West Transitway Extension
Bayshore Station to West of Moodie Drive

Document 4 – Assessment of Effects and Comparative Evaluation of Route Alternatives (AECERA)

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EXECUTIVE SUMMARY

The City of Ottawa has initiated a planning and design study in order to identify a Recommended Plan to extend the City's bus rapid transit (BRT) network (Transitway) from Bayshore Station to Moodie Drive. The study seeks to satisfy two primary objectives. The interim study objective is to complete the functional, preliminary and detail design for an exclusive BRT facility that connects Bayshore Station to shoulder bus lanes on Highway 417 west of Moodie Drive and provide a passenger transfer function to and from local bus services to Transitway buses at Moodie Drive.

The ultimate study objective is to complete a functional design for the definitive grade separation of Moodie Drive that includes a Transitway station in the vicinity of Moodie Drive.

The need to advance this phase of the West Transitway Extension in the near term is driven by current operational issues associated with running scheduled bus service in mixed traffic on Highway 417 (the Queensway). In order to improve service reliability within the corridor and attract new transit riders, an exclusive Transitway facility is required. In addition to improving reliability for transit users, the future grade separation of Moodie Drive will also result in additional benefits by way of operating, passenger and capital cost savings.

This project is being planned in accordance with the Transit Project Assessment Process (TPAP) as described in Ontario's Transit Project Regulation (O. Reg. 231/08). The regulation exempts proponents of all public transit projects from the requirements under Part II of the Environmental Assessment Act (OEEA), and describes a process that certain transit projects must follow in order to be considered exempt. The regulation requires proponents to have a clearly defined project prior to initiating the process, which necessitates a considerable amount of pre-planning work. In the context of this project, pre-planning activities include corridor selection, route selection and the selection of a preferred functional/preliminary design. Together, findings from these pre-planning activities will constitute the Recommended Plan.

The Queensway Corridor was identified and confirmed as the preferred Transitway corridor between the Southwest Transitway and Kanata through numerous planning studies completed by the City of Ottawa and former Region of Ottawa Carleton including the 1994 West Transitway Extension EA, the 1997 West Urban Community Transit Integration Study and Environmental Assessment (WUC EA), the 2003 Rapid Transit Expansion Study (RTES), the 2003 Ottawa Rapid Transit Expansion Program (ORTEP) Implementation Strategy, and the 1997, 2003 and 2008 Transportation Master Plans (TMP). Further assessment and evaluation of corridor alternatives is therefore not required. The Queensway Corridor has been carried forward as the technically preferred corridor for the West Transitway Extension from Bayshore Station to Moodie Drive

While a technically preferred corridor for the Transitway has been defined in the study area, a recommended route within this corridor has not been identified between Holly Acres Road and Moodie Drive. The process presented herein to generate, evaluate and identify a recommended route was developed in accordance with the principles of sound environmental planning and was designed to facilitate the identification of a Transitway route that:

- Is consistent with the City of Ottawa's vision and objectives for transit as identified in the approved 2008 Official Plan and Transportation Master Plan Update;
- Provides a cost-effective interim solution to current operational concerns while not precluding plans for the ultimate westerly extension of the West Transitway to Kanata (including conversion to rail);

- Minimizes effects to terrestrial and aquatic ecosystems and processes and avoids effects that can not be mitigated through design;
- Minimizes effects on the adjacent community (noise, recreation etc.) and avoids effects that can not be mitigated through design;
- Minimizes effects on Greenbelt lands (property requirements and effects to user experience etc.);
- Minimizes effects on provincial highway infrastructure;
- Supports municipal and federal land use planning objectives (transit oriented development, bundling of transportation corridors etc.); and
- Represents a responsible use of public funds.

Based on a comprehensive review of the study area and in recognition of existing constraints within the Queensway corridor, four potential route alternatives were identified; the Former Railway route; the Queensway North route; the Queensway Median route; and the Queensway South route.

In order to generate a detailed description and understanding of existing issues and constraints in the study area, a detailed inventory of existing conditions was prepared based on information obtained during previously completed studies and augmented by field investigations completed as part of the current assignment.

Route alternatives were pre-screened against a series of criteria based on their ability to meet overall study objectives and considering their potential effects to the natural environment and social/cultural environment. Based on the pre-screening process, the Queensway North and Queensway South Route alternatives were carried forward for further evaluation.

The Former Railway route alternative was not carried forward due to potential impacts to the Stillwater Creek Valley and the adjacent community that are not considered mitigable through design. The Queensway Median route alternative was not carried forward due to constraints associated with the provision of a station at Moodie Drive and due to complications with the implementation of the interim project configuration.

For the Queensway North and Queensway South route alternatives, preliminary concept drawings were prepared to facilitate a final assessment and evaluation which included property, cost and constructability considerations. Through the final assessment and evaluation process, **the *Queensway North* route is being recommended as the preferred route alternative**. This alternative is preferred because it:

- Satisfies interim and ultimate study objectives;
    - Is consistent with the City of Ottawa's vision and objectives for transit as identified in the approved 2008 Official Plan and Transportation Master Plan;
    - Provides a cost effective interim solution to current transit service reliability issues by removing buses from mixed highway traffic and providing flexibility to potentially defer costly grade separations until warranted;
    - Does not preclude plans for the ultimate westerly extension of the Transitway to Kanata (including conversion to rail); and
    - Presents an opportunity to attract new transit riders from nearby employment areas.
- Minimizes effects to the natural environment and avoids effects that can not be mitigated through design.

- Borders the southern edge of the Stillwater Creek Valley and thereby avoids the majority of this natural feature and will not result in further habitat fragmentation. This alternative may require minor edge removal/tree trimming potentially including regionally uncommon Black Maple along the edge of the Stillwater Creek valley. The young Black Maples located in close proximity to the highway do not appear to be part of the Black/Sugar Maple ecotype/association located in the main wooded portion of the valley. Edge mitigation measures can effectively mitigate impacts to terrestrial vegetation, wildlife and wildlife habitat.
- Depending on the final alignment (to be determined during the preliminary design assessment stage), an extension of the existing culvert may be required at the confluence of Stillwater Creek and its tributary (C3). Mitigation measures, which may include minor channel realignment, will vary depending on the scale of impact which will be assessed in more detail in the development of a Recommended Plan. This route also requires four other (less complex) culvert extensions at C1, C4, C5 and C7.
- May require the minor removal of wetland vegetation from a small meadow marsh inclusion abutting Highway 417. If a minor channel realignment is required at crossing C3, additional removal of vegetation from the floodplain meadow marsh may be required including the potential removal of regionally significant flora. In the event that these impacts can not be avoided, transplantation of these species to similar areas not impacted by the Transitway will be investigated.

- Minimizes effects to existing recreational resources and avoids effects that can not be mitigated through design.
  - Will not affect the playing fields near Moodie Drive.
  - Maintains community access to the Watts Creek Recreational Pathway. Minor realignment of the pathway is required in the vicinity of Corkstown Road. Plans for any pathway realignment would need to be developed by Project Team specialists (Landscape Architect, Ecologist etc.) in consultation with the NCC to ensure that potential effects to the natural environment and pathway user are avoided or minimized.
- Minimizes potential effects to the social/cultural environment and avoids effects that can not be mitigated through design.
  - The contribution to environmental noise from this route alternative will be indistinguishable from local background traffic noise in the horizon year. This route is expected to result in <1 dBA increase over ambient noise levels. An increase of 3 dBA is considered to be just perceptible to most people.
  - May result in minor visual impacts. The City of Ottawa will work with the National Capital Commission and the Ministry of Transportation to minimize these impacts through design.
- Minimizes effects on Greenbelt lands and supports land use planning objectives.
  - To the greatest extent possible, the preferred route is clustered within the existing Highway 417 transportation corridor. Impacts to the NCC Greenbelt are limited to a 0.1 ha to 1.2 ha property impact in the vicinity of Corkstown Road and the Highway 417 off-ramp which is required to accommodate sub-option B (through the Moodie Drive interchange) and associated potential station locations. Sub-option A would result in a 2.9

ha property impact, with additional property being required west of Moodie Drive to accommodate the relocation of Corkstown Road.

- Minimizes effects to highway infrastructure and the travelling public.
  - While adjustments will be required to existing highway ramps, this alternative largely avoids impacts to the main travelled portion of Highway 417.
- Represents a responsible use of taxpayer dollars
  - An exclusive, fully grade separated Transitway can be implemented within this route for an estimated capital cost of between $50M and $60M (depending on the final design and station configuration). Comparatively, the Queensway South route alternative is expected to cost an additional $35M to $45M (60% to 90%) to construct.

Now that a preferred route alternative has been identified, the final pre-planning activity for this planning and design study involves the generation, assessment and evaluation of preliminary design alternatives within the *Queensway North* route which will lead to the identification of the Recommended Plan. Design alternatives will consider issues such as the grade separations at Holly Acres Road and Moodie Drive, mainline Transitway alignment alternatives and Transitway station configurations. Design alternatives will be assessed and evaluated using the same process that was used to select a preferred route and in accordance with the same guiding principles. Upon selection of a preferred design, a detailed impact assessment will be carried out to determine specific mitigation measures and a recommended phasing strategy will be identified.

The Recommended Plan will be presented to Committee and Council for endorsement in spring/summer 2010 after which time the provincial EA process will be formally initiated. As the recommended route requires federal lands, the City is working with the National Capital Commission (NCC) to coordinate provincial and federal EA requirements.

It is currently anticipated that the design for the interim project configuration (terminating at-grade on Moodie Drive) will be ready for tender in the fall of 2010. Implementation of the Moodie Drive grade separation and transit station is not identified in the City's current Capital Works Plan and is therefore not currently anticipated within the 2008 TMPs planning horizon (2031).

