

Region of Peel

Albion Vaughan Road and King Street Intersection Class Environmental Assessment

Project File Report

16-4390

July 2020



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1. Introduction and Background

The Region of Peel is considering improvements to the intersection of Albion Vaughan Road and King Street East (Peel Regional Road 9)/King Road (York Regional Road 11), in the Town of Caledon. The current traffic conditions present long queues and delay at this intersection, and it is expected that these conditions will worsen in the future due to a significant increase of traffic along Albion Vaughan Road and King Street. Currently, all four sections of the intersection are owned by four different jurisdictions as illustrated in Figure 1.

CIMA Canada Inc. (CIMA) was retained by the Region of Peel to undertake a Municipal Class Environmental Assessment (Class EA) study for the reconstruction of Albion Vaughan Road and King Street Intersection to examine the potential for operational and safety improvements for all modes of transportation through reconstruction.

The purpose of this Class EA study is to determine the need for transportation improvement within the study Area, as shown in **Figure 1**, and to consider a wide range of alternatives to address any problems and/or opportunities. This Study assesses the impact of each alternative and considers input from the public and regulatory agencies, in an effort to determine the best solution to address identified problems.

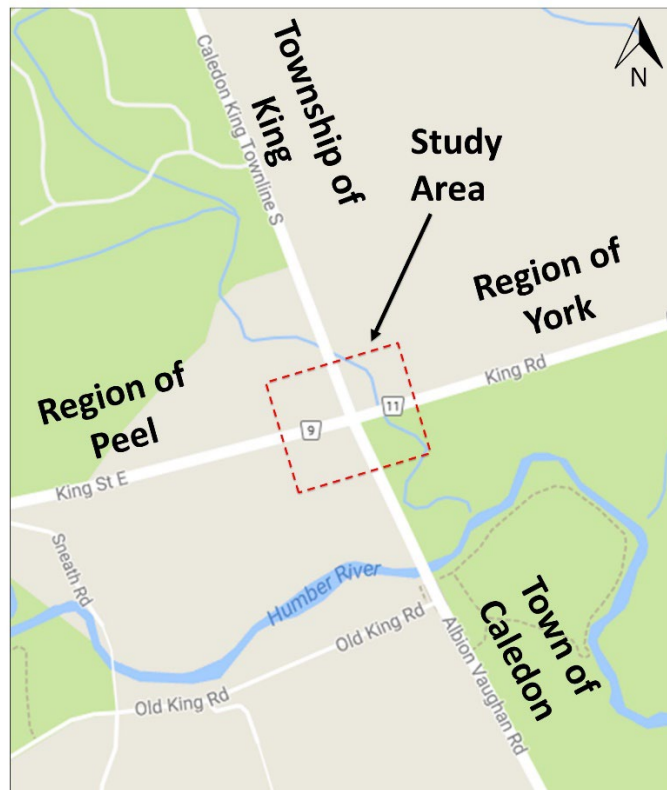


Figure 1-1: Study Area

2. Study Approach

This Municipal Class EA study was initiated in December 2016 and scheduled for completion in 2018. The study team included engineers, planners, archaeologist, and technical staff of Region of Peel, CIMA, and Golder Associates Ltd.

2.1.1. Municipal Class Environmental Assessment Process

The Municipal Engineers Association (MEA) Municipal Class Environmental Assessment (October 2000, as amended in 2007, 2011 and 2015 addendum) is an approved planning and design process under the *Ontario Environmental Assessment Act*. As illustrated in **Figure 2**, the planning and design process is comprised of five phases:

- Phase 1** Identify Problem or Opportunity;
- Phase 2** Identify and Evaluate Alternative Solutions to the problem or opportunity;
- Phase 3** Identify and Evaluate Alternative Design Concepts for the preferred solution;
- Phase 4** Complete and File Environmental Study Report (ESR) for public review; and
- Phase 5** Implement the project (Detail Design, Construction, Operation, and Environmental Monitoring).

Transportation improvements are classified into one of the following schedules:

Schedule A Projects are limited in scale, have minimal adverse environmental impacts, and may be implemented without following the full Class EA process.

Schedule A+ Projects are limited in scale, have minimal adverse environmental impacts, and may be implemented without following the full Class EA process. However, the public is to be advised prior to implementing the project.

Schedule B Projects may have some adverse environmental impacts. The proponent must undertake a screening process, involving contact with directly affected public and technical/regulatory review agencies to ensure that they are aware of the project and that their concerns are addressed. A Project File is prepared for public review.

Schedule C Projects may have significant environmental impacts. The proponent must follow the full planning, design, and documentation process of the MEA Municipal Class EA document. An Environmental Study Report is prepared for public review.

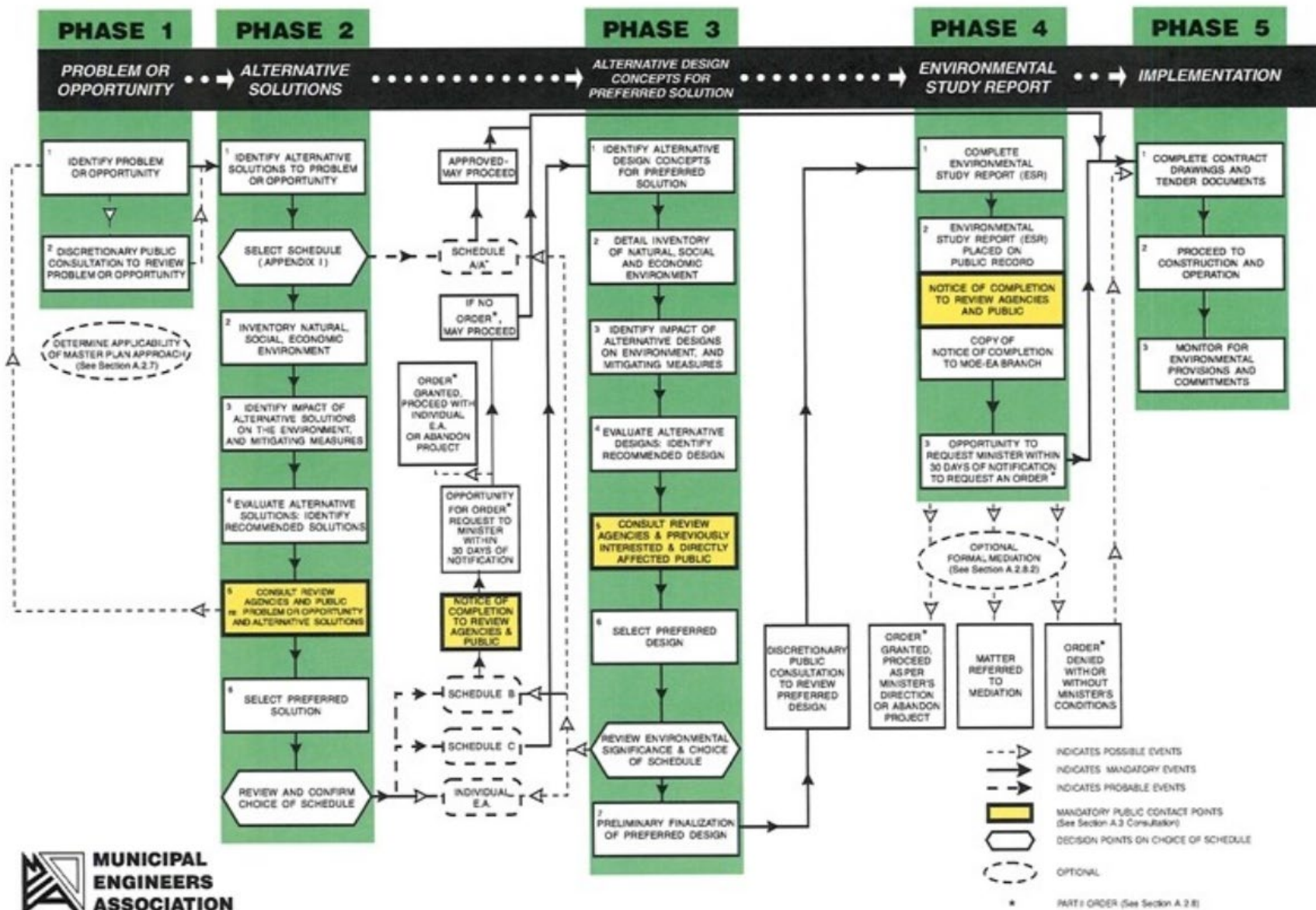


Figure 2-1: Municipal Class EA Planning and Design Process

This study follows Phases 1 and 2 of the planning and design process for Schedule B projects. The public will have 30 days to review the Project File and discuss any outstanding issues with the Region of Peel. A Notice of Study Completion will be issued notifying the public of the completion of the study and initiation of the 30-day review period.

2.1.2. Climate Change

The Ministry of Environment, Conservation and Parks (MECP) has set expectations for considering climate change in the preparation, execution and documentation of environmental assessment studies. The MECP has developed codes of practice (codes) to provide guidance on key aspects of the environmental assessment process. This guide covers the consideration of:

- the impacts of a project on climate change;
- the impacts of climate change on a project; and
- various means of identifying and minimizing negative impacts during project implementation.

The directions and methods outlined in the MECP guidance complement and support the climate-focused policies of the 2014 Provincial Policy Statement. The 2014 Provincial Policy Statement issued under the Planning Act advises planning authorities of the need to consider development that reduces greenhouse gas emissions and reduces the potential risk of climate change related events like droughts or intense precipitation. A partial listing of applicable policies in the 2014 Provincial Policy Statement include:

- Policies 1.6.2, 1.6.6.7 — Encourage green infrastructure (e.g. permeable surfaces) and strengthen stormwater management requirements
- Policy 1.8 — Require the consideration of energy conservation and efficiency, reduced greenhouse gas emissions and climate change adaptation (e.g. tree cover for shade and for carbon sequestration)
- Policy 3.1.3 — Requires consideration of the potential impacts of climate change that may increase the risk associated with natural hazards (e.g. flooding due to severe weather)

The potential impacts on climate change have been considered and documented throughout the study (see **Table 8** in Section 5.1) in accordance with the MECP guidelines.

2.1.3. Public Consultation

A stakeholder contact list was developed for this study to identify potentially interested parties and notify them of opportunities to review and comment on the study. Key stakeholder included:

- + York Region
- + Township of King
- + Town of Caledon
- + Toronto and Region Conservation (TRCA)
- + Hydro One
- + Ontario Ministry of the Environment and Climate Change
- + Residents/Property Owners

A copy of the contact list for review agencies is included in **Appendix A**.

To inform the general public of key study milestones, each of the following notices were advertised by the Region of Peel, with circulation in the Study Area:

- + Notice of Study Commencement,
- + Notice of Public Information Centre (PIC)

See Appendix A for a copy of all correspondence including a summary of comments and responses by the project team.

Study Commencement

A Notice of Study Commencement was prepared to notify agencies and the public of the initiation of the study. A comment sheet was provided with the notice. The Notice of Study Commencement was advertised in the Peel Region News on January 18, 2017 and was posted to the City's website. The Notice was mailed to property owners on January 17, 2017.

Notice of Public Information Centre

A Notice of Public Information Center (PIC) was prepared to invite the public and agency representatives to attend the PIC on December 5, 2017. The Notice was issued on November 21, 2017.

2.1.4. First Nation Consultation and Accommodation

The following First Nations communities were contacted at key milestones in the study:

- Alderville First Nation
- Curve Lake First Nation
- Hiawatha First Nation
- Mississaugas of Scugog Island First Nation
- Mississaugas of the New Credit First Nation
- The Huron Wendat

3. Existing Conditions

The existing conditions of the Study Area (2016) are described below.

3.1. Study Area

Albion Vaughan Road and King Street East (Peel Regional Road 9)/King Road (York Regional Road 11) is a signalized intersection and the posted speed limit within the study area is 60 km/h. The area is mostly rural area with residential homes scattered throughout.

The current configuration of the intersection includes exclusive left-turn, through, and right-turn lanes in the southbound and eastbound directions, and exclusive left-turn and shared through/right-turn lanes in the northbound and westbound directions.

All four approaches to the intersection have a downward slope towards the intersection. This allows for the intersection to be clearly visible at a far distance away without any sight restriction. The downward slope would be expected to contribute to an increase in vehicles speed which may be contributing to the number of rear-end collisions at the intersection. The steepest slope appears to be the west leg, which also has had historically the highest number of rear-end collisions.

The intersection of Albion Vaughan Road and King Street is the only signalized intersection in several kilometers in each direction. The current direction signs are too small to be read by unfamiliar drivers at the current operation speeds.

There are several truck route restrictions at the intersection of King and Albion. Trucks are not allowed to go north or west at the intersection, but it may be an opportunity to reduce the complexity of the truck restriction signing.

3.2. Active Transportation

With regard to current facilities provided for active transportation, within the vicinity of the Albion Vaughan Road and King Street intersection, the following should be noted.

- Narrow (approximately 1 m wide) asphalt kill strip along both sides of Albion Vaughan Road, north of King Street for approximately 85 m before transitioning to unpaved granular shoulders;
- Approximate 2 m wide concrete sidewalk along the west side of Albion Vaughan Road between King Street and Old King Street, which connects to the Humber Valley Heritage Trail;
- Narrow (approximately 1 m wide) asphalt kill strip along the east side of Albion Vaughan Road, south of King Street;
- Paved shoulders along the south side of King Street, east of Albion Vaughan Road;
- Narrow (approximately 1 m wide) asphalt kill strip along the north side of King Street, east of Albion Vaughan Road for approximately 150 m before transitioning to paved shoulders; and
- Narrow (approximately 1 m wide) asphalt kill strip along both sides of King Street, west of the Albion Vaughan Road.

