Biehn Drive: Provides a long-term solution for improved traffic operations for all modes of travel (pedestrians, cyclists, transit and local community traffic) and safety and/or provision of municipal services. It allows a bundling of municipal services in a common corridor which is required to service the expansion areas to the south to meet the Provincial *Places to Grow Act* mandate.

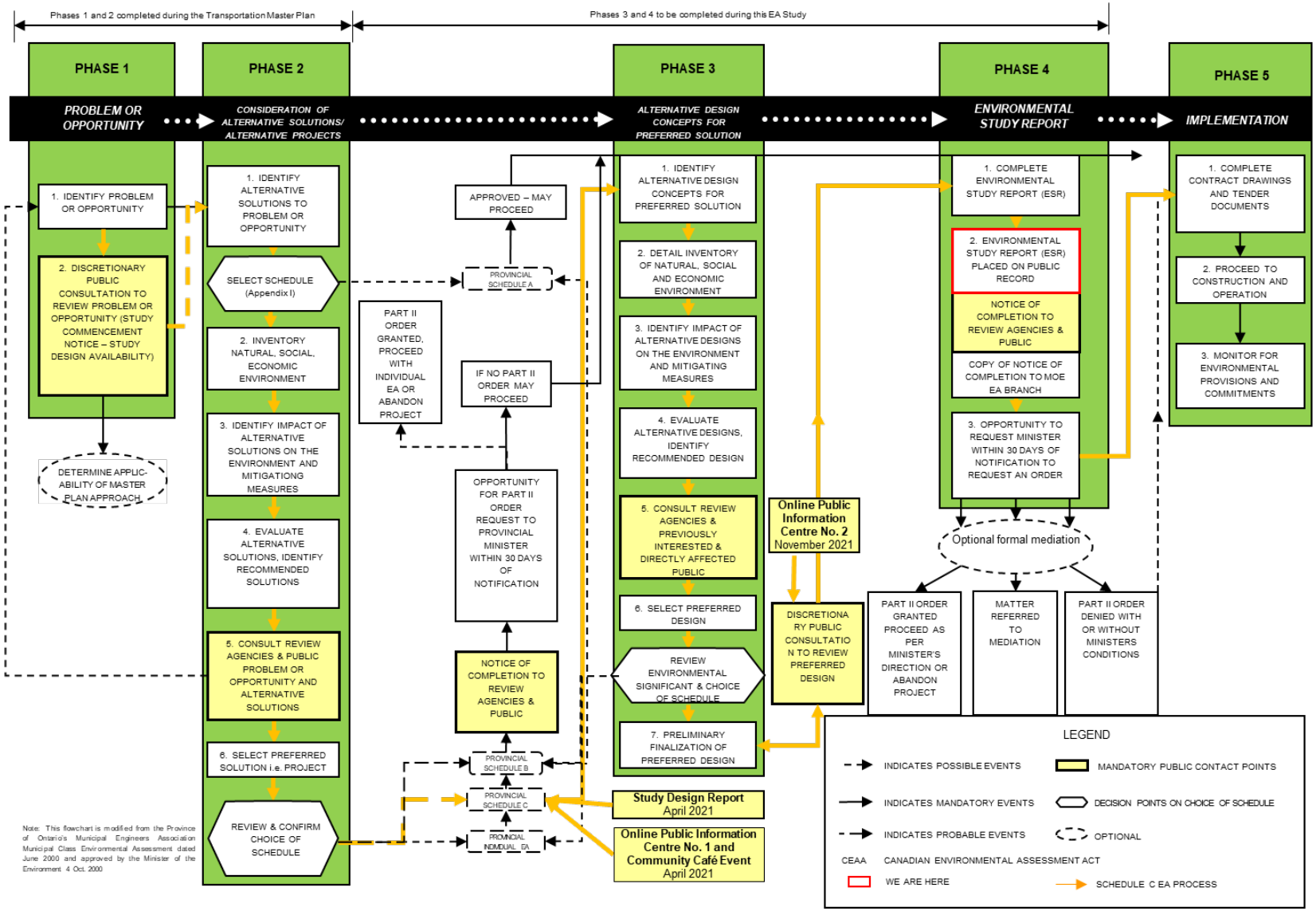


Figure 3: Municipal Class EA Process

Based on the preliminary review of Alternative Planning Solutions, "Transportation Demand Management" and "Extend Biehn Drive" (including the bundling of the proposed trunk sanitary sewer, maintenance roadway/multi-use path and watermain from Biehn Drive to Robert Ferrie Drive) are recommended. The Use of Local Roads was not a standalone solution but based on community input was carried forward as a modified approach of using two corridors (Alternative 4 carried forward using Caryndale Drive for traffic and using a municipal servicing corridor across the PSW including a MUP / service corridor for maintenance equipment to access the watermain and sanitary sewer infrastructure). This approach validates and supports the previous TMP recommendations.

The evaluation of the Alternatives to the Undertaking (Planning Alternatives) for this Study is shown in **Table 1**.

2.3 Consultation Program

Over the course of the Study, input was solicited from the public, stakeholders, agencies and Rights Holders (Indigenous Communities). Input was collected through meetings, the project website, and discussions/communication with interested parties. The Study approach was to work collaboratively with interested parties to address issues and reach a consensus on the preferred design.

The following sections provide a summary of the consultation activities held during the Study.

2.3.1 Notices

Notices for the Study were advertised on the City's website, mailed/emailed to the project contact list, and published as follows:

- Study Commencement and Community Café/Public Information Centre No. 1 – The Waterloo Region Record on March 26, 2021
- Public Information Centre No. 2 – The Waterloo Region Record on October 29, 2021
- Public Information Centre No. 3 - The Waterloo Region Record on June 14, 2024
- Notice of Study Completion - The Waterloo Region Record on January 13, 2025

In addition, a newsletter was distributed to all properties within the Broader Study Area to present background information and respond to frequently asked questions following the Community Café/PIC No. 1.

See **Appendix B1** for copies of the study notices and newsletter. **Appendix C** includes select correspondence received from interested individuals, ministries, agencies, and Indigenous Peoples.

Table 1: Planning Alternatives

Screening Criteria	Alternative 1: Do Nothing	Alternative 2: TDM	Alternative 3: Use of Existing Local Roads	Alternative 4: Limit Development	Alternative 5: Extend Biehn Drive
Transportation	Does not address forecast traffic demand. Results in increased volumes on local roads.	May reduce vehicular demand by mode shift or work at home but will not eliminate need for new or improved infrastructure.	Local roads not designed to accommodate increased volumes. Caryndale Drive is not designated as a major collector and as such should not be expected to carry additional traffic.	May reduce vehicular demand by reducing the number of trips generated by development but does not address existing demands and/or background growth.	Accommodates all modes of transportation.
Environmental	No impacts.	No or low impacts. Low impacts may be associated with active transportation projects/ improvements (i.e. sidewalks, bike lanes).	Low impacts. Creates disruption to properties on local roads that would experience an increase in traffic.	No impacts.	Low to medium Environmental effect possible with new corridor. Magnitude of effects will depend on environmental mitigation.
City Planning Objectives	Does not meet objectives/ recommendations in City Planning document or	Supports objective to encourage active transportation and alternate modes.	Does not meet objectives/ recommendations in City Planning documents. Does not support the Provincial Places to Grow	Does not meet objectives/ recommendations in City Planning documents.	Supports the recommendations for the extension of Biehn Drive in OP and TMP.

Screening Criteria	Alternative 1: Do Nothing	Alternative 2: TDM	Alternative 3: Use of Existing Local Roads	Alternative 4: Limit Development	Alternative 5: Extend Biehn Drive
	support the Provincial *Places to Grow Act* requirement to create additional development areas (including municipal services).	Does not support the *Provincial Places to Grow Act* requirement to create additional development areas (including municipal services).	Act requirement to create additional development areas (including municipal services).	Does not support the Provincial Places to Grow Act requirement to create additional development areas (including municipal services).	Supports the Provincial Places to Grow Act requirement to create additional development areas (including municipal services).
Recommendations	Not recommended but carried forward as a baseline to compare other alternatives.	Recommended as a complementary solution. This is not a standalone solution.	Following PIC No. 1 there was public support to carry forward this alternative. This is not a standalone solution. See Alternative 4 which is a combination of Use of Local Roads and a New Municipal Servicing Corridor.	Not recommended.	Recommended to be carried forward for further study (new road and/or municipal services).

2.3.2 Contact List

A public/agency mailing list was developed at the start of the Study and was updated throughout the duration. The following Sections identify the stakeholders, agencies and communities contacted.

2.3.3 Stakeholder Consultation

All agencies of groups that may have had an interest in the project or any documentation to contribute to the Study were contacted at the start of the Class EA for their input. The following ministries, agencies and stakeholders were invited to attend the public meetings:

- Ministry of the Environment, Conservation and Parks (MECP)
- Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF)
- Ministry of Citizenship and Multiculturalism (MCM)
- Ministry of Municipal Affairs and Housing (MMAH)
- Infrastructure Ontario (IO)
- Transport Canada (TC)
- Ministry of Indigenous Affairs
- Grand River Conservation Authority (GRCA)
- Emergency Services
- Utilities
- School Boards/Bus Services
- Other Stakeholders (as identified)

2.3.4 Indigenous Peoples Consultation

The City of Kitchener has a constitutional duty to consult with Indigenous Communities with traditional land use or interests within the Study Area. Notices were sent to the Indigenous Communities within the vicinity of the Study Area notifying them of the Study start-up and key milestones, refer to **Appendix B2**. Those contacted included:

- Six Nations of the Grand River (SNGR)
- Metis Nation of Ontario
- Mississaugas of the Credit First Nation
- Haudenausaunee Chiefs Confederacy Council (HCCC) represented by Haudenosaunee Development Institute (HDI)
- Huron Wendat Nation

A meeting (January 5, 2022) a site visit (February 18, 2022) and an on-line meeting (July 4, 2024) were held with Six Nations of the Grand River (SNGR) during the EA.

The City of Kitchener has committed to keeping all Indigenous Communities updated on the progress of the projects and will invite Indigenous field monitors to participate during future environmental fieldwork. The final archaeological report, which provided clearance of the project limits, was submitted both to the Ministry Sport, Tourism and Culture Industries and SNGR, HCCC (represented by HDI) and Mississaugas of the Credit First Nation.

2.4 Public Meetings

A combined Community Café Event/Public Information Centre (PIC) and two Public Information Centres were held online during the Study to present the project, the assessment of alternatives and the Technically Preferred Plan. These meetings were an integral component of the Study – seeking input and comments from the local community/stakeholders. Public and agency representatives were encouraged to provide input/feedback. City of Kitchener and consultant staff were available to respond to any verbal comments/questions at the online events and during the subsequent 2-week comment period.

See **Appendix B1** for the Community Café and Public Information Centre Summary Reports.

2.4.1 Community Café Event/ PIC No. 1

A combined Community Café and PIC was held virtually (by video webinar) on April 20, 2021 from 6:30 to 8:00 pm. The Community Café was an informal event for the public and stakeholders to facilitate conversation about issues that matter to the community. Four topics were chosen as discussion points to consider the concerns of the public including: traffic operation, pedestrians/cyclists, intersection design and neighbourhood concerns.

The Community Café process followed the principles of the 'World Café' philosophy; namely that people want to talk together about issues that matter and secondly, that as they talk together, they can collectively achieve greater wisdom. The Community Café is an effective conversational method for fostering dialogue, accessing collective intelligence and creating innovative possibilities for action. Discussion from the event was recorded and used an input for subsequent steps in the EA Study.

Based on input from the Community Café and PIC No.1, the Study Area was expanded to a Broader Study Area to consider traffic effects in adjacent neighbourhoods and to consider a new transportation alternative, Caryndale Drive.

2.4.2 Public Information Centre No. 2

The second PIC was held virtually (by video webinar) on November 17, 2021 from 6:30 to 8:00 pm. The PIC presented information on the Municipal Class EA Process, traffic, preliminary design alternatives, effects and mitigation, the Technically Preferred Alternative, and next steps.

Nine comment sheets/emails were received following the PIC.

2.4.3 Public Information Centre No. 3

The third PIC was held in-person June 20, 2024 from 7:00 to 9:00 pm and included exhibits and an opportunity to speak to the consultant and City of Kitchener staff. The PIC presented information on the Municipal Class EA Process, new studies on traffic, the environment and geotechnical assessments, as well as the preliminary design alternatives, effects and mitigation, the Technically Preferred Alternative, and next steps.

A total of 50 individuals attended the PIC. Eighteen (18) comment sheets and emails were received during and after the comment period.

2.4.4 Environmental Committee Meetings

Two (2) meetings were held with the Environmental Committee on June 17, 2021, and in October 2021 as well as it was presented to the Region of Waterloo Environmental Committee on November 29, 2021. These meetings provided updates regarding the study's progress and findings.

2.4.5 Council Resolution

Council endorsed the expansion of Biehn Drive to Robert Ferrie Drive on December 16, 2024. Biehn Drive is Identified as a major collector in the City's Official Plan and the extension will expand the transportation network in the Doon South and Brigadoon neighbourhoods. The Biehn Drive project will include a trunk sanitary sewer, storm sewers, ditches and a watermain. This expansion of this water and sanitary infrastructure will meet the immediate and future needs of a rapidly growing community.

The Council Resolution is found in **Appendix M**.

3.0 EXISTING CONDITIONS

The existing conditions of the natural and built environment, land use and property, and socio-economic environment are described in this Section.

3.1 Natural Environment

Detailed environmental studies were available from the 2021 WSP EIS of the Strasburg Creek wetland including: wildlife survey locations, vegetation and woodland limits, natural heritage features, breeding bird surveys, flora and fauna. From the 2021 surveys the Black Ash was identified as a threatened species before it was designated as a SAR in 2024.

3.1.1 Geotechnical Investigation

The subsurface conditions consist of a peat or fill underlain by a sand to silty sand soil which is interbedded with silt and sand and silt deposits. Refer to **Appendix D**.

3.1.2 Terrestrial and Aquatic

The north section of the Study Area (adjacent to the current terminus of Biehn Drive) is located within the Strasburg Creek Provincially Significant Wetland (PSW) Complex. The Strasburg Creek PSW unit at Biehn Drive is a wooded swamp dominated by mature hardwoods. A desktop background information review including an EIS for the wetland did not identify the presence of any terrestrial or aquatic Species at Risk (SAR); however, in January 2024 the Black Ash was added to the list of SAR species. The site reviews did identify suitable habitat conditions for bats within the swamp (roosting trees throughout) and for a variety of SAR songbirds on the lands currently under cultivation to the south. The general location of the Biehn Drive extension within the PSW is shown on **Figure 4.**

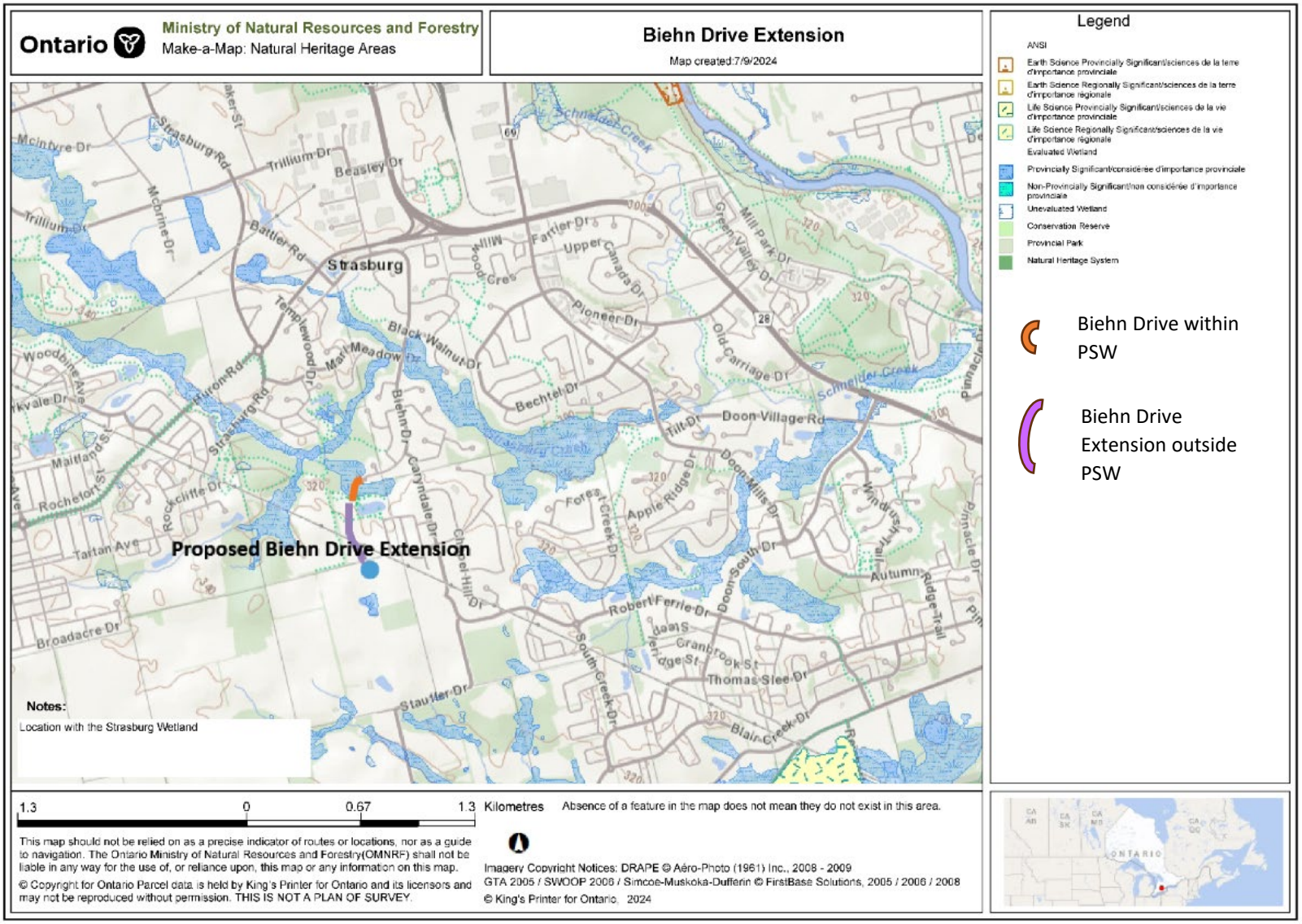


Figure 4: Biehn Drive Extension within the Strasburg Provincially Significant Wetland

No open bodies of water were in the vicinity that would indicate turtle presence in the area and their presence would likely be only transitory due to the closed canopy and lack of basking areas. Other reptiles and amphibians (frogs, salamanders, snakes, etc.) would be expected to be common. Yellow Birch (*Betula alleghaniensis*), now an uncommon tree species in many parts of southern Ontario, is well represented in the wetland and surrounding woodlands, as are Eastern Hemlock (*Tsuga canadensis*), Black Ash (*Fraxinus nigra*) and White Pine (*Pinus strobus*), all of which include large specimens. A grouping of mature Aspen Poplars (*Populus spp*.) occurs at the south boundary of the woodlot where the roadway extension will exit the PSW.

Supporting Threatened Bat Species: A baseline species-level field survey of bat presence was conducted on the evening of August 14, 2024, to identify the species of bat present over the wetlands near the proposed alignment. Acoustic monitoring identified the following species: Big Brown Bat (Eptesicus fuscus), Eastern Red Bat (Lasiurus borealis), Hoary Bat (Lasiurus cinereus), Little Brown Myotis (Myotis lucifugus), Silver-haired Bat (Lasionycteris noctivagans) and Tri-Colored bat (Perimyotis subflavus). As of August 15, 2024, the Eastern Red Bat, Hoary Bat, and Silver-haired Bat are designated as Species at Risk (SAR) under the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Additionally, the Tri-colored Bat and Little Brown Myotis are listed as Species at Risk in Ontario (SARO).

During the field surveys, several cavity trees were observed along the historic property line west of the proposed alignment. These will not be impacted by this infrastructure expansion work, however cavity trees and old buildings (e.g., barns, cabins, sheds) are well known to provide roosting habitat for several bat species. Many bat species are threatened or endangered due to loss of habitat and other issues. For example, most old barns, houses and sheds in urbanizing areas are removed for space, safety or aesthetic reasons during land development, resulting in loss of habitat for bats, barn swallows, rodents and snakes. The most significant component of disappearing bat habitat is large empty cavities that provide maternal roosting spaces as they nurse their young

The Natural Environment Site Overview Technical Memorandum is provided in **Appendix E**.

3.2 Cultural Environment

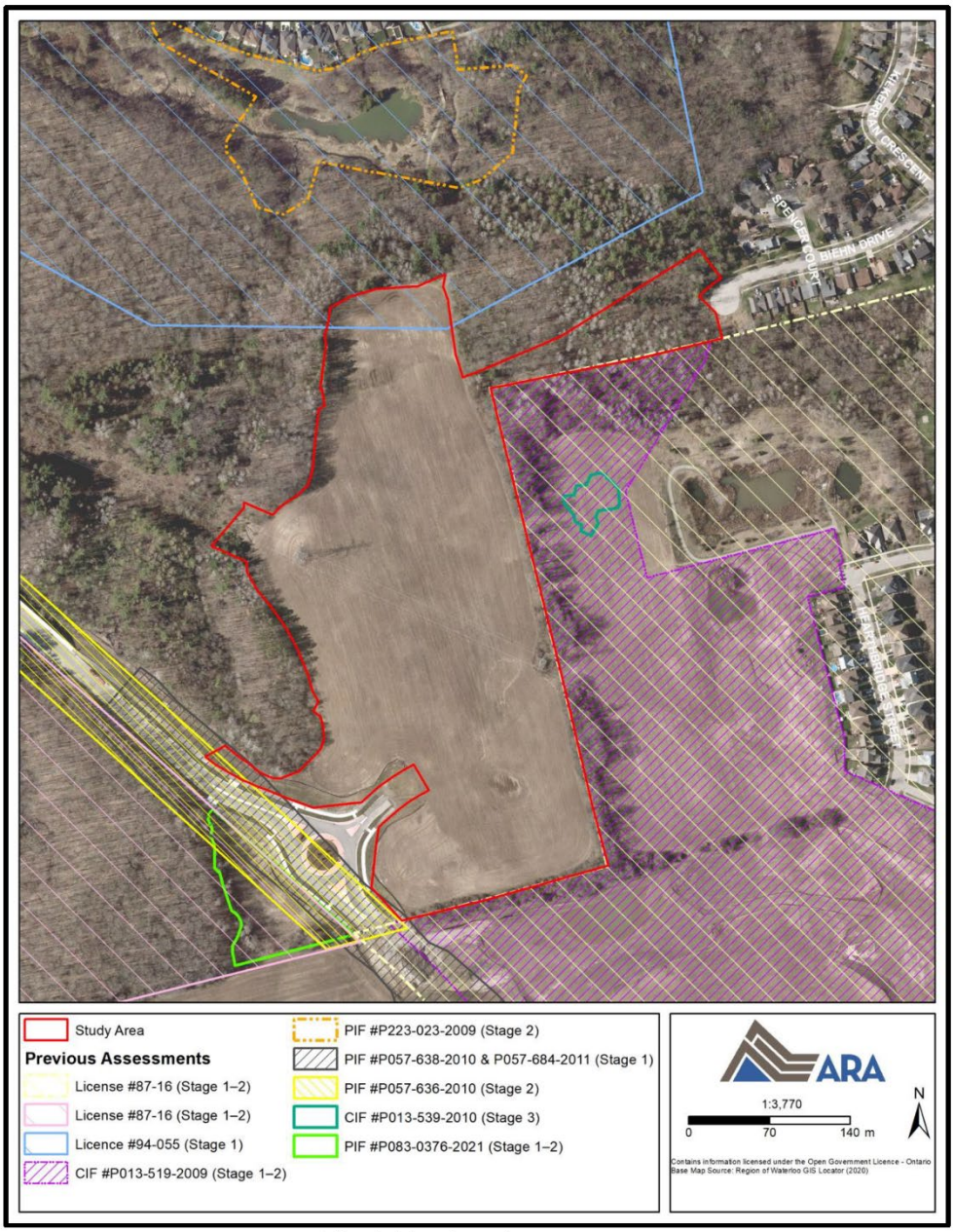
3.2.1 Built Heritage Resources and Cultural Heritage Landscapes

The MCM Checklist to screen Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes was completed and determined that no existing or potential built heritage resources and cultural heritage landscapes within the Study Area are recognized as a heritage property or to have cultural heritage value. The completed checklist is provided in **Appendix F.**

3.2.2 Archaeology

The Study Area for the proposed Biehn Drive extension and sanitary trunk sewer extension in the City of Kitchener were subject to previous Stage 1,2, 3 and 4 archaeological assessments conducted prior to the current project. The eastern portion was assessed by Archaeological Assessments Ltd. (AAL) in 2009 (P013-519-2009) and the western portion was assessed by

Archaeological Research Associates Ltd. (ARA) in 2021 (P007-1187-2021). Both of these assessments identified several archaeological sites, but they were cleared of any additional archaeological assessment. The 2021 report was completed with the participation of the HCCC (represented by HDI), the Six Nations of the Grand River Elected Council, and the Mississauga of the Credit First Nation, and all three communities reviewed the report and had no concerns with the recommendations made. The lands which have previous archaeological assessments are shown on **Figure 5** below.