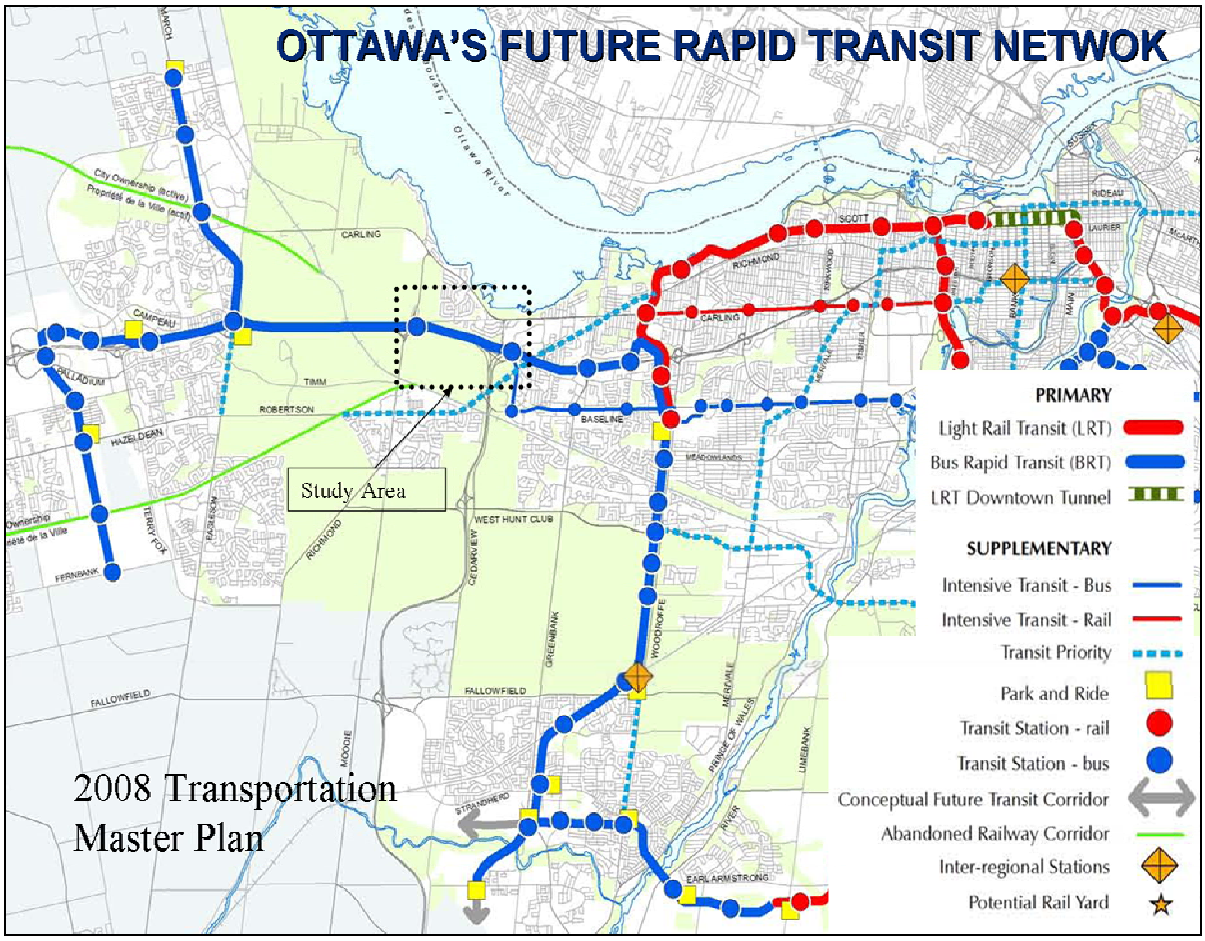
CHAPTER 1: INTRODUCTION

The City of Ottawa has initiated a planning and design study in order to identify a recommended plan to extend the City's bus rapid transit (BRT) network (Transitway) from Bayshore Station to Moodie Drive. As part of this study, alternatives are being evaluated and all necessary permits and approvals required for project implementation are being obtained.

The purpose of this report is to provide background information and document the assessment and evaluation of alternative routes to extend this section of the approved Transitway network. Once a preferred route has been recommended, the City will proceed with the generation and evaluation of preliminary design alternatives within the preferred route to fine tune and finalize a recommended plan for approval by Ottawa City Council.

1.1 Overall Study Objectives

The City of Ottawa's 2008 Transportation Master Plan (TMP) defines a rapid transit network that includes a primary rapid transit corridor extending from the Southwest Transitway to Kanata (See Exhibit 1). A primary rapid transit corridor is defined as a 'fast, frequent, high-capacity transit service using either rail or bus technology operating in an exclusive right-of-way that is generally grade separated'.[1]



1 City of Ottawa Transportation Master Plan, 2008

Exhibit 1 – Future Rapid Transit Network

The Capital Works Plan identified within the 2008 TMP establishes priorities and sequencing for the implementation of the approved rapid transit network. The implementation of the West Transitway Extension was prioritized according to the following phases. (See Exhibit 2):

Phase 1: *Pinecrest to Bayshore*- Recently opened.
Phase 2: *Bayshore to Moodie*- The subject of this report.
Phase 3: *Eagleson to Terry Fox*- Planning complete, design currently underway.
Phase 4: *Southwest Transitway to Pinecrest*- Planning currently underway.
Future Phases: These elements of the exclusive rapid transit network were not identified in the 2008 Capital Works Plan and are therefore not anticipated within the current planning horizon (2031).

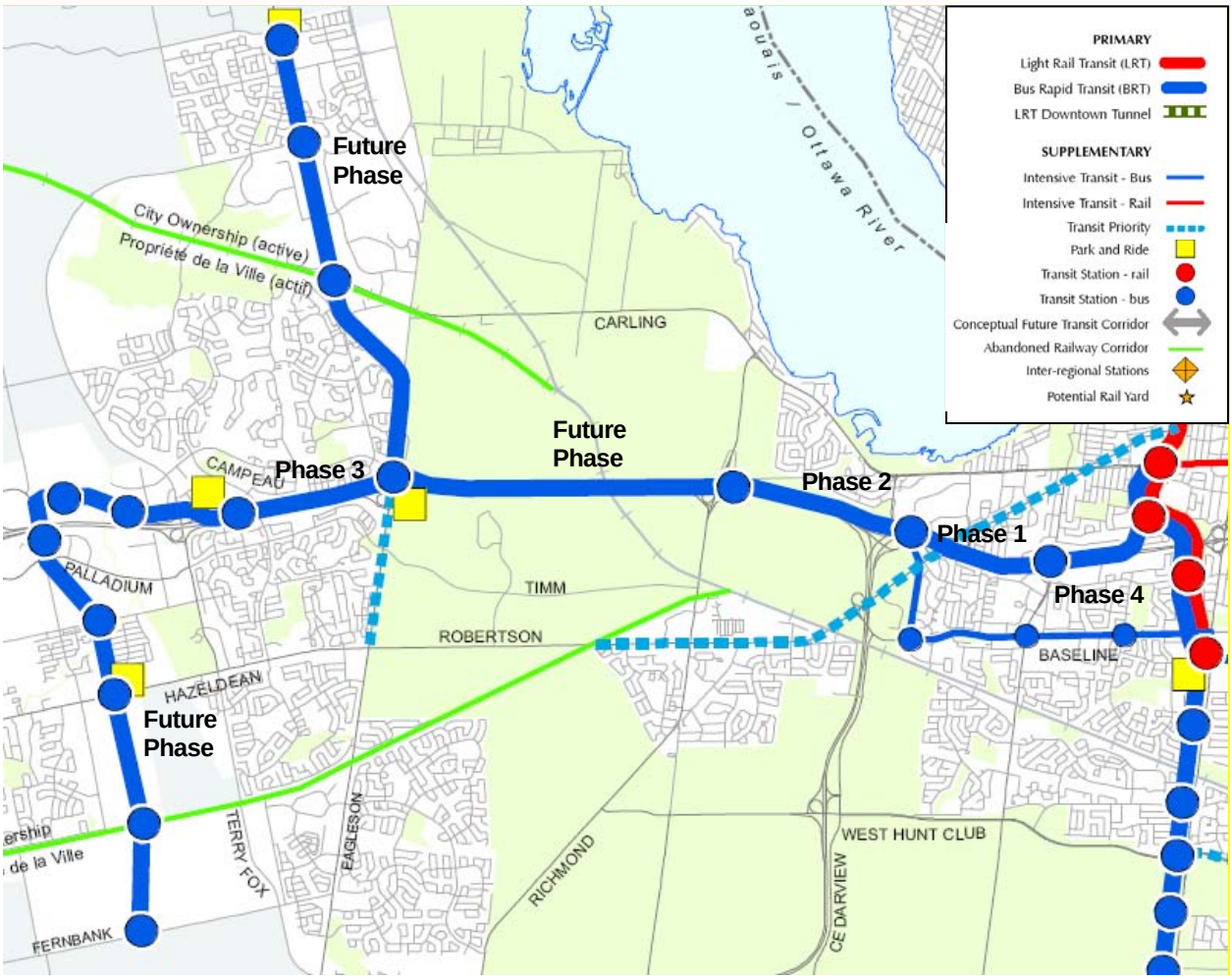


Exhibit 2- Phasing of West Transitway from the SW Transitway to Kanata

Implementation of Phase 2 of the West Transitway Extension (from Bayshore Station, terminating at Moodie Drive) is required to address current transit service reliability issues associated with running scheduled bus service in mixed traffic on Highway 417 (see Chapter 2, Project Need). ***An interim study objective is therefore to complete the functional, preliminary and detail design for an***

exclusive BRT facility that connects Bayshore Station to shoulder bus lanes on Highway 417 west of Moodie Drive and provide a passenger transfer function to and from local bus services to Transitway service at Moodie Drive.

As the Council approved rapid transit network includes plans for the ultimate extension of this facility to Kanata, ***the ultimate study objective is to complete the functional design for the definitive grade separation of Moodie Drive that includes a Transitway station in the vicinity of Moodie Drive***. Furthermore, in May 2008, Ottawa City Council approved a long-term plan to convert the West Transitway to rail technology when population and employment density targets are attained in the West Urban Community. As such, this facility must be designed to accommodate the future conversion to rail technology.

Policy 5.2.2 (2) of the City's approved TMP directs the City to "defer the costs of grade-separating rapid transit elements by introducing transit priority measures that reduce delay and improve reliability, and by incrementally introducing further enhancements to isolate transit from mixed traffic."[2] While the ultimate facility is being planned as an exclusive, fully grade separated primary rapid transit corridor, opportunities will be explored in the interim to defer the implementation of grade separations until they are warranted due to transit operational concerns, traffic concerns and/or the extension of the Transitway across the Greenbelt. As such, the interim project configuration (terminating at Moodie Drive) could potentially remain in effect beyond 2031. The triggers to proceed with the implementation of the Moodie Drive grade separation will be identified in the Recommended Plan developed as part of this study, but can only be definitively determined through ongoing monitoring of traffic and transit operations through the interim Moodie Drive intersection which will form part of future TMP updates (conducted every 5 years).

1.2 Project History

Planning for the westerly extension of the Transitway system began in 1994 with the *West Transitway Extension Individual Environmental Assessment, from Woodroffe Avenue to Acres Road* (Regional Municipality of Ottawa- Carleton {RMOC} 1994). This study identified the Queensway Corridor as the technically preferred rapid transit corridor from the Southwest Transitway to the CN rail underpass of Highway 417 west of Moodie Drive (see section 4- Alternative Corridors). The 1994 IEA also identified a Transitway alignment within that corridor up to the Bayshore Transitway Station. While the recommended alignment terminated at Holly Acres Rd, the study did recognize that plans would be developed to allow for the future westerly extension of the Transitway to Kanata and a "possible future Transitway alignment" was identified extending west of Holly Acres towards Moodie on the north side of Highway 417. However, an inventory of existing conditions in the area between Holly Acres and Moodie Drive was not carried out; alternatives to the possible future alignment were not developed; and an evaluation to determine a preferred alignment was not completed. As a result, this 'possible future alignment' was identified as being "subject to further study".

In 1997, the RMOC completed the *West Urban Community Transit Integration Study and Environmental Assessment* (WUC EA) to define the long-term extension of the rapid transit system into the West Urban Community (Kanata). This approved EA further defined the Queensway Corridor as the preferred rapid transit corridor between Moodie Drive and Terry Fox Drive. A recommended alignment was identified within this corridor on the north side of Highway 417 and conceptual Transitway stations were identified at Moodie Drive, Eagleson Road, Castlefrank Road and Terry Fox Drive. Again, while a centreline alignment was proposed east of Moodie Drive which

2 City of Ottawa Transportation Master Plan, 2008.

connected to the above-noted "possible future Transitway alignment", an analysis and evaluation of alternative alignments was not carried out within the current study area.