The northeast and southeast corners of the intersection of King and Albion do not provide sufficient space for pedestrians to stand. In particular, the sidewalk area is less than 1 m and therefore does not meet current Accessibility for Ontarians with Disabilities Act (AODA) requirement of a minimum clear width of 1.5 m. These two corners also do not have any curb ramps. None of the intersection corners included tactile walking surface indicators. Based on the foregoing, existing pedestrian and

cycling facilities are considered to be fairly limited; however, this is common for rural locations where pedestrian and cycling demand is low due to greater distances between origins/destinations.

3.3. Transit Operations

With regard to transit, bus stops are currently located around the intersection as follow:

- At the north side of King Street approximately 60 m west of the intersection; and
- At the south side of King Street approximately 40 m west of the intersection.

These bus stops currently serve GO Transit Route #38, which provides the following service:

- two scheduled buses in the eastbound direction (buses on King Street turn right to head southbound on Albion Vaughan Road) during the weekday morning peak (6:01 AM and 6:44 AM); and
- two scheduled buses in the westbound direction (buses on Albion Vaughan Road turn left to head westbound on King Street) during the weekday afternoon peak (5:45 PM and 6:40 PM).

3.4. Traffic Operations

A Transportation and Traffic study was conducted to review the existing and future traffic operations within the study area. The Transportation and Traffic Study Report is available in **Appendix B**.

The intersection of Albion Vaughan Road and King Street was included as part of an operational analysis previously completed for the April 2016 Bolton Residential Expansion Areas Study (BRES). The purpose of the BRES was to conduct intersection analysis and provide recommendations for intersection improvements on Regional Roads, based on eight land development scenarios. A resulting conclusion from the BRES report was the requirement of modifications to the Albion Vaughan Road and King Street intersection - referred to as King/Townline in the BRES report, such as additional auxiliary turn lanes to mitigate the projected performance of this intersection.

CIMA+ reviewed traffic operations and collision data for the intersection of King and Albion to gain an understanding of potential safety issues. The following data were provided by the Region:

- Turning Movement Counts (TMC), dated January 27, 2016; and
- Collision Details Report, from the years 2011-2015.

The TMC indicated that the following peak periods: AM Peak Hour, between 7:30 and 8:30 and PM Peak Hour, between 4:45 and 5:45 PM.

Figure 2 illustrates intersection turning movement volumes at peak hour periods.

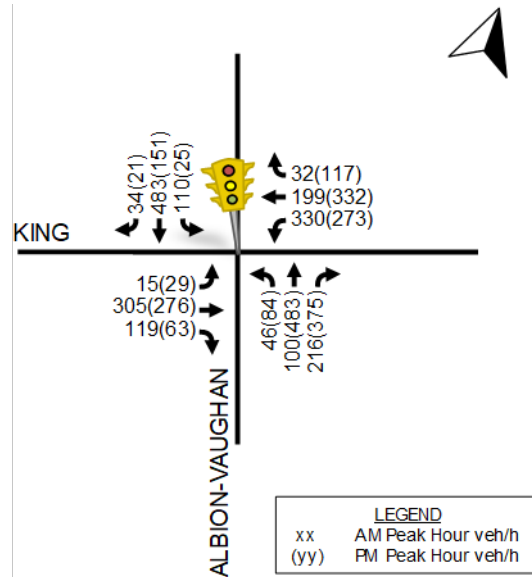


Figure 3-1: Existing (January 2016) Peak Hour Volumes

The existing traffic movements at this intersection operating at Level of Service D or higher, as described in the BRES report are shown in **Table 1**. Under existing conditions, northbound through movements during the PM peak period are operating under a Level of Service F which affects the overall level of service of the intersection.

A field investigation of study area confirmed vehicular traffic at the intersection during the most travelled time of the day exceeds the capacity of the northbound portion which affects the entire operation of the intersection generating an increase on travel time of 70 seconds per vehicle.

Table 1: Existing Intersection Operations (BRES April 2016)

Mov.	Weekday AM Peak Hour				Weekday PM Peak Hour			
	LOS	v/c	Control Delay(s)	95 th %ile Queue Length (m)	LOS	v/c	Control Delay(s)	95 th %ile Queue Length (m)
Overall	C	0.63	34.9	-	E	1.02	69.9	-
EB T	D	0.50	36.8	68.7	D	0.59	44.1	78.0
WB L	C	0.63	20.8	122.1	D	0.86	50.4	128.3
NB T	D	0.51	35.0	81.8	F	1.11	97.6	353.5
SB T	D	0.78	45.0	136.1	B	0.18	17.4	52.0

3.5. Traffic Safety

In 2012, CIMA+ conducted a safety network screening analysis for the Region of Peel using collision data from 2005 to 2009. Safety network screening is a systematic ranking of locations in terms of their potential for safety improvements. Sites ranked high have a higher potential for a safety improvement.

In the 2012 CIMA+ report, the subject intersection (described as intersection ALBION VAUGHAN RD/CALEDON KING TOWN LI @ KING ST E (INT_452)) was ranked 147 out of 587 signalized intersections putting the intersection in the top 25% of intersections in terms of the potential for a safety improvement.

During the 2005 to 2009 period there had been twenty-five property damage only collisions and four injury collisions and the average intersection entering traffic volume over the five-year period was 19,000 AADT.

As part of this study collision data from 2011-2015 was reviewed. The collision records provided for the subject intersection indicated that from a total of 21 collisions between 2011 and 2015, two were injury collision (both were angle collisions) and the rest of the collision were relatively minor property damage only collisions.

- Eleven collisions were rear-end (52%),
- Five were turning/angle collision (24%),
- Three were single motor vehicle collisions (14%), and
- Two were sideswipe collisions (10%).

There were no reported pedestrian, cyclist, or fatal collisions at King and Albion during the 2011-2015 period.

3.1. Socio-economic Environment

3.1.1. Land Use

Currently, all four corners of the intersections are owned by four different jurisdictions (Figure 1). The eastern side of the intersection is within the jurisdictions of York Region and the Township of King. The western side of the intersection is within the jurisdictions of the Region of Peel and the Town of Caledon.

York Region identifies the eastern side of the Study Area as Regional Greenlands System, which represents the NHS of the Region. Within the Greenlands System, York Region designates the Study Area as woodland.

The Township of King identifies the corner southeast of the intersection as green space.

The Region of Peel identifies the western side of the Study Area as a core area of the Greenlands System. The Region also identifies the section of the Humber River outside of the Greenbelt as a River Valley Connection (southwest of the intersection). The Town of Caledon identifies the western side of the Study Area as Environmental Policy Area.

3.1.2. Planning Context

Regional of Peel Official Plan

The Region of Peel Official Plan identifies the land use in the study area (west portion) as “urban area” as part of the Town of Caledon urban area.

Regional of York Official Plan

The Region of York Official Plan identifies the land used in the study area (east portion) as “urban area” as part of the Township of King urban area.

Town of Caledon Official Plan

The Town of Caledon official Plan designated land use in the study area as Settlement Area. Albion-Vaughan Road is located at the east border of Caledon, as part of the Bolton Community.

Township of King Official Plan

The Township of King official designated land use in the study area as Greenbelt Rural Area. The study area is located at the southwest border of King.

3.2. Natural Environment

3.2.1. Watercourses

A Natural Environment Assessment was conducted to review the natural heritage features within the study area. The Natural Environment Assessment Report is available in **Appendix C**.

The Study Area is located within the middle reaches of the main Humber River watershed. The Humber River flows east across Albion Vaughan Road south of King Street. Cold Creek, a tributary to the Humber River, flows southeast across Albion Vaughan Road and crosses King Street before its confluence with the Humber River (**Figure 4**). Both the Humber River and Cold Creek are in Toronto and Region Conservation Authority's (TRCA) Middle Humber Fish Management Zone, and both watercourses are considered to be cold water fish habitat.

Fisheries data from TRCA indicate that both Cold Creek and Humber River are habitat for salmonids, with diverse cyprinid and game fish communities. Redside Dace are reported in the Humber River watershed, but were not specifically identified in the watercourse reaches at the Study Area.

TRCA has identified a Natural Heritage System (NHS) within and around the Study Area, comprised largely of the natural areas around the watercourses and the undeveloped green spaces on the TRCA property (Figure 4). The valley and stream corridors associated with Cold Creek and the Humber River are also identified as natural environment features by the TRCA.

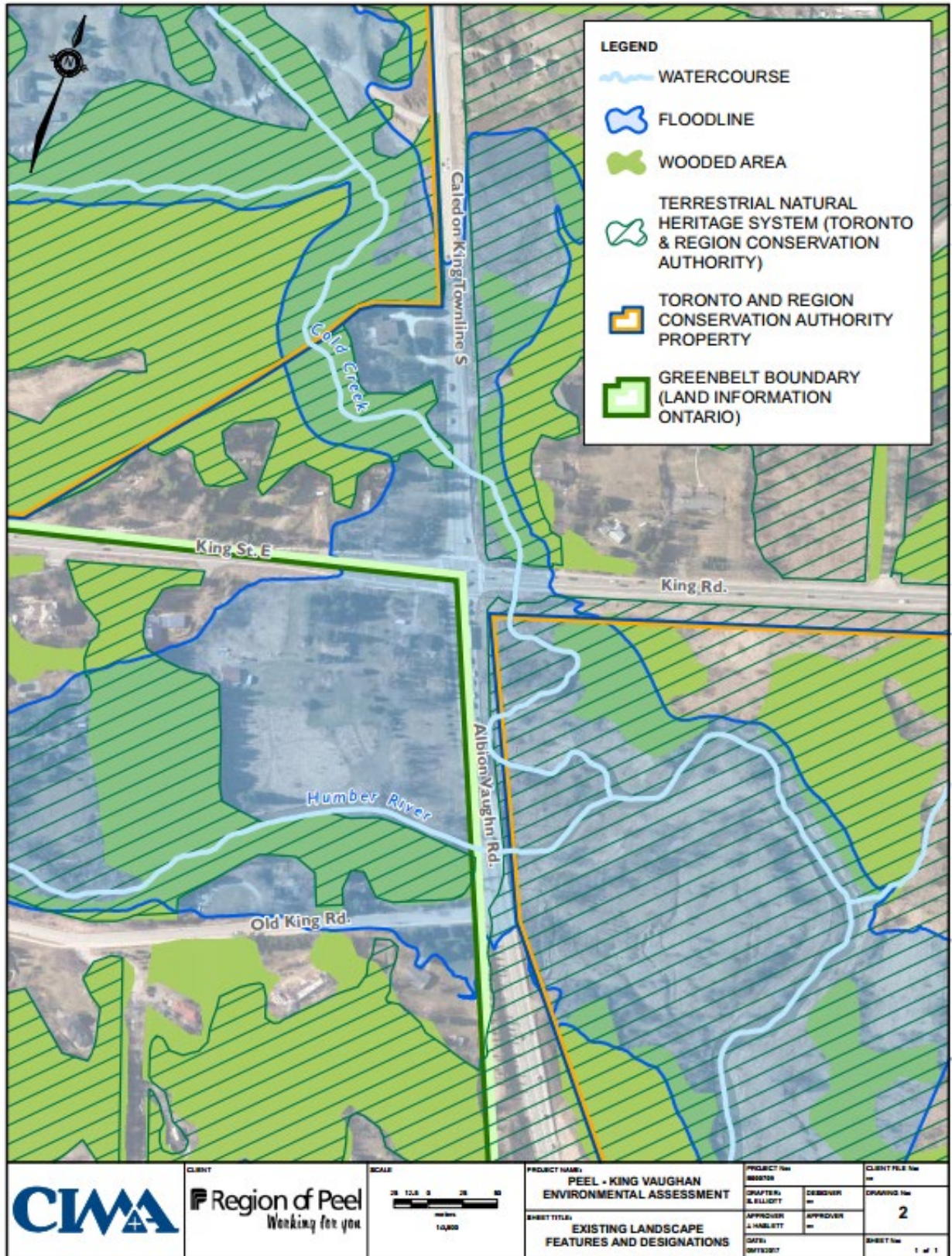


Figure 3-2: Existing Landscape Features and Designations

3.2.2. Vegetation

A vegetation survey was conducted generally following the Ecological Land Classification (ELC) approach. Polygons were delineated from aerial photograph interpretation, and a survey of plant species was conducted within the publicly owned ROW. Observations of plant species beyond the ROW were made where possible. Three community types were identified; Deciduous Forest (FOD), Cultural Meadow (CUM), and Residential (RES) as illustrated in **Figure 5**.

The Study Area is located within Ecoregion 6E, the second most densely populated ecoregion in Ontario. This ecoregion is part of the Mixedwood Plains of Southern Ontario, characterized by relatively diverse vegetation.

Uplands in the Study Area consist of forest and meadow. The lands southeast of the intersection are owned by the TRCA and are undeveloped. The other quadrants of the intersection are development as low density residential. In these areas, natural cover is punctuated with buildings and maintained green spaces.

Most of the Study Area is within the Natural Heritage System of the Protected Countryside of the Provincial Greenbelt Plan. No Provincially Significant Wetlands or Areas of Natural and Scientific Interest are within or in proximity to the Study Area.