Map 9: Previous Assessments
(Produced under licence using ArcGIS® software by Esri, © Esri)

Figure 5: Location of Previous Archaeological Assessments

3.2.2.1 Summary of Findings and Recommendations

Eastern Portion – Sunvest Reid Property

In 2010 Archaeological Assessments Ltd. submitted a Stage 1-2 Archaeological Assessment (CIF P013-519-2009) to the Ministry of Culture. A total of 12 archaeological sites were located during the Stage 2 assessment and included 8 indeterminate precontact findspots, 3 indeterminate precontact campsites and one late 19th century Euro-Canadian homestead registered as the Caryndale site. Two of the sites were potentially significant and required a Stage 3 assessment. The potentially significant sites included the Caryndale site (AiHc-65) and the Brigadoon I site (AiHc-407), a large indeterminate precontact campsite. The findings are shown on **Figure 6**.

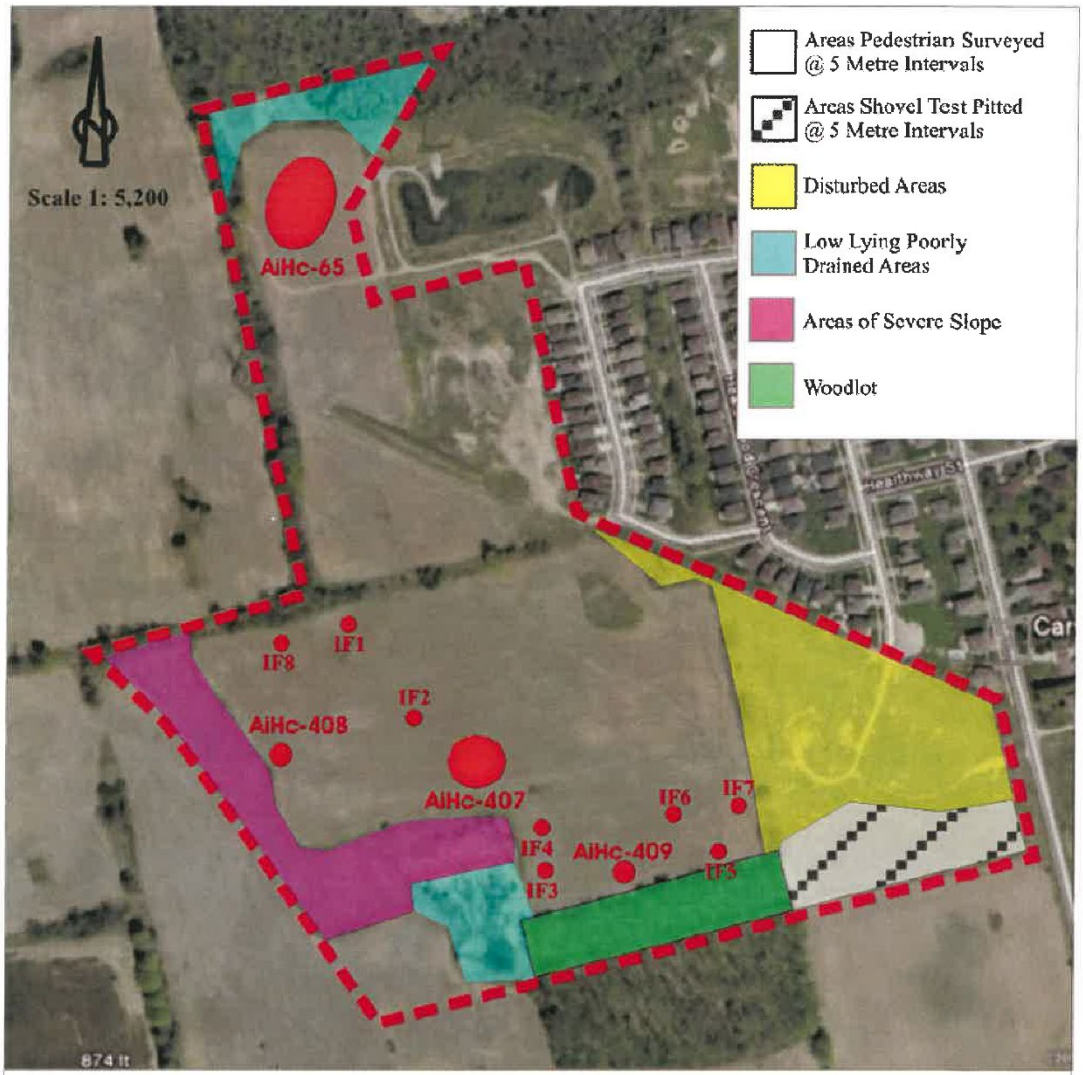


Figure 6: Eastern Portion Location of Findings

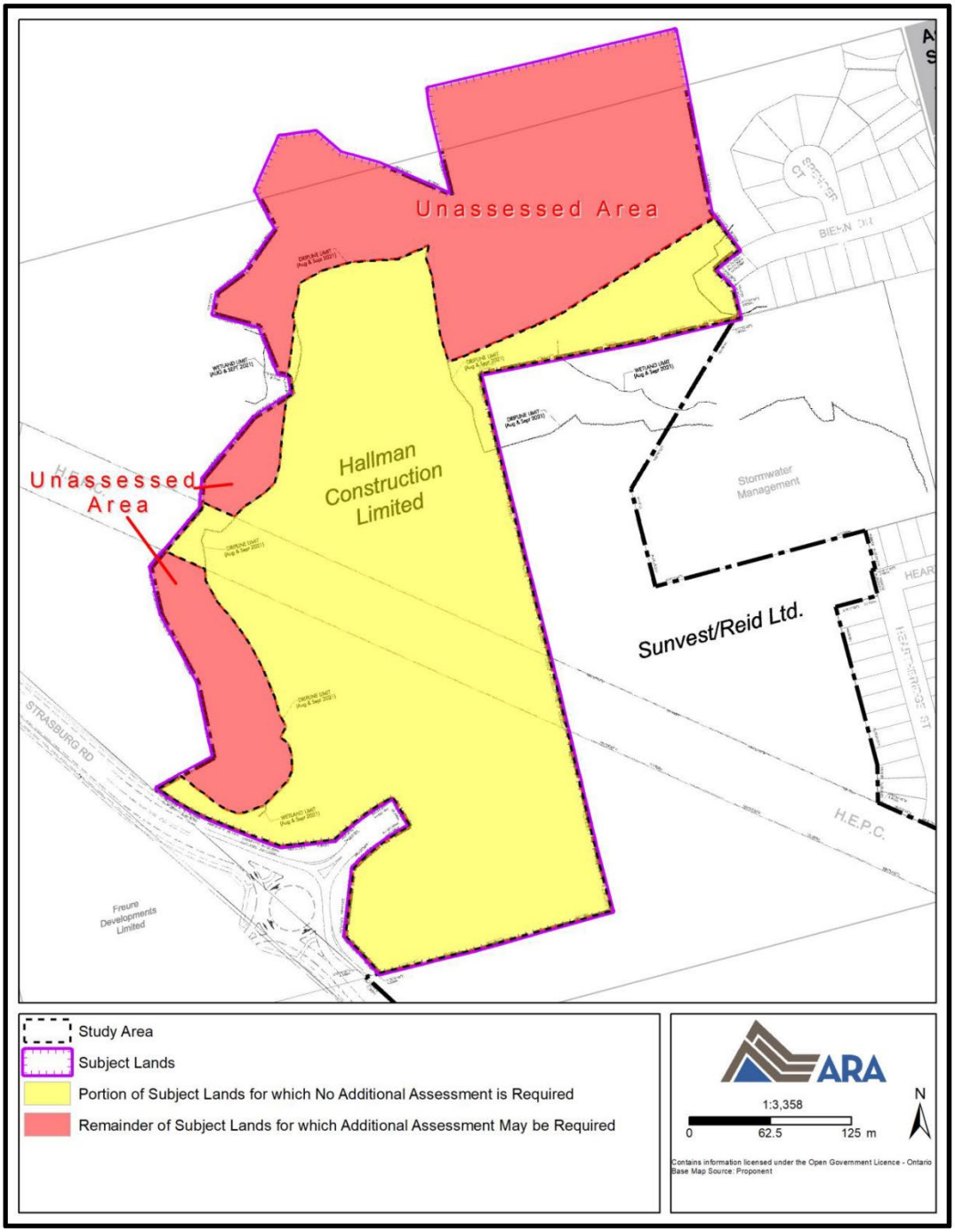
A Stage 3 assessment of the two sites was conducted in July, 2010. The results indicated that the Bridgadoon I sit (AiHc-407) is a significant archaeological resource and required a Stage 4 excavation is it could not be preserved and avoided by the proposed development. The Caryndatle site (AiHc-65) was occupied until the end of the 19th Century and is not considered to be significant due to its late date of occupation and does not require any further investigation.

The Stage 4 excavation of the Bridgadoon I sit (AiHc-407) was carried out between September 17 to November 9 2010. It was recommended following the completion of the Stage 4 work that the parcel of land be cleared of any further archaeological conditions. If any deeply buried archaeological remains are discovered during construction to contact the Ministry of Citizenship and Multiculturalism (MCM).

MCM noted that the eastern portion of the study area was assessed in 2009, and there have been changes in legislation relating to archaeological assessment since that time, notably the adoption of the Standards and Guidelines for Consultant Archaeologists (2011). Based on a review of their records, it appears that some portions of the study area have not been assessed for archaeological potential according to present standards.

Western Portion – Hallman Construction Ltd. Property

The Stage 1 and 2 assessments were conducted between May and July 2021 under PIF P007-1187-2021. The Stage 2 assessment resulted in locating five sites of archaeological materials. Euro-Canadian archaeological materials were found at Site 1 (AiHc-531) and Sites 2-5 consisted of isolated Indigenous finds, None of the sites were found to be of further cultural heritage value of interest. It was recommended that the portion of lands identified on Map 13 do not require further assessment, refer to **Figure 7**.



Map 13: Recommendations
(Produced under licence using ArcGIS® software by Esri, © Esri)

Figure 7: Western Portion Stage 2 Recommendation

3.3 Socio-Economic Environment

3.3.1 Sourcewater Protection

The Study Area is located within the Grand River Source Protection Area and is subject to the Grand River Source Protection Plan. Parts of the Study are located within:

- Wellhead protection area B (WHPA-B) with a vulnerability score of 8;
- Wellhead protection area C (WHPA-C) with a vulnerability score of 6;
- Wellhead protection area D (WHPA-D) with a vulnerability score of 4;
- Significant Groundwater Recharge Area with a vulnerability score of 2; and
- Significant Groundwater Recharge Area with a vulnerability score of 4.

These areas are illustrated on **Figure 8**. The Grand River Source Protection Plan identifies policies to protect municipal drinking water against existing and future threats in compliance with the *Clean Water Act, 2006* (Ontario Regulation 287/07). The *Clean Water Act* requires municipalities to notify Source Protection Authorities and Committees when the municipalities receive applications that could create or modify a transport pathway.

The City is required to protect against source water threats. Source protection policies which apply to this Study are summarized in the Grand River Source Protection Plan (Chapter 10 – Region of Waterloo). All applicable policies identified in the Grand River Source Protection Plan need to be followed during and post construction.

3.3.2 Climate Change

The recommendations of the ESR considered the impacts of climate change and the effectiveness of adaptation strategies to reduce the City's vulnerability. Strategies being implemented as part of or in conjunction with this ESR include:

- The expansion of cycling infrastructure to encourage active transportation;
- Improved access to transit services and the potential to provide transit services along the corridor in the future; and
- Low impact design to meet the City's water retention target and mitigate increased precipitation due to climate change.

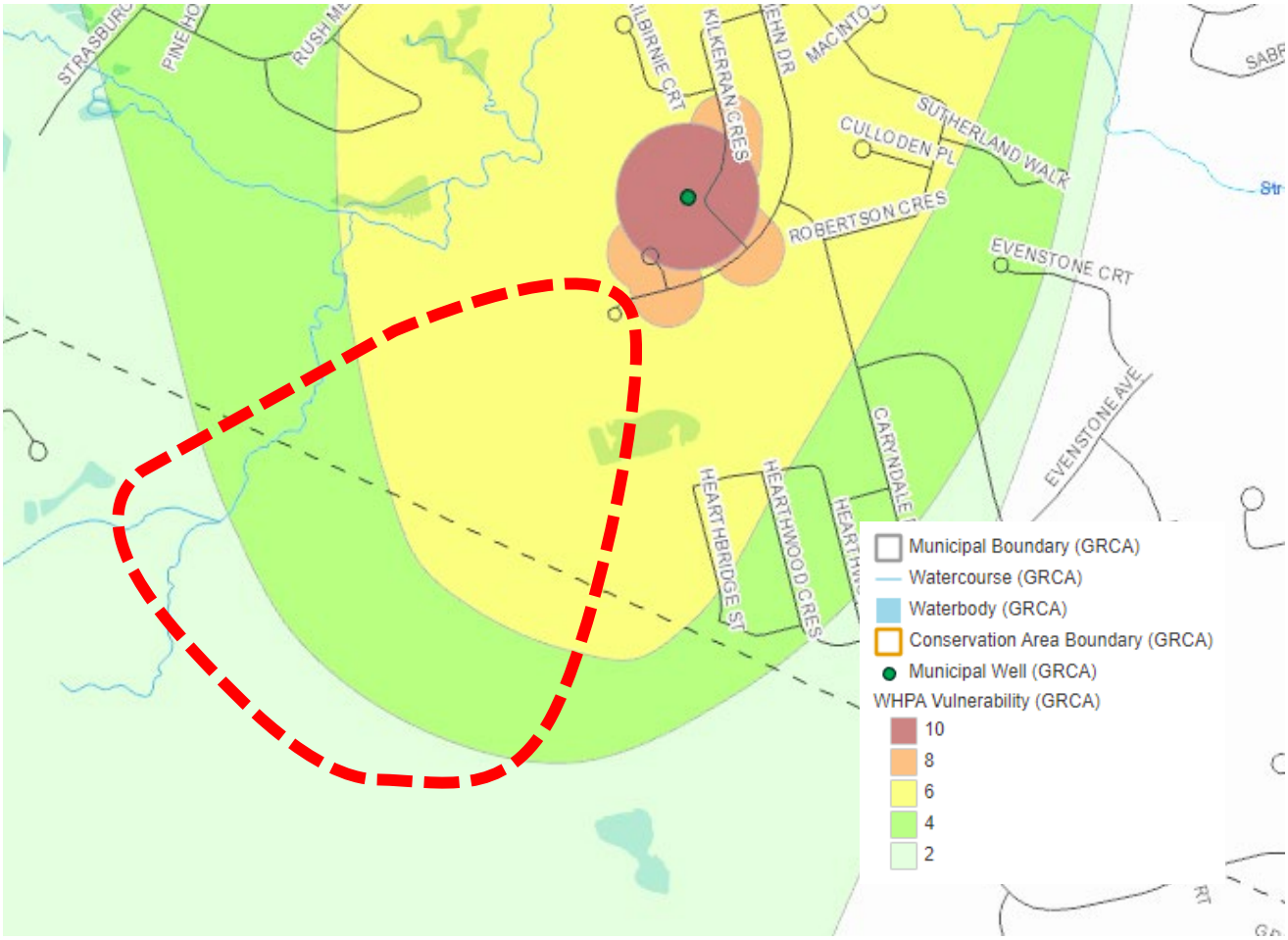


Figure 8: Wellhead Protection Areas (WHPA)

The extension of Biehn Drive is not anticipated to produce an increase or decrease in greenhouse gas emissions based on the following:

- Vehicle trips along the corridor will be generated by: a redistribution of cars from existing roads (the extension has the potential to shorten vehicle trips by providing a more direct route to/from destinations); and new trips generated by future development in Kitchener (these trips would be added to the transportation network regardless of the Biehn Drive extension).
- The construction will not be a significant source of greenhouse gasses.
- The addition of multi-use trails/boardwalks will encourage more active transportation along the corridor and will have a beneficial long-term effect on greenhouse gas emissions.

3.3.3 Air Quality

The construction of the road extension is not expected to generate additional trips within the municipality's transportation network (trips within the neighbourhood will move from Caryndale Drive to the Biehn Drive extension) and therefore air quality changes and increases in

greenhouse gas emissions are not anticipated. It will, however, provide greater opportunity for active transportation and with that a potential reduction in vehicle emissions.

3.4 Technical Investigations

3.4.1 Drainage and Stormwater Management

Groundwater monitoring wells from earlier investigations are located near the current southwest terminus of Biehn Drive on the edge of the PSW unit. A concrete headwall with twin 1.2 m culvert inlets in the wetland boundary at the south end of the roadway directs wetland drainage and local storm sewer flows from Biehn Drive to an outlet pipe 25 m north of the road, where it becomes a permanently flowing tributary connecting with Strasburg Creek. The floor of the wetland in the immediate vicinity of the culvert entrance was wet with scattered ephemeral pools extending south. Several seasonal channels could be made out within the wetland approaching the culverts from the southwest and southeast.

The following are the main conclusions of the Drainage and Stormwater Management study for the Biehn Drive Extension:

1. The existing Hearthwood Park SWM wetland can be used to provide stormwater quantity and quality control for the section of the Biehn Drive extension between Station 10+000 and Station 10+255. A storm sewer can be extended to direct the runoff up to the 100- year design storm flow to the SWM wetland.
2. From Station 10+255 to the connection to the existing Biehn Drive, the drainage from the proposed extension can be provided with stormwater quality by passing the flow through an oil-grit separator. However, it may be possible to provide additional storage and infiltration under the road.

Refer to **Appendix G.**

3.4.2 Utilities

A Hydro One transmission corridor, including a transmission tower, is located within the Study Area. A 15 m offset area around the Hydro One transmission tower is required for Hydro One maintenance and access roads.

3.4.3 Noise

A Noise Assessment was completed utilizing the STAMSON 5.04 noise software program to determine 16-hour and 8-hour nighttime equivalent sound levels (Leq) for the roadway traffic. The assessment was performed in accordance with the MECP's Noise Assessment Criteria (NPC-300) and MTO's Environmental Guide for Noise. The noise assessment was completed using three representative receiver sites, as shown in **Figure 9.** The receiver sites were located in an Outdoor Living Area (OLA) in the backyard during the day and the plane of the window of a bedroom for nighttime assessments.

It is projected that no receiver sites (residential properties) will experience sound level changes greater than 5 dBA and no receiver site will have a total sound level of over 65 dBA. The

forecast sound levels for daytime and nighttime meets the objective of 55 dBA and no mitigation is required.

See **Appendix H** for the Noise Assessment Report.

Figure 9: Representative Receiver Sites

3.4.4 Proposed/Approved Development

Future growth is occurring within the Kitchener area, and the lands adjacent to the Study Area. This growth is identified within the Official Plan, Kitchener Growth Management Plan and as approved in the Province of Ontario's *A Place to Grow: Growth Plan for the Greater Golden Horseshoe (August 2020)*. The Growth Plan for the Greater Golden Horseshoe was prepared and approved under the *Places to Grow Act*, 2005 and Amendment 1 took effect on August 28, 2020.

The successful realization of this vision centres on effective collaboration between the Province, other levels of government, Indigenous Peoples, residents, private and non-profit sectors across all industries, and other stakeholders. The policies of this Plan regarding how land is invested are based on the following principles:

- Support the achievement of complete communities that are designed to support healthy and active living and meet people's needs for daily living throughout an entire lifetime.
- Prioritize intensification and higher densities to make efficient use of land and infrastructure and support transit viability.

The Places to Grow Plan targets the Region of Waterloo to achieve a population threshold of 923,000 and an employment threshold of 470,000 by 2051.

3.5 Additional Studies

Following PIC 2 in November 15 to 29, 2021, three additional studies were carried out to fully understand the traffic and natural heritage impacts anticipated with the extension of Biehn Drive. These studies included an updated traffic analysis of the Doon South and Brigadoon communities, a survey for Black Ash trees which were listed as a Species at Risk in January 2024 and geotechnical investigations assessing dewatering and trenchless technology assessments for constructing municipal services beneath the Strasburg Creek Wetland. These studies updated the evaluation methodology and added significant criteria which were not considered in the original evaluation of road alignments carried out in October 2021. The Analysis and Evaluation Report has been updated to reflect the recent findings and include documentation of the "Do Nothing" alternative. This report documents the revised evaluation of the Preliminary Design Alternatives.

3.5.1 City of Kitchener Doon South Community Area Transportation Study

The purpose of this study was to confirm the need and justification for the Biehn Drive extension and the implications of not proceeding with this project.[2] Refer to **Appendix I**. The findings and conclusion are briefly listed as follows:

- Caryndale Drive currently functions as a major neighbourhood community collector (although designated as a minor collector street). It provides the only connection between Biehn Drive and Robert Ferrie Drive.
- Caryndale Drive in combination with Biehn Drive and Robert Ferrie Drive provides the only route through the western area of the Doon South neighbourhood between New Dundee Road and Huron Road to the south.
- The future extension of Robert Ferrie Drive west to Strasburg Road, and the extension of Strasburg Road south to New Dundee Road will increase traffic volumes on Caryndale Drive by providing a new link to Caryndale Drive from Strasburg Road (if Biehn Drive is not connected to Robert Ferrie Drive).
- The extension of Biehn Drive to Robert Ferrie Drive will ensure Carnydale Drive functions as the minor neighbourhood collector street it was constructed to be and as it is designated in the City of Kitchener Official Plan. It will provide an alternate route to the Caryndale Drive corridor. As such, it will balance traffic demands onto both Biehn Drive and Carnydale Drive.

The Doon South Community Area is shown in **Figure 10.**

3.5.2 Black Ash Tree Identification

A Site Reconnaissance of the portion of the Strasburg Creek Provincially Significant Wetland (PSW) within the Study Area was undertaken on October 23, 2024, to identify Black Ash trees.

[2] City of Kitchener Doon South Community Area Transportation Study, by Paradigm Transportation Solutions Limited 02/2024.

Six trees are considered potential Black Ash within the preferred road alignment, four were classified as potential Black Ash due to the absence of leaves, which limits identification, and two exhibit stronger potential based on distinct bark characteristics. Refer to **Appendix E**.

The Endangered Species Act, 2007 (ESA) protections for Black Ash came into force on January 26, 2024. Ontario's new regulations apply to healthy Black Ash, in designated regions, that appear to have survived exposure to the Emerald Ash Borer (EAB). These regions encompass various municipalities, counties, townships, and cities, including Kitchener in the Region of Waterloo. Ontario's habitat protection prohibitions are applicable to a radial distance of 30 metres around Black Ash.

3.5.3 Hydrogeology Assessment

Cambium Inc. (Cambium) is pleased to provide BT Engineering (the client) with a dewatering assessment to present the background review, groundwater levels, and dewatering estimates in support of the proposed roadway extension of Biehn Drive. Due to the presence of the Strasburg Creek Wetland Complex across the linear infrastructure alignment, some of the installation will be completed using trenchless horizontal directional drilling (HDD) or microtunnelling. Based on the geotechnical recommendations the future detail design construction dewatering will minimize effects outside the work zone. This is intended to lower the groundwater levels in the excavation area in order to ensure a dry working condition for the placement of linear infrastructure such as storm and sanitary sewers and watermains. Refer to **Appendix J**.

Where construction dewatering is required in amounts in excess of 400,000 L/day, a Permit To Take Water (PTTW) must be obtained. For temporary construction dewatering (six months or less) greater than 50,000 L/day but less than 400,000 L/day, registration through Environmental Activity and Sector Registry (EASR) is required. Based on the estimated dewatering rate for each 50 m trench segment of 249,300 L/day (including a safety factor) and the estimated dewatering rate for each receiving pit of 235,000 L/day (including a safety factor), an EASR registration will be required as dewatering rates exceed 50,000 L/day. Additionally, if multiple excavations are dewatering simultaneously, dewatering rates could exceed 400,000 L/day and a Permit to Take Water (PTTW) may be required.

The proposed trenchless installation method is suitable for the placement of sewer and watermain infrastructure beneath the Strasburg Creek Wetland, based on hydrogeologic conditions assessed across the area. Refer to **Appendix J**. Trenchless construction would normally require less or no dewatering than traditional open cut installations.

3.5.4 Butternut Identification

A vegetation survey was carried out by WSP for the developers. Pages from their report are appended to **Appendix E** for reference. Butternut trees, *Juglans cinerea,* were not identified within the Study Area.