As neither the 1994 nor 1997 EA studies fully evaluated Transitway routes or designs between Holly Acres Road and the conceptual station just east of Moodie Drive, the City must complete additional planning work before Phase 2 of the West Transitway Extension can be implemented. The limits of previously completed planning studies in relation to the limits of the current assignment are illustrated in Exhibit 3.

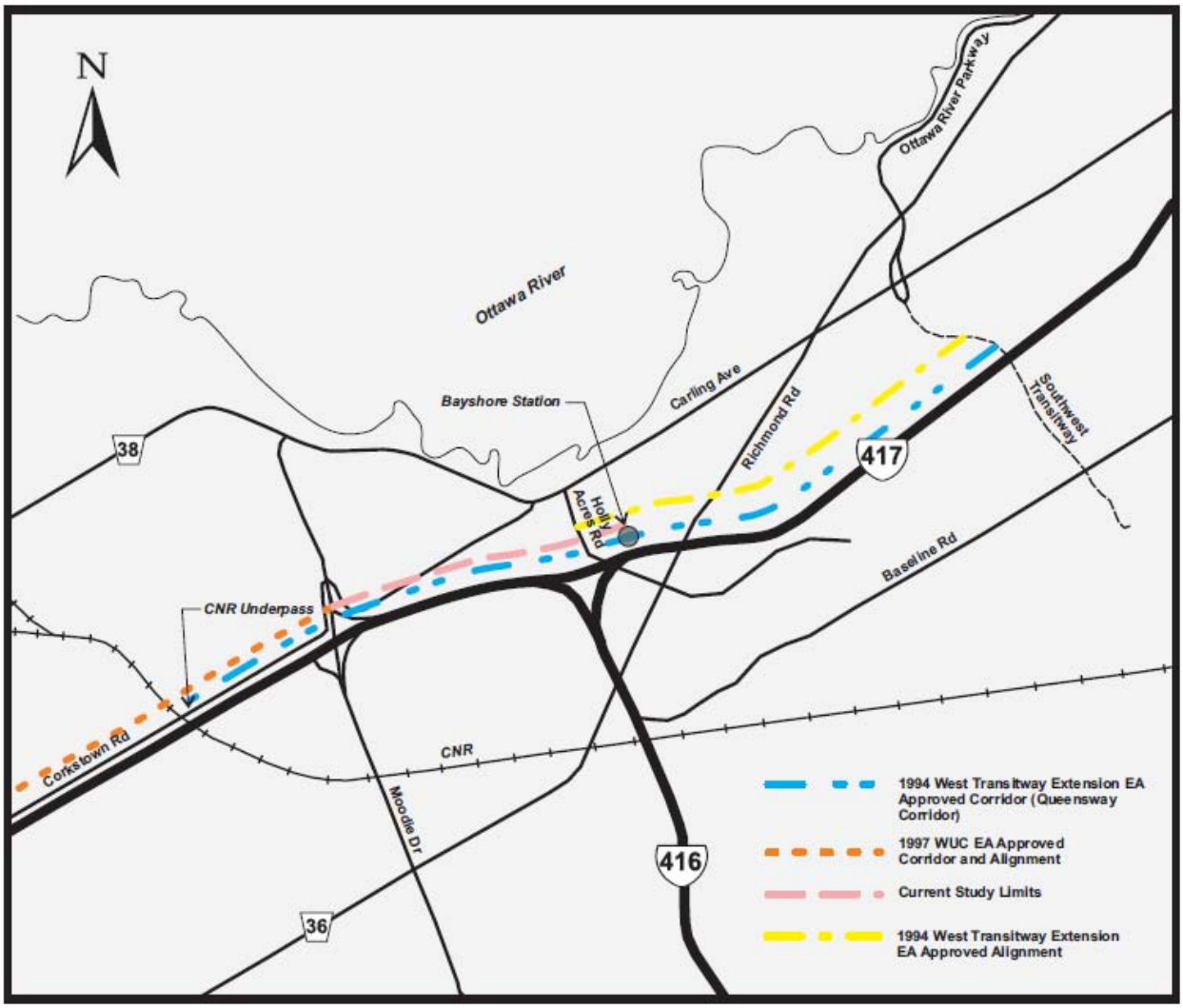


Exhibit 3- Project Limits

CHAPTER 2: PROJECT NEED

Existing transit ridership in the City of Ottawa is higher than other North American cities of similar size. This can be directly attributed to the popularity of the City's bus rapid transit (BRT) system, known as the Transitway. However, to support the growth management objectives established in the Official Plan (OP), Ottawa must become even more transit oriented. Towards this end, the City has established the strategic goal to increase the peak-hour transit modal split[3] to 30% by 2031, which represents a 7% increase over today's level. To achieve this aggressive target, the approved 2008 Transportation Master Plan (TMP) sets forth a vision to reduce automobile dependence by giving priority to investment in public transit infrastructure as the primary means to meet future growth in travel demand. While emphasis is placed on the importance of making non-motorized trips more practical, the plan recognizes that public transit will remain the most affordable, accessible and all-season travel option of area residents in the future.

The expansion, or full build-out of the Transitway is recognized as a critical element in the achievement of the City's transit objectives. The 2008 TMP includes a plan for a network of inter-linked transit corridors which includes a downtown tunnel and incremental extensions to urban centres outside of the Greenbelt. As funding is not available to proceed with the immediate, concurrent build-out of the full rapid transit network, the 2008 TMP sets out a Capital Works Plan to guide the implementation of the plan and provide the basis for the preparation of annual budgets and long-range financial plans. The plan also indicates that, wherever possible, attempts will be made to shorten the timeline for the delivery of these projects. Based on the implementation phasing contained in the Capital Works Plan, the extension of the West Transitway from Bayshore Station to Moodie Drive is identified as a Phase 1, Increment 1 project (subject to immediate implementation provided the availability of funding).

The full build out of the West Transitway (described in section 1.1) will help the City achieve its 30% transit modal split objective by improving service reliability between downtown and the west urban community in the peak hour in both directions by obviating the requirement to operate transit service in mixed traffic on Highway 417 (the Queensway). In addition to improving reliability for transit users, the ultimate, fully grade-separated facility will also result in positive externalities for the City of Ottawa by way of operating and capital cost savings due to a reduction in travel times and a reduction in the number of buses required to maintain an adequate level of transit service.

A more detailed explanation of the calculations used to determine service reliability, travel time savings, capital cost savings, operational cost savings, and passenger cost savings described in this section have been included in Appendix A.

2.1 Need for Interim Project (Terminating with an at-grade intersection with Moodie Drive)

As noted in subsection 1.1, the priority for implementation of the interim project is founded on the need to address current service reliability issues associated with operating buses in mixed traffic on Highway 417 between Bayshore Station and Moodie Drive.

3 Transit modal split is defined as the percentage of person trips made by transit relative to the number of person trips made by motorized modes (automobile and transit combined).

2.1.1 Current Operational Concerns

Until recently, westbound buses traveled on the paved shoulder of Highway 417 between Holly Acres Road and Moodie Drive. However, following the completion of the recent highway widening, westbound buses must now operate in mixed traffic in the westbound lanes on Highway 417. The northernmost lane, originally built as a bus-only shoulder lane, has been converted to a mixed-use auxiliary lane coincident with the installation of protective barriers that prevent the previously unsafe multi-lane change maneuvers (weave) of northbound traffic coming from Highway 416 exiting to Moodie Drive.

In the eastbound direction, buses travelling from Kanata/Stittsville operate in a shoulder bus-only lane on Highway 417 from Eagleson Road to Moodie Drive. East of Moodie Drive, buses operate in mixed traffic because the current configuration of the highway prevents the designation or construction of any form of bus-only lane due to the conflict with eastbound auto traffic exiting to join Highway 416 (to avoid the 416 ramp, buses would be required to weave from the shoulder lane into the through lanes and back into the shoulder lane to exit at Holly Acres). In mixed traffic environments, traffic congestion increases potential for delay and reduces reliability for transit service.

2.1.2 Transit Service Reliability

According to the 2008 TMP, the City's main strategic objective for transit service is to provide ease of mobility to individuals by offering reliable and safe public transit services that satisfy the travel needs and expectations of the largest number of persons possible in various circumstances. Service reliability has a major impact on a person's decision to use, or not use, transit and is in essence a function of travel time variability.

Under existing conditions, data obtained from OC Transpo indicates that eastbound travel times in the segment of Transitway between the Eagleson Park and Ride and Bayshore Station vary by as much as 5 minutes in the peak period (from 6 minutes to 11 minutes). The provision of bus-only shoulder lanes between Eagleson Road and Moodie Drive suggest that this variance is due entirely to the operation of bus service in mixed highway traffic between Moodie Drive and Bayshore Station.

In order to account for this variability, OC Transpo currently builds 2 minutes into the scheduled travel time during peak periods. The implication of this additional 2 minutes is that more buses are required to maintain an adequate level of service (thus increasing operational and capital costs). It would not be cost effective to fully address the documented 5 minute variance as OC Transpo would need to build a full 5 minutes into their schedule during peak periods. This would represent a 70% increase over the off-peak scheduled travel time and would require even more buses to maintain service (with a corresponding increase in operational/capital cost).

As OC Transpo cannot justify the operating funding to completely immunize the service against the 5 minute variance, service reliability within this segment of the Transitway suffers. More important, however, is the fact that service unreliability in one segment of the network results in a cumulative and compounding reduction in service reliability throughout the entire network. For example, when a bus is late for its scheduled stop at Bayshore Station, it will be late for all subsequent stops along the route. When a bus is late, more passengers accumulate at stops downstream. This accumulated demand results in further delays due to an increase in required loading time. One way to address this effect would be to provide standby buses that can be dispatched to fill gaps in service. This would have a high labour cost both for additional bus operators and additional service control supervisors, and still would not assure completely reliable service, as delays occur very quickly, usually faster than remedies can be applied.

The implementation of an interim configuration (terminating at grade on Moodie Drive) will introduce an additional transit signal for those westbound buses that currently remain on Highway 417 between Bayshore Station and Eagleson Road. However, delay will only occur when the Demand for Service Indicator Signal (DSIS) at Moodie Drive is activated by a waiting passenger. While this may result in a minor delay for these westbound buses, transit signals are predictable and can be managed through scheduling to ensure service reliability.

In order to improve service reliability and attract new transit riders, an exclusive Transitway facility is required immediately to remove buses from unpredictable mixed traffic on Highway 417.

2.2 Additional Benefits of Implementing the Ultimate Grade Separation at Moodie Drive

As documented in the approved 2008 TMP, the ultimate configuration of this facility will be an exclusive, fully grade-separated bus rapid transit facility with a station at Moodie Drive compatible with future conversion to rail. In addition to the improved service reliability gained by removing buses from mixed traffic in the interim, the ultimate grade separation of Moodie Drive will reduce travel times and result in tangible cost savings to the City and its transit users. As noted above, this grade-separation is not included in the 2008 TMP Capital Works Plan and is therefore not currently anticipated within the planning horizon (to 2031). For information purposes only, an opening day of 2031 has been assumed to illustrate potential cost savings.

It should be noted that the discussion of travel time savings and cost savings that can be expected to result from the ultimate grade separation of Moodie Drive is not intended to serve as a 'Business Case' for the extension of the Transitway network. Rather, these benefits should be considered ancillary to the overall benefit to transit users that will result from the fully operational and contiguous rapid transit network defined in the approved 2008 TMP.