3.2.3. Birds

No formal breeding bird survey was conducted as part of the field assessment. CIMA+ ecologists collected data on bird species present in the Study Area through opportunistic observations. Data from the Nature Counts eBird program and from TRCA were also compiled and reviewed. The results are summarized in the Natural Environment Assessment in Appendix C, representing all documented observations in the vicinity of the Study Area.

Of the recent bird species observations (within the last 5 years), there are several with rarity classifications that trigger policy protection. These include species that are designated as either provincially or federally at risk, or Species of Conservation Concern as identified by TRCA (L1 to L3 ranks). Species of Conservation Concern may not currently be rare, but they are highly sensitive to habitat loss and disturbances associated with changes in the surrounding landscape. As such, they are protected under the Provincial Policy Statement.

3.2.4. Amphibians and Reptiles

The Ontario Nature Herptile Atlas (Atlas Squares 17PJ05 and 17PJ06) was consulted to determine which amphibian and reptile species are likely to occur in the general vicinity of the Study Area. These records were augmented with data provided by TRCA.

Of the recent herptile species observations (within the last 5 years), there are several with rarity classifications that trigger policy protection. These include species that are designated as either provincially or federally at risk, or Species of Conservation Concern as identified by TRCA (L1 to L3 ranks). Species of Conservation Concern may not currently be rare, but they are highly sensitive to habitat loss and disturbances associated with changes in the surrounding landscape. As such, they are protected under the Provincial Policy Statement. A full list of rare herptile species is provided in the Natural Environment Assessment in Appendix C.

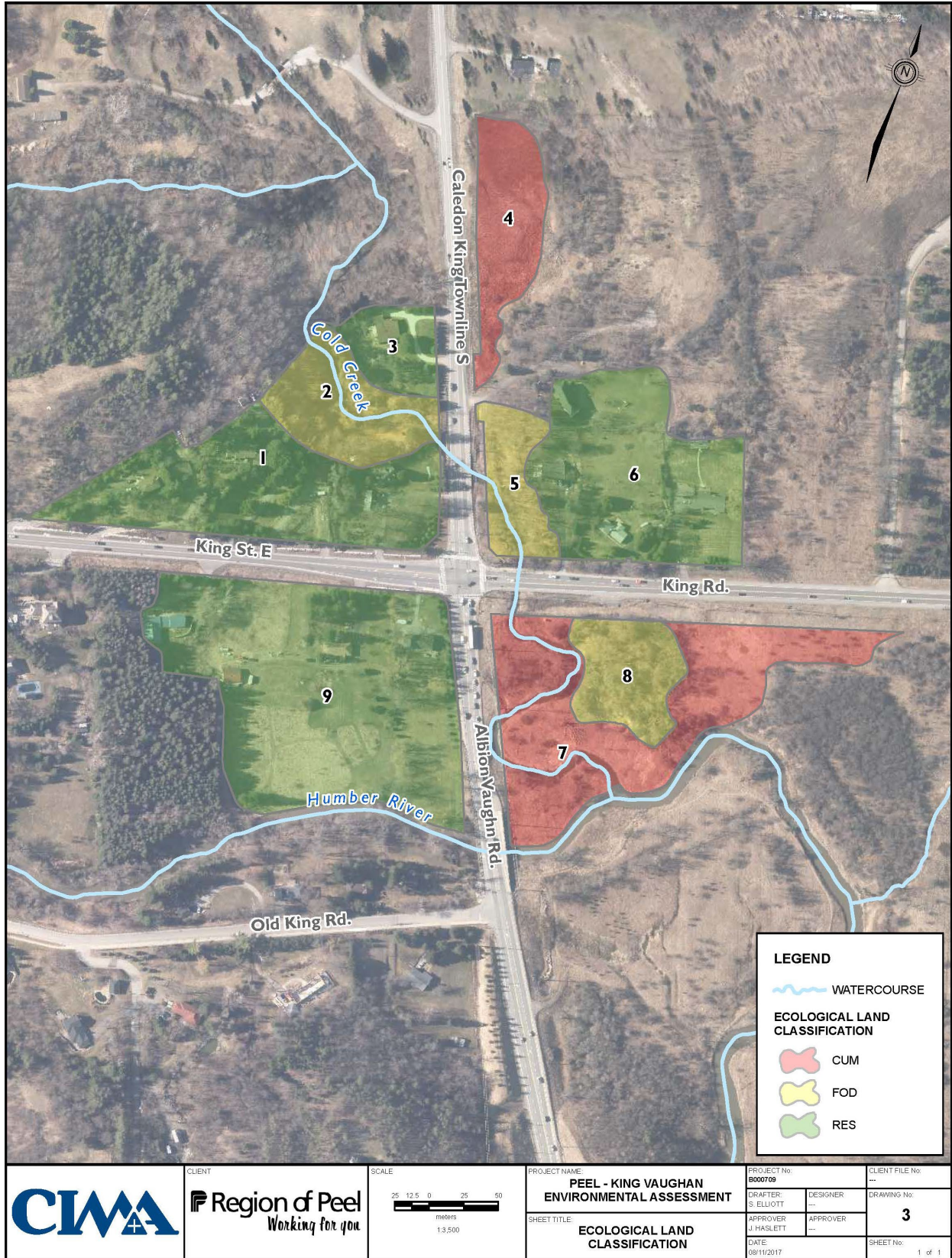


Figure 3-3: Ecological Land Classification

3.2.5. Mammals

The Atlas of the Mammals of Ontario was consulted to determine which species are likely to occur in the general vicinity of the Study Area. These records were augmented with data provided by TRCA.

Of the recent mammal species observations (within the last 5 years), only one species has a rarity classification that triggers policy protection. Rare species are designated as either provincially or federally at risk or can be Species of Conservation Concern as identified by TRCA (L1 to L3 ranks). Species of Conservation Concern may not currently be rare, but they are highly sensitive to habitat loss and disturbances associated with changes in the surrounding landscape. As such, they are protected under the Provincial Policy Statement.

Within the Study Area, TRCA observed Northern Short-tailed Shrew (*Blarina brevicauda*) from the forested area approximately 900 m northwest of the intersection. This species is not at risk federally or provincially but is ranked as L3 by TRCA. Northern Short-tailed Shrew is most commonly found in hardwood forests with deep leaf-litter and abundant food and tends to avoid areas with little cover and extremes of temperature and moisture. The habitat adjacent to the intersection would not be preferred by this species.

3.2.6. Fish and Fish Habitat

CIMA+ ecologists conducted a stream assessment on June 27, 2017 to document the biophysical characteristics of both Cold Creek and Humber River.

Fisheries data was compiled from TRCA monitoring information. Two fishery sites, located in Cold Creek and the Main Humber River just southeast of the Study Area, provide recent and historical information about species present in these waterbodies. The fish species in Cold Creek are characteristic of a cold water community, with Rainbow Trout (*Oncorhynchus mykiss*), Brown Trout (*Salmo trutta*), Mottled Sculpin (*Cottus bairdii*), White Sucker (*Catostomus commersonii*), Northern Hog Sucker (*Hypentelium nigricans*), and American Brook Lamprey (*Lethenteron appendix*). The forage fish community is comprised of common cyprinids such as Fathead Minnow (*Pimephales promelas*), Creek Chub (*Semotilus atromaculatus*), Blacknose Dace (*Rhinichthys atratulus*), and Longnose Dace (*Rhinichthys cataractae*). Darters, Yellow Perch (*Perca flavescens*), Pumpkinseed (*Lepomis gibbosus*) and Brown Bullhead (*Ameiurus nebulosus*) are also present.

The fish species in Humber River are similar to that of Cold Creek, with the addition of a more diverse cyprinid and sunfish community. Both watercourses meet the definition of Commercial, Aboriginal, or Recreational (CRA) fishery under the most recent policies of the Fisheries Act.

No aquatic species at risk are known in the Study Area, however American Brook Lamprey is ranked as L3 by TRCA. This species is associated with stable, high quality cold water habitats. Maintenance of clean substrates and cold water temperature are important.

3.3. Stormwater Management

A Stormwater Management assessment was conducted to review the existing drainage patterns and soil conditions of the study area. The Stormwater Management Report is available in **Appendix D**.

Topography of the study area is defined by the valley / channel of the Humber River, and the confluence with Cold Creek Tributary. Existing overland drainage generally drains to a low point / sag at the intersection. The catchment areas and outlets are described below:

- **Catchment 1:** King Street East from Sneath Road to Caledon King Townline Road, and Caledon King Townline Road to Cold Creek Bridge to the North is an urban cross-section with curb and gutter, catch basins, and storm sewers. The majority of the flows from King Street East are treated by an existing Oil Grit Separator on the NW corner of the intersection, prior to outletting to Cold Creek via a 675mm stormsewer on the NE corner of the intersection.
- **Catchment 2:** Albion Vaughan Road from King Street East to Old King Road is an urban cross-section with curb and gutter, catch basins and storm sewers discharging to an outlet on the SE corner of the intersection via a 450mm stormsewer. The flows outlet to a 1.0m wide enhanced swale prior to discharging to Cold Creek.
- **Catchment 3:** King Road from Albion Vaughan Road to 400m East of the intersection is a semi-rural crosssection with CB's and DI's on the north side of the road outletting to a grass ditch on the South Side of the road outletting to Cold Creek.
- **Catchment 4:** Caledon King Townline Road North of Cold Creek is a rural cross-section with grass ditching on both sides of the roads draining South to Cold Creek.
- **Catchment 5:** The external drainage area is predominantly undeveloped with low-density residential properties draining to the King Street East stormsewer system as described in Catchment 1.
- **Catchment 6:** The external drainage area is predominantly undeveloped draining to the Caledon King Townline Road ditch system as described in Catchment 4.

Land use in the study area generally consist of low-density residential development, and undeveloped valley lands. The soil within the study area consist primarily of bottom land, and clay loam which is classified as hydrologic soil group C. In terms of drainage this type of soil is considered to have a moderate to poor drainage capability, meaning very little rainfall in the open areas will soak into the ground, leaving most of the water as runoff

3.4. Hydraulics

A Hydraulics Assessment was conducted to investigate the existing and proposed hydraulics condition of the bridges within the study limits. The Hydraulic Assessment Report is provided in **Appendix D**.

There are three bridge structures present within the study area (**Figure 6**):

- Albion Vaughan Bridge (structure 1)
- King Road Bridge (structure 2)
- Caledon King Townline South Bridge (structure 3)

A field investigation was completed on December 8, 2016 to document the hydraulic characteristics of the existing Bridges including any drainage and erosion concerns at each bridge. Background documents were obtained including General Arrangement drawings to confirm crossing span and height, roadway profiles, and channel dimensions.

Table 2 provides a description of the existing bridge structures, and photograph of each watercourse crossing.

Table 2: Summary of Existing Watercourse Bridge Crossing Structures

Description	Picture
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<p>Structure 1: Albion / Vaughan Road (Peel Regional Road 14) Bridge over Humber River, is a 3 span (12.1m-20.2m-12.1m) pre-stressed concrete girder bridge, original constructed in 2004. The structure is located approximately 200m south of King Road.</p> <p>No erosion/scour to note. There is a pedestrian trail on the south side including staircase walkway on the west side of the structure.</p>	
<p>Structure 2: King Road Bridge (York Regional Road 11) over Cold Creek (Structure ID 37-78), is a 12.9m single span arch concrete bridge, constructed is unknown. The structure is located approximately 25m east of Caledon Townline Road.</p> <p>A water survey of Canada (WSC) monitoring gauge is located at the upstream end of King Road Bridge. The spillway/intake is on the upstream side of the bridge, and the shelter is on the south side of King on the east bank.</p>	
<p>Structure 3: Caledon King Townline Road Bridge over Cold Creek (Structure ID 37-77), is an 8.4m single span arch concrete bridge, original constructed in 1982, and rehabilitated in 2004. The Structure is located approximately 90m north of King Road.</p> <p>There is an erosion/scour hole along the south abutment (0.3m to 0.5m deep). No damage or uncutting of the footing was observed.</p>	



Figure 3-4: Location of Bridge Structures

Under existing conditions, Structure 1 conveys the 100-yr flow, Structure 2 conveys the 25-year flow, and Structure 3 conveys the 5-year flow.

Structure 1 successfully meets MTO criteria for clearance, which states that at a 50 year water level clearance must measure greater than or equal to 1.0 vertical metre. The clearance measured for this Bridge was 1.24m. However, in regard to freeboard (measured using 50 year water levels) and relief flow depth (measured using regulatory water levels), Structure 1 failed to meet either criteria. Freeboard was measured at 0.35m, below the acceptable criteria of greater than or equal to 1.0m. Relief flow depth was measured at a depth of 1.99m, exceeding the criteria of less than or equal to 0.3m.

For Structure 2, none of the MTO criteria for freeboard, clearance and relief flow depth were met. Freeboard for this bridge was measured at -0.28m, clearance at -0.89m, and relief flow depth at 1.61m. Both freeboard and clearance were measured at 50 year water levels and relief flow depth was measure using regulatory water levels.

Structure 3 also failed to meet the MTO criteria for freeboard, clearance and relief flow depth. Using 50 year water levels, freeboard and clearance both landed outside the criteria at -0.54m, and -1.03m, respectively. Using regulatory water levels relief flow depth was measured to be above criteria at 1.98m.