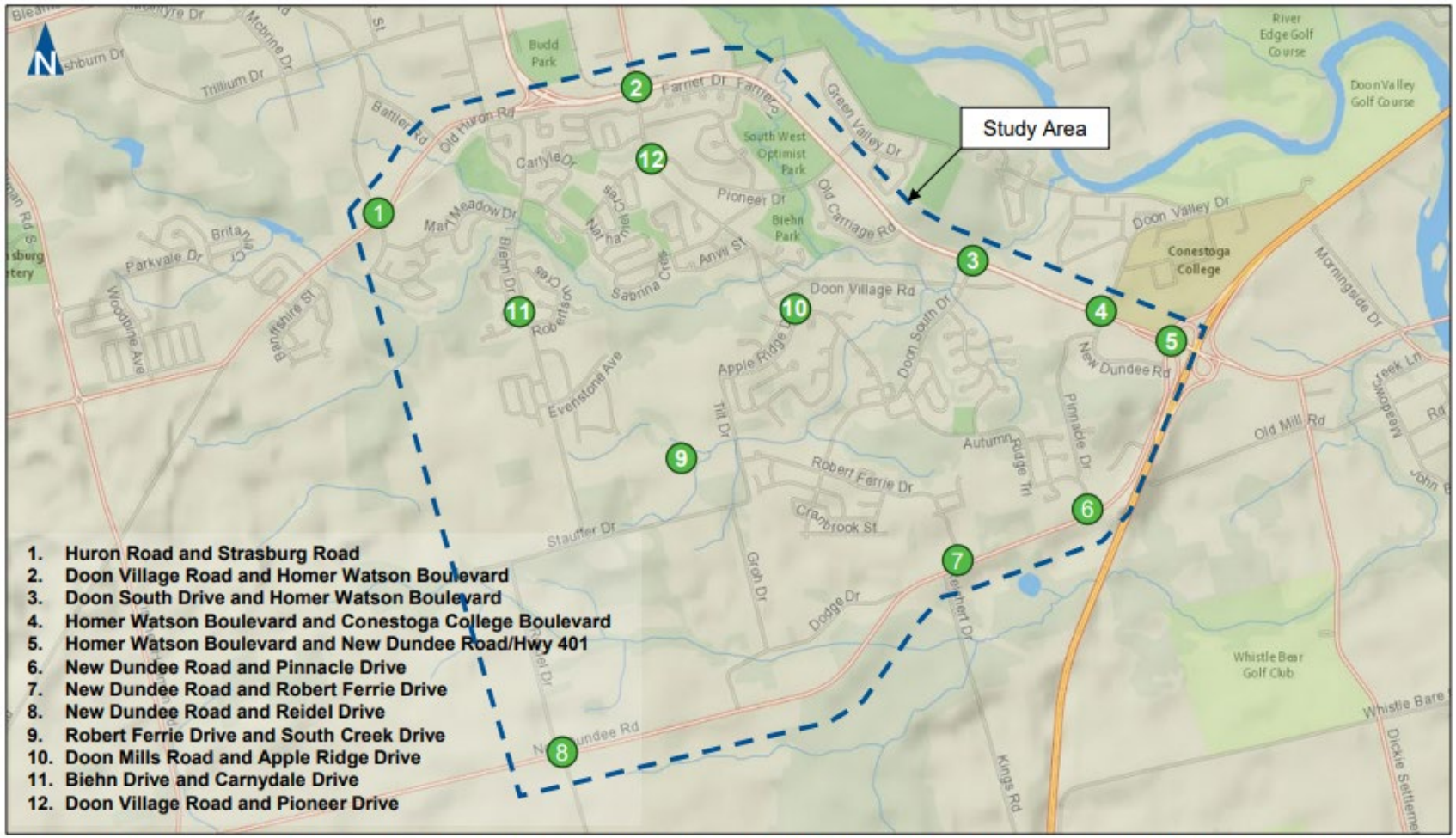


Figure 10: City of Kitchener Doon South Study Area and Intersections

4.0 TRAFFIC

The extension of Biehn Drive has been part of the integrated land use and transportation plan for the larger community for decades.

The new street is needed to evenly distribute traffic movements into and out of neighbourhoods to the arterial road network. Multiple connections from the arterial road network are desirable to reduce the traffic volumes on any one street, reduce the travel distance from any house to the arterial road network, and provide multiple access points for emergency services to each neighbourhood. If Biehn Drive is not extended, there will be increased traffic on adjacent streets (i.e. Caryndale Drive, Templewood Drive, and Biehn Drive northeast of the Study Area). Diversion of traffic from a neighborhood to go through other neighbourhoods is not desirable because of the disruption to other communities.

The extension of Biehn Drive will be possible when Robert Ferrie Drive is extended to the Strasburg Road arterial to provide a western arterial street to service neighbourhoods to the east. The construction of Strasburg Road and the new Biehn Drive link will mean that traffic will no longer need to travel a longer distance on circuitous routes through adjacent neighbourhoods to reach an arterial road network. The new link will reduce traffic volumes in other neighbourhoods and provide a new route to serve the neighbourhood currently near the termination of Biehn Drive. The traffic demand to destinations to the south and west will increase as development levels achieve the 2051 Places to Grow Plan with expansion areas in these areas.

4.1 Previous Studies

The Biehn Drive extension has been included in the City's planning documents since the late 1980's. The extension is part of the integrated land use and transportation plan for the Brigadoon community that will provide for convenient travel from neighbourhoods to the arterial road network. The transportation and land use studies that have led to this plan have included (chronologically):

1. Brigadoon Community Plan (1989);
2. Official Plan Amendment No. 98 (1991);
3. Doon South – Brigadoon Transportation Network and Corridor Study (McCormick Rankin, 1994);
4. Kitchener Planning and Development Staff Report PD95/51 (1994);
5. Updated Brigadoon Community Plan (2005);
6. Kitchener Integrated Transportation Master Plan (2013);
7. Robert Ferrie Drive Extension Environmental Assessment (2014); and
8. Official Plan Amendment No. 103 (March 21, 2019).

These previous studies have developed an integrated land use and transportation plan that provides a reasonable distribution of traffic volumes on collector streets into and out of neighbourhoods and considers all modes of transportation (vehicular, pedestrian and cyclists).

4.1.1 Previous Need and Justification Review (2014)

The Biehn Drive Extension Need and Justification Report was completed by Paradigm Transportation Solutions in June 2014. This Report identified that eliminating the Biehn Drive extension would result in:

- Inefficiencies in the road network and backtracking/out-of-way travel for residents in the Doon South/Brigadoon communities;
- Insufficient capacity to accommodate the forecast traffic demands at the 2031 planning horizon; and
- Increased traffic on adjacent streets (i.e. Caryndale Road, Templewood Drive, and Biehn Drive (northeast of the Study Area)). These roads would be operating at traffic levels above their road classifications.

The Report concluded that eliminating Biehn Drive would be a fundamental design change to the Doon South/Brigadoon communities and would result in significant impacts to adjacent roads and other neighbourhoods, and that the Biehn Drive extension is therefore required.

This conclusion was validated by the Paradigm February 2024 Traffic Peer Review.

4.2 Road Classification

Road networks are categorized into four levels based on their function and capacity as a hierarchy with increasing design standards:

- Local streets - function to provide access to land/driveways (shown as grey in **Figure 11)**. These are typically low speed and accommodate pedestrians and parking on-street. Examples of these types of streets in the community include McLeod Court and Kilkerran Crescent.
- Collector streets - function to collect traffic from several local streets and provide access to arterial streets (shown as orange and brown in **Figure 11**). These streets typically separate pedestrians and vehicles and have moderate traffic volumes. Examples of these types of streets in the community include Caryndale Drive and Biehn Drive.
- Arterial streets - carry higher volumes of traffic and truck traffic (shown as purple in **Figure 11**). Examples of these types of streets in the community include Huron Road and Strasburg Road.
- Highways and freeways - provide linkages between communities (shown in blue in **Figure 11**). Highways and freeways are high speed and accommodate inter-regional trips.

The City's Official Plan (November 2014) identifies Biehn Drive as a Major Community Collector Street.

4.3 Projected Traffic Volume

The Broader Study Area (bound by Strasburg Road and Huron Road) includes 4 community neighbourhoods (see **Figure 12**). Each of these neighbourhoods, with exception of the Biehn Drive South neighbourhood (Neighbourhood 3) has a collector road to provide them a direct

link to the arterial road system. If the new Biehn Drive link is not constructed, traffic from Neighbourhood 3 will continue to go through adjacent neighbourhoods using Caryndale Drive (Zone 4). This was never intended as part of the land use plan for the broader residential area.

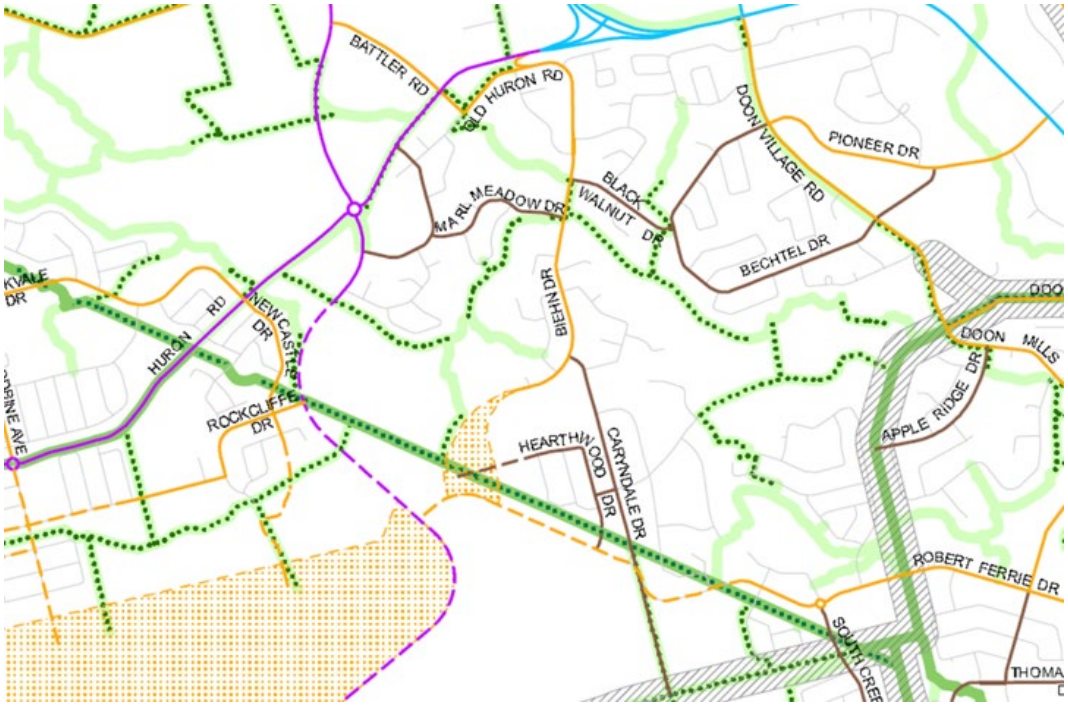


Figure 11: Road Network

Figure 12: Existing Neighbourhood Areas

4.3.1 Trip Generation

Traffic volumes along the Biehn Drive extension were forecast based on existing traffic volumes and the daily traffic generated by the 4 existing adjacent neighbourhoods. Daily trip generation rates developed by the Institute of Transportation Engineers Trip Generation Manual (11th Edition) were utilized. Trip generation for the existing neighbourhoods is summarized in **Table 2**.

Table 2: BTE Trip Generation Rates of Existing Neighbourhoods (2024)

Neighbourhood	Approximate Number of Dwelling Units	ITE Trip Generation Rate	Total Daily Vehicle Trips
Neighbourhood 1 (Biehn Drive North Neighbourhood)	260	Single-Family Detached Housing 9.43 Daily Trip Generation Rate/Dwelling Unit	2452
Neighbourhood 2 (Marl Meadow Neighbourhood)	475		4480
Neighbourhood 3 (Biehn Drive South Neighborhood)	265		2490
Neighbourhood 4 (Caryndale Neighbourhood)	225		2122

Alignment alternatives for Biehn Drive include two scenarios:

- Scenario 1 includes an extension of Biehn Drive for vehicular traffic; and
- Scenario 2 does not include the extension of Biehn Drive beyond an extension for the sanitary sewer, associated servicing and a multi-use trail (vehicle trips would continue to use existing roads including Caryndale Drive).

The primary travel routes to the arterial road network are shown in **Figure 13**.

The trip distribution and assignment of traffic to Biehn Drive under Scenario 1 and Caryndale Drive under Scenario 2 are summarized in **Table 3**. The projected trip distribution is based on future travel patterns based on proposed improvements to the road network (i.e. Robert Ferrie Drive extension and opening and extension of Strasburg Road). When the Strasburg Road and Robert Ferrie Drive extensions are constructed and opened, drivers will select the shortest route/fastest route to their destinations utilizing the arterial road network. It will result in traffic avoiding the traffic calming measures in the vicinity of the school on Caryndale Drive.

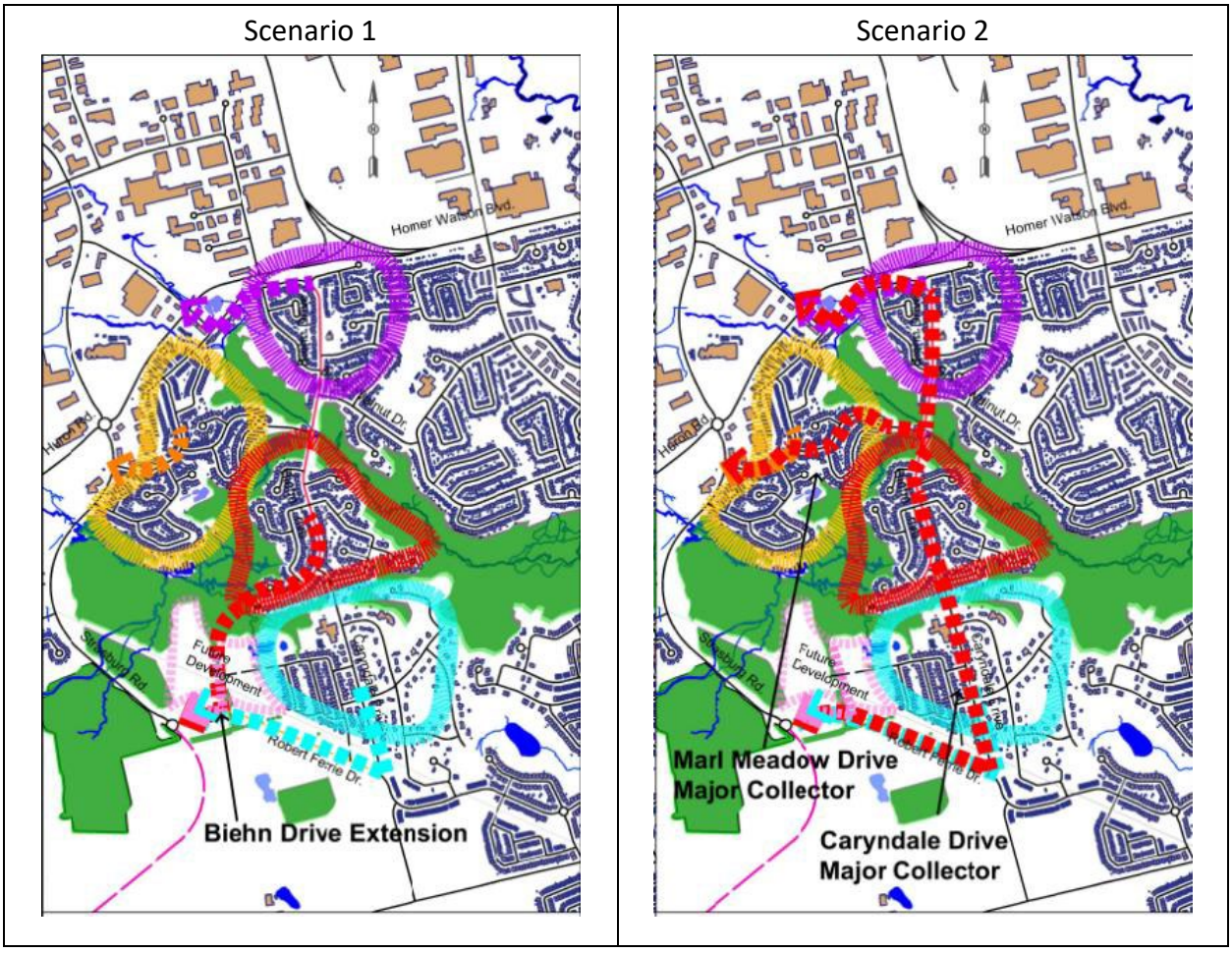


Figure 13: Primary Neighbourhood Access Routes

Table 3: BTE Trip Distribution and Assignment (2024)				
Scenario	**Origin / Destination Neighbourhood**	**Distribution**		**Number of Vehicle Trips**
Scenario 1 – Extension of Biehn Drive **(Location – Current Biehn Drive Terminus)**	Neighbourhood 2 (Marl Meadow Neighbourhood)	Trips to/from the south via Robert Ferrie Drive	5%	224
	Neighbourhood 3 (Biehn Drive South Neighborhood)	Trips to/from the south Robert Ferrie Drive	90%	2,258
			Total=	2,482
Scenario 2 – Without Biehn Drive Extension **(Location – Caryndale Drive north of Robert Ferrie Drive)**	Neighbourhood 2 (Marl Meadow Neighbourhood)	Trips to/from the south via Caryndale Drive	5%	224
	Neighbourhood 3 (Biehn Drive South Neighborhood)	Trips to/from the south via Caryndale Drive	50%	1,250
	Neighbourhood 4 (Caryndale Neighbourhood)	Trips to/from Robert Ferrie Drive	90%	1,909
			Total=	3,383

Under Scenario 1 (extension of Biehn Drive), Biehn Drive is projected to have a daily traffic volume between 2,500 to 3,000 vehicles/day (at the current terminus (cul-de-sac)) with an allowance for potential daily variation in traffic flows. To the south of the Provincially Significant Wetland, traffic volumes will increase as Biehn Drive will then include additional traffic from the future development lands north of Robert Ferrie Drive. These volumes are within the acceptable range of a major collector roadway in the City's TMP.

Under Scenario 2 (no extension of Biehn Drive), Caryndale Drive will have a daily traffic volume of approximately 3,500 vehicles/day (north of Robert Ferrie Drive). Caryndale Drive currently carries increased traffic as it is used by motorists on Robert Ferrie Drive to access the arterial road network along Biehn Drive North. The extension of Robert Ferrie Drive to Strasburg Road, without an extension of Biehn Drive, would reverse the flow of that current traffic demand on Caryndale Drive, as residents in the area of Biehn Drive would use Caryndale Drive (a minor collector street which includes an elementary school) to access Robert Ferrie Drive and Strasburg Road.

From a traffic operation and safety perspective, Scenario 1 is preferred.

5.0 SANITARY SEWER

A Technical Memorandum was prepared to present the definition of the sanitary drainage area and the estimated peak flow at the proposed connection to the existing sanitary trunk sewer on Biehn Drive. This is included in **Appendix K.**

The sanitary drainage area/tributary area includes the lands designated for urban development (see **Figure 14**) and excludes the lands designated as Rural and Agricultural. The sanitary trunk sewer drainage area includes 64.0 ha. The design criteria for sanitary servicing meets the requirements of the City of Kitchener's Development Manual.

The sanitary sewer extension will follow the alignment of the Biehn Drive extension. The required sanitary sewer pipe size is 525 mm diameter. No other alternative is available for the sanitary sewer alignment. The green agricultural land identified in **Figure 14** has subsequently been added to the expansion areas in the secondary plan and the sanitary servicing should be reviewed at the detail design stage for this additional tributary area.

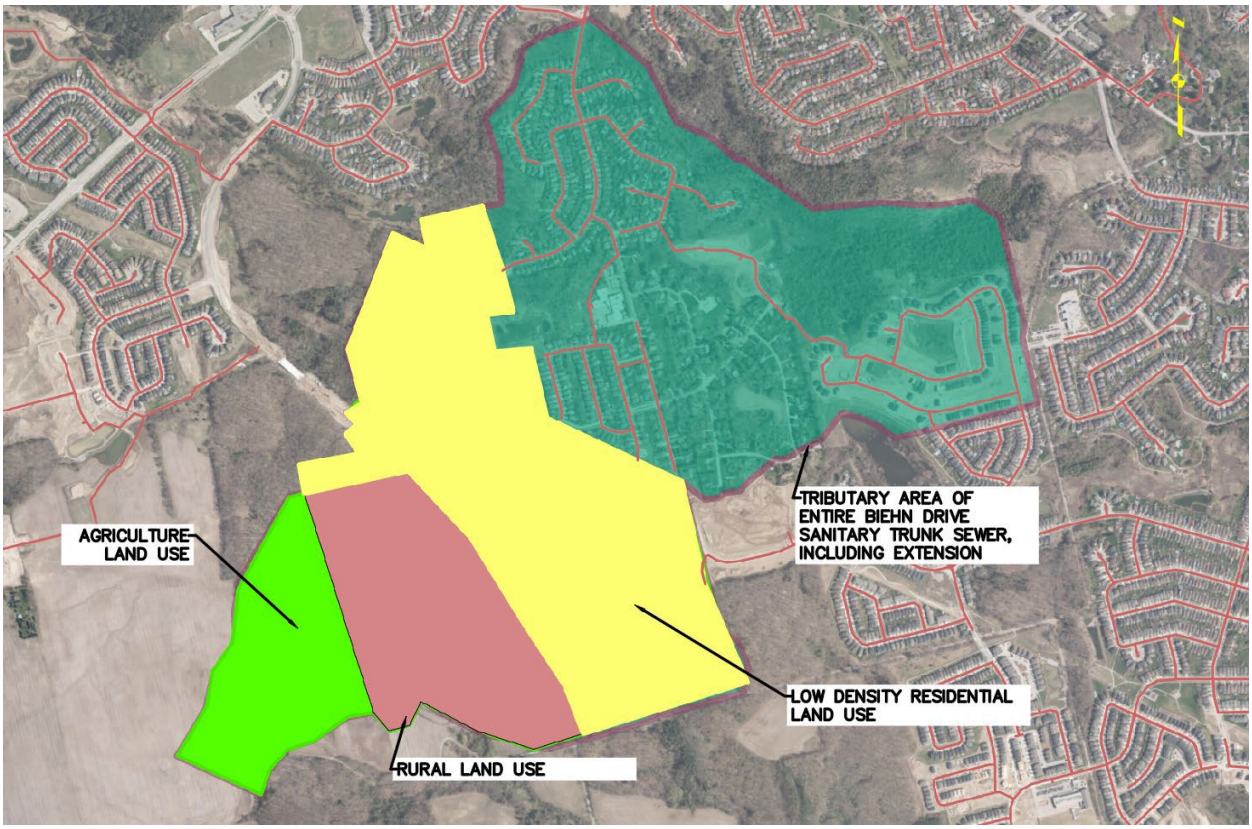


Figure 14: Tributary Area Based on Land Uses per the Official Plan

6.0 EVALUATION OF ALTERNATIVES

The evaluation of alternatives was completed using both quantitative and qualitative assessments to compare the net effects and performance of the alternatives.

The quantitative assessment used various global factors and a weighted additive score methodology to mathematically evaluate the alternatives being considered. The methodology is referred to as the Multi Attribute Trade-off System (MATS).

The qualitative evaluation method measured the relative differences and compared the advantages and disadvantages of each alternative using evaluation criteria. The evaluation criteria looked at the effects each alternative had on the natural, social/cultural, economic and physical elements in the Study Area.

The Analysis and Evaluation Report detailing the evaluations for each alternative is included in **Appendix L** and is summarized in this section.

6.1 Preliminary Design Alternatives

The analysis and evaluation process is a central requirement of the Class EA process. In adhering to this process, several alternatives were generated for consideration which would improve traffic operations through the broader Study Area to meet existing and future traffic and active transportation demands.

A “long list” of alternatives was generated, based on identified needs, to ensure consideration of a wide range of transportation alternatives (i.e. all reasonable alternatives are considered). The preliminary design alternatives were categorized under 3 groups:

1. Alignment Alternatives (road and sanitary sewer and municipal services)
2. Cross Section Alternatives
3. Intersection Alternatives

6.1.1 Coarse Screening Alignment Evaluation

The Preliminary Alignment Alternatives presented to the public at PIC No. 1 and are shown in **Figure 15**. An additional Alignment, Alternative 4 using existing roadways, was added following input from PIC No. 2 and included a proposed 3 m Multi Use Trail linking Biehn Drive to Robert Ferrie Drive to limit impacts to the PSW. The Do Nothing was included as a baseline to compare other alternatives. All the alternatives carried forward to the detailed evaluation were considered by the Study Team to be reasonable alternatives to the Planning Solution and are listed in **Table 4**.

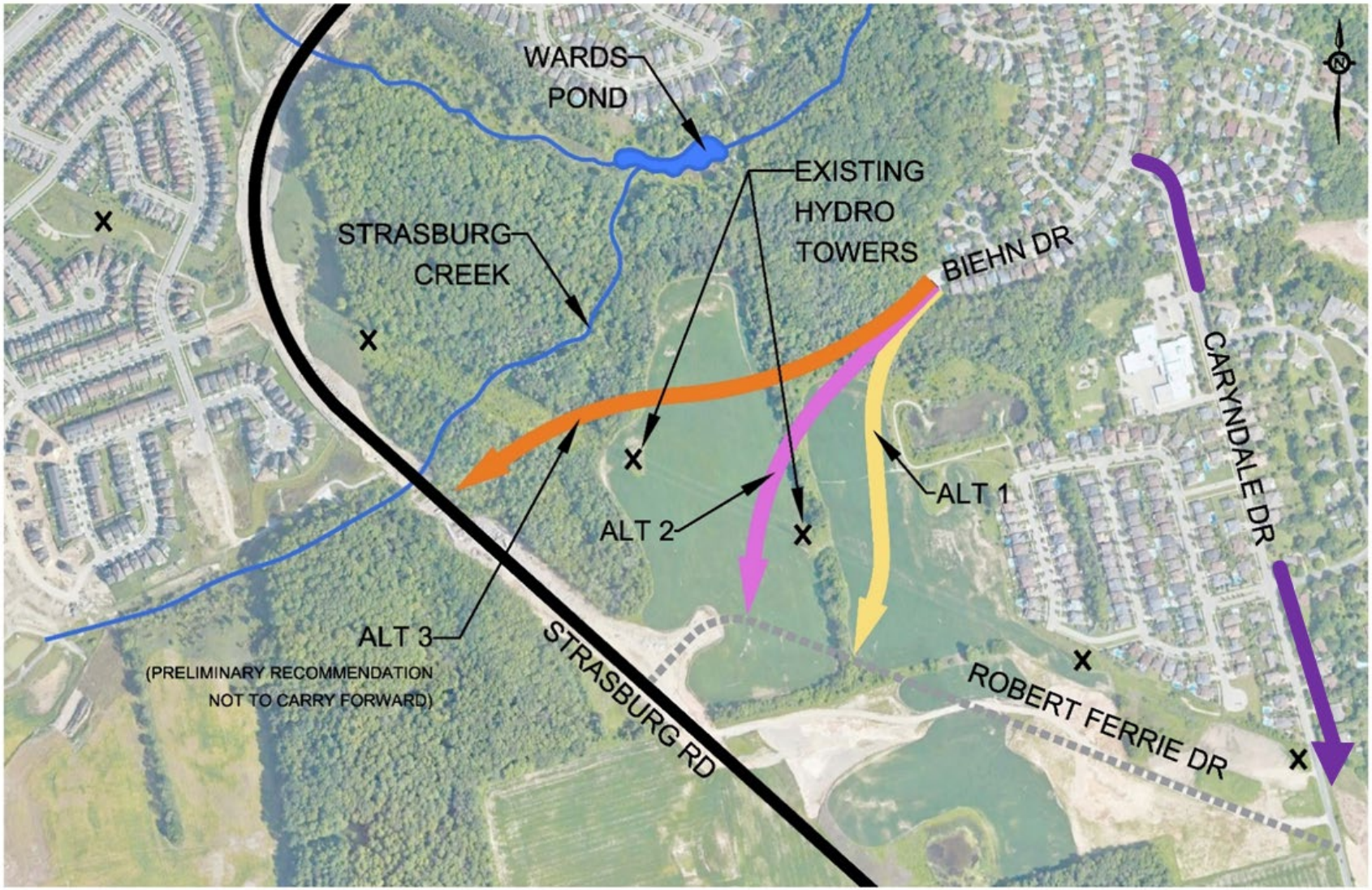


Figure 15: Preliminary Alignment Alternatives

NTS

Legend

Future Roadway Alignment

Table 4: Preliminary Alignment Alternatives

Alternative	Description
Do Nothing	Existing - Caryndale Drive/use of trenchless technology for municipal services.
Alternative 1	Connect Biehn Drive to Robert Ferrie Drive - East Alignment
Alternative 2	Connect Biehn Drive to Robert Ferrie Drive - Central Alignment
Alternative 3	Connect Biehn Drive to Strasburg Road - West Alignment
Alternative 4	Existing - Caryndale Drive Provide an Active Transportation Link Municipal Trunk Sewer to follow Alternative 1

The coarse screening of Alignment Alternatives is shown in **Table 5.**

The preliminary alignment alternatives will include a trunk sanitary sewer in conjunction with the 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.