2.2.1 Travel Time Savings

Travel time savings come from two primary areas; 1) changes in the physical design of a transit facility; and 2) reduced signal and congestion delay. In terms of physical design changes, all route alternatives under consideration result in a travel time savings of approximately 1 minute for eastbound buses (from the existing four minutes to approximately three minutes) due to a reduction in route length. There is no significant change to the length of the route for westbound buses; therefore, there are no significant travel time savings due to the physical design of the facility for westbound buses.

The 2 minutes added to existing scheduled travel times for eastbound buses during the AM peak period accounts for congestion on the highway and local roads where buses operate in mixed traffic, as well as the potential for buses to get delayed at signals on Moodie Drive and Holly Acres Road.

Once the grade separation of Moodie Drive is implemented, the combination of physical design changes (1 minute savings) and a reduction in congestion and signal delay (2 minute savings) is expected to result in a travel time savings of 3 minutes in the AM peak period for eastbound buses. During the rest of the day, eastbound buses would benefit from the 1 minute time savings due to changes in the physical design only.

For westbound buses, the time savings would only be achieved during the PM peak period due to the elimination of congestion and signal delay (2 minute savings).

When considering the round trip travel time savings, 3 minutes can be saved during peak periods while a 1 minute savings can be achieved in the midday/evening period.

2.2.2 Cost Savings Due to Reduced Travel Time[4]

The time savings associated with the operation of the exclusive, fully grade-separated transit facility between Bayshore and Moodie Drive compared to mixed operation of buses on Highway 417 results in cost savings to both the city and the transit passenger. There are *capital cost savings* due to fewer buses required in operation, *operational cost savings* due to fewer transit service hours to accommodate the transit demand, and *passenger cost savings* due to a reduction in the amount of time spent by passengers on transit vehicles.

Transit Capital Cost Savings

With the buses requiring less time to complete a round-trip than the existing routing, fewer buses would be required in-service to provide the equivalent transit capacity. Assuming that half of the passengers are accommodated on articulated buses and the remainder on standard buses, the 3 min round trip travel time savings in both the AM and PM peaks results in 8 fewer buses being required to accommodate the transit demand in 2031.

Assuming vehicle costs of $630,000 for standard hybrid-electric buses and $900,000 for articulated hybrid-electric buses, the introduction of this new exclusive Transitway would save the city $6.12M in transit capital costs (assuming an opening day of 2031) due to fewer buses required in service to accommodate the transit demand.

Annual Transit Operational Cost Savings

Cost savings to the City were determined using the number of passengers on this section of the West Transitway and the number of buses required to accommodate these passengers. Each bus within the corridor will benefit from the travel time savings resulting in fewer total operational hours of in-service transit vehicles.

Assuming 250 service days and an estimated 117 buses/ hour on opening day in 2031, the annual eastbound time saving in 2031 is projected to be 6,250 hours which reflects a total 5 minute time savings in the AM peak hour, mid-day and PM peak periods.

Assuming an average operational cost of $120/hour, this time savings results in annual cost savings of $750,000 for eastbound operations. In the westbound direction, time savings in 2031 are projected to be 3,750 hours which reflects a 2 minute time savings in the PM peak period. This results in annual cost savings of $450,000 for westbound operations.

The total annual operational cost savings can therefore be estimated at $1.2M in 2031.

Annual Passenger Cost Savings

Annual passenger travel time savings can be determined by considering the transit ridership on both the eastbound and westbound transit services operating throughout the day.

Total annual eastbound and westbound passenger time savings have been calculated assuming 250 service days per year and an average income of $10.49/hr. (Derived from the 2006 Census average income and converted to hourly using a standard work week)

In 2031, there would be 240,000 hours of passenger time saved due to enhancements to eastbound services resulting in passenger cost savings of $2.52M. In the westbound direction, 200,000 hours could be saved resulting in passenger cost savings of $2.1M.

4 All cost savings are quoted in nominal (2010) dollars and have not been adjusted for inflation.

The travel time savings therefore result in an annual total passenger cost savings of approximately $5.63M in 2031.

2.5 Need for Transit Station at Moodie Drive

The 2008 TMP identifies rapid transit stations as excellent locations for future employment opportunities, as they serve high volumes of passengers and can serve as meeting points that allow passenger transfers between transit routes, between bus and rail transit modes, and between transit and other modes such as walking, cycling, taxis and private automobile.

Accordingly, the approved rapid transit network defined in the 2008 TMP identifies a station at Moodie Drive. This station was originally recommended as part of the 1997 WUC EA to serve as "at least, a point of on-and-off bus access between the Transitway and the collector or arterial roadway system, so that peak period express routes serving Bells Corners and the BNR/Northern Telecom may enter and exit the Transitway there. However, it is likely that there would also be at least one local all-day bus route serving Northern Telecom and BNR, and that route would interface with regular Transitway services at this location. There would be an associated need for a local bus platform and passenger waiting facilities. It should be noted that, unless there are changes in the policy of the NCC with respect to development of Greenbelt lands, the walk-in ridership at this station is likely to be limited mostly to Northern Telecom employees"[5].

While a recent decline in the high-tech sector has led to a current underutilization of the aforementioned Nortel campuses (at Corkstown Road and at Carling Avenue), this is not expected to be a permanent condition. In fact, the proposed Transitway station in the vicinity of Moodie Drive will not only provide improved transit access for employees at Abbott Point-of-Care (the former Nortel Corkstown facility), but will also support the potential redevelopment of that site as well as the re-use of the Nortel Carling Avenue campus through the provision of convenient and reliable transit service that is either within walking distance or a short shuttle bus ride away.

A station at Moodie Drive would further support the City's transit strategy by improving accessibility for some residents and other employees in the Crystal Beach/Lakeview area, and the overall integration between rapid transit (Transitway) routes, mainline bus routes, local bus routes, and peak period bus routes to employment areas. It also supports the City's transit vision by fostering the potential for transit-oriented development of other nearby lands and providing a fast and reliable link between communities and employment centres.

Finally, a station at this location would provide OC Transpo with operational flexibility particularly in off-peak periods. In peak periods it is likely that ridership demand at the Corkstown and Carling employment nodes would be sufficient to warrant direct rapid transit service to and from the east (Bayshore) and west (Kanata Town Centre). During off-peak periods, however, a transfer station at Moodie Drive would facilitate the use of Moodie Drive service to feed the E-W rapid transit route. Furthermore, in the longer term, when the corridor is converted to rail, the station could continue to be fed by Moodie Drive service.

5 RMOC West Urban Community Transit Integration Study and EA, 1997.

CHAPTER 3: STUDY PROCESS

3.1 Integrated Planning and Design

To address both interim and ultimate study objectives, an integrated planning and design process is being followed. The planning process developed for this study includes the consideration of a reasonable range of alternatives and the evaluation of alternatives based on an assessment of environmental effects. It has been fully integrated with the design process to ensure that decision making is phased, narrowing progressively to the selection of a recommended plan. Consultation milestones have been scheduled to coincide with key decision making milestones in order to ensure stakeholder participation in the determination of a recommended plan. Alternative Solutions (i.e. alternatives to transit) and Alternative Corridors were evaluated during previous planning studies completed by the former RMOC and the City of Ottawa. This current assignment therefore focuses on Alternative Methods of implementing an exclusive rapid transit facility within the Queensway Corridor between Bayshore Station and Moodie Drive. The planning and design process is flexible and is being adjusted as the study progresses to accommodate stakeholder issues (i.e. evaluation criteria, milestones, deliverables etc.)

The integrated planning and design process is illustrated in Exhibit 4.

3.2 Approvals

3.2.1 Province of Ontario EA Approval

This project is being planned in accordance with the **Transit Project Assessment Process (TPAP)** as described in Ontario's **Transit Project Regulation** (O. Reg. 231/08). The regulation exempts proponents of all public transit projects from the requirements under Part II of the Environmental Assessment Act (OEEA), and describes a process that certain transit projects must follow in order to be considered exempt.

In accordance with Schedule 1 of the regulation, the West Transitway extension project is subject to the TPAP as it fits the definition of "the construction of a new transit system, i.e. involving construction of new infrastructure."[6]

The TPAP is based on the principles of sound EA planning and requires that the proponent base decisions on sound scientific approaches and methods in consultation with stakeholders. As with the Class EA process, the TPAP is a proponent driven, self assessment process. Proponents are required to consider alternative methods and identify potential impacts and mitigation when evaluating and recommending a preferred plan.

The pre-planning for this project constitutes the route selection phase (documented in this report) and preliminary design selection phase (undertaken once preferred route has been recommended). All pre-planning activities are being carried out in consultation with stakeholders. Together, the findings from these pre-planning activities will be incorporated into the Recommended Plan for presentation to Committee/Council for approval. Upon Committee/Council approval of the Recommended Plan, the TPAP will be formally initiated with a Notice of Commencement. In accordance with the TPAP, the Council approved Recommended Plan will be documented in a Draft Environmental Project Report (EPR) which is subject to additional public consultation including a Public Open House and a 30-day

6 Ontario Regulation 231/08, Schedule 1, 2008

public review period. Following the 30-day public review period, the Minister of Environment has an additional 35 days to consider objections after which the project is approved. Upon receipt of provincial EA approval, the detail design for the first phase of implementation (the interim project) will commence.

Major differences between TPAP and traditional Individual or Class EA processes include:

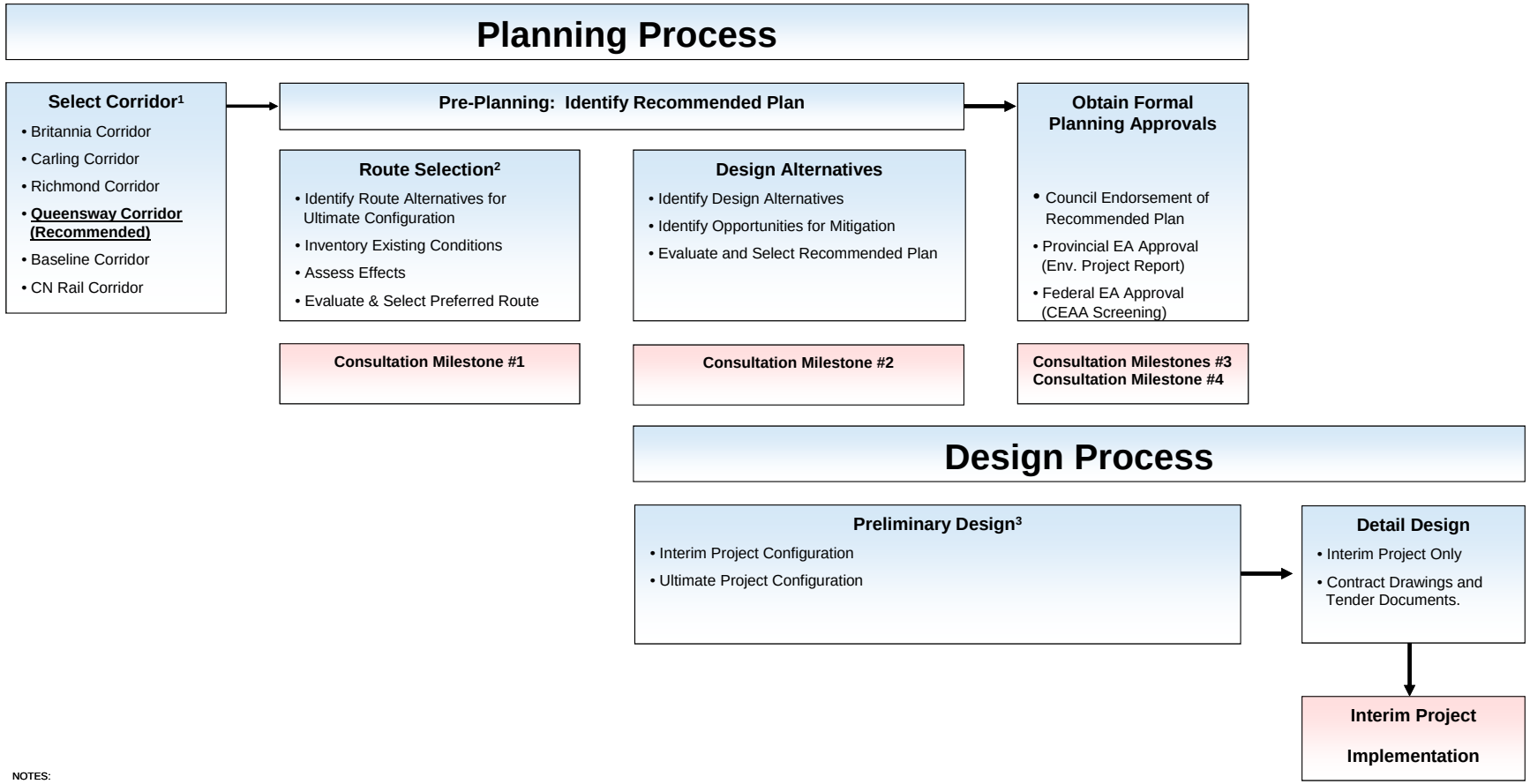
Alternative Solutions ('Alternatives to') – Unlike the Individual or Class EA process, the TPAP begins with a selected transit project. Proponents are not required to consider 'alternatives to' transit, as the benefits to communities, the environment, and the economy are clear.

Regulated Timelines – There is a six-month time limit on the approvals process which begins once all pre-planning activities are complete. The six month approval process is triggered with the publication of a Notice of Study Commencement and includes a maximum 120-day consultation and documentation period; a 30-day public and agency comment period; and a 35-day period for the Environment Minister to review objections.

Stakeholder Objections – The Minister of Environment may only act if an objection is received regarding a potential negative impact on a matter of provincial importance that relates to the natural environment or has cultural heritage value or interest or on a constitutionally protected aboriginal or treaty right, that cannot be resolved.

3.2.2 Federal EA Approval

As federal lands will likely be required for this project, a federal screening under the Canadian Environmental Assessment Act (CEAA) is required. The project team is working colaboritively with the National Capitla Commission (NCC) to ensure that pre-planning activities also address federal EA process requirements.



NOTES:

1. Completed as part of 1996 West Transitway Extension EA & 1997 West Urban Community Transit Integration Study and EA
2. See Final AECERA Report- (MRC, February 2010)
3. Interim configuration terminates at an at-grade intersection with Moodie Drive. Ultimate configuration includes the grade separation of Moodie Drive including the planned passenger transfer facility.

Exhibit 4- Integrated Planning and Design Process

CHAPTER 4: ALTERNATIVE CORRIDORS- FROM SW TRANSITWAY TO KANATA

As explained in section 1.2- Project History, the Transitway corridor between the Southwest Transitway and Kanata is well defined and well documented beginning with the MOE approved 1994 West Transitway Extension EA. As part of that study, six basic east-west corridors were developed along major transportation facilities or corridors. In order to compare the corridors fairly, common start and end points were selected. The start point was the existing Southwest Transitway, and the end point was the CN railway underpass of Highway 417 between Moodie Drive and Eagleson Road. The limits of the current study (from Bayshore Station to Moodie Drive) are contained entirely within the limits of this previously approved planning study.

The six alternatives included:

Britannia Corridor: Extending west from the Ottawa River Parkway in the east, running along the recreational pathway to Bayshore Dr, then turning south and following Bayshore to the north side of Highway 417. The corridor continues westerly along Highway 417 to the CNR underpass.

Carling Corridor: Extending west from the Lincoln Fields Transitway station, travelling parallel to Carling Ave. and Bayshore Drive, before turning south and following Bayshore Drive to the north side of Highway 417. The corridor continues westerly along Highway 417 to the CNR underpass.

Richmond Corridor: Extending west from the Southwest Transitway near Lincoln Fields, running parallel to Carling Ave. to Richmond Road, before following Richmond Road to Highway 417 where it continues to the CNR underpass.

Queensway Corridor: Following Highway 417, extending from the Southwest Transitway near Queensway Station to the CNR underpass.

Baseline Corridor: Extending west from the Southwest Transitway in the east, following Baseline Road to the CNR tracks near Richmond Road, and then following the tracks west to Highway 417.

CN Rail Corridor: Extending south from the proposed Southwest Transitway extension and then following the existing CN Beachburg railway line west to Highway 417.

Alternative corridors are illustrated in Exhibit 5.

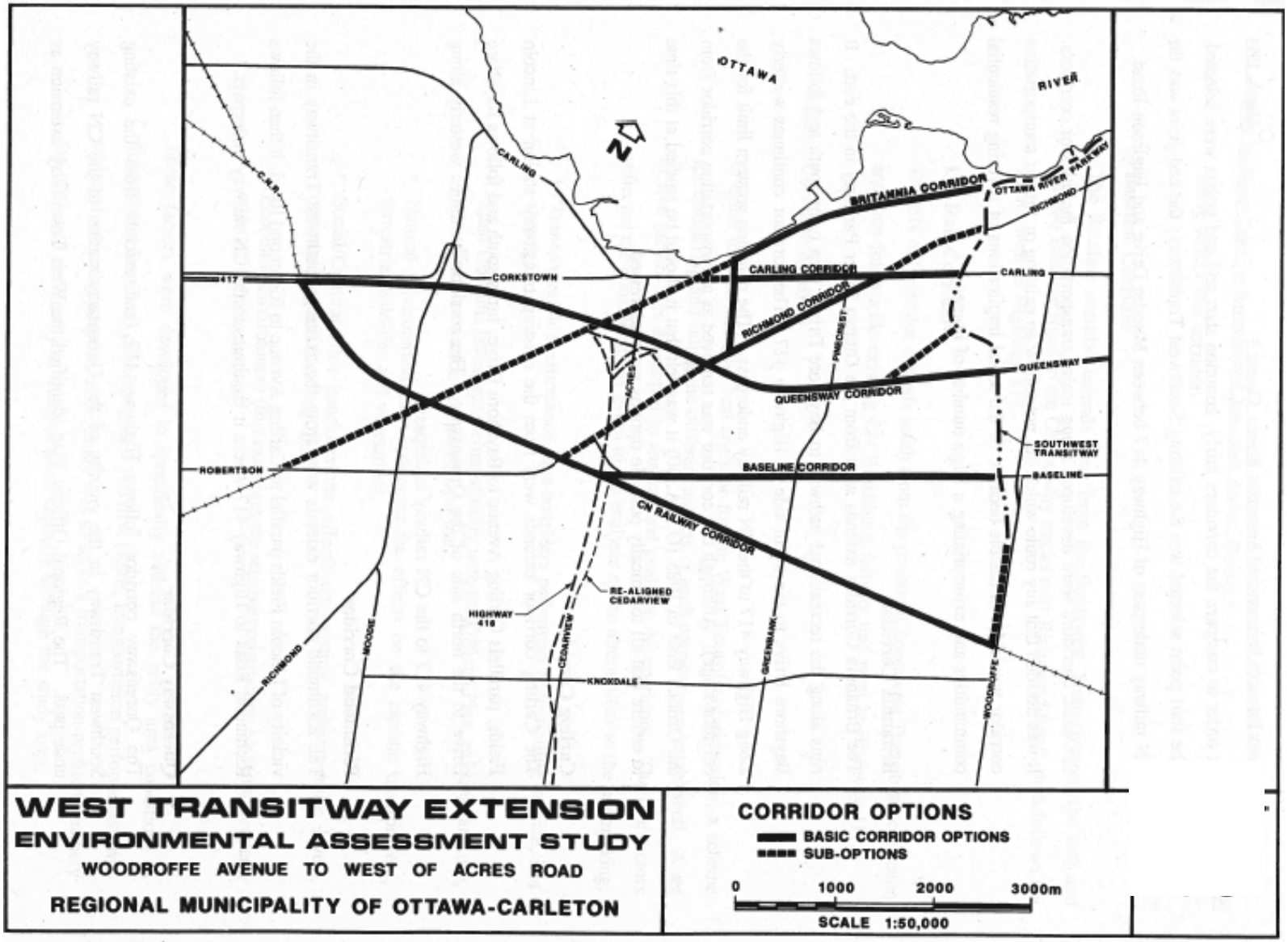


Exhibit 5- Corridor Alternatives (1994 EA, RMOC)

To evaluate alternatives, a set of five factors was developed which included:

- Transportation Performance (pedestrian accessibility, service and staging)
- Land Use (compatibility with Official Plan, existing land use and effects on various forms of land use)
- Natural Environment (effects on the aquatic environment, terrestrial wildlife and vegetation)
- Social/Cultural (effects on ambient noise levels, communities and dwelling units)
- Economic Environment (construction costs and property costs)

Each factor was divided into a number of indicators which provided a means of assessing the alternatives. An assessment of effects was carried out by applying the criteria to each corridor. A summary of this is presented in Exhibit 6.