3.5. Structures

Burgess Engineering Inc. completed an inspection of each of the bridges on February 18, 2017 to document the structural condition. The following is a summary of the results for each bridge:

- **Albion Vaughan Bridge – Structure 1**
 - The bridge is in good to excellent condition showing no signs of structural distress. Minor asphalt repairs are recommended for maintenance.
- **King Road Bridge – Structure 2**
 - The Bridge is in good to excellent condition showing no signs of structural distress. Minor asphalt and barrier handrail repairs are recommended for maintenance. It was also noted that there was a minor debris blockage upstream which should be reviewed for historical design before removal.
- **Caledon King Townline South Bridge – Structure 3**
 - The Bridge is in good to excellent condition showing no signs of structural distress. Minor asphalt, drainage repair and stream debris removal is recommended for maintenance.

3.6. Fluvial Geomorphology

A Fluvial Geomorphic Assessment was conducted for the proposed intersection improvements. The Fluvial Geomorphic Assessment Report is available in **Appendix E**. The results of the field studies and historical air photo analysis at the reach lengths of Cold Creek (CC-01) and the Main Humber River (HR-01) suggest that the channel at CC-01 is transitional or stressed with evidence of aggradation and widening, while the channel at HR-01 is generally stable. The meander belt width of the reach length of CC-01 is approximately 134m, while the meander belt width at the reach length of HR-01 is 238m. In accordance with TRCA guidelines, the meander belt width for CC-01 and HR-01 was aligned with average distance between the top and bottom of the valley walls for the full extent of the study reach.

The 100-year erosion limit at the reach lengths of CC-01 and HR-01 is 106m and 80m, respectively. The reach lengths are shown in Figure 7.

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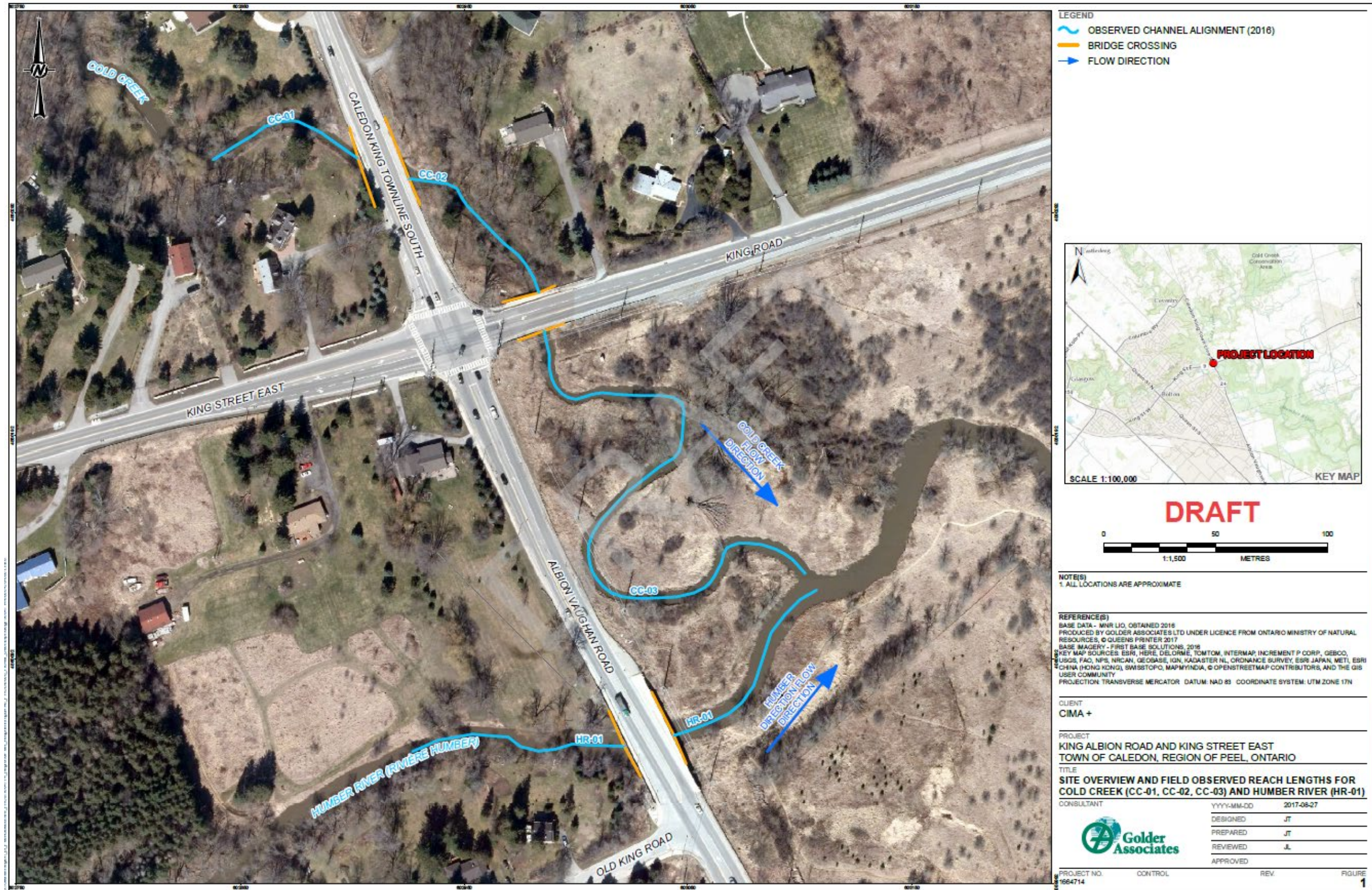


Figure 3-5: Reach Lengths

3.7. Hydrogeology

A Hydrogeological investigation was undertaken to determine the subsurface soil and groundwater conditions in the study area. The Hydrogeology Report is available in **Appendix F**.

Forty-four water well records were identified within 500m of the study area but no municipal or public wells were identified. A private well survey was completed for the study areas and 10 domestic well residences were identified.

3.8. Soils and Geology

Surficial geology mapping from the Ontario Geological Survey indicates that the Study Area is within two surficial geological units of the Till Plains physiographic region of southern Ontario (Chapman and Putnam 1984). Typical soils in these units are comprised of modern alluvial deposits of clay, silt, sand, and gravel, or glaciolacustrine deposits of clay to silt-textured till.

3.9. Contamination

A Contamination Overview study was conducted to identify potential subsurface chemical contamination issues associated with the study area. The Contamination Overview Study Report is available in **Appendix G**.

Based on existing land use information and field investigations, there are no properties which would require further environmental investigation to assess the potential presence of subsurface impacts if a land transfer or property acquisition is required.

3.10. Cultural Heritage

3.10.1. Built/Cultural Heritage

A cultural heritage screening for the proposed intersection improvements was conducted to determine if any heritage resources are present within the study limits. The Cultural Heritage Screening Report is available in **Appendix H**.

The Ministry of Tourism, Culture and Sport (MTCS) Criteria for Evaluating Potential for Built Heritage Recourses and Cultural Heritage Landscapes (2015) checklist results, consultation with the Town of Caledon's Heritage Resource Officer, background research and examination of aerial photographs, and field investigations, have confirmed that there are no known or potential built heritage resources of cultural heritage landscapes within or immediately adjacent to the Study Area.

Although the Study Area contains properties with structures over 4- years old, none of these are considered properties of potential cultural heritage value or interest, and the Project is not predicated to adversely impact the cultural heritage values of the Humber River. As such, no further cultural heritage studies are recommended as part of the Class EA for the Project.

3.10.2. Archaeological Assessment

Stage 1 and Stage 2 Archaeological Assessments were conducted in support of the Municipal Class EA for the improvement of Albion Vaughan Road and King Street intersection in Town of Caledon. The Stage 1 and Stage 2 Archaeological Assessment Reports are available in **Appendix I and Appendix J**, respectively.

The objectives of the Stage 1 Archaeological Overview/Background Study were to compile all available information about the known and potential cultural heritage resources within the study area and to provide specific direction for the protection, management and/or recovery of these resources.

The objectives of the Stage 2 archaeological assessment were to provide an overview of archaeological resources on the property and to determine whether any of the resources might be artifacts and archaeological sites with cultural heritage value or interest and to provide specific direction for the protection, management and/or recovery of these resources, consistent with MTCS guidelines (MTCS 2011).

The Stage 2 archaeological assessment was undertaken for portions of the Project Area, as illustrated in **Figure 8**, by test pit survey at an interval of five metres. No archaeological resources were identified in the areas subject to Stage 2 archaeological assessment and no further archaeological assessment is recommended for these areas. If the project detailed design phase identifies any areas outside of the current alignment for construction, further archaeological assessment of the additional areas may be required.

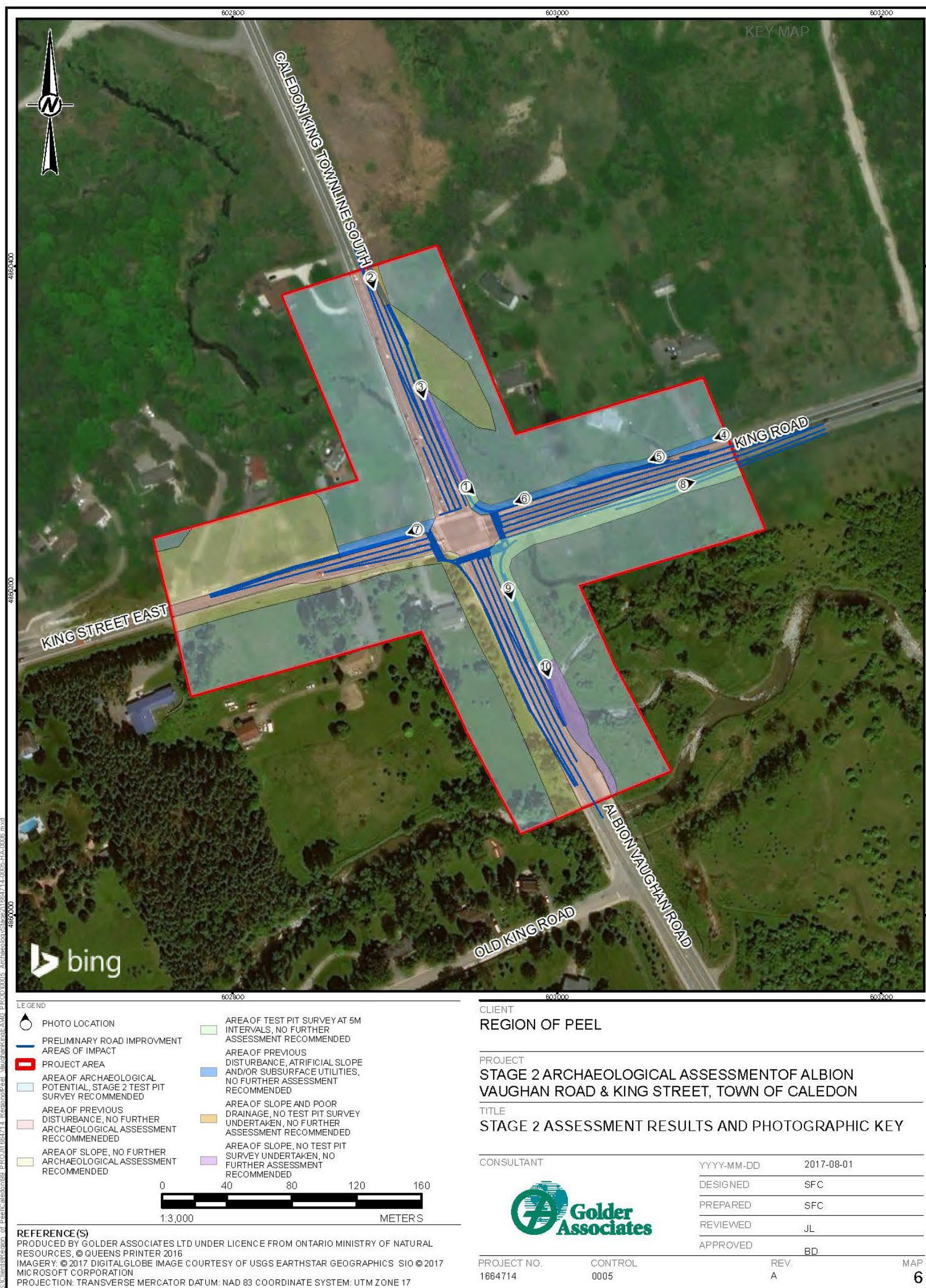


Figure 3-6: Stage 2 Archeological Assessment Results

4. Problem and Opportunity

The results of the capacity analysis of the intersection of Albion Vaughan Road and King Street East (Peel Regional Road 9)/King Road (York Regional Road 11) indicate that long queues and delays are present under current traffic conditions causing operational issues at the intersection.

It is expected that these conditions will worsen in the future due to a significant increase of traffic along King Street and Albion Vaughan Road.

As such, the intersection would significantly benefit from operational and safety improvements for all modes of transportation.

5. Alternative Solutions

Four alternative solutions were examined as part of this study to address the problem described in the previous section of this report:

- Alternative 1: Do Nothing
- Alternative 2: Additional Northbound Right Turn Lane
- Alternative 3: Double Left Turn (Westbound)
- Alternative 4: Double Left Turn and Road Widening (North-South)
- Alternative 5: Widening to Four Lanes

5.1. Analysis and Evaluation

Alternative 1: Do Nothing

No modification to the current Albion Vaughan Road and King Street intersection. The results of the operational; analysis for the future (2031) 'Do Nothing' scenario project the following conditions if intersection improvements are not implemented:

- AM Peak hour: Most movements operating at the intersection is operating over capacity; and
- PM Peak hour: All movements operating at the intersection is operating over capacity.