6.1.2 Short Listed Alignment Alternatives Evaluation

Figure 16 illustrates the three (3) alignment alternatives that were carried forward following the coarse screening.

6.1.3 Long List of Criteria Alignment

A long list of sub-factors was established for each of the main factor categories to allow for the identification of all potential benefits and impacts. The relative measured effect of each criterion is also defined to ensure that the significance of each criterion (factor group or sub-factor) is recognized in the evaluation process.

Sub-factors are measurable criteria under a factor group. For example, under the category/factor group “Transportation”, sub-factors relate to measurable transportation differences among alternatives. Using the Transportation factor group as an example, sub-factors may relate to safety or traffic operations measures for the identification of benefits and impacts.

Table 5: Coarse Screening of Alignment Alternatives

Screening Criteria	Do Nothing	Alternative 1	Alternative 2	Alternative 3: Strasburg Road Connection	Alternative 4: Existing Caryndale Drive
Does this alternative satisfy forecast traffic demand, improve safety, and address all modes of transportation?	Does not meet forecast traffic demand, improve safety nor address all modes of transportation.	Provides a north-south connection to Robert Ferrie Drive. Accommodates all modes. Reduces cut-through traffic on Biehn Drive.	Provides a north-south connection to Robert Ferrie Drive. Accommodates all modes. Reduces cut-through traffic on Biehn Drive.	Provides a north-south connection to Strasburg Road. Accommodates all modes.	Provides a north-south connection to Strasburg Road. Accommodates all modes. However, there are increased levels of traffic on local roads.
Does the approach result in significant impacts to the natural environment?	No impacts.	Minor impacts to the woodlot/PSW (~0.3 ha).	Minor impacts to the woodlot/PSW (~0.3 ha).	Significant impacts to the woodlot/PSW (~1.3 ha).	No impacts.
Is the approach affordable for the City to implement?	Affordable alternative.	No significant difference.	No significant difference.	Higher cost - requires an intersection onto Strasburg Road (arterial).	Affordable alternative.
Does this alternative comply with the recommendations of the City s planning documents (I.e., TMP, OP, KGMP)	This alternative does not comply with the recommendations of the City's planning documents.	This alternative complies with the recommendations of the City's planning documents.	This alternative complies with the recommendations of the City's planning documents.	Does not comply with the recommendations of the Official Plan or Growth Management 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 comply with the recommendations of the City's planning documents.
Recommendation:	Carry forward as a base line to compare alternatives. ✓	Carry forward for further evaluation. ✓	Carry forward for further evaluation ✓	Do not carry forward ✗	Carry forward for further evaluation ✓

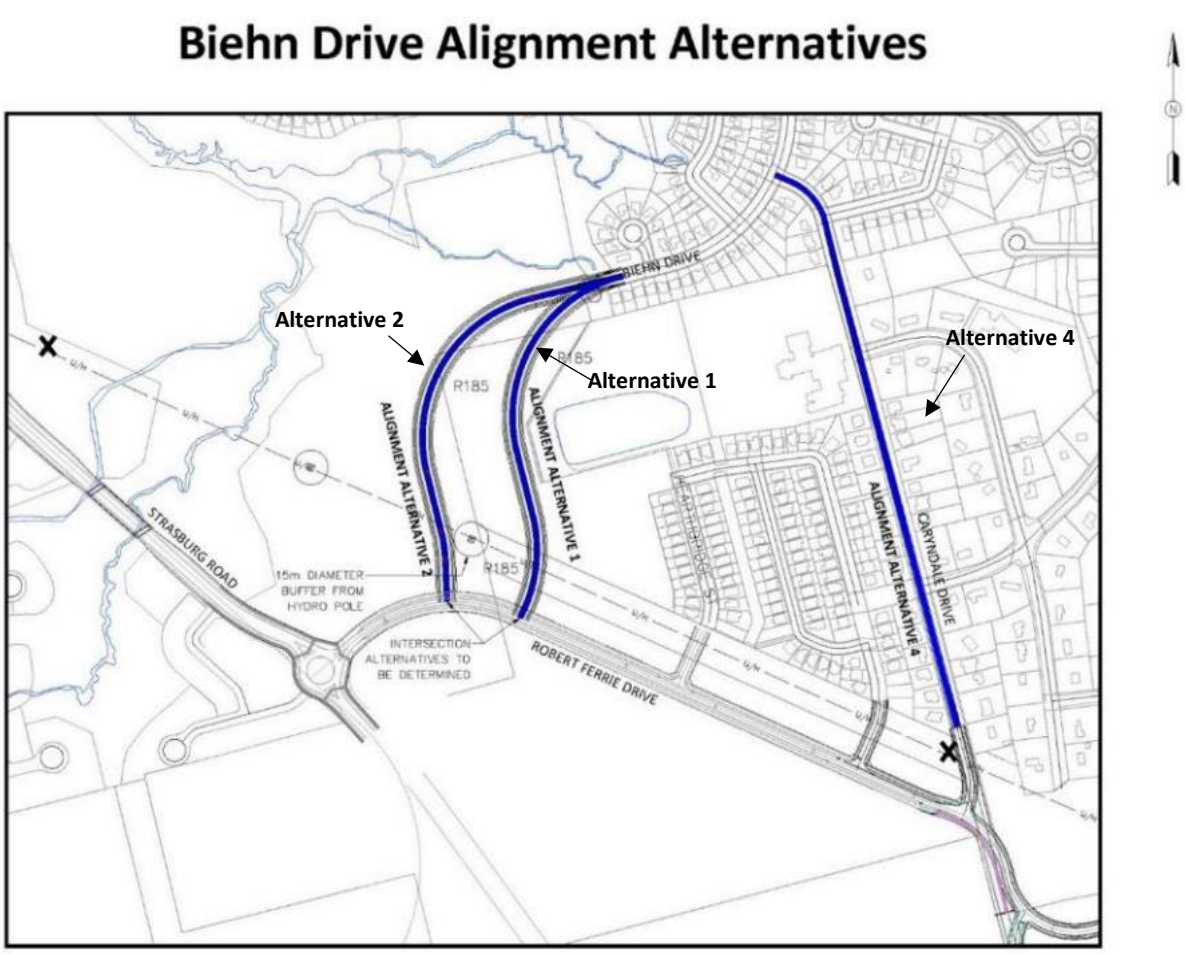


Figure 16: Short Listed Alignment Alternatives

Six categories or factors were selected which were used for each evaluation. Within each of these factor groups are sub-criteria, described as sub-factors, which define the measure and the relative differences of magnitude of impact or benefit. The factor groups include:

- Traffic and Transportation
- Natural Environment
- Cultural Environment
- Socio-Economic Environment
- Land Use and Property
- Cost

Within each of these categories (factor groups) are sub-factors which define the measure and the relative differences of magnitude of impact. The sub-factors were developed from a long list created by the Study Team (Consultants and City Staff). Where there were no measurable or meaningful differences between alternatives, and it is agreed that the alternatives are generally equal with respect to this criterion, then the sub-factor is not carried forward. When

the Evaluation Team (Consultants and City Staff) considered the impacts were double counted among one or more criteria, then only one criterion was selected to be carried forward.

The long list of evaluation criteria that will not be carried forward are found in **Appendix L**. For a sub-factor to be carried forward, the sub-factor must:

- Be a measure of a meaningful difference among alternatives.
- Capture a measurable difference among alternatives.
- Not "double count" the effect that was measured under another sub-factor.
- Describe a difference in performance or an effect on the natural or social environment that the Technical Advisory Committee (Consultants and City Staff) considered necessary to be included in the decision-making process.

The selection of the sub-factors to address the goal of the study, are comprehensive enough to describe all aspects of the effects of the project, and do not double-count sub-factors.

6.1.4 Short Listed Criteria

Sub-factors selected to evaluate the alternatives including their definitions and scores are described in **Appendix L**.

6.1.5 Preferred Alignment Alternative

The Evaluation Team members were responsible for completing separate weighting exercises which provided independent perspectives of the relative importance of factor groups and sub-factors for each specific evaluation. The results of the weighting exercise are illustrated in **Figure 17** and **Figure 18.**

6.2 Technically Preferred Alternative

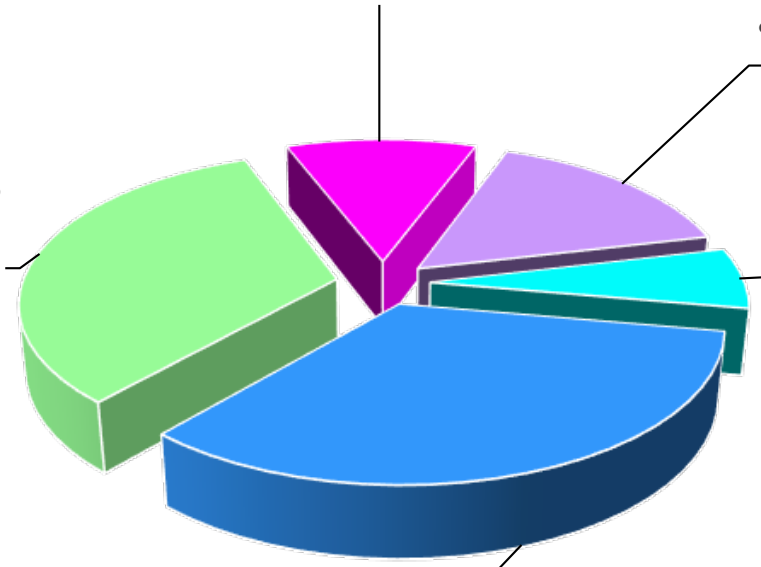
The Technically Preferred Alternative (TPA) is Alternative 1, which is the best-balanced solution, refer to **Table 6**. It provides the best transportation performance while minimizing natural and social environmental impacts. A limited number of Black Ash trees have been identified along the corridor, however the city's best efforts to combat the Emerald Ash Borer has had limited success. The crossing of a PSW is accepted by the Provincial Policy Statement for transportation and utility corridors.

The TPA is shown in **Figure 19**. This recommendation minimizes the impacts to the PSW and provides a direct connection to Robert Farrie Drive. The trunk sewer and municipal water services will be extended southerly from Biehn Drive.

Socio - Economic Environment 10.3%
- Community Disruption to Biehn Drive North 21.0%
- Community Disruption to Biehn Drive South 50.0%
- Community Disruption to Caryndale 29.0%

Land Use and Property 14.2%
- Supports the City of Kitchener's Official Plan 56.0%
- Efficient Utilization of Land 29.5%
- Crossing of the Hydro Corridor 14.5%

Natural Environment 29.7%
- Wildlife Habitat 15.1%
- Accommodating Wildlife Movement 11.9%
- Provincially Significant Wetlands (PSW) Removed 24.8%
- Potential Black Ash Impacted 24.8%
- Groundwater Infiltration 23.5%



Cost 5.9%
- Capital Costs 100.0%

Transportation 30.5%
- Supports Urban Transit Service 8.5%
- Improved Emergency Response 7.1%
- Roadway Safety – Supports Area Traffic Calming Measures 17.5%
- Efficiency of Travel 19.9%
- Compatibility with Integrated Transportation Master Plan 8.3%
- Safety of School Zone 14.7%
- Personal Security of Pedestrians and Cyclists 7.3%
- Intersection Spacing/Safety 16.6%

Note:

Weights have been adjusted to account for updates to sub-factors.

Figure 17: Global Factor and Sub-factor Weights

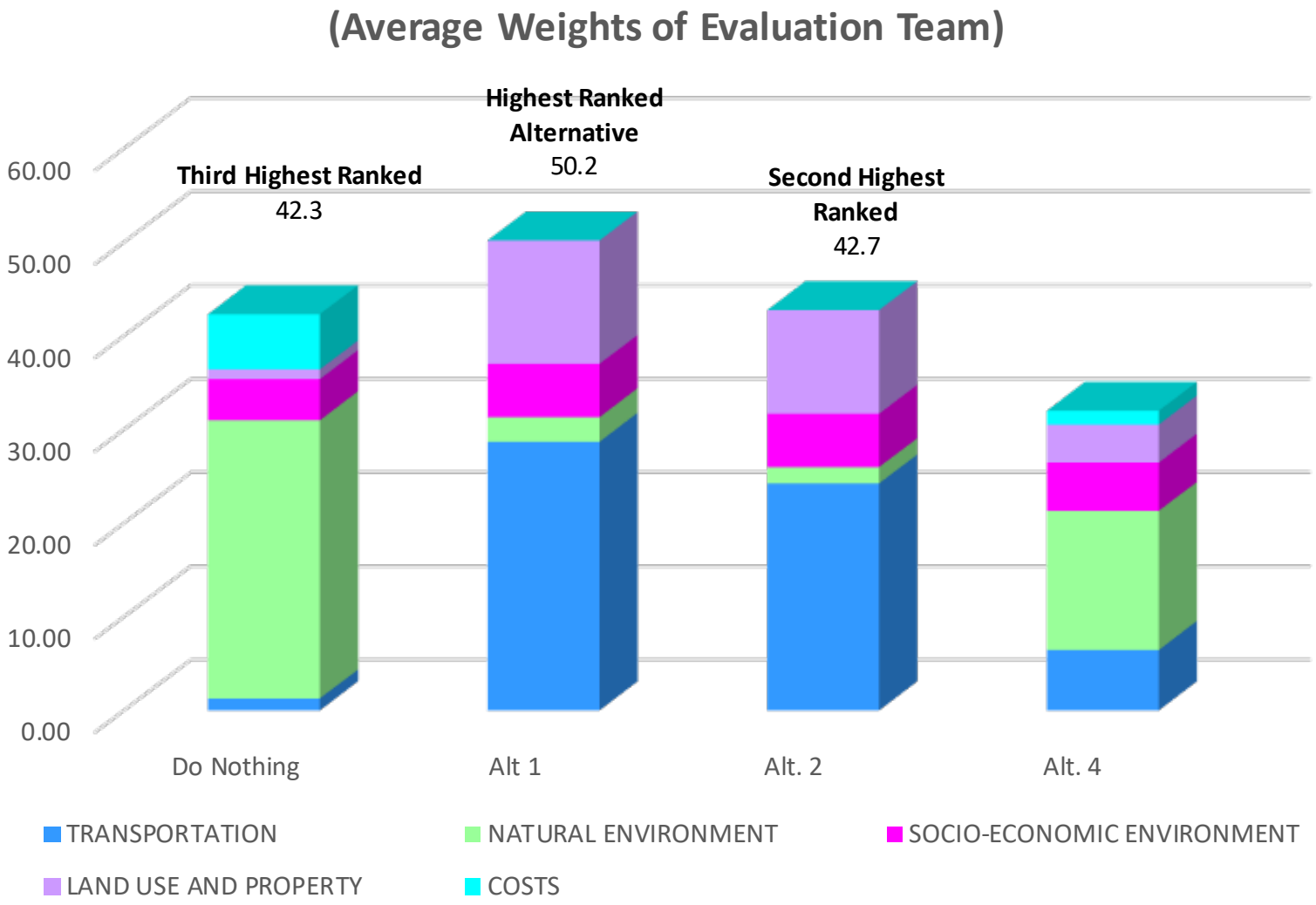


Figure 18: Alternative Totals

Table 6: Summary of Technical Recommendations

Do Nothing	Alternative 1: Extend Biehn Drive to Robert Ferrie Drive east of Hydro Tower	Alternative 2: Extend Biehn Drive to Robert Ferrie Drive west of Hydro Tower	Alternative 4: Existing Caryndale Drive and a Multi Use Path crossing the PSW
Not recommended. The Do Nothing alternative fails to address the traffic volume and safety concerns along Caryndale Drive which should be expected to increase when the extension of Strasburg Road to New Dundee Road provides alternative access to Highway 401. Caryndale Drive will continue to accommodate a higher volume of traffic and will be forced to function as a major collector street. The limited number of Black Ash trees in the PSW will continue to decline due to the Emerald Ash Borer. ✗	Recommended as the **Preferred Transportation Solution**. Alternative 1 is the best-balanced solution. It provides the best transportation performance while minimizing natural and social environmental impacts. A limited number of Black Ash trees have been identified along the corridor, however the city's best efforts to combat the Emerald Ash Borer has had limited success. The crossing of a PSW is accepted by the Provincial Policy Statement for transportation and utility corridors. ✓	Not recommended. Although this alternative provides comparable transportation performance to Alternative 1 the environmental impacts are much greater. ✗	Not recommended. Caryndale Drive, classified as a minor neighbourhood collector street, will be forced to function as a major collector street. The neighbourhood was not designed for Caryndale Drive to continue to carry increasing volumes of vehicle traffic. ✗

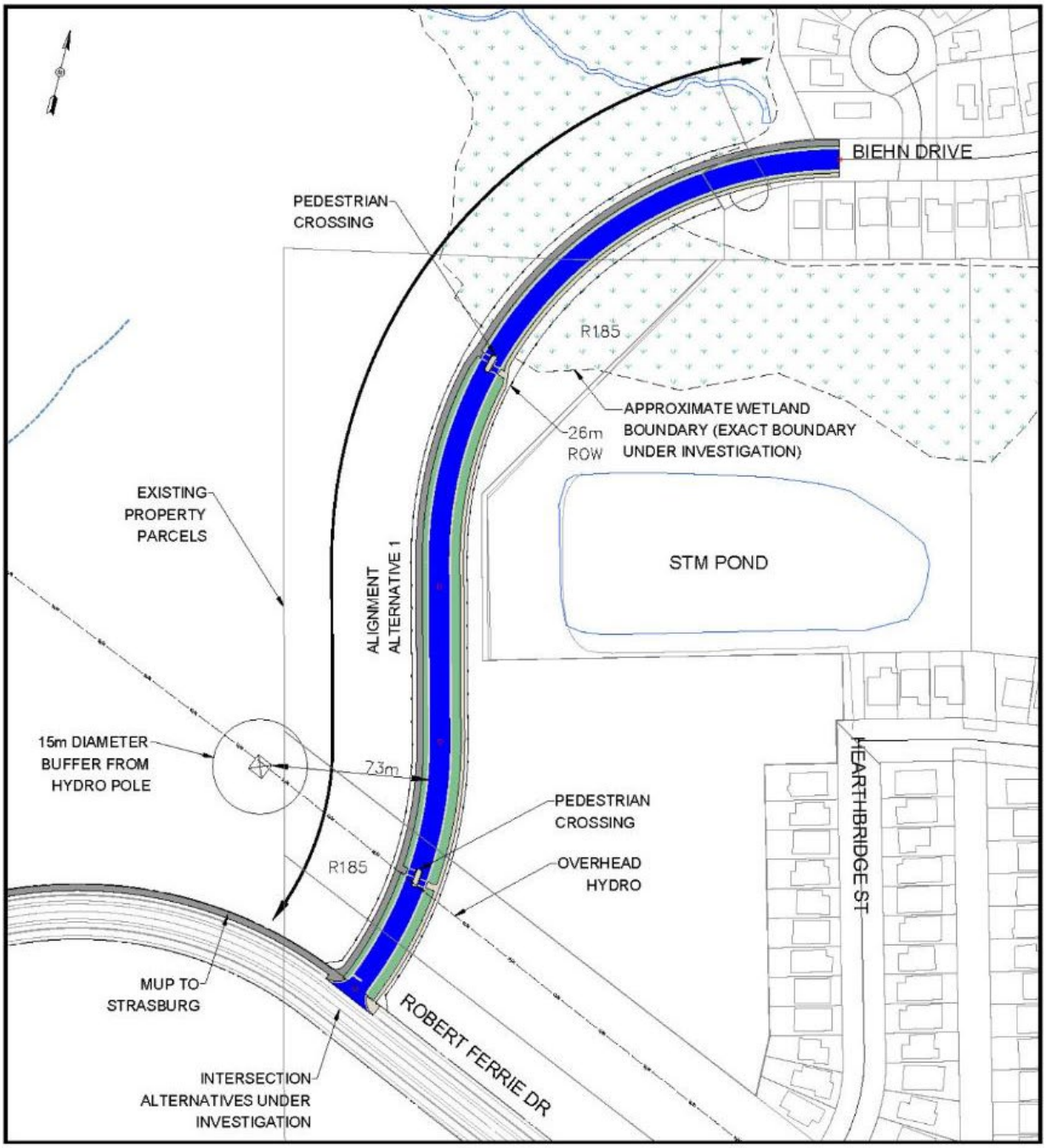


Figure 19: Technically Preferred Alternative

6.2.1 Corridor Sensitivity Testing

To validate the weighting exercise, a sensitivity testing program was undertaken to determine whether the Technically Preferred Alternative (TPA) would have changed if a particular factor group was assigned a higher or lower importance than the group average. This ensures greater confidence in the selection process. The results of the sensitivity testing are shown in **Table 7**.

Table 7: Summary of Sensitivity Tests

Summary of Sensitivity Tests

	WEIGHT	Score:	42.3	50.2	42.7	32.0
Ranking			3	1	2	4
TRANSPORTATION	High	45.00%	3		2	4
	Low	20.00%		2	3	4
NATURAL ENVIRONMENT	High	40.00%		2	3	4
	Low	20.00%	3		2	4
SOCIO-ECONOMIC ENVIRONMENT	High	15.00%	2		3	4
	Low	10.00%	2		3	4
LAND USE AND PROPERTY	High	20.00%	3		2	4
	Low	10.00%	2		3	4
COST	High	10.00%	2		3	4
	Low	2.00%	3		2	4

6.3 Cross Section Alternatives

Two (2) cross section alternatives were considered for Biehn Drive outside the limits of the wetland, refer to **Appendix L**:

1. Alternative 1 – 26 m Major Collector with In-boulevard Cycling Facilities; and
2. Alternative 2 - 26 m Major Collector with Bike Lanes.

6.3.1 Technically Recommended Cross Section

The preliminary evaluation of the cross-section alternatives is shown in **Table 8**. Alternatives were developed to reflect the City of Kitchener's Complete Streets guidelines. The recommended cross section is Alternative 1 with multi-use trails as shown in **Figure 21**.

Table 8: Cross Section Evaluation

Evaluation Criteria	Alternative 1 26 m ROW with Multi use Trail	Alternative 2 26 m ROW with Bike Lanes
Active Transportation		Better accommodates pedestrians by separating pedestrians and cyclists. Increased conflict between cyclists and access to/from parked vehicles. ✗

Evaluation Criteria	Alternative 1 26 m ROW with Multi use Trail	Alternative 2 26 m ROW with Bike Lanes
	corridor and potential to connect to the MUTs along Strasburg Road. ✓	
Traffic Calming	The reduced pavement width would better promote lower travel speeds. ✓	A wider asphalt surface would be less effective in reducing travel speeds. ✗
Impacts to Natural Environment / Storm Water Quality	All alternatives considered equal.	All alternatives considered equal.
Impacts to Developable Lands	All alternatives considered equal.	All alternatives considered equal.
Cost	MUTs are more cost effective to construct with reduced pavement thickness and granulars. ✓	Wider roadway pavement structure increases construction cost. ✗
Recommendation:	Carry Forward **Alternative 1** ✓	

6.4 Intersection Alternatives

A roundabout is proposed at the intersection of Biehn Drive and Robert Ferrie Drive. This recommendation is consistent with the approved plan identified in the Robert Ferrie Drive Class Environmental Assessment. Additional justification for the preferred alignment and the recommendation of a roundabout at this location includes:

- To limit queuing (due to the proximity to Strasburg Road) and to accommodate pedestrian crossings.
- To accommodate access to future development south of Robert Ferrie Drive.
- At Black Walnut Drive, Biehn Drive traffic volumes would be reduced by an average of approximately 2,500 vehicles/day.
- On Caryndale Drive, south of Biehn Drive, traffic volumes would be reduced by an average of approximately 500 to 1,000 vehicles/day.
- The houses along Biehn Drive, between Caryndale and the existing cul-de-sac will experience an increase in traffic ranging from 2,000 to 3,000 vehicles/day.