Factor	Indicator	Measures	Units	Britannia	Carling	Richmond	Queensway	Baseline	CNR
Transportation Service	Compatibility	Possibility for future extensions to the west (ie. Kanata)	G/F/P	G	G	G	G	G	G
		Flexibility to interface with Southwest and West Transitways	G/F/P	G	G	G	G	P	F
	Pedestrian Accessibility	Dwelling units within 400m and 800m of stations.	Number	850/2225	3300/5550	2100/3850	850/2350	2600/4075	750/1375
		Potential trips generated by commercial/office/ industrial areas. (Within 400 & 800m of stations.)	Number	4450/4500	4450/5425	4450/5425	6850/7500	1300/2225	1100/2000
	Service	Transit level of service.	G/F/P	P	F	G	G	F	P
	Staging	Ability to implement transitway in stages.	G/F/P	P	F	F	G	P	P
		Inconvenience to traffic during construction.	G/F/P	P	P	P	F	P	G
Land Use	Land Use	Compatibility with Official Plan objectives (eg. influence in supporting existing and future residential & commercial areas).	G/F/P	F	F	F	G	F	P
		Compatibility with existing development.	G/F/P	F	F	F	G	F	P
		Effects on regionally significant resources.	G/F/P	P	F	G	G	G	G
		Effects on N.C.C. western farm district.	G/F/P	G	G	G	G	F	F
Natura Environment	Aquatic	Wetlands affected. (amount and significance).	G/F/P	P	G	G	G	G	G
		Effects on environmental significant areas.	G/F/P	P	G	G	F	F	F
		Effects on waterfowl/migratory bird staging areas.	G/F/P	P	G	G	F	F	G
		Number of watercourse crossings (cold and warm water)	Number	2	2	2	3	3	2
		Effects on flood/fill areas.	Subj.	Ottawa R. & Britannia Woods: Flood	Stillwater, Graham Creeks: Fill	None	Stillwater, Graham Creeks: Fill	Graham Crk & Tributary: Fill	Stillwater Creek: Fill
	Terrestrial Wildlife	Effects on wildlife habitat (movement corridors, habitat significance).	G/F/P	P	F	G	G	G	F
	Vegetation	Woodlots affected. (amount/significance).	Hectares	2.7	-	-	-	0.9	0.9
Social/ Cultural	Noise	Increase in noise levels above ambient.	G/F/P	P	F	F	G	G	P
			dBa	+ 1 - 5	+ 1 - 5	+ 1 - 5	0	0	+ 1 - 5
	Social	Community facilities displaced or disrupted	Number	4	9	6	2	3	3
		Communities severed.	Number	1	0	0	0	0	0
		Number of dwelling units removed.	Number	75	150-265	75-100	25-50	100-150	100-200
		Number of dwelling units adjacent to the transitway right of way.	Number	850	750-1800	750-1275	200-250	450-600	250-650
Economic Environment	Capital	Relative construction costs (structures, roadworks, utilities, etc.)	Relative	BASE	1.5 x BASE	BASE	BASE	BASE	1.5 x BASE
		Relative property acquisition costs	Relative	1.5 x BASE	1.5 x BASE	BASE	BASE	BASE	1.5 x BASE

WEST TRANSITWAY EXTENSION
ENVIRONMENTAL ASSESSMENT STUDY
WOODROFFE AVENUE TO WEST OF ACRES ROAD
REGIONAL MUNICIPALITY OF OTTAWA-CARLETON

CORRIDOR ANALYSIS

G/F/P indicates Good/Fair/Poor

EXHIBIT 4-9

Exhibit 6- Assessment of Corridor Effects (1994 EA, RMOC)

Based on the results of the assessment of effects, a comparative evaluation was carried out and the Queensway corridor was recommended as the technically preferred corridor (see Exhibit 7). The evaluation was presented to the Technical Advisory Committee, Regional Transportation Committee and to the public. The Queensway Corridor was recommended as it was most preferred in all factor areas.

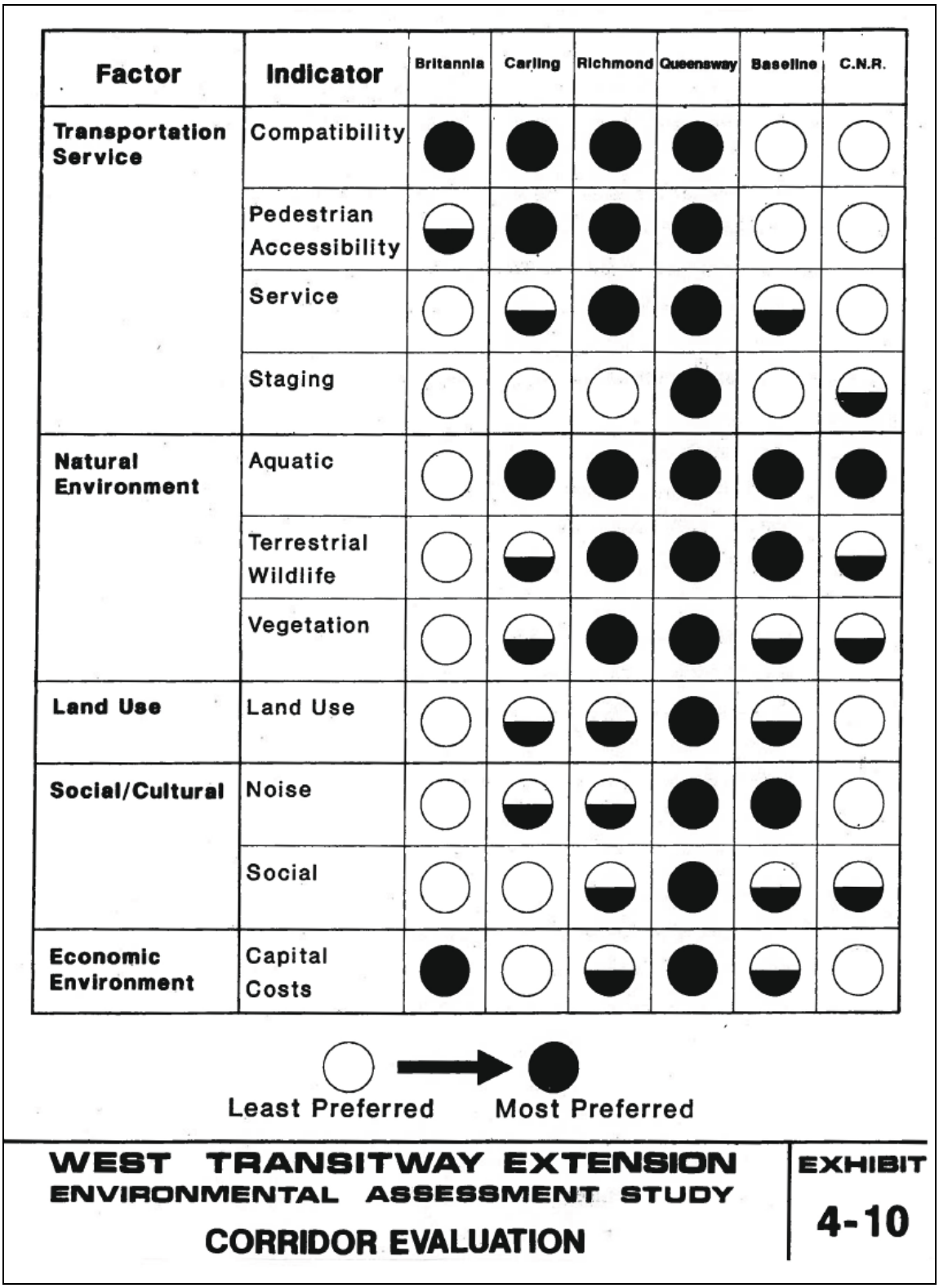


Exhibit 7- Comparative Evaluation of Alternative Corridors (1994 EA, City of Ottawa)

Building on the 1994 EA study, the 1997 WUC EA evaluated alternative corridors for the westerly extension of the Transitway from Moodie Drive to Kanata. The analysis and evaluation again

recommended the Queensway Corridor as the technically preferred rapid transit corridor extending from east of Moodie Drive to Terry Fox Drive. The EA concluded that "the Highway 417 corridor, through the Greenbelt and the Kanata Town Centre, will act as the backbone of the Transitway system in the West Urban Community."

Subsequent transportation planning exercises completed by the former RMOC and the City of Ottawa including the 2003 Rapid Transit Expansion Study (RTES), 2003 Ottawa Rapid Transit Expansion Program (ORTEP) Implementation Strategy, and the1997, 2003 and 2008 TMPs all recognized that the future westerly extension of the Transitway network would occur within the Queensway corridor.

Based on the plans described above, and due to the fact that the limits of the current assignment are contained entirely within the approved Queensway Corridor, further assessment and evaluation of corridor alternatives is not required. The Queensway Corridor has been carried forward as the technically preferred corridor for the West Transitway Extension from Bayshore Station to Moodie Drive.

CHAPTER 5: ROUTE ALTERNATIVES FROM BAYSHORE STATION TO MOODIE DR.

While a technically preferred Transitway corridor has been defined in the study area (Queensway Corridor), a recommended route has not been identified within this corridor between Holly Acres Road and Moodie Drive. A review of the Queensway Corridor within the current study area has identified four potential routes for this connection that must be explored before preliminary design alternatives can generated and assessed and a recommended plan can be finalized. Chapter 5 presents the assessment and evaluation of route alternatives.

5.1 Route Selection Process

The process used to generate, evaluate and identify a recommended route was developed in accordance with the principles of sound environmental planning with guidance from the Ontario Ministry of the Environment's *Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario* (MOE, 2008). The evaluation process, including evaluation criteria, was presented at the first Public Open House and was subsequently refined/ revised based on feedback received from members of the public and the study Technical Advisory Committee (TAC).

5.1.1 Guiding Principles

The route selection process adheres to the following guiding principles:

- The evaluation must be carried out in consultation with key stakeholders;
- The criteria must consider all aspects of the environment;
- The criteria must consider the overall project objectives;
- The process must be understandable; and
- The results must be traceable and defensible.

More specifically, the process has been designed to facilitate the identification of a Transitway route that:

- Is consistent with the City of Ottawa's vision and objectives for transit as identified in the approved 2008 Official Plan and Transportation Master Plan Update;
- Provides a cost-effective interim solution to current operational concerns while not precluding plans for the ultimate westerly extension of the West Transitway to Kanata (including conversion to rail);
- Minimizes effects to terrestrial and aquatic ecosystems and processes and avoids effects that can not be mitigated through design;
- Minimizes effects on the adjacent community (noise, recreation etc.) and avoids effects that can not be mitigated through design;
- Minimizes effects on Greenbelt lands (property requirements and effects to user experience etc.);
- Minimizes effects on provincial highway infrastructure;
- Supports municipal and federal land use planning objectives (transit oriented development, bundling of transportation corridors etc.); and
- Represents a responsible use of public funds.

Identification of Route Alternatives

The first step in the evaluation process involved the identification of a 'reasonable range' of route alternatives. All routes must have a common start point (Bayshore Station) and end point (1997

approved alignment north of Highway 417 and west of Moodie Drive), and must be capable of accommodating a facility that is both constructible and satisfies interim and ultimate study objectives.

Inventory of Existing Conditions

In order to generate a detailed description and understanding of existing environmental conditions in the study area, the following inventory work was completed by Project Team specialists:

- Heritage/ Archaeology
- Noise/ Vibration/ Air Quality
- Aesthetics and Recreation
- Hydrology
- Fluvial Geomorphology (Stillwater Creek)
- Subsurface Conditions (Geotechnical)
- Contaminated Property
- Natural Environment (Aquatic and Terrestrial Ecosystems)
- Transportation

Existing conditions were documented based on information obtained during previously completed studies and augmented by field investigations completed as part of the current assignment. A summary of background and field data that informed the route selection process is included in Section 5.3.