The results of the operational analysis are presented in **Table 3** for all critical movements.

Table 3: 2031 Intersection Operations (Do-Nothing)

Mov.	Weekday AM Peak Hour				Weekday PM Peak Hour			
	LOS	v/c	Control Delay(s)	95 th %ile Queue Length (m)	LOS	v/c	Control Delay(s)	95 th %ile Queue Length (m)
Overall	F	1.21	91.4	-	F	1.35	124.7	-
EB T	F	1.00	96.5	180.9	F	0.95	89.9	144.8
WB L	F	1.20	153.9	218.7	F	1.39	235.6	185.1
NB T	E	0.82	56.5	151.5	F	1.29	177.8	408.9
SB T	F	1.14	128.0	300.0	B	0.20	18.3	38.3

Alternative 2: Additional Northbound Right Turn Lane

This alternative was presented in the BRES report for the intersection of Albion Vaughan Road and King Street and includes the following improvements as presented in **Figure 9**:

- Addition of an auxiliary northbound right turn lane
- Addition of an auxiliary westbound right turn lane

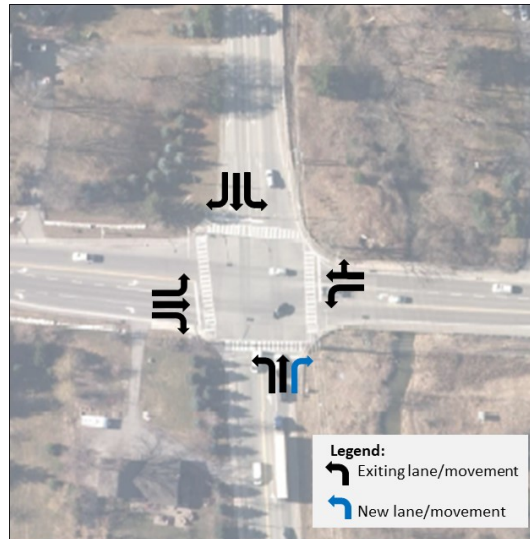


Figure 5-1: Alternative 2 Configuration

The results of the proposed improvements are presented in **Table 4**.

Table 4: 2031 Intersection Operations (BRES Option 6)

Mov.	Weekday AM Peak Hour				Weekday PM Peak Hour			
	LOS	v/c	Control Delay(s)	95 th %ile Queue Length (m)	LOS	v/c	Control Delay(s)	95 th %ile Queue Length (m)
Overall	E	1.10	71.3	-	D	0.89	42.5	-
EB T	F	1.00	96.9	254.4	D	0.60	39.9	92.9
WB L	F	1.15	132.7	136.3	D	0.90	45.8	149.3
NB T	C	0.23	32.7	51.1	D	0.87	51.1	251.2
SB T	F	1.01	81.2	300.9	C	0.29	29.6	54.8

Alternative 3: Double Left Turn (Westbound)

This option expands the recommendations of the BRES Report. This alternative was not included as part of the BRES report, due to the potential implications to property and structures surrounding the study area and it is presented in the report for discussion purposes. Improvements considered as part of this alternative are the following as presented in **Figure 10**:

- Converting existing southbound exclusive right turn lane to southbound through right lane (requires two southbound receiving lanes)
- Adding westbound through-right lane (requires two westbound receiving lanes)

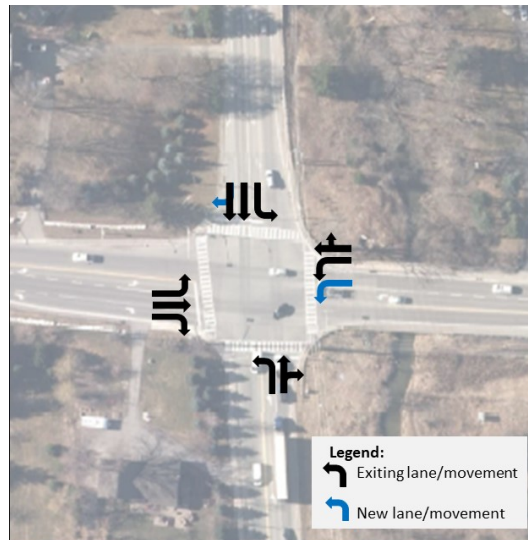


Figure 5-2: Alternative 3 Configuration

The results of the proposed improvements are presented in **Table 5**.

Table 5: 2031 Intersection Operations (Double Left Turn Westbound)

Mov.	Weekday AM Peak Hour				Weekday PM Peak Hour			
	LOS	v/c	Control Delay(s)	95 th %ile Queue Length (m)	LOS	v/c	Control Delay(s)	95 th %ile Queue Length (m)
Overall	D	0.77	48.3	-	D	0.86	40.5	-
EB T	D	0.69	47.1	139.9	D	0.79	54.4	115.8
WB L	E	0.82	64.5	87.4	E	0.75	56.1	51.0
NB T	D	0.39	19.2	53.3	D	0.84	45.7	179.4
SB T	D	0.42	35.1	127.9	C	0.26	28.3	23.0

Alternative 4: Double Left Turn and Road Widening (North-South)

This alternative was not included as part of the BRES report, due to the potential implications to property and structures surrounding the study area and it is presented in the report for discussion purposes. Improvements considered as part of this alternative are the following as presented in **Figure 11**:

- Addition of a second auxiliary westbound left turn lane (dual left with protected phase)
- Addition of a northbound through lane (requires two northbound receiving lanes)
- Converting the existing southbound exclusive right turn lane to southbound through right lane (requires two southbound receiving lanes)

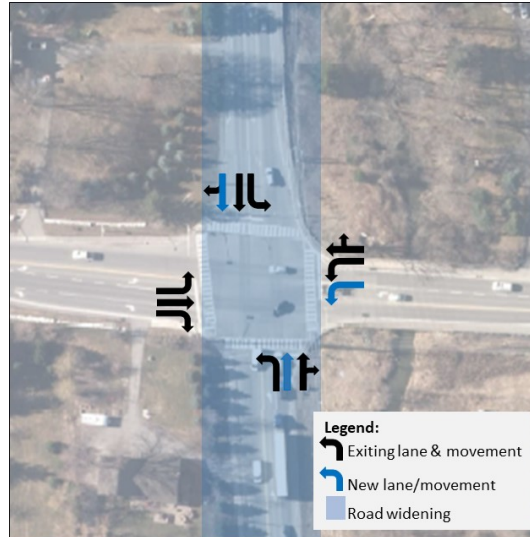


Figure 5-3: Alternative 4 Configuration

The results of the proposed improvements are presented in **Table 6**.

Table 6: 2031 Intersection Operations (Double Left Turn and Road Widening)

Mov.	Weekday AM Peak Hour				Weekday PM Peak Hour			
	LOS	v/c	Control Delay(s)	95 th %ile Queue Length (m)	LOS	v/c	Control Delay(s)	95 th %ile Queue Length (m)
Overall	D	0.79	48.9	-	D	0.83	39.5	-
EB T	D	0.69	47.1	139.9	D	0.75	50.4	111.9
WB L	E	0.82	64.5	87.4	D	0.73	53.3	48.7
NB T	D	0.36	49.9	34.5	D	0.82	41.4	139.1
SB T	E	0.86	59.5	127.9	C	0.14	21.9	24.4

Alternative 5: Widening to Four Lanes

This alternative was not included as part of the BRES report, due to the potential implications to property and structures surrounding the study area and it is presented in the report for discussion purposes. Improvements considered as part of this alternative are the following as presented in **Figure 12**:

- Addition of a northbound through-right lane (requires two northbound receiving lanes)
- Converting existing southbound exclusive right turn lane to southbound through right lane (requires two southbound receiving lanes)
- Addition of a westbound through-right lane (requires two westbound receiving lanes)
- Converting existing Eastbound exclusive right turn lane to eastbound through right lane (requires two eastbound receiving lanes)

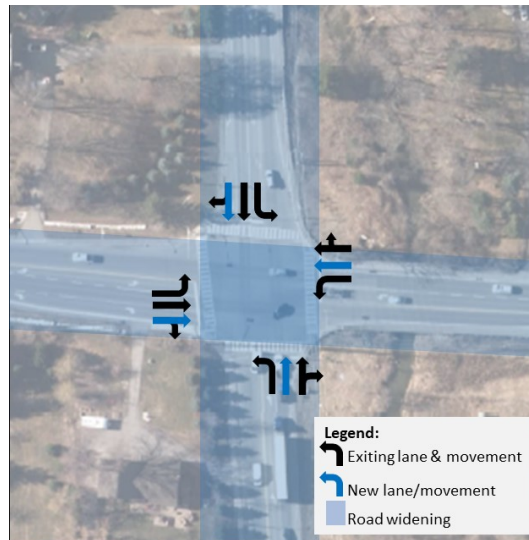


Figure 5-4: Alternative 5 Configuration

The results of the proposed improvements are presented in **Table 7**.

Table 7: 2031 Intersection Operations (Widening to Four Lanes)

Mov.	Weekday AM Peak Hour				Weekday PM Peak Hour			
	LOS	v/c	Control Delay(s)	95 th %ile Queue Length (m)	LOS	v/c	Control Delay(s)	95 th %ile Queue Length (m)
Overall	D	0.91	47.4	-	D	0.82	36.3	-
EB T	D	0.66	50.5	96.3	D	0.67	51.5	68.0
WB L	D	0.88	44.0	144.0	C	0.77	30.5	103.3
NB T	D	0.37	50.6	34.5	D	0.85	45.8	141.1
SB T	D	0.59	40.3	129.3	C	0.35	32.8	24.7

Active Transportation

All of the Alternative Solutions consider at minimum the following elements to improve active transportation:

- **Pedestrian Safety**
 - Sidewalk from the northwest corner of the intersection to the GO Transit stop.
 - Intersection modifications to improve pedestrian movements across the intersection.
- **Cycling Opportunities**
 - Consideration for future implementation of bicycle lanes west of the intersection along King Street East as identified in the Region of Peel Sustainable Transportation Study.
- **Accessibility Related Improvements**
 - Curb cuts and ramps at cross-walks.
 - AODA push buttons with locator tones.
 - Tactile plates.

Alternative design concepts for the preferred alternative solution were developed, assessed and evaluated based on the following factors:

- **Transportation and Engineering**
 - Intersection Operation (2031)
 - Existing Structures
 - Planning Policies
 - Safety
 - Compliance with Design Standards
- **Social Environment**
 - Noise
 - Property Impacts
 - Streetscape
 - Driveway Access
- **Natural Environment**
 - Aquatic
 - Meander Belt
 - Riparian Cover
 - Natural Heritage System Cover
 - Wildlife
 - Stormwater Management
- **Implementation**
 - Utility Relocation
 - Operations and Maintenance
 - Regulatory Framework
 - Ease of Construction
 - Construction Disturbance
- **Health**
 - Accessibility
 - Air Quality
 - Active Transportation
- **Cultural Environment**
 - Built/Cultural Heritage Resources
 - Archaeological Features
- **Economic Environment**
 - Capital Cost and value-of-time

The evaluation of alternative solutions is provided in **Table 8**.

Table 8: Evaluation of Alternative Solutions

TECHNICAL CRITERIA	DO NOTHING	BRES REPORT OPTION 6	DOUBLE LEFT TURN (WESTBOUND)	DOUBLE LEFT TURN AND ROAD WIDENING (NORTH-SOUTH)	WIDENING TO FOUR LANES
TRANSPORTATION ENGINEERING					
Intersection Operation (2031)	Intersection exceeds capacity in the AM (LOS F) and PM peak hour (LOS F). Does not meet Regional target (LOS E or better).	Intersection exceeds capacity in the AM peak hour (LOS E) and below capacity in the PM peak hour (LOS D). Meets Regional target (LOS E or better).	Intersection below capacity in the AM (LOS D) and PM peak hour (LOS D). Meets Regional target (LOS E or better).	Intersection below capacity in the AM (LOS D) and PM peak hour (LOS D). Meets Regional target (LOS E or better).	Intersection below capacity in the AM (LOS D) and PM peak hour (LOS D). Meets Regional target (LOS E or better).
Existing Structures	No impact. Under existing conditions, all structures are adequate from a structural perspective.	Bridge widening not required.	Requires widening of King Road Bridge.	Requires widening of King Road Bridge and Caledon King Townline Road Bridge.	Requires widening of King Road Bridge and Caledon King Townline Road Bridge.
Planning Policies	No policy effects.	Site alteration is permitted within Core Areas of the Greenlands System when approved through the Environmental Assessment process. Infrastructure is permitted within the Protected Countryside of the Greenbelt Plan provided that environmental impacts are minimized to the greatest extent possible.	Site alteration is permitted within Core Areas of the Greenlands System when approved through the Environmental Assessment process. Infrastructure is permitted within the Protected Countryside of the Greenbelt Plan provided that environmental impacts are minimized to the greatest extent possible.	Site alteration is permitted within Core Areas of the Greenlands System when approved through the Environmental Assessment process. Infrastructure is permitted within the Protected Countryside of the Greenbelt Plan provided that environmental impacts are minimized to the greatest extent possible.	Site alteration is permitted within Core Areas of the Greenlands System when approved through the Environmental Assessment process. Infrastructure is permitted within the Protected Countryside of the Greenbelt Plan provided that environmental impacts are minimized to the greatest extent possible.
Safety	Identified in the top 25% of intersections in the Region in terms of potential for safety improvement. Intersection improvements are required to reduce safety deficiencies.	Potential to incorporate safety improvements such as pedestrian facilities, route restrictions and signage to improve vehicular and pedestrian safety at the intersection.	Potential to incorporate safety improvements such as pedestrian facilities, route restrictions and signage to improve vehicular and pedestrian safety at the intersection.	Potential to incorporate safety improvements such as pedestrian facilities, route restrictions and signage to improve vehicular and pedestrian safety at the intersection.	Potential to incorporate safety improvements such as pedestrian facilities, route restrictions and signage to improve vehicular and pedestrian safety at the intersection.
Compliance with Design Standards	No impact.	Proposed intersection improvements follow the design criteria approved by the Region	Proposed intersection improvements follow the design criteria approved by the Region	Proposed intersection improvements follow the design criteria approved by the Region	Proposed intersection improvements follow the design criteria approved by the Region
SOCIAL ENVIRONMENT					
Noise	The Region of Peel's noise level limit criterion of 60dBA is exceeded (2017) at 15 representative OLAs	The Region of Peel's noise level limit criterion of 60dBA is exceeded (2037) at all 16 representative OLAs Exiting driveways along the study area does not allow for implementation of a continuous noise barriers which limits their effectiveness	The Region of Peel's noise level limit criterion of 60dBA is exceeded (2037) at all 16 representative OLAs Exiting driveways along the study area does not allow for implementation of a continuous noise barriers which limits their effectiveness	The Region of Peel's noise level limit criterion of 60dBA is exceeded (2037) at all 16 representative OLAs Exiting driveways along the study area does not allow for implementation of a continuous noise barriers which limits their effectiveness	The Region of Peel's noise level limit criterion of 60dBA is exceeded (2037) at all 16 representative OLAs Exiting driveways along the study area does not allow for implementation of a continuous noise barriers which limits their effectiveness