- Strasburg Road has been constructed and will provide a western arterial road to service the community.
- With implementation of the proposed Biehn Drive extension, traffic will not have to take a circuitous route through neighbourhoods to reach the arterial road network.

6.5 Conclusions and Recommendations

The following are updated 2024 preliminary recommendations from the EA based on new data sources that included, the geotechnical investigation, the 2023 field inventory of ash trees, an analysis of the long-term Emerald Ash borer impacts on ash tree mortality in North America and City of Kitchener as well as the 2024 Doon South Community Area Transportation Study.

- Based on the 2023 geotechnical investigations it is feasible for the sanitary sewer and watermain without surficial construction to cross the PSW.
- The 2024 Doon South Community Area Transportation Study confirmed the recommendations of the current Transportation Master Plan, 2013 reflected in the Official Plan, 2019, for the long-term use of Biehn Drive and its extension as a major collector in the City.
- The 2024 provincial designation of the Black Ash trees as a Species at Risk (SAR) is now reflected in the recommendations.

The following is the preferred approach for the planned improvements:

- Caryndale Drive will continue to be utilized until the extension of the Biehn Drive link is constructed.
- The health of the Black Ash trees is to be monitored.
- Development south of the PSW be permitted to proceed.
- That a right-of-way continue to be protected at the intersection of Biehn Drive and Robert Ferrie Drive for a future roundabout.
- The land acquisition should include the Right-of-Way required for municipal services and a road corridor.
- The alignment of the servicing corridor for the trunk sanitary sewer and watermain to follow the alignment for the road corridor.
- If Black Ash trees are impacted due to construction, the City will compensate for the loss. Compensation to be determined by Ministry of Environment Conservation and Parks (MECP).

6.6 Technically Preferred Plan

The Technically Recommended Plan (TPP) includes the recommended cross section, refer to **Figure 20**. This recommendation conforms to the City of Kitchener's Official Plan and Integrated Transportation Master Plan and accommodates the associated municipal servicing. It minimizes the impacts to the Provincially Significant Wetland by eliminating the on-street

parking and provides a high level of land use planning efficiency to the lands available for development. In addition, this alternative redistributes vehicles travelling to Robert Ferrie Drive from Caryndale Drive and Brigadoon Public School to Biehn Drive, a designated Major Collector in the City of Kitchener.

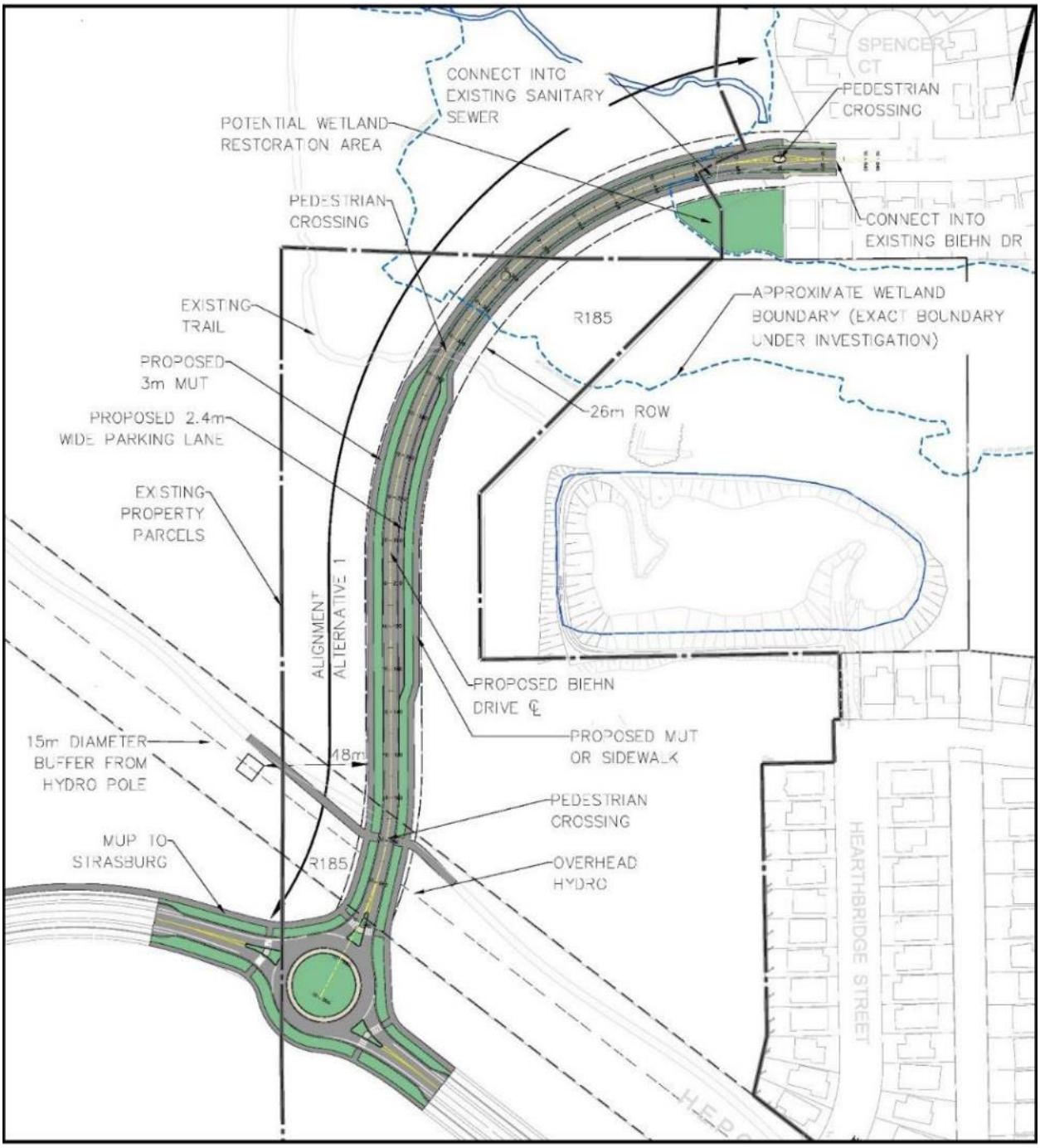


Figure 20: Technically Preferred Plan

A multi-use trail (MUT) on the north side of Robert Ferrie Drive was not identified in the previous EA but is recommended as part of this EA to provide for active transportation along the short section of Robert Ferrie Drive in place of a sidewalk, noting:

- MUT's have already been placed on the portion of the east leg of the Strasburg Road roundabout which has been constructed.
- It would provide better network continuity (providing a MUT connection between the MUTs on Strasburg Road and the MUTs on Biehn Drive).
- At the time the Robert Ferrie Drive EA was being completed, MUTs on Biehn Drive had not been identified.

The TPP was presented at PIC No. 3. Following the PIC, the TPP was subject to refinements based on input from the public, stakeholders and Indigenous Communities. These include:

- Outside the wetland, the cross section (see **Figure 21**) will be reduced to 23.5 m through the subdivision, reducing the width of the boulevard on the east side to accommodate the MUT.
- Through the wetland, the cross section (see **Figure 22**) will be identical to the cross section beyond the PSW, except that it will be revised to:
    - Remove the Multi-Use Trail (MUT) from the north (west) side of the road.
    - Minimize the footprint to 14.5 m through the wetland.
    - Provision for a wildlife passage culvert within the PSW.
    - No Parking within the PSW.
    - Lighting with full cut-off fixtures.
- Opportunity to enhance naturalization of PSW Adjacent Lands.
- Opportunity to replace the PSW within the Study Area.

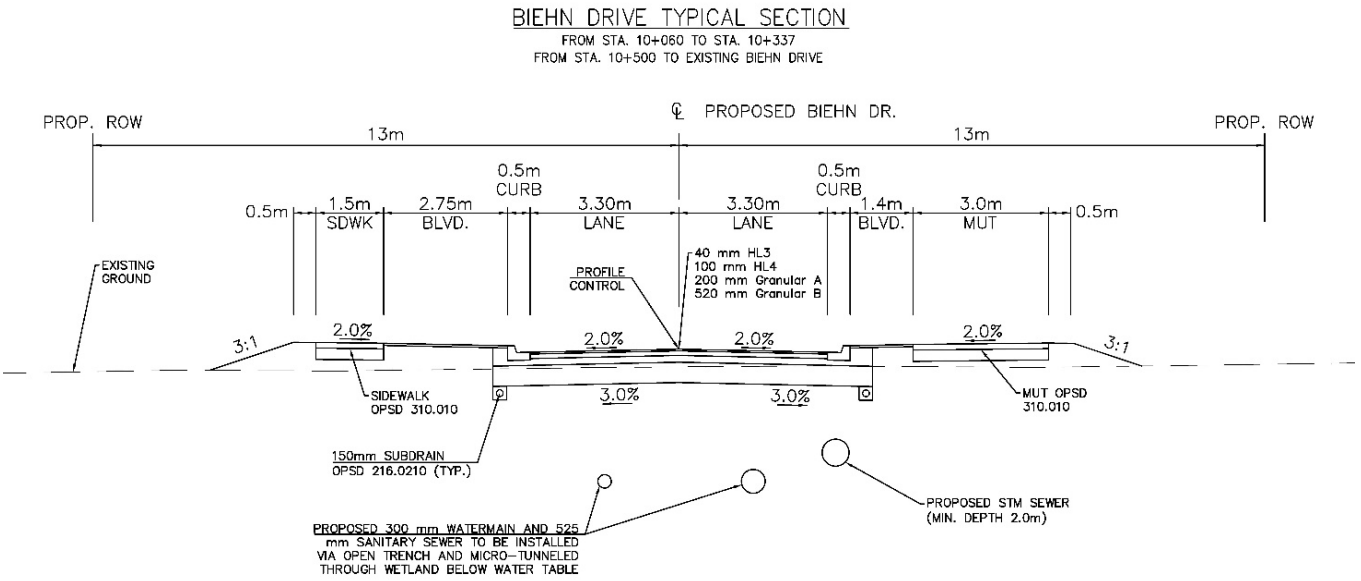


Figure 21: Typical Cross Section Outside the Wetland

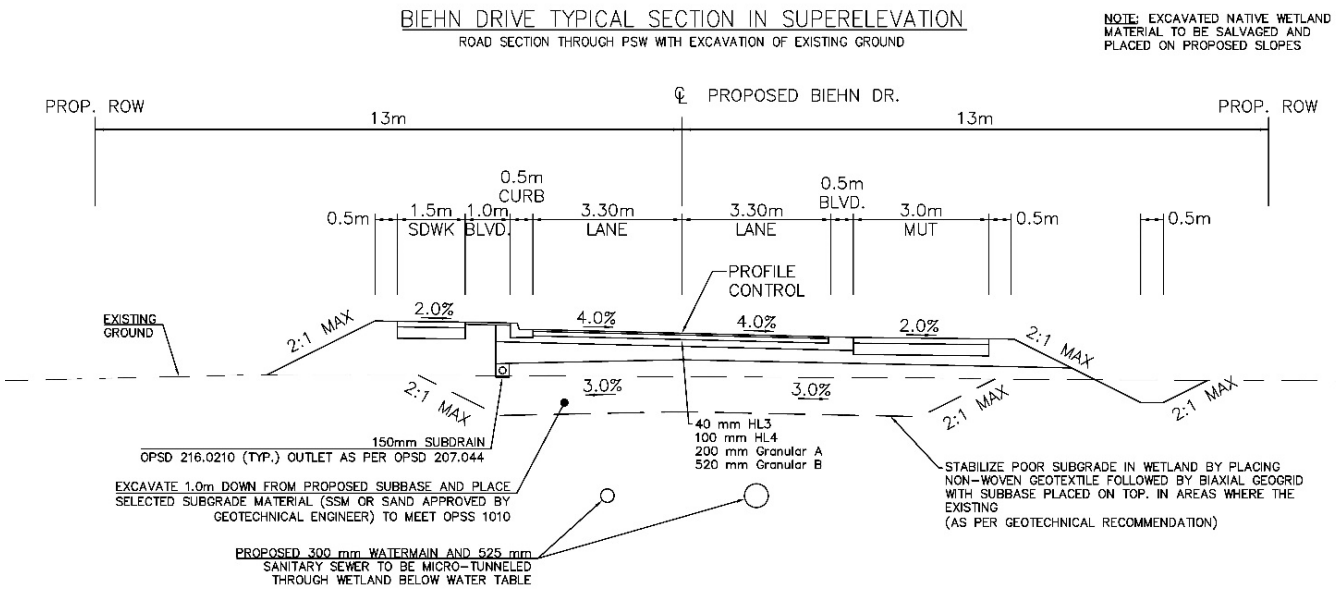


Figure 22: Typical Cross Section Through Wetland

7.0 RECOMMENDED PLAN EFFECTS, MITIGATION MEASURES AND FUTURE RECOMMENDATIONS

Following PIC 3 it was recommended that TPP, Biehn Drive Extension be carried forward as the Recommended Plan, refer to **Figure 23.** The benefits to this alignment are:

- Provides the best transportation performance while minimizing natural and social environmental impacts.
- A limited number of Black Ash trees have been identified along the corridor however the city's best efforts to combat the Emerald Ash Borer has had limited success. Health of the trees will be monitored. The city will comply with compensation determined by MECP.
- The crossing of a PSW is accepted by the Provincial Policy Statement for transportation and utility corridors. Mitigation to include 1:1 replacement on-site.

7.1 Endorsement of the Recommended Plan

The Recommended Plan was presented to the City of Kitchener Council where it was endorsed on December 16, 2024. The resolution is included in **Appendix M**. The plan was then carried forward as the Recommended Plan.

7.2 Recommended Plan

The final Recommended Plan is shown on **Figure 23** and illustrated in detail in **Section 8.0**.

The Biehn Drive Recommended Plan includes:

- New 2-lane road connecting the current Biehn Drive terminus to the future Robert Ferrie Drive
  - Alignment will be east of the Hydro Tower
  - Cross section will include 3.3 m lanes with curb/gutter (0.5 m)
- Active transportation improvements will include:
  - 3.0 m MUT on the east side of the road from Robert Ferrie Drive to the wetland (see Statement of Flexibility **Section 7.3**).
  - 1.5 m sidewalk on the west side from the Hydro Easement to Biehn Drive terminus.
  - Boulevard (varying width, minimum 1.0 m)
  - Potential pedestrian crossing at the south edge of the wetland.
- Roundabout at the intersection of Biehn Drive and Robert Ferrie Drive (per the recommendations of the Robert Ferrie Drive Environmental Assessment).
- Installation of municipal services beneath the road alignment including:
  - Sanitary trunk sewer (500-525 mm diameter)
  - Storm sewer
  - Watermain (300 mm diam.)

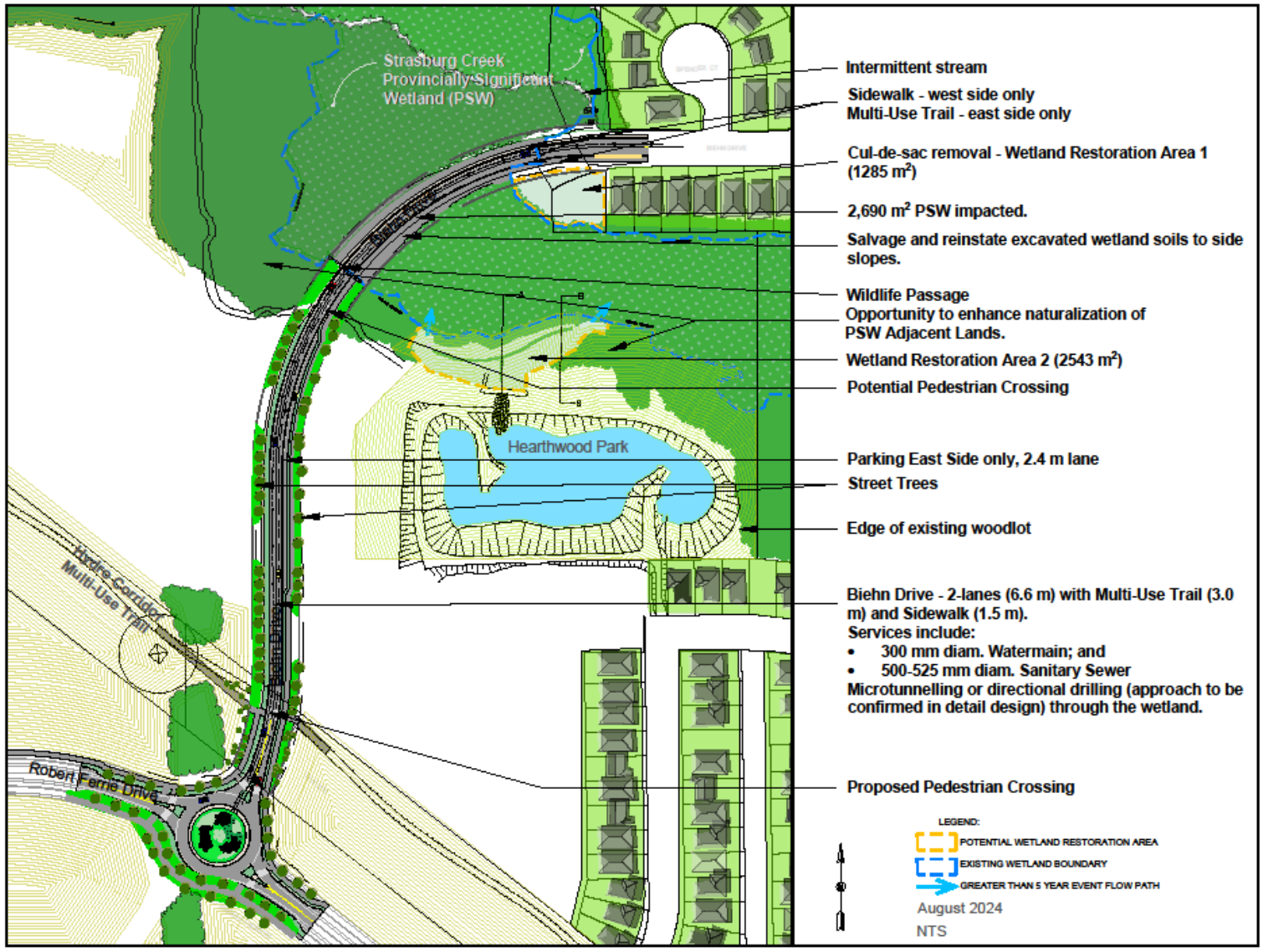


Figure 23: Recommended Plan

- Natural environment mitigation including:
    - Construction of one concrete box culvert with a 1.0 m span and 1.0 m rise for the provision of wildlife passage under the Biehn Drive extension in the area of the Strasburg Creek PSW (final sizing, design and number of crossings to be defined in detail design). The Biehn Drive Wildlife Crossing Technical Memorandum is included in **Appendix E.**
    - Installation of permanent wildlife fencing
    - Stormwater quality control of northern outlet to the PSW (oil grit separator)
    - Target desirable compensation for wetland loss including:
        - 10:1 tree replacement
        - 1:1 wetland replacement (on-site)
        - 2:1 wetland replacement (off-site) (if required)
        - The feasibility for compensation to be further reviewed with the future determination of the offsets from the PSW to development lands as an opportunity for naturalization and include the re-naturalization of the removal of the existing cul-de-sac on Biehn Drive.

The Recommended Plan is illustrated in **Figure 23.**

7.2.1 Infrastructure

The sanitary sewer extension will follow the alignment of the Biehn Drive extension. The required sanitary sewer pipe size is 525 mm diameter and installed by microtunnelling or directional drilling. The watermain extension will follow the alignment of the Biehn Drive extension and be installed with microtunnelling or directional drilling.

7.3 Statement of Flexibility

The Recommended Plan contains key features with flexibility for refinements during detail design including:

- Minor adjustments to the vertical profile and cross section through the development lands during detail design.
- Minor adjustments to the sidewalk and MUT through the PSW to minimize impacts to the natural environment and include input from the EIS to be completed during detail design.
- Selection of the surface type/material of the sidewalk and MUT through the wetland. This will be determined during detail design.

Modifications to the size, location and number of wildlife passages based on consultation with Indigenous Peoples and GRCA during detail design.

7.4 Effects and Mitigation

The effects on the environment were considered in accordance with the Municipal Class EA process and are described below. The EA Addendum highlights several factors that will need to be considered during detailed design and project implementation. This will include impacts to private property, archaeological artifacts, excessive noise during construction, management of

excess soils, species at risk, utilities, vegetation, lighting, drainage, natural gas and groundwater monitoring wells. All these factors will be considered, and mitigated as required, throughout the course of detailed design and project implementation.

The following sections provide a description of the effects and mitigation proposed with the Recommended Plan.

7.4.1 Natural Environment

7.4.1.1 Groundwater

A trenchless installation method is suitable for the placement of sewer and watermain infrastructure beneath the Strasburg Creek Wetland, based on hydrogeologic conditions assessed across the area. There will only be dewatering requirements for the road construction for the north culvert and oil grit separator. Refer to **Appendix J.**

7.4.1.2 Terrestrial and Aquatic Environment

No open bodies of water were in the vicinity that would indicate turtle presence in the area and their presence would likely be only transitory due to the closed canopy and lack of basking areas. No direct impacts to fish or fish habitat are anticipated.

Suitable Category 2 and Category 3 habitat for Blandings Turtle exists along Strasburg Creek on average 310 m distance from the proposed Biehn Drive alignment, which is within their range of known summer wanderings. therefore, consideration of their presence as "transitory habitat" a possibility, and erected temporary, trenched-in turtle control fencing during the geotechnical borehole testing in July 2023. During detailed design the City will review if permanent wildlife exclusion fencing along either side of the roadway is appropriate and will consider other mitigation measures.

Black Ash is identified as a SAR species, was confirmed to be present. Four trees were classified as potential Black Ash due to the absence of leaves, which limits identification, and two exhibit stronger potential based on distinct bark characteristics. within the recommended right-of-way. The health of these trees will be monitored. Compensation to be determined by MECP.

The placement of permanent exclusion fencing and additional (more than one) associated wildlife passages under the road are to be considered during Detail Design.

Any clearing and grubbing should be completed outside of the active breeding bird season of April 1 to August 31. If this is not possible, clearing and grubbing should occur under the supervision of an environmental professional, and only after the specific trees and vegetation needing removal have been screened for nesting birds or roosting bats.

Bats are present over the wetlands near the proposed alignment. Acoustic monitoring identified the following species: Big Brown Bat (Eptesicus fuscus), Eastern Red Bat (Lasiurus borealis), Hoary Bat (Lasiurus cinereus), Little Brown Myotis (*Myotis lucifugus*), Silver-haired Bat (*Lasionycteris noctivagans*) and Tri-Colored bat (*Perimyotis subflavus*). As of August 15, 2024, the Eastern Red Bat, Hoary Bat, and Silver-haired Bat are designated as Species at Risk (SAR) under the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Additionally, the Tri-colored Bat and Little Brown Myotis are listed as Species at Risk in Ontario (SARO).

A bat condo structure similar to that shown in **Figure 24** is proposed for construction at the southeastern corner of the wetland, along the edge of the tree line. Bat condos are capable of providing roosting spaces for up to 6,000 individuals and are considered appropriate for community-scale projects such as a wetland restoration. Depending on the location selected, a structure here may be partially shaded (< 6 hrs./day) yet with open flyways over the restored wetland and the stormwater wetland above which should provide optimal forage habitat for bats as insects emerge from the water each night.

Provide cut-off illumination through the PSW.

Figure 24: Maternal Bat Roosting Structure Built at the Rouge National Park

7.4.1.3 Sourcewater Protection

All applicable policies identified in the Grand River Source Protection Plan need to be followed during and post construction.

The City will protect against sourcewater threats including:

- Salt impact assessment to design roads and sidewalks to minimize the need for repeat application of road salts, and to ensure the handling and storage of road salts doesn't become a significant drinking water threat.
- Reducing roadway platform requiring salt (reduced lane widths, eliminating shoulders by inclusion of urban curbs and elimination of east MUT).
- Ensure that the removal and storage of snow doesn't become a significant drinking water threat.
- Spill Prevention, contingency plans and emergency response plans during construction
- Ensure discharge from a stormwater management facility does not become a significant drinking water threat.
- Compliance with the Salt Management Plan to reduce potential for salt related surface water run-off and groundwater infiltration.

7.4.1.4 Climate Change

The extension of Biehn Drive is not anticipated to produce an increase or significant decrease in greenhouse gas emissions.

7.4.1.5 Air Quality

The extension of Biehn Drive is not anticipated to produce an increase or significant decrease in greenhouse gas emissions.

Potential for temporary lower air quality during construction. The construction of the road extension is not expected to generate adverse air quality as the contractor will be required to maintain the construction equipment in good working order.

MECP recommends that non-chloride dust suppressants be applied. For a comprehensive list of fugitive dust prevention and control measures, refer to *Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities* report prepared for Environment Canada, March 2005.

7.4.1.6 Offset Wetland Restoration

The preferred Biehn Drive extension is proposed to cross the Strasburg Creek Provincially Significant Wetland (PSW) resulting in impacts to the wetland. Best effort has been made to mitigate the impacts, most notably by adjusting the vertical road profile, and horizontal cross roadway section to reduce the footprint in the wetland. Approximately 2,690 m^2 of wetlands will be permanently lost through the construction of the roadbed. Stakeholder feedback indicated that this was one of the most important concerns of the new transportation infrastructure.