Assessment of Effects & Comparative Evaluation

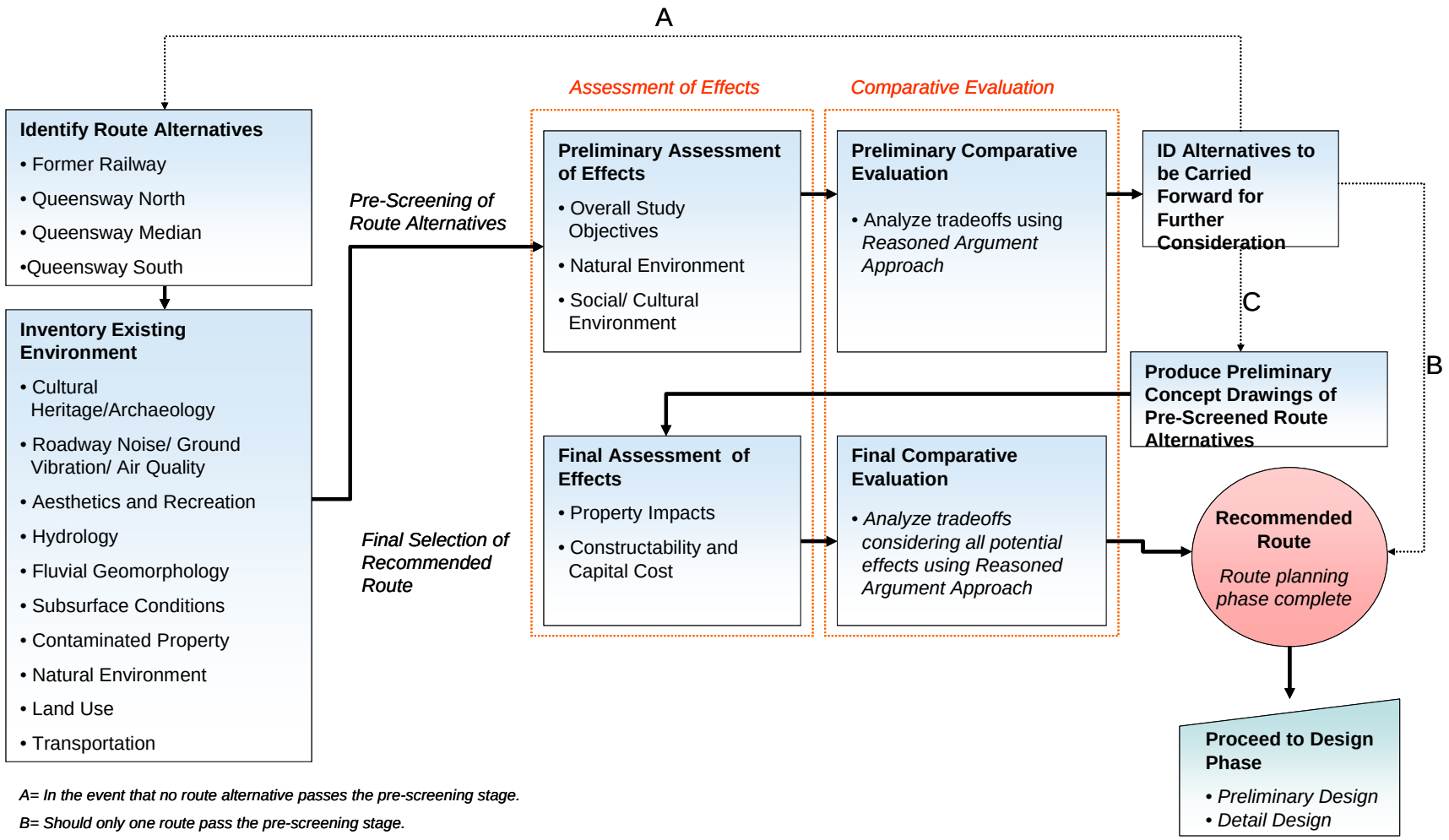
Both the assessment of effects and comparative evaluation of route alternatives were carried out in two stages consistent with a phased decision making process. The first stage involved pre-screening alternatives against a predetermined set of evaluation criteria in order to identify how each route performed in terms of the following Factor Areas: Overall Study Objectives; Potential Effects to the Natural Environment; and Potential Effects to the Social/Cultural Environment. A comparative evaluation was carried out based on the preliminary assessment of effects in order to identify those alternatives which should be carried forward for further consideration. It is important to note that only those alternatives which were considered to be capable of meeting overall study objectives while avoiding effects to the natural and social/cultural environments that could not be mitigated through design were carried forward for further consideration.

The process recognized that, should none of the proposed route alternatives pass the pre-screening stage, the route identification process would need to be revisited. In the event that only one route alternative passed the pre-screening stage, the route selection process would be considered complete and preliminary design alternatives would be developed for the preferred route. In the event that more than one route alternative passed the pre-screening stage, preliminary concept drawings would be prepared in order to develop an understanding of potential property impacts, technical issues/constraints (constructability) and to facilitate an estimation of capital cost.

Pre-screened alternatives were assessed and compared based on a technical review of the preliminary concept drawings and a recommended route was identified for the extension of the West Transitway between Bayshore Station and Moodie Drive. It was recognized that, while all alternatives carried forward from the pre-screening stage would be considered acceptable alternatives, they would not

necessarily exhibit identical potential effects. Potential effects identified during the pre-screening stage, therefore, were also considered in the final comparative evaluation.

This two-stage approach allows for the consideration of route alternatives independently from capital cost and is illustrated in Exhibit 8.



A= In the event that no route alternative passes the pre-screening stage.

B= Should only one route pass the pre-screening stage.

C= Should more than one route pass the pre-screening stage.

Exhibit 8- Route Selection Process

Pre-Screening Assessment of Effects

Table 1 presents the evaluation factor areas used in the pre-screening stage and includes the criteria and performance measures that were used to determine potential effects. Evaluation criteria were selected based on their ability to differentiate route alternatives and determine route preference. Performance measures describe the optimal performance of a route alternative against each criterion and allows for a comparative evaluation of route alternatives. Wherever possible, quantitative performance measures have been utilized.

TABLE 1: PRE-SCREENING EVALUATION CRITERIA

Factor Area/Criteria		**Performance Measures** "The preferred route alternative…<insert measure>"
Factor Area 1: Overall Study Objectives		
1	Travel Time	Provides the greatest savings over existing conditions.
2	Interim Study Objective	Is capable of accommodating the interim project configuration which consists of an exclusive BRT facility connecting Bayshore Station to shoulder bus lanes on Highway 417 west of Moodie Drive via an at-grade intersection with Moodie Drive. The interim project configuration also must provide a passenger transfer function at Moodie Drive.
3	Ultimate Study Objective	Is capable of accommodating the ultimate project configuration which includes: the westerly extension of the facility beyond Moodie Drive and connecting to the approved 1997 EA alignment north of Highway 417; a rapid transit station in the vicinity of the Moodie Drive interchange; and the potential for conversion of the facility to rail technology.
4	Provision of Community Transit Service	Has the greatest potential service catchment with the highest level of station accessibility.
Factor Area 2: Natural Environment		
5	Fish and Fish Habitat	Minimizes effects on fish and fish habitat considering sensitivity and relative magnitude of potential effect.
6	Species at Risk	Avoids effects to known federally or provincially designated flora or fauna species and/or habitat.
7	Designated Natural Env. Features/Areas	Minimizes effects to designated natural environmental features/areas including ANSIs, ESAs etc.
8	Wetlands	Minimizes effects to wetland vegetation/communities considering sensitivity, quality and significance of wetland vegetation (including regionally rare/uncommon plant species) and relative magnitude of potential effect
9	Upland Vegetation	Minimizes effects to upland vegetation (including wooded tablelands and valleys and culturally influenced communities such as cultural thicket, meadow and hedgerows) considering sensitivity, quality and significance of vegetation (including regionally rare/uncommon plant species) and relative magnitude of

		potential effect
10	Wildlife	Minimizes effects on habitat considering sensitivity, quality and significance (including migratory birds and known habitat for regional wildlife species of conservation concern) and relative magnitude of potential effect.
11	Fluvial Geomorphology	Minimizes impacts on Stillwater Creek and its Tributaries with respect to: • Flow regime (timing and volumes) • Energy regime • Sediment transport • Erosion and/or sedimentation • Quality and functioning of existing fluvial features
12	Drainage/ Hydrology	Minimize TSS loading to watercourses. Minimize increases to flood flows. Minimize SWM facility maintenance.
Factor Area 3: Social/ Cultural Environment		
13	Heritage/ Archaeology	Avoids areas with heritage/archaeological potential
14	Contaminated property	Avoids contaminated property
15	Agriculture	Avoids productive agricultural land
16	Noise	Minimizes noise level increases at sensitive receivers
17	Air Quality/ Ground Vibration	Demonstrates maximum separation from sensitive receivers
18	Visual Impact	Maintains/enhances buffer areas and scenic vistas
19	Recreation Resources	Maintains/enhances recreational resources
20	Land Use	Compatibility with existing land use designations (Greenbelt Master Plan)

Route performance and/or potential effects were determined through a high-level screening based on the information gathered during the inventory of existing conditions and further technical analysis. This assessment was carried out by Project Team specialists who analysed routes against factors in their particular area of expertise.

The performance and/or potential effects of each route alternative were recorded in the context of their corresponding performance measure, either qualitatively or quantitatively as appropriate. In order to facilitate a comparison of effects, each corridor was assigned a 'performance grade' for each criterion which describes how well each alternative performed in relation to a specific criterion. The performance grade reflects an assessment of the absolute level of potential effect and was subdivided as follows:

Good: The alternative performs optimally as measured against the stated criteria.

Fair: The alternative is less than optimal, but does perform reasonably well against the stated criteria.

Poor: The alternative performs poorly against the stated criteria.

Finally, the relative difference in absolute effects among alternatives was compared for each criterion and routes were ranked in order of preference. The same ranking process was used to determine route preference for each overall factor area.

Table 2 provides an example of the tables used to document the assessment of effects.

TABLE 2: EXAMPLE OF ASSESSMENT OF EFFECTS TABLE

Factor Area 1- (Overall Study Objectives, Natural Environnent, Social/Cultural Environnent etc.)

Criteria	**Performance Measures**	**Assessment of Effects**			
		Former Railway	**Queensway North**	**Queensway Median**	**Queensway South**
See tables 1 & 3 for a list of criteria	See table 1 for a description of performance measures for each criteria	Description of the absolute effect in relation to the performance measure.	Description of the absolute effect in relation to the performance measure.	Description of the absolute effect in relation to the performance measure.	Description of the absolute effect in relation to the performance measure.
	PERFORMANCE GRADE	good/fair/poor	good/fair/poor	good/fair/poor	good/fair/poor
	PREFERENCE	1st, 2nd, 3rd or 4th	1st, 2nd, 3rd or 4th	1st, 2nd, 3rd or 4th	1st, 2nd, 3rd or 4th
	RATIONALE	Description of the justification used to determine the preference of one alternative over another for each criterion.			
Factor Area 2 Summary					
	OVERALL PERFORMANCE GRADE	good/fair/poor (considers all criteria in a factor area)	good/fair/poor (considers all criteria in a factor area)	good/fair/poor (considers all criteria in a factor area)	good/fair/poor (considers all criteria in a factor area)
	OVERALL PREFERENCE	1st, 2nd, 3rd or 4th (for the entire factor area)	1st, 2nd, 3rd or 4th (for the entire factor area)	1st, 2nd, 3rd or 4th (for the entire factor area)	1st, 2nd, 3rd or 4th (for the entire factor area)
	RATIONALE	Description of the justification used to determine preference for one alternative over another for the factor area.			

Pre-Screening Comparative Evaluation

Due to the number of competing interests, opportunities and constraints in the immediate study area, the careful consideration of tradeoffs was considered to be critical to the fair selection of a preferred route.

Building on the preliminary assessment of effects, a reasoned argument approach was used to compare and evaluate the advantages and disadvantages of each route alternative and determine which routes should be carried forward for further consideration. It should be noted that while some effects were considered very important, if there was no measurable difference in effect between alternatives, the effect was not considered 'decision relevant' (i.e. it could not be used to determine route preference).