Property Impacts	No impact.	Property acquisition is not required. Improvements required for the northbound and westbound movements can be completed as part of the existing right-of-way	Property acquisition may be required to support proposed improvements at the southwest portion of the intersection.	Property acquisition may be required to support proposed improvements at the southwest portion of the intersection.	Property acquisition may be required to support proposed improvements at the southwest portion of the intersection. Improvements required for the widening of the intersection can be completed as part of the existing right-of-way
Streetscape	No impact.	Trees allocated on private property in the southwest portion of the intersection may be affected during construction. No opportunities for streetscaping due to space limitations and the rural environment surrounding the intersection	Trees allocated on private property in the southwest portion of the intersection may be affected during construction. No opportunities for streetscaping due to space limitations and the rural environment surrounding the intersection	Trees allocated on private property in the southwest portion of the intersection may be affected during construction. No opportunities for streetscaping due to space limitations and the rural environment surrounding the intersection	Trees allocated on private property in the southwest portion of the intersection may be affected during construction. No opportunities for streetscaping due to space limitations and the rural environment surrounding the intersection
Driveway Access	No impact.	One driveway in the northeast corner of the intersection needs to be reconstructed. Access to the property will be maintained	One driveway in the southwest corner of the intersection needs to be reconstructed. Access to the property will be maintained	One driveway in the southwest corner of the intersection needs to be reconstructed. Access to the property will be maintained	One driveway in the southwest corner of the intersection needs to be reconstructed. Access to the property will be maintained. Two driveways in the northeast corner of the intersection needs to be reconstructed. Access to the properties will be maintained
NATURAL ENVIRONMENT					
Aquatic	No impact.	The proposed retaining wall within the riparian zone of Cold Creek and associated bank stabilization in the area of the retaining wall will affect fish habitat. Mitigation of impact will be required.	The proposed retaining wall within the riparian zone of Cold Creek and associated bank stabilization in the area of the retaining wall will affect fish habitat. The structure over Cold Creek at King Road will also require widening. Mitigation of impact will be required.	The proposed retaining wall within the riparian zone of Cold Creek and associated bank stabilization in the area of the retaining wall will affect fish habitat. The structure over Cold Creek at Caledon King Townline Road will also require widening. Mitigation of impact will be required.	The proposed retaining wall within the riparian zone of Cold Creek and associated bank stabilization in the area of the retaining wall will affect fish habitat. The structures over Cold Creek at Caledon King Townline Road and King Road will also require widening. Mitigation of impact will be required.
Meander Belt	No impact.	Any upgrade or replacement of the existing crossing structures at the study reaches should consider an appropriate span for improved opportunities for channel form and function.	Any upgrade or replacement of the existing crossing structures at the study reaches should consider an appropriate span for improved opportunities for channel form and function.	Any upgrade or replacement of the existing crossing structures at the study reaches should consider an appropriate span for improved opportunities for channel form and function.	Any upgrade or replacement of the existing crossing structures at the study reaches should consider an appropriate span for improved opportunities for channel form and function.
Riparian Cover	No impact.	Vegetation within 30m of Cold Creek will be lost; compensation will be required.	Vegetation within 30m of Cold Creek will be lost; compensation will be required.	Vegetation within 30m of Cold Creek will be lost; compensation will be required.	Vegetation within 30m of Cold Creek will be lost; compensation will be required.
Natural Heritage System Cover	No impact.	Grading will be required in areas identified by TRCA as Natural Heritage System. A vegetation restoration plan will	Grading will be required in areas identified by TRCA as Natural Heritage System. A vegetation	Grading will be required in areas identified by TRCA as Natural Heritage System. A vegetation restoration plan will	Grading will be required in areas identified by TRCA as Natural Heritage System. A vegetation restoration plan will be required.

		be required. Some tree removals will occur, but no rare or Species at Risk will be impacted.	restoration plan will be required.	be required. Some tree removals will occur, but no rare or Species at Risk will be impacted.	Some tree removals will occur, but no rare or Species at Risk will be impacted.
Wildlife	No impact.	Construction will occur adjacent to natural areas recorded as providing habitat for Species at Risk. Timing restrictions and best management practices will be required to protect these species and migratory birds.	Construction will occur adjacent to natural areas recorded as providing habitat for Species at Risk. Timing restrictions and best management practices will be required to protect these species and migratory birds.	Construction will occur adjacent to natural areas recorded as providing habitat for Species at Risk. Timing restrictions and best management practices will be required to protect these species and migratory birds.	Construction will occur adjacent to natural areas recorded as providing habitat for Species at Risk. Timing restrictions and best management practices will be required to protect these species and migratory birds.
Stormwater Management	No impact.	No impact. A hydraulic assessment of this alternative was not required	Negligible impacts on water levels and velocities when compared to existing conditions	Considered similar than full widening. Negligible impacts on water levels and velocities when compared to existing conditions	Negligible impacts on water levels and velocities when compared to existing conditions
CULTURAL ENVIRONMENT					
Built/Cultural Heritage Resources	No impact.	Properties within the study area are not considered to be of cultural heritage value or interest. No impacts anticipated.	Properties within the study area are not considered to be of cultural heritage value or interest. No impacts anticipated.	Properties within the study area are not considered to be of cultural heritage value or interest. No impacts anticipated.	Properties within the study area are not considered to be of cultural heritage value or interest. No impacts anticipated.
Archaeological Features	No impact.	No archaeological resources were identified in the areas subject to Stage 1 or Stage 2 assessment. No impacts anticipated.	No archaeological resources were identified in the areas subject to Stage 1 or Stage 2 assessment. No impacts anticipated.	No archaeological resources were identified in the areas subject to Stage 1 or Stage 2 assessment. No impacts anticipated.	No archaeological resources were identified in the areas subject to Stage 1 or Stage 2 assessment. No impacts anticipated.
ECONOMIC ENVIRONMENT					
Capital Cost	No impact.	Low It requires the reconstruction of the northbound portion of the intersection to implement the dedicated right turn and the construction of the retaining wall	Medium In addition of reconstruction of the northbound portion of the intersection to implement the dedicated right turn and the construction of the retaining wall this alternative requires the widening of the bridge structure east of the intersection as well as the reconstruction of the westbound portion of the intersection	High In addition of reconstruction of the northbound portion of the intersection to implement the dedicated right turn and the construction of the retaining wall this alternative requires the widening of the bridge structure east of the intersection as well as the reconstruction of the westbound and southbound portions of the intersection	High It requires the reconstruction of the full intersection as well as the widening of 2 structures and the construction of a retaining wall.
IMPLEMENTATION					
Utility Relocation	No impact.	May require the relocation of hydro pole located in the southeast corner of the intersection. Requires the relocation of traffic signal poles located in the east segment of the intersection	May require the relocation of hydro poles located in the southeast portion of the intersection. Requires the relocation of traffic signal poles	May require the relocation of hydro poles located in the southeast portion of the intersection. Requires the relocation of traffic signal poles	May require the relocation of hydro poles located in the southeast portion of the intersection. Requires the relocation of traffic signal poles

Operations and Maintenance	No impact.	The retaining wall may increase maintenance requirements	The retaining wall and the widened structures may increase maintenance requirements	The retaining wall and the widened structures may increase maintenance requirements	The retaining wall and the widened structures may increase maintenance requirements
Regulatory Framework	No impact.	Proposed roadway improvements are under Regional jurisdiction	Proposed roadway improvements are under Regional jurisdiction. Region of York jurisdiction east of the intersection needs to be considered for implementation	Proposed roadway improvements are under Regional jurisdiction. Region of York jurisdiction east of the intersection needs to be considered for implementation	Proposed roadway improvements are under Regional jurisdiction. Region of York jurisdiction east of the intersection needs to be considered for implementation
Ease of Construction	No impact.	A retaining wall to mitigate impacts to the encroachment of fill adjacent to Cold Creek will be required.	Requires a retaining wall and widening of King Road Bridge.	Requires a retaining wall and widening of King Road Bridge and Caledon King Townline Road Bridge.	Requires a retaining wall and widening of King Road Bridge and Caledon King Townline Road Bridge.
Construction Disturbance	No impact.	Northbound movements may be affected during construction of the retaining wall.	Northbound movements may be affected during construction of the retaining wall. Eastbound movements may be affected during widening of the bridge structure.	Northbound movements may be affected during construction of the retaining wall. Eastbound movements may be affected during widening of the bridge structures.	Northbound movements may be affected during construction of the retaining wall. Eastbound movements may be affected during widening of the bridge structures.
HEALTH					
Accessibility	No impact.	Provides opportunity for compliance with AODA requirements for pedestrian crossings	Provides opportunity for compliance with AODA requirements for pedestrian crossings	Provides opportunity for compliance with AODA requirements for pedestrian crossings	Provides opportunity for compliance with AODA requirements for pedestrian crossings
Air Quality	Does not provide opportunities for traffic conditions improvements with the consequent effects on air quality	Intersection improvements will minimize the air quality impact of increased traffic through improved traffic flows and reduced queuing times at intersections. Impact is anticipated to be positive	Intersection improvements will minimize the air quality impact of increased traffic through improved traffic flows and reduced queuing times at intersections. Impact is anticipated to be positive	Intersection improvements will minimize the air quality impact of increased traffic through improved traffic flows and reduced queuing times at intersections. Impact is anticipated to be positive	Intersection improvements will minimize the air quality impact of increased traffic through improved traffic flows and reduced queuing times at intersections. Impact is anticipated to be positive
Active Transportation	No opportunity to include additional active transportation infrastructure	May provide opportunities for sidewalk facilities connecting the south and west portions of the intersection	May provide opportunities for sidewalk facilities connecting the south and west portions of the intersection	May provide opportunities for sidewalk facilities connecting the south and west portions of the intersection	May provide opportunities for sidewalk facilities connecting the south and west portions of the intersection
Climate Change	No opportunity to include climate change adaptation techniques. Additional vulnerability to changing climatic conditions. No opportunity to contribute to climate change mitigation.	The proposed intersection improvements will help to relieve existing and future traffic congestion, and thereby reduce idling that is currently experienced in the study area. Thus, the project will not materially contribute towards climate change.	The proposed intersection improvements will help to relieve existing and future traffic congestion, and thereby reduce idling that is currently experienced in the study area. Thus, the project will not materially contribute towards climate change.	The proposed intersection improvements will help to relieve existing and future traffic congestion, and thereby reduce idling that is currently experienced in the study area. Thus, the project will not materially contribute towards climate change.	The proposed intersection improvements will help to relieve existing and future traffic congestion, and thereby reduce idling that is currently experienced in the study area. Thus, the project will not materially contribute towards climate change.
RECOMMENDATION	Not recommended	Not Recommended	Not recommended	Not recommended	Recommended - Final

6. Public Information Centre

A Public Information Centre (PIC) was held on December 5, 2017 at the Albion Bolton Community Centre to present the study to public and receive comments regarding the proposed reconstruction of Albion Vaughan Road and King Street intersection.

6.1. Notice of PIC

A Notice of Public Information Centre was mailed in advance of the PIC to 11 agency representatives. The Notice was also mailed to affected property owners. The Notice was advertised in the Caledon Citizen and the Caledon Enterprise on November 23, 2017. The Notice explained the purpose of the study, details regarding the PIC, and contact information. A copy of the Notice and agency contact list is included in Appendix A.

6.1.1. PIC

The PIC was held on December 5th, 2017 from 6:00 PM to 8:00 PM at the Albion Bolton Community Centre – Auditorium Room on 150 Queen Street South in Bolton. Fifteen people signed into the PIC including one member of the project team and fourteen owners/residents of property in or near the study area.