A high-level review was undertaken of the lands surrounding the Strasburg Creek Provincially Significant Wetland (PSW) to identify restoration sites of potential wetland restoration. The following two sites were recommended for wetland restoration:

Restoration Area 1 entails the removal of a cul-de-sac located at the southerly end of Biehn Drive. A plan view of the conceptual wetland is provided on **Figure 23**, along with two sections are found in **Appendix E**.

Restoration Area 2 is an open area of tree canopy that lies roughly 100 m east of the proposed Biehn Road situated north of, and below, the Hearthwood Natural Area stormwater wetland management (SWM) facility. A plan view of the conceptual wetland is provided on **Figure 23** along with two sections in **Appendix E**, to be further refined during detailed design. The side slope lying south to the SWM pond is not included in the calculation of proposed wetland area.

Net Offsetting Wetland Compensation: The Restoration Area 1 will net approximately 1,285 m^2 after accounting for slope losses. Restoration Area 2 will net approximately 2,543 m^2 plus the retained 10 m wide existing forest edge. These areas will be further refined during detailed design. Together these two areas net approximately 3,828 m^2 of restored wetlands, more than offsetting the loss of 2,690 m^2 of Provincially Significant Wetlands, resulting in a finished gain: loss ratio of roughly 1.4: 1 exceeding the minimum 1:1 goal.

7.4.2 Cultural Environment

No properties within the Study Area are recognized as an existing or potential heritage property or to have cultural heritage value.

7.4.2.1 Previous Archaeological Assessments

MCM noted that the eastern portion of the study area was assessed in 2009, and there have been changes in legislation relating to archaeological assessment since that time, notably the adoption of the Standards and Guidelines for Consultant Archaeologists (2011). Based on a review of their records, it appears that the eastern portion of the study area has not been assessed for archaeological potential according to present standards.

The eastern property (Sunvest and Reid Ltd.) requires further archaeological assessment to meet current ministry standards, as shown on **Figure 25**.

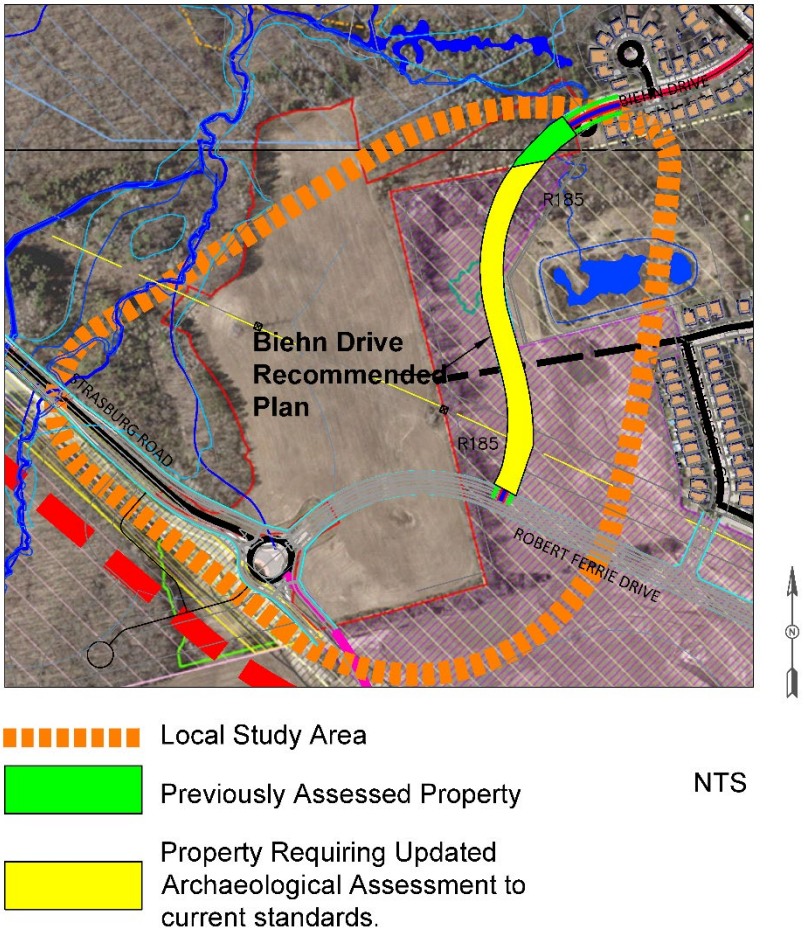


Figure 25: Previous Archaeological Assessments and the Recommended Plan

It is noted that:

- Should previously undocumented archaeological resources be discovered, they may indicate a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological assessment, in compliance with Section 48 (1) of the *Ontario Heritage Act*.
- The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with Ontario Regulation 30/11, the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are

associated with archaeological resources, the MCM should also be notified (at archaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act.*

7.4.3 Socio-Economic Environment

7.4.3.1 Noise

It is projected that no receiver sites (residential properties) will experience sound level changes greater than 5 dBA and no receiver site will have a total sound level of over 65 dBA. The forecast sound levels for daytime and nighttime meets the objective of 55 dBA and no mitigation is required.

The City commits to monitor noise complaints with the opening of Biehn Drive. If the noise complaints last beyond the initial experience of the road opening, then traffic counts will be undertaken to compare with the ESR noise calculation traffic projections. Based on the comparison, the City will assess if any noise mitigation measures are required, technically feasible and cost effective.

7.4.4 Land Use and Property

Property acquisition or a land dedication will be required for the extension of Biehn Drive. This will be coordinated between the property owner (developer) and the City as part of the development planning and approvals process.

Property negotiations are also required to implement the tree replacement mitigation measure of 10:1 in the areas within the PSW Adjacent Lands.

7.4.5 Summary of Effects and Mitigation

Key issues and Preliminary Design features and associated mitigation measures have been identified and are summarized in **Table 9**.

Identified Preliminary Design mitigation measures reflect commitments by the City of Kitchener to mitigate environmental effects. Effects on the environment were considered in accordance with the Municipal Class EA process.

Table 9: Effects and Mitigation			
No.	**Factor**	**Environmental Issues and Potential Effects**	**Proposed Mitigation Measures**
1.0	**Transportation**		
1.1	Traffic Calming	Increase in traffic speeds at the current Biehn Drive terminus.	To control traffic speeds and provide a more pedestrian friendly environment: • Lane widths have been reduced to 3.3 m – identified as the City's new preferred standard for major collector street • A centre pedestrian refuge island and crosswalk at the south end of existing Biehn Drive as a traffic calming measure and to transition to the narrower lane widths on the proposed extension
2.0	**Natural Environment**		
2.1	Erosion and Sediment Control	Downstream impacts to Strasburg Creek cold water fish habitat and impacts to ephemeral/intermittent features in the PSW.	Erosion and sediment control should be installed to mitigate sediment transport into the downstream Strasburg Creek or the piped stormwater system under and north of Biehn Drive. As indirect fish habitat is present in the Study Area in the form of overland flow, particular attention should be paid to stabilizing erodible soil during construction and associated clearing and grubbing. An erosion and sediment control specialist should be on site during construction to ensure the proper installation of these controls. The recommended timing restrictions for Strasburg Creek and its tributaries in this area is October 1st to June 30th of the following year (Note: dates represent when in-water work should be avoided).

Table 9: Effects and Mitigation			
No.	**Factor**	**Environmental Issues and Potential Effects**	**Proposed Mitigation Measures**
2.2	Water Quality	Decrease in water quality in Strasburg Creek from stormwater runoff.	A stormwater management plan is being developed to reduce chloride loading into the watercourse and to cool stormwater prior to its outlet into this cold-water system. Direction of stormwater from the new roadway to the existing stormwater pond (drainage area from the pond southerly) Inclusion of an oil grit separator at the northern/eastern outlet to the PSW. Prepare a Storm Water Management Report.
2.3	Wildlife Habitat	Loss of wildlife habitat including removal of vegetation and tree canopy.	To reduce impacts to nocturnal wildlife, lighting will be reduced along this portion of the road and will include mitigation measures to limit dispersal into the adjacent wetland and woodland areas (use of cut-off lighting). A bat condo structure is proposed for construction at the southeastern corner of the wetland, along the edge of the tree line, Refer to **Section 7.4.1.2**.
2.4	Accommodating Wildlife Movement	Reduced ability of animals to cross from one portion of the wetland/woodland to another due to the new road construction.	It is recommended that permanent exclusion fencing and one or more associated wildlife passages under the road be considered during Detail Design. Wildlife passages should take into consideration a suitable Openness Ratio for the target species/wildlife type (i.e. amphibians and small mammals) as described in **Appendix E.** Maintain groundwater upwellings if those features are present within the footprint of the proposed crossing site.

Table 9: Effects and Mitigation			
No.	**Factor**	**Environmental Issues and Potential Effects**	**Proposed Mitigation Measures**
			The relocation of wildlife outside of the work area (including amphibians, reptiles, and small mammals), a Wildlife Collector's Authorization under the Fish and Wildlife Conservation Act will be required. Confirm if additional opening(s) are required to ensure wetland connectivity and equalization.
2.5	Species at Risk	Impacts to Species at Risk and loss of habitat.	An updated assessment for SAR listed in the *Endangered Species Act* (ESA) and *Species at Risk Act* (SARA) will be completed during Detail Design since it is the responsibility of the proponent to ensure that Species at Risk (SAR) are not killed, harmed, or harassed, and that their habitat is not damaged or destroyed through the proposed activities to be carried out on the site. If the proposed activities cannot avoid impacting protected species and their habitats, then the proponent will need to apply for an authorization under the *Endangered Species Act* (ESA). If the proponent believes that their proposed activities are going to have an impact or are uncertain about the impacts, they should contact SAROntario@ontario.ca to undergo a formal review under the ESA. The Eastern Red Bat, Hoary Bat, and Silver-haired Bat are designated as Species at Risk (SAR) under the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Additionally, the Tri-colored Bat and Little Brown Myotis are listed as Species at Risk in Ontario (SARO).

Table 9: Effects and Mitigation			
No.	**Factor**	**Environmental Issues and Potential Effects**	**Proposed Mitigation Measures**
			Ensure that tree clearing activities occur outside of the bat active window (May to October). Black Ash SAR have been confirmed in the Study Area based on field investigations completed by BTE. There will be continued monitoring of the condition of the Black Ash. Compensation to be determined. Ontario's habitat protection prohibitions are applicable to a radial distance of 30 metres around Black Ash. Submit an information Gathering Form (IFG) to the Species At Risk Branch during design on how the project may impact SAR. Suitable Category 2 and Category 3 habitat for Blandings Turtle exists along Strasburg Creek on average 310 m distance from the proposed Biehn Drive alignment, which is within their range of known summer wanderings. therefore, consideration of their presence as "transitory habitat" a possibility, and erected temporary, trenched-in turtle control fencing during the geotechnical borehole testing in July 2023. During detailed design the City will review if permanent wildlife exclusion fencing along either side of the roadway is appropriate and will consider other mitigation measures.
2.6	Significant Woodlands and Specimen Trees	Loss of Significant Woodlands and Specimen Trees.	Inventory trees to be removed and replace at a ratio of 10:1 within the PSW adjacent lands. Limit trees to be removed and avoid if possible significant trees.

Table 9: Effects and Mitigation			
No.	**Factor**	**Environmental Issues and Potential Effects**	**Proposed Mitigation Measures**
2.7	Provincially Significant Wetlands	Loss of Provincially Significant Wetland.	Target desirable compensation for wetland loss including: • 10:1 tree replacement • 1:1 wetland replacement (on-site) • 2:1 wetland replacement (off-site) (not required) The feasibility for compensation to be reviewed with the future determination of the offsets from the PSW to development lands as an opportunity for naturalization and include the re-naturalization of the removal of the existing cul-de-sac on Biehn Drive. • The Detail Design should consider narrowing of the roadway corridor through the wetland area where feasible. • Reconstruct PSW as per the Recommended Plan on-site at a ratio of 1:1 (or greater). • Salvage and reuse wetland material. • Limits of construction should be clearly marked to ensure impacts on wetlands are kept to a minimum. • Confirm with GRCA that wetland boundaries have not changed. • Review and confirm that the proposed Biehn Drive right-of-way will not be an obstacle to the natural drainage path. • Confirm if the existing Hearthwood stormwater management facility was designed to accept higher flows from Biehn Drive right-if-way and provide SWM control.

Table 9: Effects and Mitigation			
No.	**Factor**	**Environmental Issues and Potential Effects**	**Proposed Mitigation Measures**
			• Confirmation of how the Reginal Storm flows will be safely conveyed will be required.
2.8	Migratory Bird Nesting	Disturbances to birds during the nesting season.	Detail Design and Construction Recommendation: Any clearing and grubbing should be completed outside of the active breeding bird season of April 1 to August 31. If this is not possible, clearing and grubbing should occur under the supervision of an environmental professional, and only after the specific trees and vegetation needing removal have been screened for nesting birds or roosting bats.
2.9	Groundwater – Wellhead Protection Sensitivity Areas Groundwater – Infiltration		The City will protect against sourcewater threats including: • Salt impact assessment to design roads and sidewalks to minimize the need for repeat application of road salts, and to ensure the handling and storage of road salts doesn't become a significant drinking water threat • Reducing roadway platform requiring salt (reduced lane widths, eliminating shoulders by inclusion of urban curbs and elimination of east MUT). • Ensure that the removal and storage of snow doesn't become a significant drinking water threat • Spill Prevention, contingency plans and emergency response plans during construction

Table 9: Effects and Mitigation			
No.	**Factor**	**Environmental Issues and Potential Effects**	**Proposed Mitigation Measures**
			• Ensure discharge from a stormwater management facility does not become a significant drinking water threat • Compliance with the Salt Management Plan to reduce potential for salt related surface water run-off and groundwater infiltration
2.10	Dewatering	Requirements for dewatering disposal	A groundwater and surface water monitoring program and contingency plan are required before, during, and after the proposed dewatering/construction activities irrespective of the dewatering/construction methods to be implemented due to the sensitivity of the PSW. Dewatering will be determined during detail design.
2.11	Floodplain Storage	Loss of floodplain storage.	Reduced footprint in wetland by reducing lane widths and use of urban cross section.
2.12	Permits and Approvals	Requirements for environmental permits and approvals.	**Permit to Take Water (PTTW):** The category of PTTW that may be required depends on the level of risk associated with the proposed water taking, source of water, rate/volume of water to be taken, purpose, etc. Further details can be found on the MECP website: https://www.ontario.ca/page/permits-take-water. In addition, the "Guide to Permit to Take Water Application Form" outlines procedures for applying to the MECP's Permit to Take Water (PTTW) including the approach for filling in the required application form and the type of supporting documentation/studies to be submitted:

Table 9: Effects and Mitigation			
No.	**Factor**	**Environmental Issues and Potential Effects**	**Proposed Mitigation Measures**
			https://www.ontario.ca/page/guide-permit-take-water-application-form. The Water Taking and Transfer regulation O. Reg. 387/04 can also provide further guidance: https://www.ontario.ca/laws/regulation/040387. **Environmental Activity and Sector Registry (EASR):** The guide provides information on EASR as it pertains to water takings for eligible highway projects and transit projects, construction site dewatering and pumping tests: https://www.ontario.ca/page/water-taking-user-guide-environmental-activity-and- sector-registry. For the proposed water taking activity to be eligible to register on EASR, it must meet the criteria set out in O.Reg. 63/16: https://www.ontario.ca/laws/regulation/160063 **Endangered Species Act:** An updated assessment for SAR listed in the Endangered Species Act (ESA) will be completed during Detail Design since it is the responsibility of the proponent to ensure that SAR are not killed, harmed, or harassed, and that their habitat is not damaged or destroyed through the proposed activities to be carried out on the site. Based on the EA study recommendations there will be a loss of Black Ash trees if they remain healthy until the start of construction. Health monitoring of these trees will be undertaken during the detail design. It is expected that

Table 9: Effects and Mitigation			
No.	**Factor**	**Environmental Issues and Potential Effects**	**Proposed Mitigation Measures**
			there will be a requirement to apply for an authorization under the ESA **Species at Risk Act:** Parks Canada and Environment and Climate Change Canada should be consulted regarding permitting requirements under the federal Species at Risk Act (SARA). **Conservation Authorities Act (1990)** The Grand River Conservation Authority (GRCA) regulates development and interference with wetlands, shorelines and other hazard lands under under Ontario Regulation 41/24 of the Conservation Authorities Act (1990). A permit will be required from GRCA prior to construction. An application should be submitted once final drawings and additional plans (construction dewatering plan, site restoration plan, etc.) are completed during the detailed design phase. Detailed engineering design Drawings, including vii. vegetation clearing viii. grading and construction ix. erosion and sediment control x. construction sequencing, staging, and access xi. dewatering xii. landscaping • Functional Servicing Report and/or SWM Report.

Table 9: Effects and Mitigation			
No.	**Factor**	**Environmental Issues and Potential Effects**	**Proposed Mitigation Measures**
			• Plans and Reports to be signed and stamped by a professional engineer. • Pursuant to GRCA policy 8.4.7, a scoped EIS will be required to demonstrate how the hydrologic functions of the wetland will be maintained or restored.
2.13	Noise and Vibration	Potential for elevated long and short-term noise levels.	**Long Term**: The City commits to monitor noise complaints with the opening of Biehn Drive. If the noise complaints last beyond the initial experience of the road opening, then traffic counts will be undertaken to compare with the ESR noise calculation traffic projections. Based on the comparison, the City will assess if any noise mitigation measures are required, technically feasible and cost effective. **Short Term**: The construction contract will include restrictions on construction activities for night-time works and heavy vehicles will be restricted to accessing from Strasburg Road.
2.14	Air Quality - Construction	Potential for temporary decreased air quality during construction.	The construction of the road extension is not expected to generate adverse air quality as the contractor will be required to maintain the construction equipment in good working order. MECP recommends that non-chloride dust suppressants be applied. For a comprehensive list of fugitive dust

Table 9: Effects and Mitigation			
No.	**Factor**	**Environmental Issues and Potential Effects**	**Proposed Mitigation Measures**
			prevention and control measures, refer to *Cheminfo Services Inc. Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities* report prepared for Environment Canada, March 2005.
2.15	Excess Materials and Waste	New Environment Protection Act Regulation - phased implementation.	• Excess generation will be minimized through promoting contractor salvage, recycling and re-use in the contract tender documents, where appropriate. • Manage and dispose of excess materials generated in accordance with OPSS 180 (General Specification for the Management and Disposal of Excess Material) and MOE's Protocol for the Management of Excess Material in Road Construction and Maintenance. • Manage contaminated material in accordance with O. Reg. 153/04 and O. Reg. 406/19 and the MECP's current documents: • Management of Excess Soil – A Guide for Best Management Practices (2014); and • Comply with the Soil Management and Excess Soil Quality Standards (2022).

Table 9: Effects and Mitigation			
No.	**Factor**	**Environmental Issues and Potential Effects**	**Proposed Mitigation Measures**
3.0	**Cultural Environment**		
3.1	Archaeological Impacts		The eastern property owned by Sunvest and Reid Ltd., requires further archaeological assessment to meet current ministry standards. Should previously undocumented archaeological resources be discovered, they may indicate a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological assessment, in compliance with Section 48 (1) of the *Ontario Heritage Act*. The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 requires that any person discovering human remains must cease all activities immediately and notify the police or coroner. If the coroner does not suspect foul play in the disposition of the remains, in accordance with Ontario Regulation 30/11, the coroner shall notify the Registrar, Ontario Ministry of Public and Business Service Delivery, which administers provisions of that Act related to burial sites. In situations where human remains are associated with archaeological

Table 9: Effects and Mitigation			
No.	**Factor**	**Environmental Issues and Potential Effects**	**Proposed Mitigation Measures**
			resources, the MCM should also be notified (at archaeology@ontario.ca) to ensure that the archaeological site is not subject to unlicensed alterations which would be a contravention of the *Ontario Heritage Act.*
4.0	**Land Use and Property**		
4.1	Property Requirements	Need for property acquisition or land dedication for the new road right-of-way.	Property acquisition or a land dedication will be required for the extension of Biehn Drive. This will be coordinated between the property owner (developer) and the City as part of the development planning and approvals process. Permission to plant trees on developer lands is required for tree replacement on PSW Adjacent Lands (30 m within the wetland boundary).

7.5 Monitoring

As the proponent, the City of Kitchener will commit to a Monitoring Program for this project as part of the Detail Design and Construction phases. An environmental firm specializing in monitoring programs will be part of the Detail Design team and Construction team to ensure the continuity of the environmental measures outlined in **Table 9**.

The Monitoring Program will address the Class Document requirements as set out in Section A.4.2.1 including:

- Key impacts to be monitored.
- Monitoring requirements during detail design, construction and during the operation of Biehn Drive.
- The period during which monitoring will be necessary.
- Frequency and timing of surveys, the location of monitoring sites and the methods of data collection, analysis and evaluation.
- The content, manner and form in which records of monitoring data are to be prepared and retained.
- Where and for how long monitoring records and documentation will be on file, specific requirements for monitoring appropriate to the particular circumstances and conditions under which the project will be implemented.
- How unexpected environmental effects identified during monitoring will be addressed.

Wetland Restoration Post Construction Monitoring: A three-year post-construction monitoring program is proposed for implementation. The monitoring program is to start following a one-year period to allow the seeded areas and salvaged wetland soils the opportunity to begin the process of recovery before a critical assessment is made. Many of the planted trees will be deciduous, which can be difficult to establish, particularly in wet organic soils. Mandatory replanting/overplanting should be included in the detailed design to optimize the wetland area coverage, and so that there is more than one generation of plant materials to improve survival in case of drought/ excessive wet conditions. Up to 20 % of the plant material may need replanting annually during the monitoring period, with the rates being determined by the results of the monitoring.

Monitoring of the habitats created can be more challenging as they may be below ground (i.e. herpetofauna hibernaculum) or are only used at night (i.e. fox den). Monitoring the flow of bat species in and out of the bat condo, best done around sunset, will chart the population using the structure during the month of June when roosting is most prevalent. Mid-winter surveys may also be warranted if the structure is insulated.

Monitoring reports will be due by December 31st of each year, and pending disclosure rules under the *Endangered Species Act*, will be made public on the City website and reported to https://batwatch.ca/.

7.6 30-Day Review

Following the Notice of Study Completion there is a minimum 30-day period during which documentation may be reviewed and comments and input can be submitted to the proponent.

The public may request a higher level of assessment on a project if they are concerned about potential adverse impacts to constitutionally protected Aboriginal and treaty rights, Section 16(6) of the Environmental Assessment act. In addition, the Minister may issue an order on their own initiative within a specified time period. The Director of the Environmental Assessment Branch will issue a Notice of Proposed Order to the proponent if the Minister is considering an order for the project within 30 days after the conclusion of the comment period on the Notice of Completion. At this time, the Director may request additional information from the proponent. Once the requested information has been received, the Minister will have 30 days within which to make a decision or impose conditions on the project.

The Notice of Study Completion, for this study, will contain directions on how an individual or group can communicate their concerns to the Minister of the Environment. Conservation and Parks. These directions are outlined below and in the public Notice.

Therefore, the proponent cannot proceed with the project until at least 30 days after the end of the comment period provided for in the Notice of Completion. Further, the proponent may not proceed after this time if:

- A Section 16 order request has been submitted to the ministry regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights; or
- The Director has issued a Notice of Proposed Order regarding the project.

Outstanding concerns are to be directed to the proponent for a response, and that in the event there are outstanding concerns regarding potential adverse impacts to constitutionally protected Aboriginal and treaty rights, a Section 16 order request on those matters should be addressed in writing to:

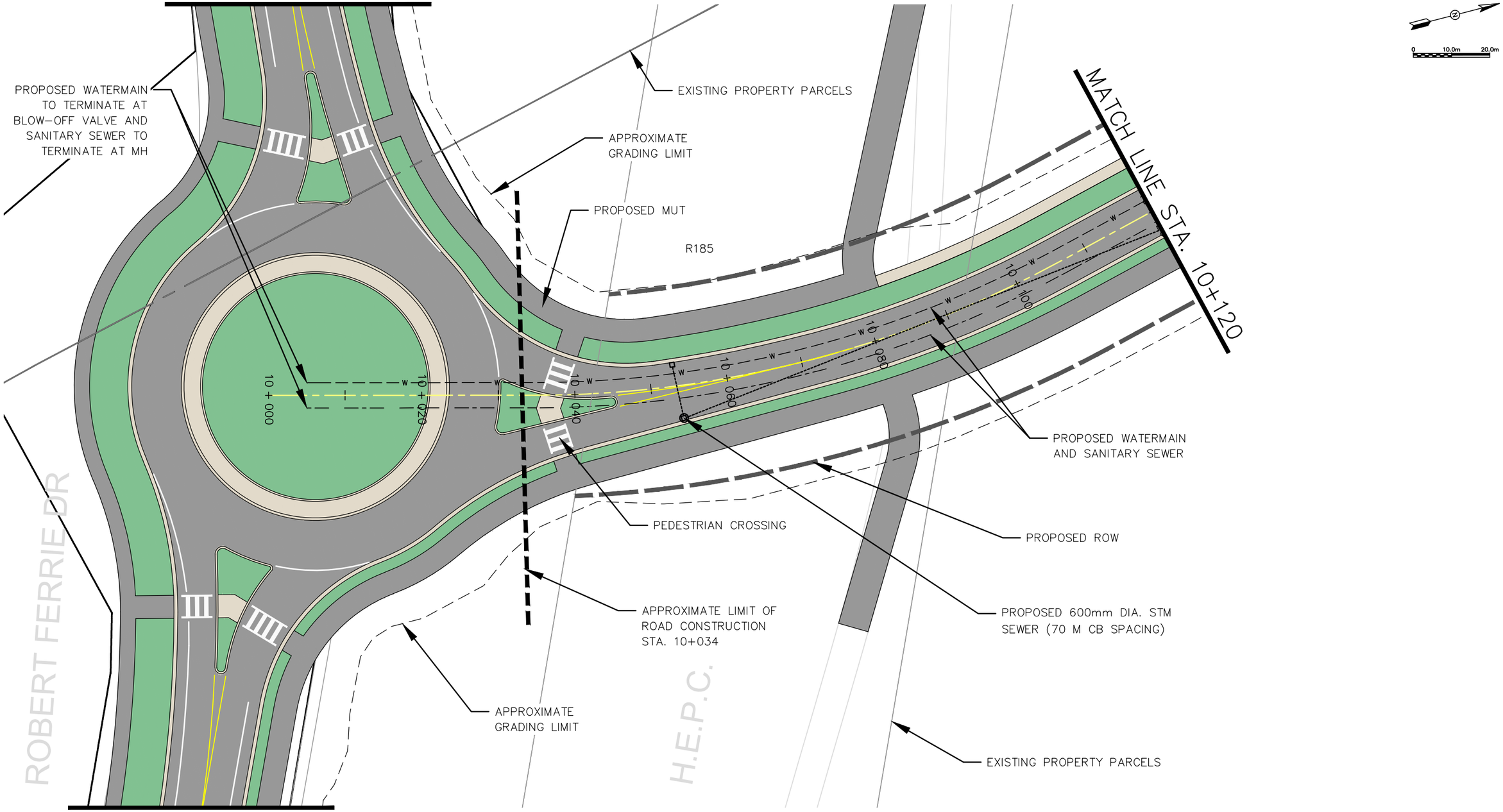
Ministry Andrea Khanjin
777 Bay Street, 5th Floor
Toronto, ON M7A 2J3
minister.mecp@ontario.ca

Director, Environmental Assessment and
Permissions Branch
Ministry of Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, ON M4V 1P5
EABDirector@ontario.ca

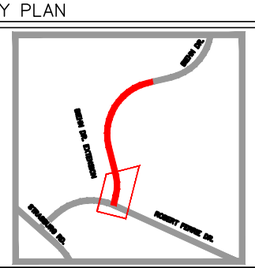
7.7 Future Activities

Following Class EA clearance and a 30-day public review period, if there are no objections, this project, or any individual element of this project, may proceed to Detail Design and Construction after obtaining the necessary environmental permits and approvals, and subject to availability of funding and construction priorities. Mitigation measures listed in **Section 7.0** are to be incorporated during Detail Design and Construction, as appropriate. The timeline for implementation is expected to be within the 5-year capital program.