The PIC was held in an open house format with information presented on display boards and project team members present to answer questions or discuss comments. The display boards described the following:

- Purpose of the Event
- Class EA Process
- Problem Statement
- Existing Conditions
 - Transportation
 - Engineering
 - Social and Cultural Environment
 - Natural Environment
 - Health Related – Noise and Air Quality
- Future Projected Traffic Conditions
- Alternative Solutions
- Active Transportation
- Evaluation Criteria
- Evaluation of Alternative Solutions
- Potential Phasing
- Technically Preferred Alternative Solution
- Next Steps

Sign-in and comment sheets were provided to record attendance and obtain written comments. A copy of the PIC materials is included in Appendix A.

One comment sheet was received in response to the PIC. The comment expressed concern for potential property impacts and requested additional information regarding the project justification and construction timing.

7. Preferred Solution

Based on the evaluation of alternatives and consultation with the public and stakeholders, Alternative Solution #4 - Widening to Four Lanes was selected as the preferred solution that best addresses the future needs of the intersection.

7.1. Refinements to the Preferred Solution

Following the selection of the preferred solution, comments from Toronto and Region Conservation Authority (TRCA) were received and the design was refined in order to address TRCA's concerns. Modifications considered as part of the refinement of the preferred solution included:

- Relocation of the entire intersection to the west,
- Use of roundabout to replace the existing signalized intersection
- Relocation of the south segment of the intersection

As a result of the review process, the south segment of the intersection was shifted to the west to avoid impact to Cold Creek.

The shift eliminates the need for a retaining wall on the east side of Albion Vaughan Road south of King Street.

In addition, based on turning movements and increased volumes in the future, the Region of Peel also recommended changes to the intersection configurations by converting the proposed northbound, westbound and eastbound through-right lanes to exclusive right-turn lanes. The revised preferred solution includes the following elements:

- Addition of a northbound right turn lane;
- Converting existing southbound exclusive right turn lane to southbound through-right lane;
- Addition of a westbound right turn Lane;
- No modification to the existing eastbound intersection configuration (exclusive left turn, through lane, right-turn lane) and
- Opportunities for integration of sidewalks in all segments of the intersection as well as cycling facilities to tie into eventual active transportation facilities along the King Street corridor.

As a result of this changes to the design of the preferred solution, the widening of Structure #2 (east-leg of intersection) and Structure #3 (north-leg of intersection) have been reduced by half because only one additional lane is required.

It should be noted that this project is planned to be implemented in two phases:

- Phase 1: Interim Solution (an additional northbound right-turn lane)
- Phase 2: Ultimate Solution (Refined Preferred Solution)

The interim solution - an additional northbound right-turn lane, will be completed prior to the implementation of the preferred solution to improve safety at the intersection. An interim solution is recommended as the replacement of structures adjacent to the intersection of Albion Vaughan Road and King Street is anticipated to delay the implementation of the preferred alternative solution as the study area includes roads that are not within the Region of Peel jurisdiction.

Based on the refinements to the preferred solutions, the effects and impacts of the full widening are overstated in the technical reports. These findings are considered to be conservative given that the impacts have been reduced and as such, have not been revised.

8. Impact Assessment

As discussed above, the preferred solution includes the following elements:

- Addition of a northbound right turn lane;
- Converting existing southbound exclusive right turn lane to southbound through-right lane;
- Addition of a westbound right turn Lane;
- No modification to the existing eastbound intersection configuration (exclusive left turn, through lane, right-turn lane) and
- Opportunities for integration of sidewalks in all segments of the intersection as well as cycling facilities to tie into eventual active transportation facilities along the King Street corridor.

The preliminary design drawings for the interim and full widening are provided in **Appendix K**.

8.1. Natural Environment

The proposed infrastructure improvements will require expansion of the two structures over Cold Creek and widening of the road within the right-of-way. The structure expansion involve work in and around a watercourse that is considered fish habitat, therefore design and mitigation techniques will be required to prevent serious harm as defined in the Fisheries Act. Habitat for American Brook Lamprey, a Species of Conservation Concern is also present, therefore techniques to protect its habitat will be required. Recommendations are provided in **Section 9**.

Widening of the road within the right-of-way will require removal of roadside vegetation, grading of side slopes, and disturbance at the edge of existing natural communities. Trees that could need to be removed for this project would be located:

- West side of Albion Vaughan Rd (south of King Rd)
 - Removal of 1 tree on north side of existing driveway
- West Side of Albion Vaughan Rd (north of King Rd)
 - Removal of 2 trees on south side of existing driveway
 - Likely Removal of 6 trees on north side of existing driveway
- North side of King Rd (east of Albion Vaughan Rd)
 - Removal of 1 tree at corner (large tree, but it has been heavily pruned away from the overhead wires and it has severe dieback)
 - Possible Removal of additional trees at bridge widening.

From the assessment of biological communities in the vicinity of the Study Area, 14 rare species are known or likely to occupy the natural habitats adjacent to the intersection. These species are highly sensitive to disturbance and require mitigation measures to prevent long-term impacts to adjacent habitats. Potential threats related to the project and mitigation measures are provided in Section 9.

8.2. Stormwater Management

Prior to the refinements of the preferred solution, a stormwater management assessment of the four lane widening was completed to evaluate the impact of the preferred solution. The proposed drainage conditions for the future intersection improvements will result in some localized increases in roadway imperviousness at the intersection. The following table summarizes the increase in

impervious area for each section within the study area based on airphoto interpretation, survey data and proposed four lane widening intersection improvements as shown in **Figure 8-1**.

Table 9: Summary of Impacts for Four Lane Widening Alternative

Catchment	Area (ha)	% Impervious		Increase in Impervious (%)	Impervious Area (ha)	
		Existing	Future		Existing	Future
Catchment #1	0.92	82.7%	88.2%	5.5%	0.76	0.81
Catchment #2	0.60	84.1%	99.4%	15.3%	0.50	0.60
Catchment #3	1.01	51.9%	59.2%	7.3%	0.52	0.60
Catchment #4	0.72	30.5%	33.0%	2.5%	0.22	0.24
Total	3.25	61.8%	69.0%	7.2%	2.01	2.24

Overall, there is less than 10% increase in the impervious area for the entire study area under ultimate conditions. Catchment #2 can expect to see the greatest increases, with approximate 15% increase in impervious area, while Catchment #4 will have the smallest increases at 2.5%.

There are no major changes to the drainage patterns as part of the future improvements. However, stormsewers may be impacted by the widening and will require modifications including re-location catchbasin inlets and extension of sewer leads.

The proposed strategy for managing the impacted study area will be to enhance the water quality treatment of Catchment #2. In the interim and ultimate intersection configurations, this catchment will be impacted the most (greater than 10% increase) and therefore efforts should focus on this catchment. An oil grit separator could be installed before the enhanced swale to provide a treatment train approach to achieve 80% TSS removal for Catchment #2. A Hydroworks HydroStorm 8 or equivalent OGS unit will provide the necessary level of quality control to outlet Catchment #2 to the enhanced swale. The existing enhanced swale, at the outlet, could be enlarged or lengthened in order to capture the 5mm event for the area of widening, a total of 11.5m³ of runoff, which would require an extra 2.5m wide, 23m long swale.

No water quality control will be implemented for the remaining catchments given the minor increases. The existing best management practices, including, oil-grit separator and roadside ditches, will be sufficient to mitigate the proposed widening.

No quantity controls will be required, as per TRCA guidelines for Humber River, Table E.1 Quantity Control Release Rates can be found in **Appendix D**.

It is assumed that the refined preferred solution will not detriment the conditions identified for the four-lane widening conditions.

Based on the refinements to the preferred solutions, the effects and impacts of the full widening are overstated in the SWM report and can be addressed at detailed design.

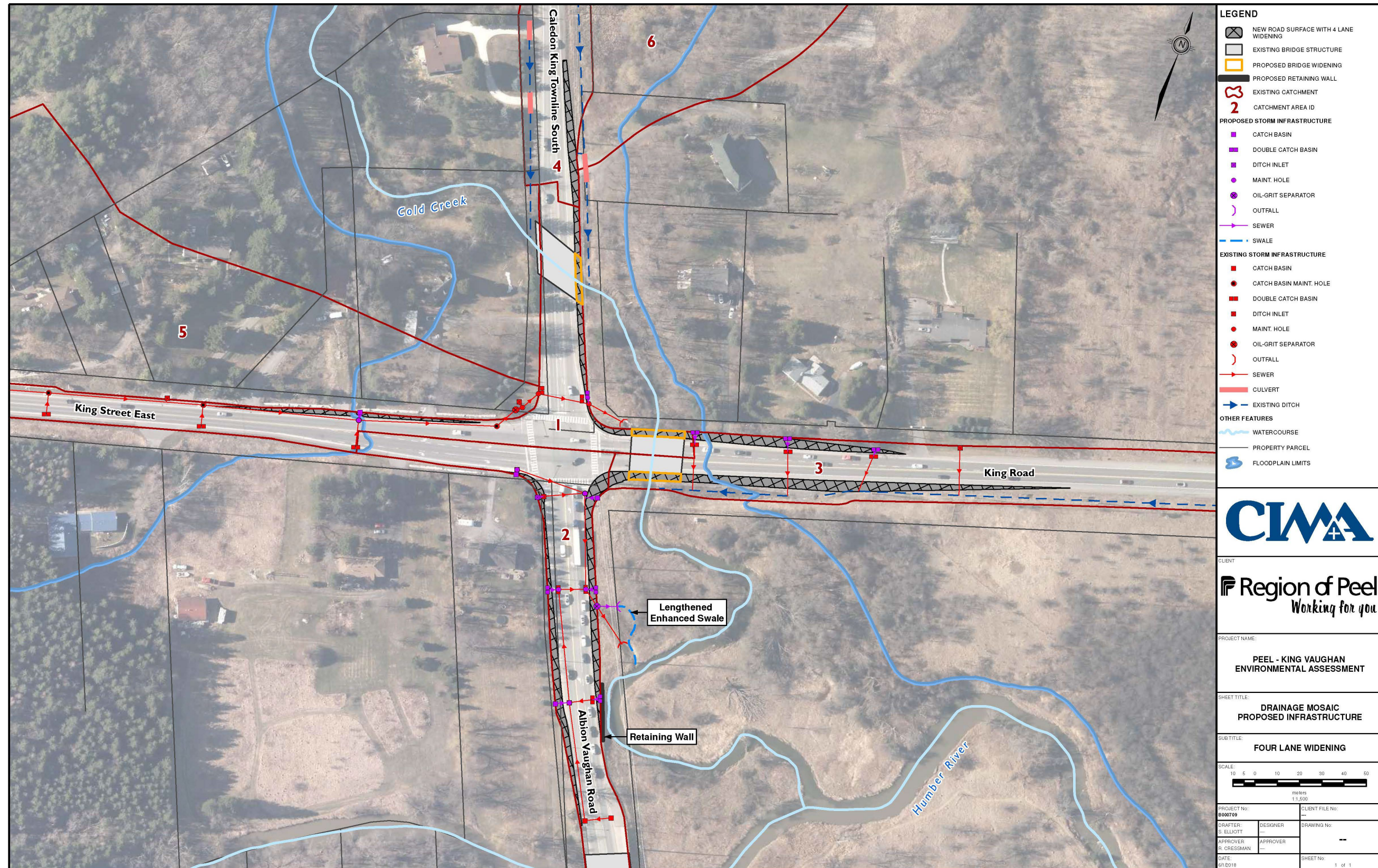


Figure 8-1: Drainage Mosaic Proposed Infrastructure

8.3. Hydraulics

Prior to the refinements of the preferred solution, a hydraulic assessment of the four lane widening was completed to evaluate the impact of widening the King Road Bridge to a total length of 24.0m (3.5m lengthening on the south side and 3.5m lengthening on the north side), and lengthening the Caledon King Townline Road Bridge to a total length of 24.8m (2.0 on the west side and 2.8m lengthening on the east side).

It was determined that the hydraulic impact for the four-lane widening will have negligible impacts on water levels and velocities when compared to existing conditions. However, the widening on the north side will have impacts on the Water Survey of Canada (WSC) stream gauge and will require consultation with the National Hydrological Service.

It is assumed that the refined preferred solution will not detriment the conditions identified for the four-lane widening conditions.

Based on the refinements to the preferred solutions, the effects and impacts of the full widening are overstated in the hydraulics report and can be addressed at detailed design.

8.4. Fluvial Geomorphology

The roadway improvements will involve modifications of the existing crossing structures at Cold Creek and the Main Humber River. The existing bridges at these locations will be extended laterally to accommodate the planned improvements.

According to TRCA protocols, crossing structures should be constructed outside of the meander belt width of a watercourse to the extent possible, or, alternatively, the features should be designed to match or exceed the 100-year erosion limit of the channel. However, for the study reaches at Cold Creek (CC-01) and the Main Humber River (HR-01), it is recognized that spanning a crossing structure the length of the estimate belt width or 100-year erosion limit of the channel would be impractical and cost prohibitive. Maintaining a crossing span less than the estimated dimensions of the meander belt width and 100-year erosion limit at CC-01 and HR-01 would be appropriate for this particular study with considerations (see Appendix E).

Improvements to Albion Vaughan Road in the area south of the intersection of King Street East will need to consider the observed channel conditions at Cold Creek in this area. Any extension of the Albion Vaughan Road crossing structure at the Main Humber Rive should also consider the identified channel patterns, recognizing the outer meander bend on the western side of the valley is currently trending toward the existing crossing structure. Monitoring and further investigation of the prominent meander pattern at Cold Creek is recommend to support any planning and design of future road improvements or maintenance activities at Albion Vaughan Road between King Street East and the watercourse crossing at the Main Humber River.