8.0 PLATES



KEY PLAN



NO.	REVISIONS	DATE	APPROVED
1.	ESR	SEP/24	S.J.T.

BIEHN DRIVE

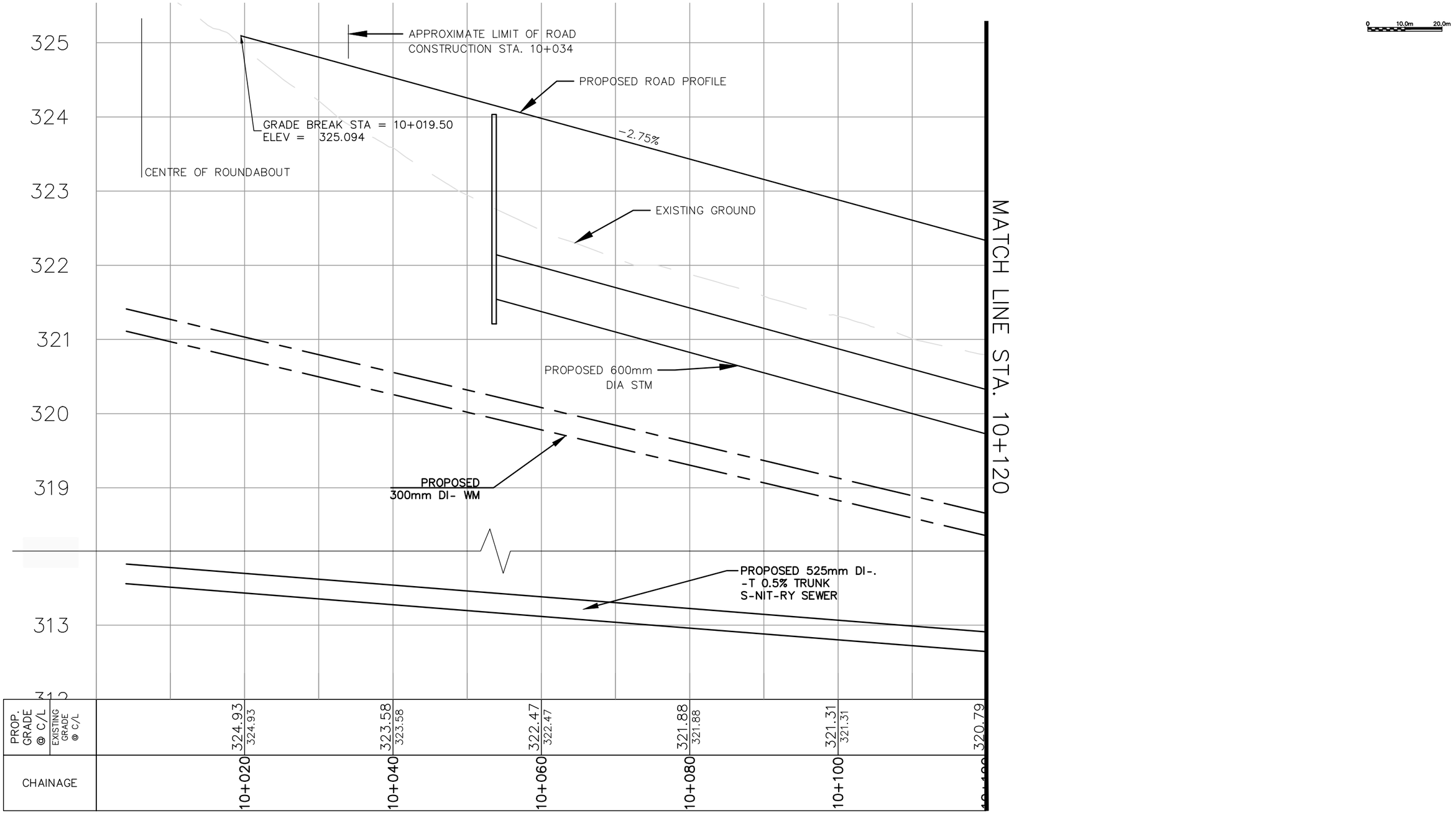
PRELIMINARY ROAD DESIGN

PLATES – PLAN
FROM STA. 10+000 TO STA. 10+120

BT ENGINEERING

HORZ.	1:500
VERT.	1:50
DRAWN	A.D.
DESIGN	A.D.
REVIEWED	S.J.T.
DATE	2024/09/03

CONTRACT 21–003 SHEET NO. C–001



NO.	REVISIONS	DATE	APPROVED
1.	ESR	SEP/24	S.J.T.

BIEHN DRIVE

PRELIMINARY ROAD DESIGN

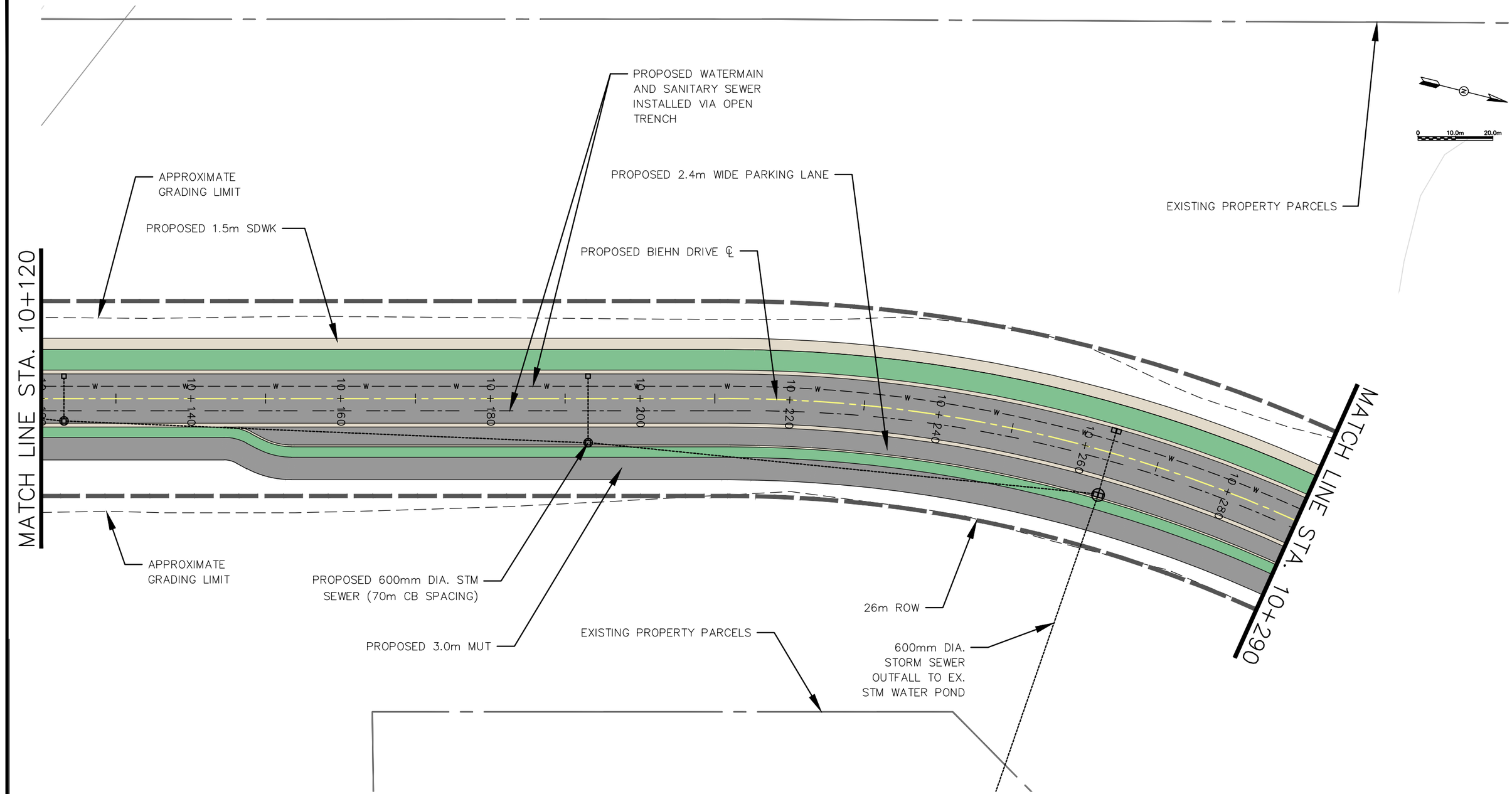
PLATES – PROFILE
FROM STA. 10+000 TO STA. 10+120

BT ENGINEERING

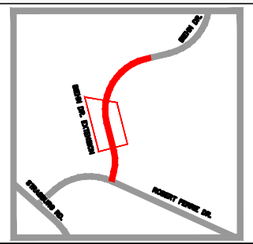
BTE

HORZ.	1:500
VERT.	1:50
DRAWN	A.D.
DESIGN	A.D.
REVIEWED	S.J.T.
DATE	2024/09/03

CONTRACT 21–003 SHEET NO. C–002



KEY PLAN



NO.	REVISIONS	DATE	APPROVED
1.	ESR	SEP/24	S.J.T.

BIEHN DRIVE

PRELIMINARY ROAD DESIGN

PLATES
FROM STA. 10+120 TO STA. 10+290

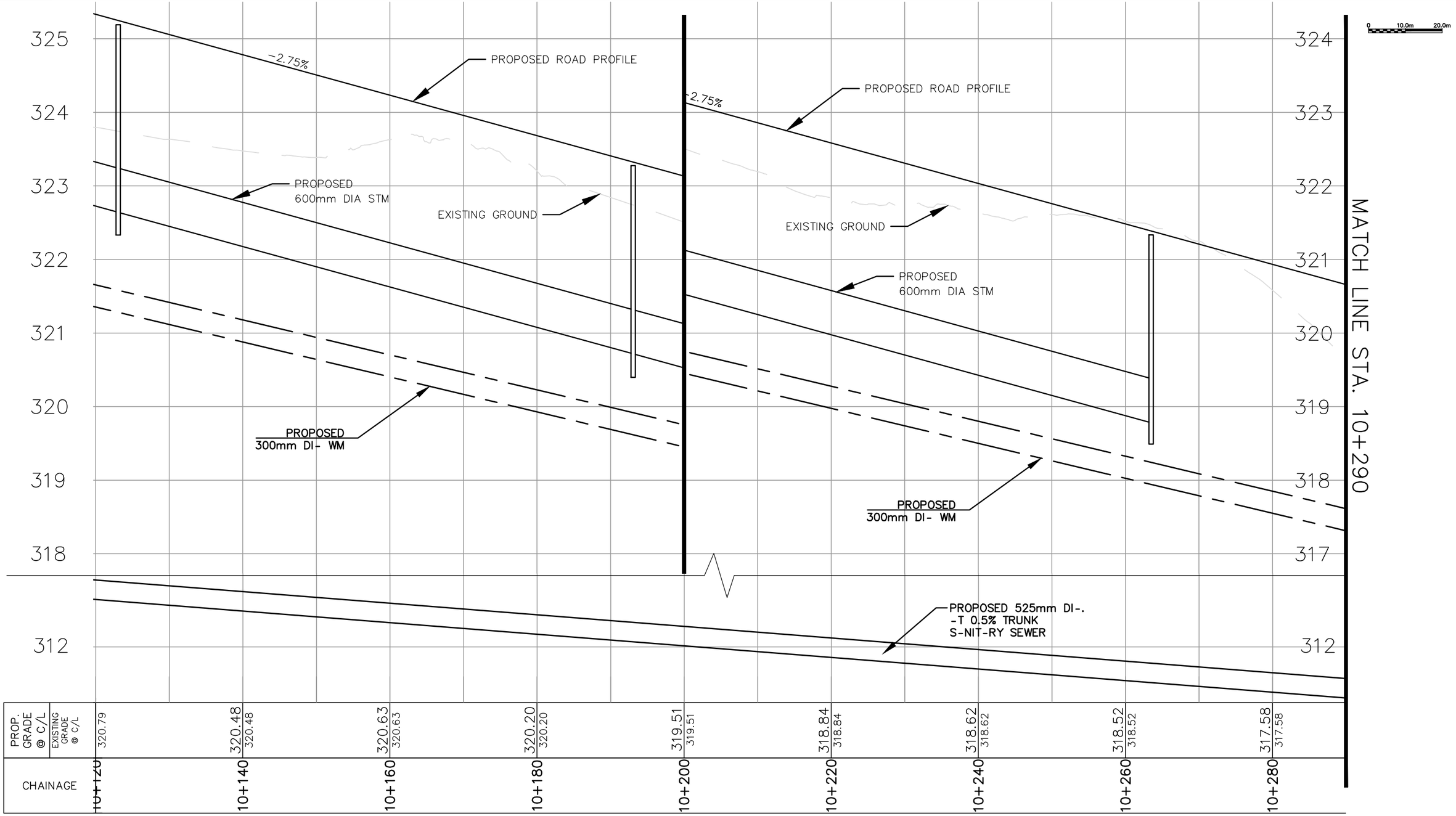
BT ENGINEERING

BTE

HORZ.	1:500
VERT.	1:50
DRAWN	A.D.
DESIGN	A.D.
REVIEWED	S.J.T.
DATE	2024/09/03

CONTRACT 21-003

SHEET NO. C-003



NO.	REVISIONS	DATE	APPROVED
1.	ESR	SEP/24	S.J.T.

BIEHN DRIVE

PRELIMINARY ROAD DESIGN

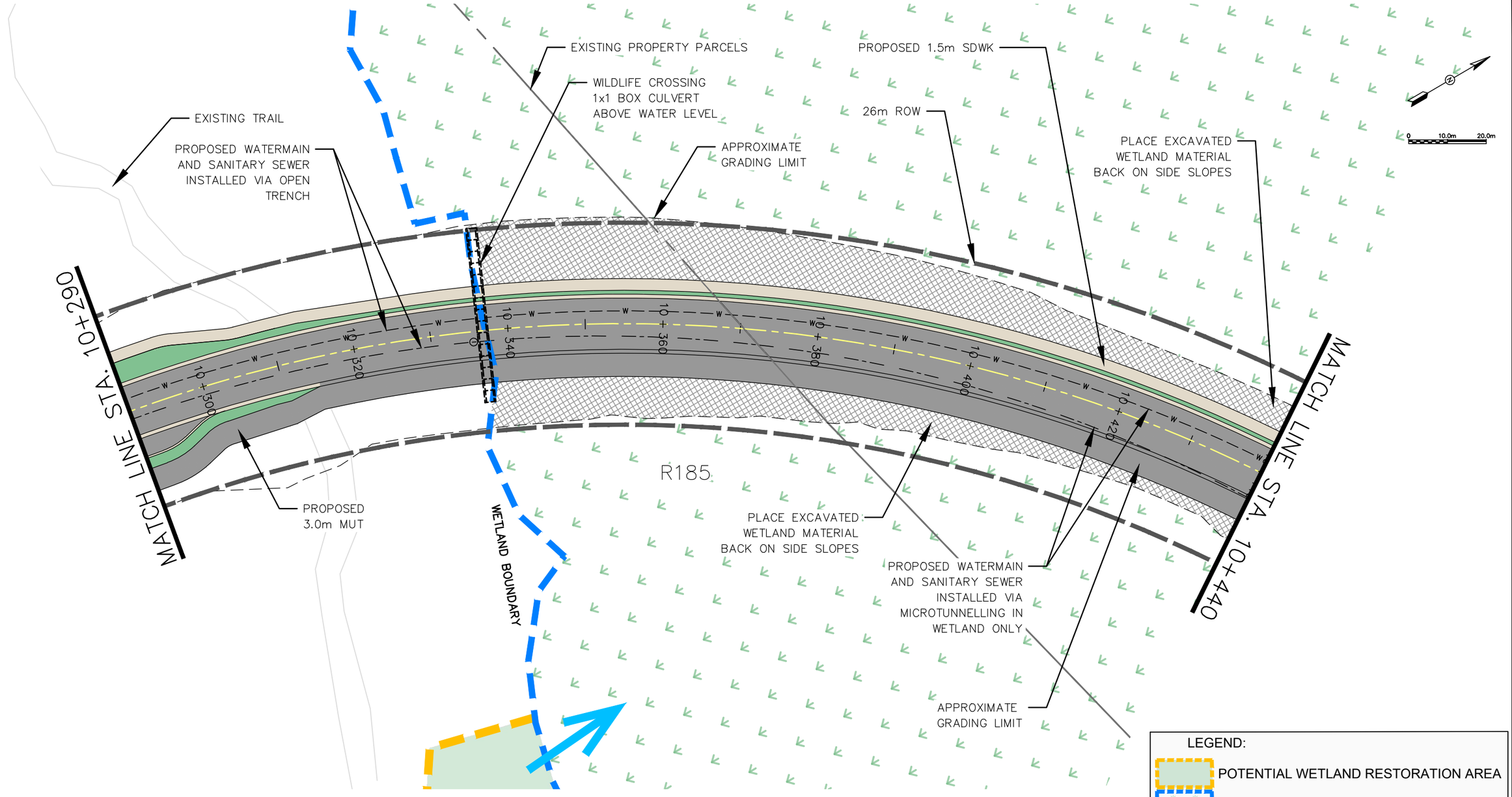
PLATES – PROFILE
FROM STA. 10+120 TO STA. 10+290

BT ENGINEERING

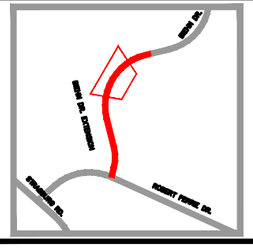
BTE

HORZ.	1:500
VERT.	1:50
DRAWN	A.D.
DESIGN	A.D.
REVIEWED	S.J.T.
DATE	2024/09/03

CONTRACT 21–003 SHEET NO. C–004



KEY PLAN



NO.	REVISIONS	DATE	APPROVED
1.	ESR	SEP/24	S.J.T.

BIEHN DRIVE

PRELIMINARY ROAD DESIGN

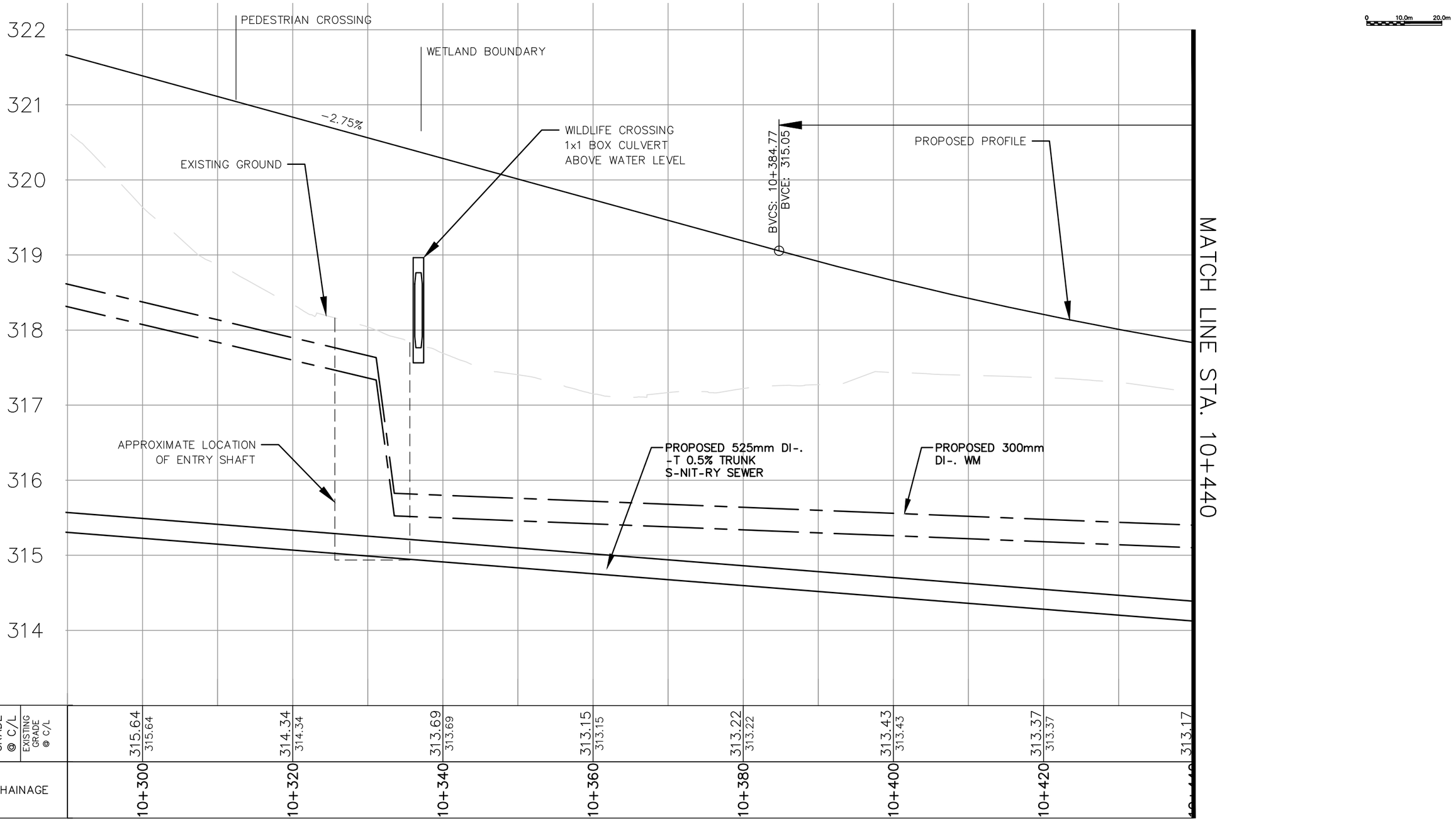
PLATES
FROM STA. 10+290 TO STA. 10+440

BT ENGINEERING

HORZ.	1:500
VERT.	1:50
DRAWN	A.D.
DESIGN	A.D.
REVIEWED	S.J.T.
DATE	2024/09/03

CONTRACT 21-003

SHEET NO. C-005



NO.	REVISIONS	DATE	APPROVED
1.	ESR	SEP/24	S.J.T.

BIEHN DRIVE

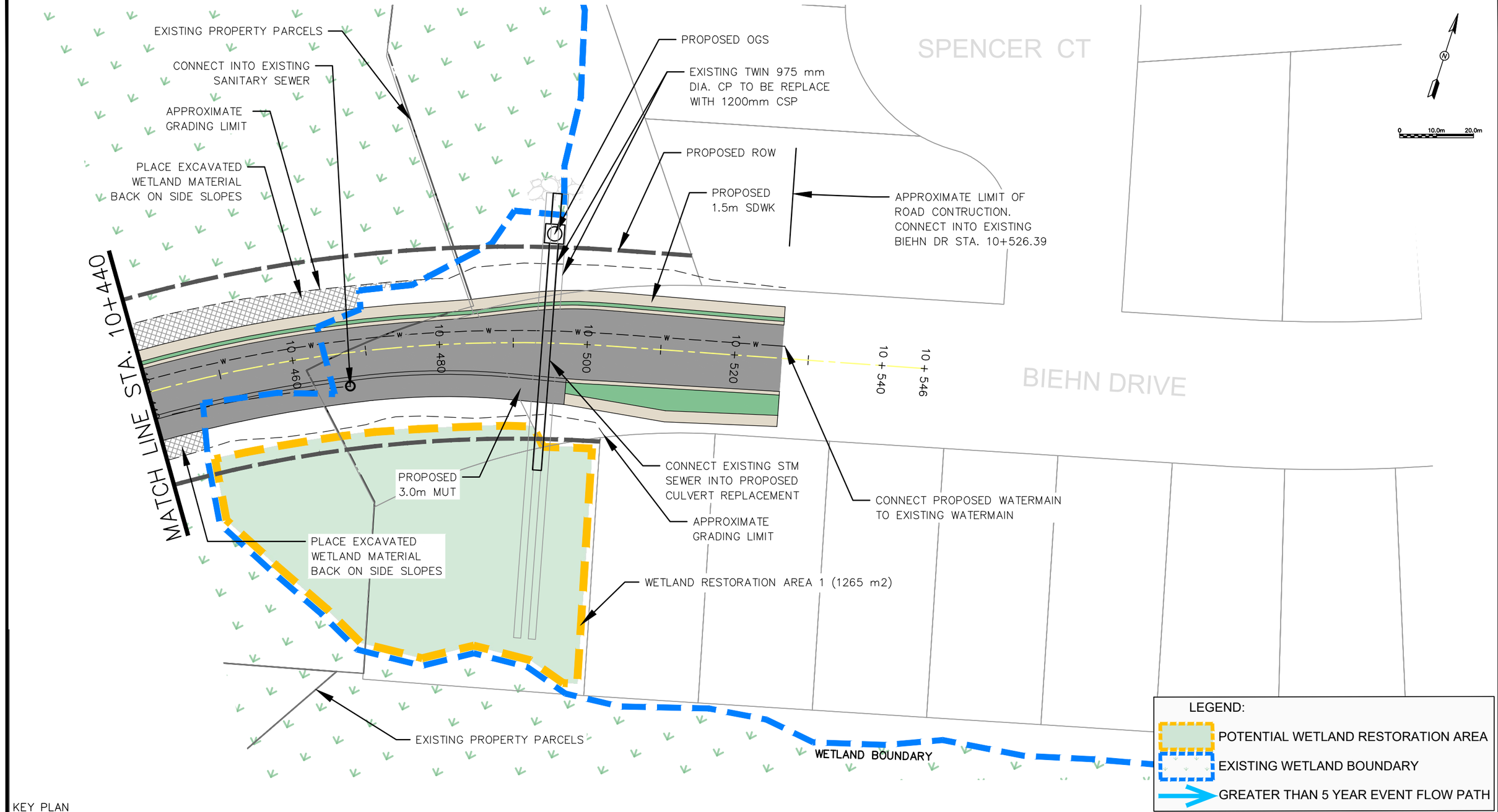
PRELIMINARY ROAD DESIGN

PLATES – PROFILE
FROM STA. 10+290 TO STA. 10+440

BT ENGINEERING

HORZ.	1:500
VERT.	1:50
DRAWN	A.D.
DESIGN	A.D.
REVIEWED	S.J.T.
DATE	2024/09/03

CONTRACT 21–003 SHEET NO. C–006



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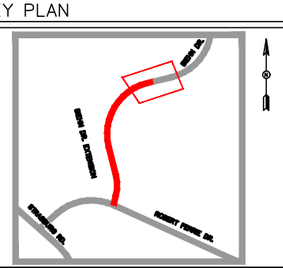


NO.	REVISIONS	DATE	APPROVED
1.	ESR	SEP/24	S.J.T.

BIEHN DRIVE

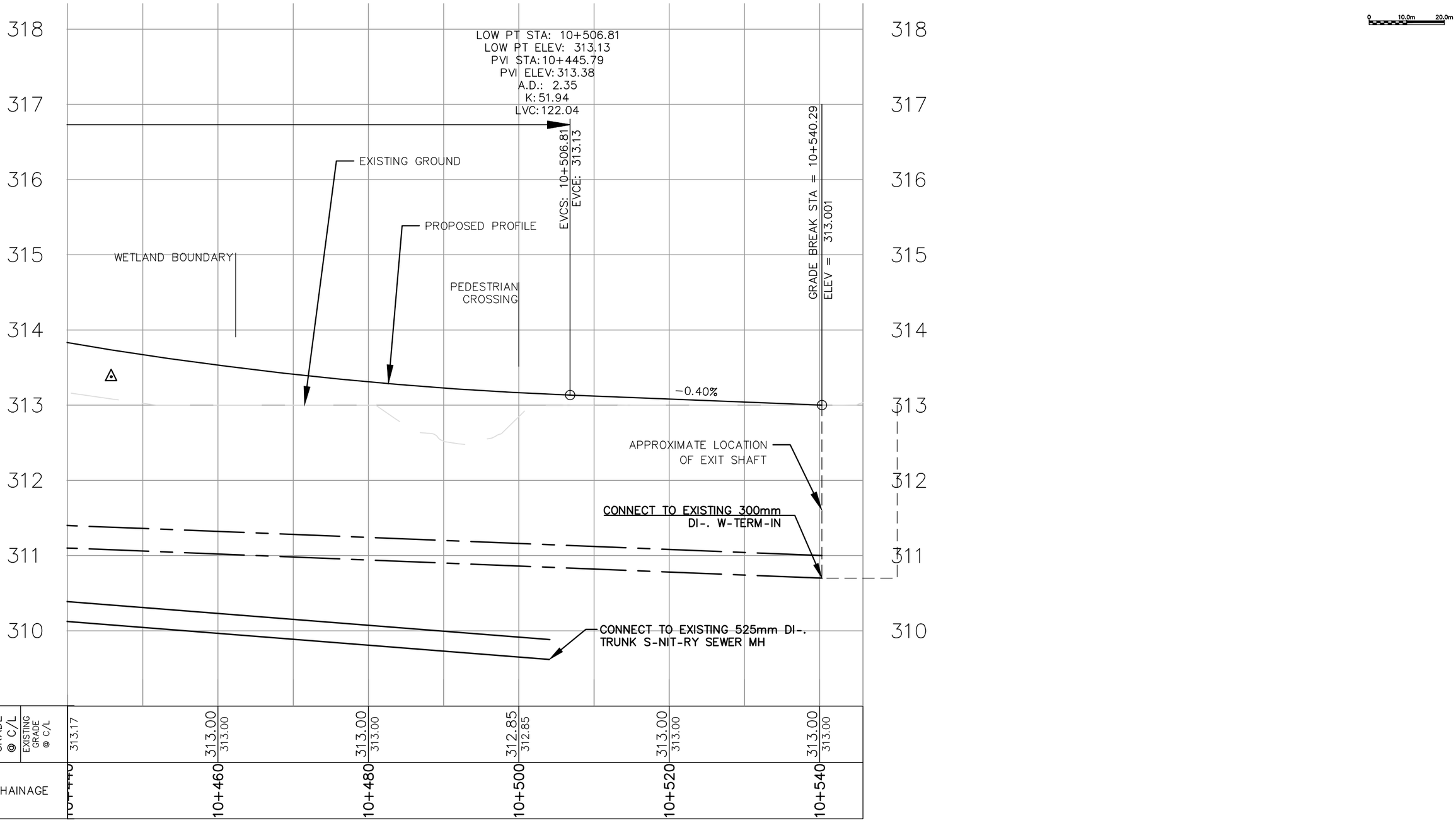
PRELIMINARY ROAD DESIGN

PLATES
FROM STA. 10+440 TO STA. 10+526.39

BT ENGINEERING

HORZ.	1:500
VERT.	1:50
DRAWN	A.D.
DESIGN	A.D.
REVIEWED	S.J.T.
DATE	2024/09/03

CONTRACT 21–003 SHEET NO. C–007



NO.	REVISIONS	DATE	APPROVED
1.	ESR	SEP/24	S.J.T.

BIEHN DRIVE

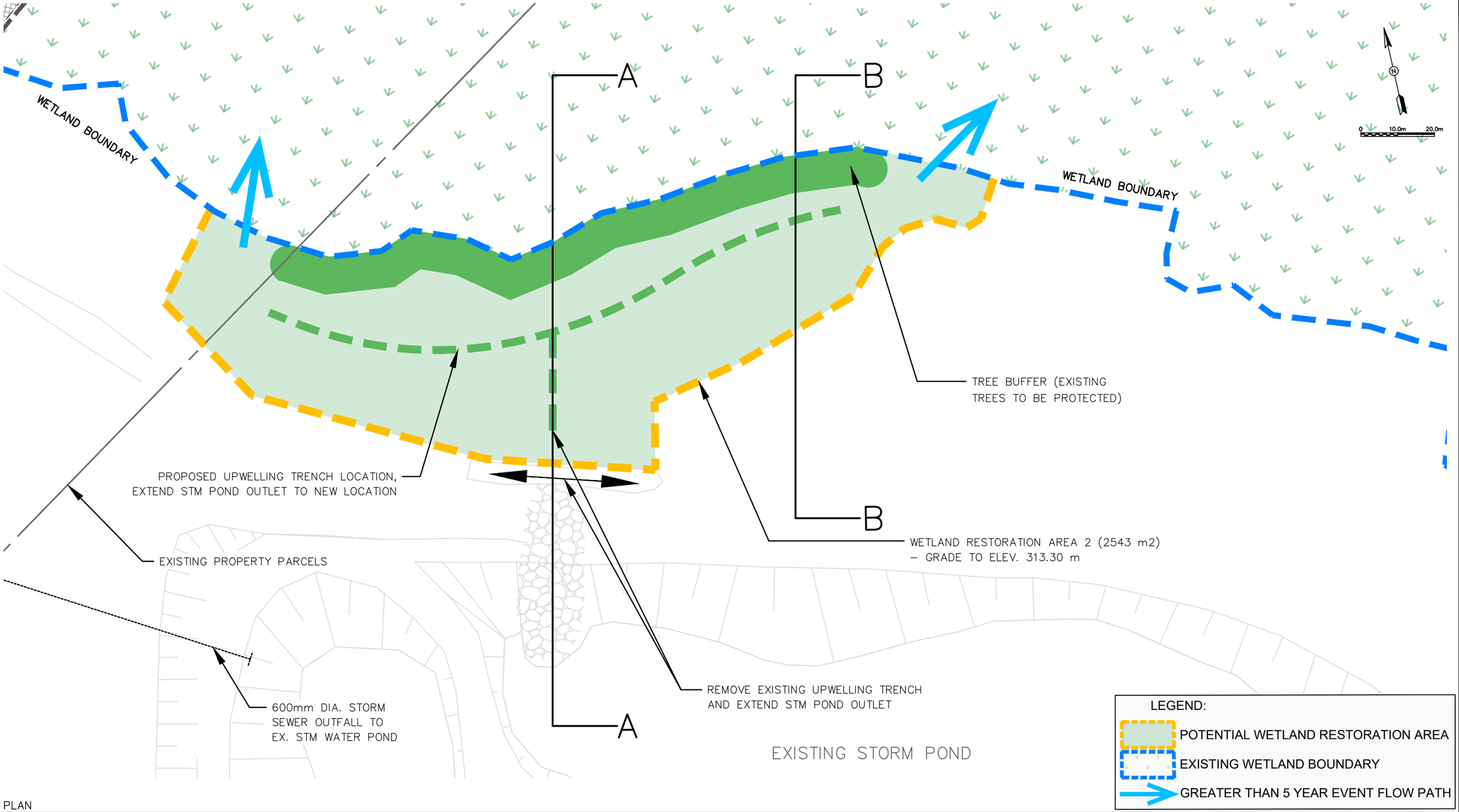
PRELIMINARY ROAD DESIGN

PLATES – PROFILE
FROM STA. 10+440 TO STA. 10+526.39

BT ENGINEERING

HORZ.	1:500
VERT.	1:50
DRAWN	A.D.
DESIGN	A.D.
REVIEWED	S.J.T.
DATE	2024/09/03

CONTRACT 21-003 SHEET NO. C-008



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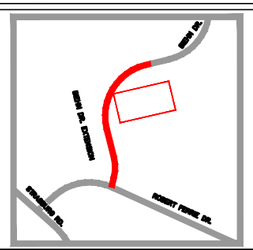


NO.	REVISIONS	DATE	APPROVED
1.	ESR	SEP/24	S.J.T.

BIEHN DRIVE

PRELIMINARY ROAD DESIGN

ADDITIONAL WETLAND RESTORATION AREA

BT ENGINEERING

BTE

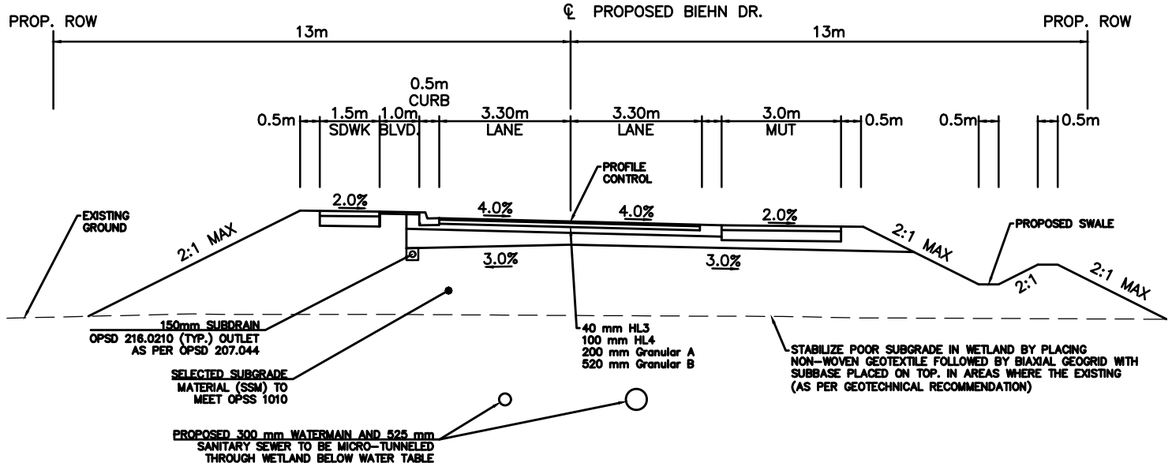
HORZ.	1:500
VERT.	1:50
DRAWN	A.D.
DESIGN	A.D.
REVIEWED	S.J.T.
DATE	2024/09/03

CONTRACT 21–003 SHEET NO. C–009

BIEHN DRIVE TYPICAL SECTION IN SUPERELEVATION

ROAD SECTION THROUGH PSW FROM STA. 10+337 TO STA. 10+500

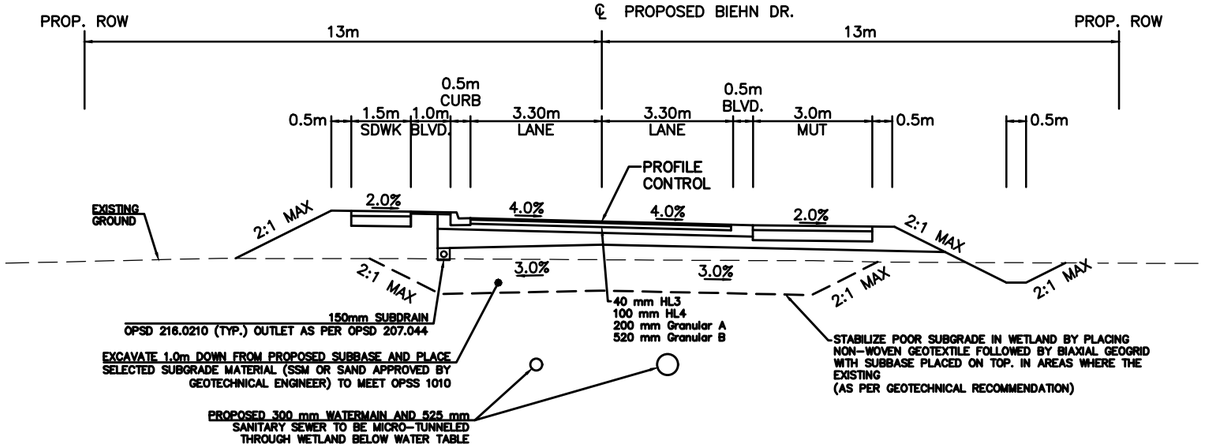
NOTE: EXCAVATED NATIVE WETLAND MATERIAL TO BE SALVAGED AND PLACED ON PROPOSED SLOPES



BIEHN DRIVE TYPICAL SECTION IN SUPERELEVATION

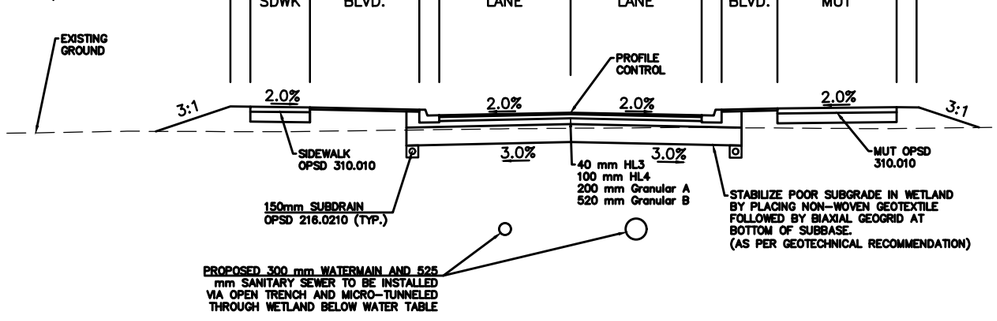
ROAD SECTION THROUGH PSW WITH EXCAVATION OF EXISTING GROUND

NOTE: EXCAVATED NATIVE WETLAND MATERIAL TO BE SALVAGED AND PLACED ON PROPOSED SLOPES



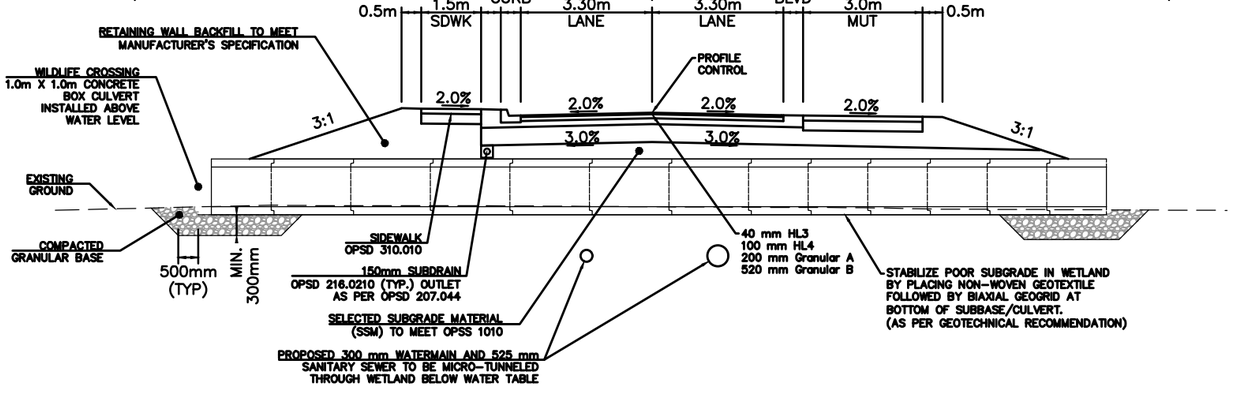
BIEHN DRIVE TYPICAL SECTION

FROM STA. 10+060 TO STA. 10+337
FROM STA. 10+500 TO EXISTING BIEHN DRIVE



BIEHN DRIVE TYPICAL SECTION

ROAD OVER WILDLIFE PASSAGE



NO.	REVISIONS	DATE	APPROVED
1.	ESR	SEP/24	S.J.T.

BIEHN DRIVE

PRELIMINARY ROAD DESIGN

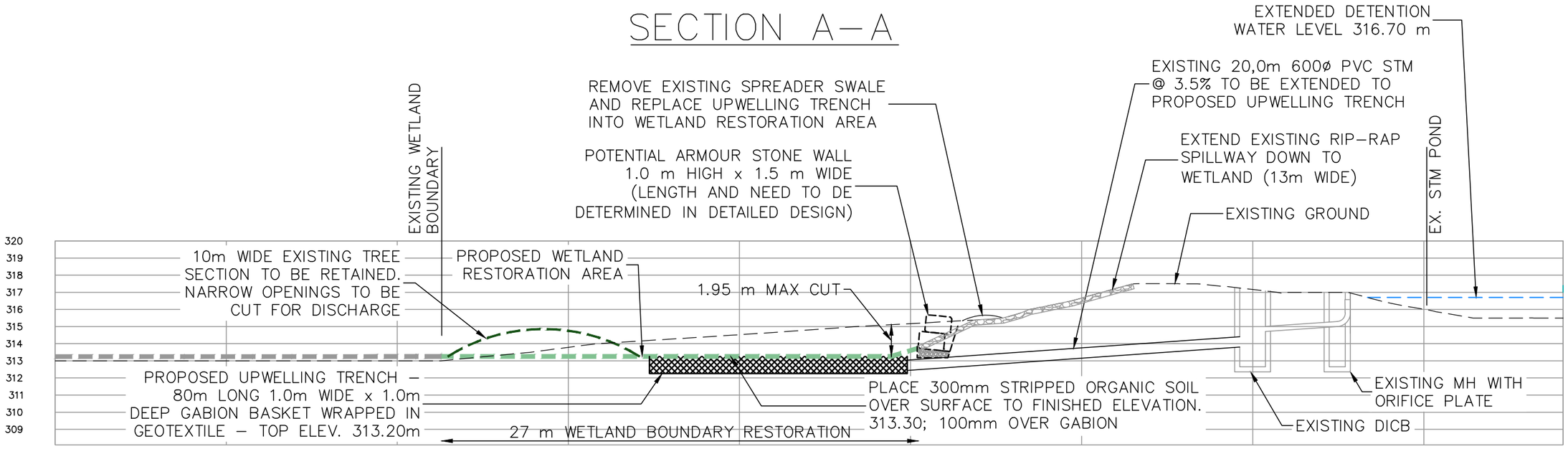
TYPICAL CROSS SECTIONS

BT ENGINEERING

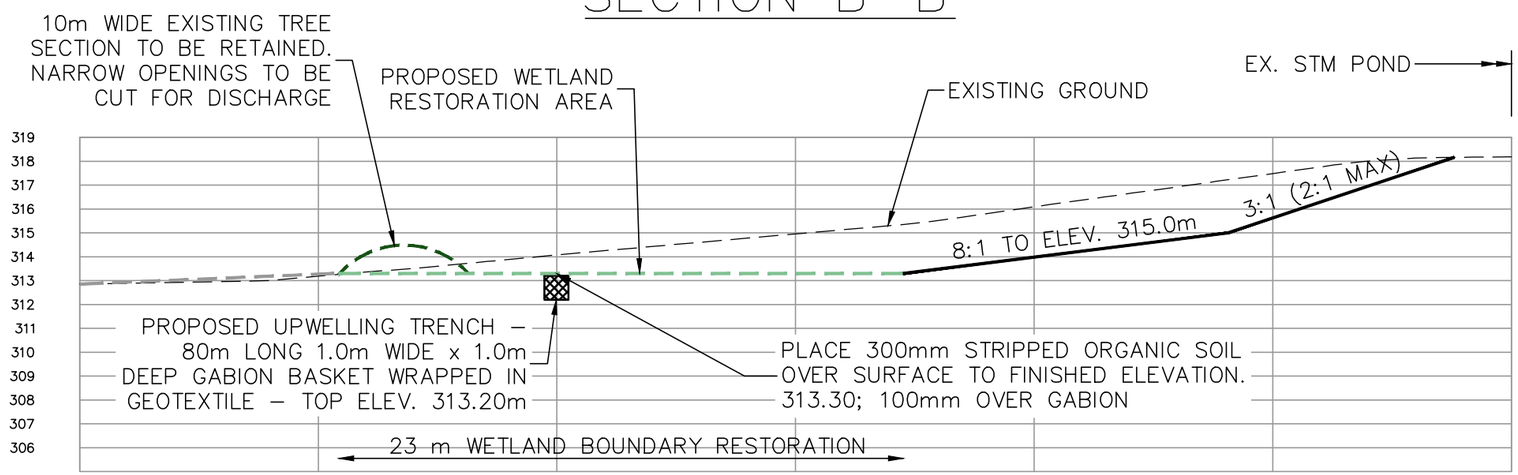
HORZ.	1:150
VERT.	1:150
DRAWN	A.D.
DESIGN	A.D.
REVIEWED	S.J.T.
DATE	2024/09/03

CONTRACT 21-003 SHEET NO. C-010

SECTION A–A



SECTION B–B



	REVISIONS	DATE	APPROVED
1.	ESR	SEP/24	S.J.T.

BIEHN DRIVE

PRELIMINARY ROAD DESIGN

WETLAND RESTORATION SECTIONS

BT ENGINEERING

BTE

HORZ.	1:250
VERT.	1:250
DRAWN	A.D.
DESIGN	A.D.
REVIEWED	S.J.T.
DATE	2024/09/03

CONTRACT 21–003 SHEET NO. C–011

The following list of technical appendices are available online at:
https://www.kitchener.ca/en/development-and-construction/construction-projects.aspx

A copy is also available for review at the City of Kitchener office upon request.

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	Appendix B2	Indigenous Consultation
Appendix C	Select Correspondence	
Appendix D	Geotechnical Investigation	
Appendix E	Environmental Investigations	
Appendix F	Cultural Heritage	
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Volume 3 - Technical Appendices

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Volume 4 - Technical Appendices

Appendix J	Dewatering Assessment
Appendix K	Biehn Drive Truck Sanitary Sewer Extension Technical Memorandum
Appendix L	Analysis and Evaluation Report
Appendix M	Council Resolution