8.5. Hydrogeology

No groundwater users were identified within the estimated radius of influence based on MOECC water well records. There are no anticipated impacts to surrounding surface water and natural environment since the estimated dewatering rates are low and may be limited by groundwater control construction methods. It is recommended that prior to construction, groundwater and surface water samples should be obtained in order to assess baseline water quality, options for discharge and potential impacts to receptors.

8.6. Geotechnical and Pavement

A Geotechnical and Pavement Investigation was undertaken to determine the subsurface soil and groundwater conditions at the two stream crossing structures in the study limits and to recommend a pavement design. The Geotechnical and Pavement Investigation Report is provided in Appendix L.

The rehabilitated pavement structure design would include a grade raise of 90 mm and includes the following:

- Pulverize existing Hot Mix Asphalt (HMA) and blend one to one with underlying granular
- Remove 50 mm of blended material
- Stabilize 150 mm of blended HMA and existing granular material with expanded asphalt
- Place 50 mm lower binder course asphalt
- Place 50 mm upper binder course asphalt
- Place 40 mm surface course asphalt

The proposed pavement rehabilitation and widening structural design would involve a grade raise of 120 mm and includes the following:

- Pulverize existing Hot Mix Asphalt (HMA) and blend one to one with underlying granular
- Stabilize 150 mm of blended HMA and existing granular material with expanded asphalt
- Place 70 mm binder course asphalt
- Place 50 mm subsurface asphalt

8.7. Air Quality

An air quality assessment was conducted for the proposed intersection improvements which is provided in Appendix M. As outlined in the Ministry of Transportation guidance, sensitive receptors within 500 m of the study area should be identified and assessed. The area surrounding the subject intersection is rural residential and the only sensitive receptors within 500 m are private properties located along Albion Vaughan Road, King Street East and King Road.

The sensitive receptors are already located close to the intersection and will be impacted by the projected traffic growth. The proposed improvements will act to minimize the air quality impact of increase traffic through improved traffic flows and reduced queuing times at the intersections within the vicinity of the study area. As a result, the impact on the identified sensitive receptors is anticipated to be positive.

Overall, the project is anticipated to a relatively minor source when compared to other larger sources within the area, therefore the impact on overall air quality in the Region is expected to be negligible.

8.8. Noise

A Noise Impact Study was conducted to assess the potential noise impact resulting from the proposed improvements in the study area. The Noise Assessment Report is provided in Appendix N.

Based on the Noise Impact Study, the following conclusions were determined:

- The Region of Peel's Noise Barrier Policy noise level limit criterion of 60 dBA has been exceeded at all identified representative Outdoor Living Areas (OLAs) when considering future traffic volumes.
- Based on preliminary modelling, noise barriers along the Project right-of-way were predicted to provide less than 5 dB of attenuation at the OLAs. Based on these results and various possible acoustic barrier layouts, further consultation with the Region of Peel and residents is recommended in order to develop an acoustic barrier layout that is technically, economically and administratively feasible.
- An outline regarding construction noise, a noise complaint process and the applicable noise by-law during the construction phase of the Project has been provided in Appendix N. Based on a review of available information, an exemption from the applicable by-law may be required.

9. Future Commitments

In consultation with agencies, the preferred solution has mitigated negative impacts to the environment where possible. Where impacts cannot be entirely avoided, mitigation measures and commitments for detailed design and construction have been developed to minimize or avoid impacts (**Table 9**).

Table 10: Mitigation and Commitments to Further Work

Issue	Approval Agency/ Interested Party	Commitments
Aquatic Habitat Protection and Restoration	Toronto and Region Conservation Authority (TRCA) DFO (Fisheries Act)	<ul style="list-style-type: none"> • Bank treatments to accompany the structure widenings should include bioengineering techniques at the interface with the channel. • The substrate in Cold Creek is suitable spawning habitat for salmonids, so excavation of the stream bed should be kept to a minimum. • All disturbed areas must be restored with native species of vegetation, complementary to the adjacent natural communities. A landscape restoration plan must be reviewed and approved by TRCA. • To protect critical life stages of cold water aquatic species, in-water construction must occur during the July 1 to September 15 cold water work window. • Instream works must be conducted in an area isolated from the active channel, and fish and wildlife must be salvaged from the work area prior to construction. • Fish and wildlife salvage must be completed by a qualified professional with appropriate permits. Fish passage must be maintained at all times. • The sequence of construction must be planned to minimize the duration of instream work. Hand-labour should be considered for the bioengineering techniques to minimize requirements for machinery to enter the water. • The project will involve work within and adjacent to CRA habitat,

Issue	Approval Agency/ Interested Party	Commitments
		<p>therefore the project will require a self-assessment at the detailed design stage to determine if DFO requires review of the proposed works.</p> <ul style="list-style-type: none"> • The structure widenings involve work in and around a watercourse that is considered fish habitat, therefore design and mitigation techniques will be required to prevent serious harm as defined in the Fisheries Act. Habitat for American Brook Lamprey, a Species of Conservation Concern is also present, therefore techniques to protect its habitat will be required. • A permit from TRCA under O. Reg. 166/06 will be required at the detailed design stage. • At detailed design the hydraulic modelling should be updated utilizing the most current hydraulic modelling. • Monitoring and further investigation of the prominent meander pattern at Cold Creek is recommend to support any planning and design of future road improvements or maintenance activities at Albion Vaughan Road between King Street East and the watercourse crossing at the Main Humber River. • Requirements outlined within the TRCA Valley and Stream Corridor Crossing Guideline (2015) will be reviewed and met during detailed design. • Brown Trout are known to spawn in early October-late November (water temperature dependent) therefore efforts will be made during detailed design to ensure construction works are completed as close to the September 15 construction timing window as possible. The construction timing window will be applied to the detailed design drawings.

Issue	Approval Agency/ Interested Party	Commitments
		<ul style="list-style-type: none"> • If during detailed design it is determined that impacts to the Natural Heritage System are anticipated, a restoration/compensation plan will be developed. • Based on the refinements to the preferred solutions, the effects and impacts of the full widening are overstated in the hydraulics report and can be addressed at detailed design. • Based on the refinements to the preferred solutions, the effects and impacts of the full widening are overstated in the SWM report and can be addressed at detailed design.
<p>Sediment and Erosion Control</p>	<p>Toronto and Region Conservation Authority (TRCA)</p>	<ul style="list-style-type: none"> • Water quality in Cold Creek is good, and the benthic macroinvertebrate community is productive. Stringent sediment and erosion controls must be installed prior to construction and monitored and maintained throughout construction. TRCA must approve of the proposed sediment and erosion controls. • Instream works should be conducted during a period of low flow and stable weather. Work should not be planned if extended periods of precipitation is forecasted. • If water must be pumped/diverted from the site, as per TRCA Erosion & Sediment Control Guidelines for Urban Construction (December 2006), dewatering water will be pumped through a filter bag. This filter bag: <ul style="list-style-type: none"> ○ Will be located on a grassed area a minimum of 30 m away from the receiving waterbody. If a suitable grassed location is not available/possible, the filter bag will need to be placed on top of a rock pad and surrounded with sediment

Issue	Approval Agency/ Interested Party	Commitments
		<p>fencing or approved equivalent.</p> <ul style="list-style-type: none"> ○ The sediment bag must be securely clamped to the outside of the discharge hose to form a secure seal; and ○ The bag will be routinely monitored for efficiency (i.e. outflow) and deficiencies in the bag and hose clamp, and replaced or repaired accordingly. <ul style="list-style-type: none"> ● Intake pipes must be screened to prevent entrainment of fish and wildlife. ● Sediment and erosion controls must be removed after the site is stabilized to prevent long-term entrapment of wildlife. ● Sediment bag discharge has been changed to be placed in a well vegetated area. TRCA staff would like to note that ● An option to use settlement tanks if there isn't sufficient space for sediment laden water discharge will be reviewed at detailed design. An appropriate dewatering method will be reflected on the Erosion and Sediment Control Plan at detailed design. ● Staged Erosion and Sediment Control Plans will be submitted at detailed design. ● Grading used for the final widening will be confirmed during detailed design.
<p>Terrestrial Habitat Protection and Restoration</p>	<p>Toronto and Region Conservation Authority (TRCA)</p>	<ul style="list-style-type: none"> ● Tree removal and site preparation for construction should occur before March 1 or after September 30 to protect habitat of amphibians, reptiles, mammals and migratory birds during critical life stages, and comply with provincial and federal legislation.

Issue	Approval Agency/ Interested Party	Commitments
		<ul style="list-style-type: none"> • Natural vegetation areas should be fenced to limit construction materials from entering adjacent communities, and to limit wildlife from entering the work area. • Tree removal should be kept to a minimum where possible. Trees that must be removed should be replaced with native tree species that are complementary to the adjacent natural communities. • All disturbed areas must be restored with native species of vegetation, complementary to the adjacent natural communities. A landscape restoration plan must be reviewed and approved by TRCA. • Compensations for loss of habitat will be requires on all TRCA lands. • Replacement plantings are required for all native and non-native vegetation. • If possible, construction should be timed toward the end of the summer, when critical nesting periods are complete. • Contract documents should specify that maintenance of newly vegetated areas should not include the use of pesticides
<p>Migratory Birds and Bats Protection</p>	<p>Toronto and Region Conservation Authority (TRCA)</p>	<ul style="list-style-type: none"> • The following mitigation measures are required during construction in order to comply with the Migratory Birds Act and the Endangered Species Act requirements to protect migratory birds and bats species at risk that could use the study area (including under the existing bridges) to nest or roost: • As potential tree/vegetation removal is being proposed in FOD and CUM ELC units, complementary species at risk surveys (e.g. Eastern Wood-pewee, Wood Thrush, Eastern Meadowlark, Eastern Small-footed Myotis, Little Brown Myotis, Tri-

Issue	Approval Agency/ Interested Party	Commitments
		<p>coloured Bat) needs to be conducted during detail design to confirm the absence of species at risk from the proposed works area.</p> <ul style="list-style-type: none"> • Any wildlife incidentally encountered during construction will not be knowingly harmed. • Nesting migratory birds will be protected in accordance with the Migratory Birds Convention Act, 1994. • The Proponent/Contractor will not destroy active nests (i.e. nests with eggs or young birds), or wound or kill birds, of species protected under the Migratory Birds Convention Act, 1994 and/or regulations under the Act. • If a nesting migratory bird or nest containing eggs or young of migratory birds are identified within the study area adjacent lands, all activities will stop and the Canadian Wildlife Services of Environment and Climate Change Canada will be contacted to discuss mitigation measures. • Any nest found will be protected with a buffer zone determined by a setback distance appropriate to the species, the intensity of the disturbance and the surrounding habitat until the young have naturally and permanently left the vicinity of the nest. • The Contractor will ensure that the work site is kept clean and that no garbage or food scraps that could attract animals or alter their behaviour are left behind. • The Contractor will ensure that all debris and solid waste left on site, as well as temporary fencing and signs are removed after completion of the works. • When possible, work should be completed during daylight hours. If

Issue	Approval Agency/ Interested Party	Commitments
		<p>nighttime lights are used, they will be installed so as to illuminate the work area only to minimize impacts to nighttime activities of wildlife.</p> <ul style="list-style-type: none"> • Existing access roads will be used as much as possible and speed limits will be clearly posted on site access and construction roads to minimize the potential for wildlife road mortality. • If works affecting bridges are proposed between the months of April and September, put physical barriers in place before April 15 to prevent migratory birds and bats to use the existing bridge structures to be affected by the proposed works to nest or roost. These barriers need to be removed after the works are completed.
Noise	Ministry of Environment, Conservation and Parks (MECP)	<ul style="list-style-type: none"> • Further consultation with the Region of Peel and residents is recommended in order to develop an acoustic barrier layout that is technically, economically and administratively feasible. • An exemption from the applicable by-law may be required.
Geotechnical and Pavement	Region of Peel Region of York Town of Caledon Township of King	<ul style="list-style-type: none"> • During detailed design, it is recommended that boreholes or surficial test holes be advanced to obtain information on the surficial materials and to determine the thickness of the cohesive deposit. • A monitoring well should be installed during detailed design in the lower granular deposit to measure and confirm the artesian groundwater level. • At the detailed design stage, the embankment needs the geotechnical design to ensure the appropriate recommendations for construction as well as the stability of the embankment.

Issue	Approval Agency/ Interested Party	Commitments
		<ul style="list-style-type: none"> • The detailed geotechnical and structural design is needed for various elements of the proposed work. The engineered-stamped drawings are needed to be prepared at the detailed design stage. Furthermore, the details of the protection of the slope from the fluvial process is also needed to be developed during the design stage, and all engineering drawings to be prepared at the detail design stage.
Other		<ul style="list-style-type: none"> • At detailed design, any utility relocations will be identified as a part of the interim or final design. Please note that separate TRCA permits are required for any utility work. • All relocations will be coordinated with the respective utility companies. • During the construction of the preferred solution the alignment of a buried 4" conduit with fiber optic cables (east-west) along King Road should be considered. Rogers will provide surveyed as-builts of the constructed conduit showing minimum depth of bury (stipulated 1.5m minimum). • At detailed design, landowner authorizations for all proposed work will be provided to TRCA, including any temporary construction staging or storage areas, that will be required at the interim and final design stage. • A detailed slope stability assessment will be completed during detailed design for the full widening.



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