Final Assessment of Effects and Comparative Evaluation

As indicated above, the final assessment of effects and comparative evaluation was based on an analysis of property impacts, constructability issues/constraints and the resulting capital cost of each route alternative that was carried forward from the pre-screening stage. This was accomplished by advancing the preliminary design of pre-screened alternatives to fully assess technical constraints/considerations.

Table 3 presents the criteria and associated performance measures that formed the basis for the final assessment and evaluation of route alternatives. The final evaluation considered all potential effects (including those identified in the pre-screening stage) to identify a recommended route.

TABLE 3: FINAL EVALUATION CRITERIA

Factor/Criteria		**Performance Measures** "The preferred route alternative…<insert measure>"
Factor Area 4: Technical Considerations		
21	Property Impacts	Bundles transportation corridors and requires least amount of new NCC Greenbelt lands and/or private property.
22	Constructability/Capital Cost	Minimizes impacts to existing transportation facilities and public utilities. Avoids complex construction staging. Can be constructed at the lowest capital cost.

5.2 Identification of Route Alternatives

Based on a comprehensive review of the study area and in recognition of existing constraints within the Queensway corridor, four potential route alternatives were identified. The alternative of routing the Transitway along Corkstown Road was not given consideration as it was determined that the existing-right-of-way could not accommodate an exclusive Transitway without significant roadway widening and associated property impacts. The four alternatives that were carried forward for consideration include:

5.2.1 Description of Route Alternatives

Former Railway: This route leaves Bayshore Station in the east, crosses Holly Acres Road, and runs along a former railway located immediately adjacent to the Crystal Beach Community. The route then travels parallel to Corkstown Road and joins Moodie Drive between Corkstown Road and the Hwy 417/ Moodie Drive off-ramp. Two sub-options have been identified for this route alternative. Sub-option A travels around the Moodie Drive interchange to the north while Sub-option B travels through the Moodie Drive interchange. In the ultimate configuration, the route crosses (over/under) Moodie Drive before joining the approved alignment for the westerly extension of the Transitway between Corkstown Road and Highway 417.

Queensway North: This route leaves Bayshore Station in the east, crosses Holly Acres Road and travels immediately adjacent to the westbound 417 lanes. The route joins Moodie Drive between Corkstown Road and the Hwy 417/ Moodie Drive off-

ramp. Similar to the Former Railway route alternative, two sub-options have been identified for this route. Sub-option A travels around the Moodie Drive interchange to the north while Sub-option B travels through the Moodie Drive interchange. Again, in the ultimate configuration, the route crosses (over/under) Moodie Drive before joining the approved alignment for the westerly extension of the Transitway between Corkstown Road and Highway 417.

Queensway Median: This route leaves Bayshore Station in the east, crosses Holly Acres Road, and travels a short distance adjacent to the westbound Highway 417 lanes. The route then crosses the westbound lanes and travels west within the Highway median past Moodie Drive before crossing the westbound Highway 417 lanes and joining the approved future alignment for the westerly extension of the Transitway between Corkstown Road and Highway 417.[7]

Queensway South: This route leaves Bayshore Station in the east, crosses Holly Acres Road, and travels a short distance adjacent to the westbound Highway 417 lanes. The route then crosses both the westbound and eastbound Highway 417 lanes and travels west along the south side of the highway to Moodie Drive. The sub-option of routing the Transitway around the Moodie Drive interchange (to the south) was explored, however, due to geometric constraints a transfer station could not be accommodated at Moodie Drive. The ultimate configuration would require a second highway grade separation west of Moodie Drive to connect with the approved alignment for the westerly extension of the Transitway between Corkstown Road and Highway 417. Due to profile requirements at the Moodie Drive station, it has been determined that the Transitway would need to pass under Highway 417 at this location.

The four route alternatives are illustrated in Exhibits 9 to 12. In order to identify the full range of potential footprint impacts, potential locations for a Transitway Station in the vicinity of Moodie Dr. were identified. These station locations have not been formally evaluated and are intended only to identify potential effects. A full evaluation of potential station concepts will be carried out once a preferred route alternative has been selected.

5.2.1 Route Variations (Consideration of cut and cover tunnel options)

Through consultation with the adjacent community, a request was made to explore the cost implications of the following variations on the above noted route alternatives:

- Queensway North- Rather than travel at grade between Holly Acres Road and Moodie Drive, travel below grade for the entire length of the project limits in a cut and cover tunnel.

7 Due to the existing configuration of Highway 417 and the Moodie Drive structure, significant issues were identified with the provision of a transit station (both in the interim and ultimate project configuration) in the highway median. An operational review of the Median Route alternative was carried out to further explore potential constraints associated with the provision of a station at Moodie Drive and the provision of the interim project configuration in the highway median (see Appendix B). This review determined that the median route alternative is not capable of accommodating a Transitway Station without relocating a significant portion of the Highway (potentially several kilometers east and west of Moodie Drive). Furthermore, the review also determined that the interim project cannot be constructed in the median without requiring buses to operate in mixed traffic between Moodie Drive and Eagleson Road (essentially shifting the existing problem to the west).

- Queensway South- Rather than fly-over Highway 417 near Holly Acres Road, travel beneath both westbound and eastbound lanes in a cut and cover tunnel.

Concept-level cost estimates for each of these variations were subsequently generated. Due to the length of the proposed cut and cover tunnel variation of the Queensway North route alternative, the additional construction cost is estimated to be roughly $150,000,000 more than the at-grade alternative. For the Queensway South route alternative, the variation of tunneling under Highway 417 is estimated to cost an additional $15,000,000 compared to the overpass alternative.

Based on the high additional construction cost and considering the availability of other appropriate alternatives with effects that can be mitigated through design, these sub-options were not considered reasonable and therefore were not carried forward for further consideration.

Exhibit 9 – Former Railway

Exhibit 10 – Queensway North

Exhibit 11 – Queensway Median

Exhibit 12 – Queensway South

5.3 Existing Conditions Overview

The following provides a summary of findings from the inventory of existing conditions that was carried out for this project by Project Team specialists. Existing conditions will be refined as necessary through further agency consultation, additional review of background information and possibly, additional field work should data gaps be identified. All existing conditions, sensitivities and an assessment of impacts of the preferred alternative will be documented in the draft Environmental Project Report (EPR).

5.3.1 Heritage and Archaeology

A Stage 1 archaeological investigation was undertaken by Golder Associates (See Appendix C). This investigation included a review of an updated site data listing from the Ministry of Culture, relevant archaeological, historical and environmental data pertaining to the study area and some primary historical data including land registry records, historical maps and aerial photographs. A non-intrusive site visit was conducted on March 26, 2009, in order to determine the nature and extent of any pre-existing disturbance.

The study area consisted of a 3 km corridor, roughly 6.44 ha in size, extending from Bayshore Station to west of Moodie Drive and focused on areas north and south of Highway 417. The following presents a summary of findings from the investigation.

Historically, the study area had been extensively utilized and farmed since the early part of the nineteenth century. There are no recorded pre-contact archaeological sites located within a 3 km radius of the study area. The study area can be divided into three distinct sections characterized by differing degrees of disturbance and known past land uses.

The eastern section of the study area has been previously disturbed and is characterized by a large man made earthwork that extends approximately 800 m from west of Holly Acres Road.

The central section of the study area includes forested land bordering Stillwater Creek and extends from the berm west to Corkstown Road. Based on in-field site reconnaissance, portions at the eastern end of this section appear to have been subjected to little to no previous disturbances. The western end of this section appears to have been modified in order to divert Stillwater Creek. In addition, numerous storm water drains that feed the creek have provided for other disturbances in this section.

The western section of the study area was primarily used for farming from the early part of the nineteenth century and extends from Corkstown Road to west of Moodie Drive. Based on archival information and historic maps, four structures were identified as previously located directly or very close to the boundary of the study area. Air photos indicate that that these structures have long disappeared but that the cultural material associated with these structures and early farming activities may remain intact.

5.3.2 Roadway Noise, Air Quality and Ground Vibration

An assessment of existing roadway noise, air quality and ground vibration conditions was carried out by Gradient Microclimate Engineering Inc. on behalf of the City of Ottawa. (See Appendix D) Key findings are summarized below.

Roadway Noise

The following presents an overview of theoretical and measured existing noise conditions in the study area.

Using traffic information received from the City of Ottawa, noise levels were calculated at 24 receptor locations within the area bounded by Highway 417 to the South, Holly Acres Road to the east, Carling Avenue to the north, and Moodie Drive to the west. Roadway noise calculations were performed with the assistance of the Ministry of Environment (MOE) road noise program Stamson 5.04. This program calculates noise based on (i) Annual Average Daily Traffic (AADT) volumes, (ii) source-receiver distance, exposure angle and intermediate ground surface characteristics, and (iii) source-receiver ground elevation data. This use of this program satisfies both MOE and City of Ottawa requirements.

Results of the roadway noise analysis indicates that existing noise levels range between 48 dBA and 63 dBA for daytime periods, and between 41 dBA and 57 dBA for nighttime periods. The highest noise levels occur at receptors closest to Highway 417, with levels diminishing with increasing distance from the noise source. Calculations indicate that noise levels at some locations currently exceed the discretionary City of Ottawa limit of 60 dBA for outdoor living areas. Calculations also indicate that significant noise attenuation is provided by the existing earth berm located along Highway 417 (estimated noise level reduction of 5-6 dBA).

In addition to theoretically calculated noise levels that represent existing conditions, outdoor noise measurements have been performed at six locations to represent the outdoor living areas of residences backing on Highway 417. (See Appendix E) The measurement locations were selected to correspond with the theoretical receptor locations used in the initial assessment of existing conditions. This allows for a direct comparison of calculated vs. measured noise levels. The measurement period at each receptor location was initiated at 0700 extending continuously through to 2300. During this time, noise meters were not reset, ensuring that the final value recorded at 2300 accurately represents the complete 16 hour equivalent noise level. This corresponds to the same time period used for the calculated values according to the City of Ottawa Environmental Noise Control Guidelines enacted May 2006.

Table 4 provides a comparative summary of the measured LEQ 16 against GME's theoretically calculated values.

Table 4- Comparative Measured vs. Theoretical Noise Levels (Leq dBA)			
Address	**Receptor #**	**Measured 16 Hr Leq**	**GME Theoretical (16 Hr Leq)**
43 Creeks End Lane	25	57.6	62.5
55 Creeks End Lane	25	56.6	62.5
33 Creekwood Cr.	14	56.7	63.0
70 Cleandon	20	57.1	58.8
19 Aero Dr.	5	53.0	57.2
48 Aero Dr.	10	56.7	58.1

In all cases measured values are lower than theoretical values. The lower measured values may be attributed to the combined effects of several mitigating factors including atmospheric conditions, foliage, complex topographical attenuation, and actual traffic volumes that are lower than those used in the calculations. In a similar fashion, with optimal highway and atmospheric conditions, measured noise levels could approach the theoretical values. This situation demonstrates the benefits of using theoretical prediction models that are based on annually averaged data and conservative estimates of environmental effects; and demonstrates why limited field measured data cannot be exclusively relied upon to generate an accurate representation of existing conditions.

Air Quality

An assessment of air quality was performed for common vehicle pollutants (CO2, NOx, HC, PM) using peak hour traffic volumes. This information was input into a computer model of the study area, including all major intersections with significant vehicle traffic. Twenty four receptors, matching the noise measurement locations were selected to determine the worst-case concentrations expected to occur at receptor locations.

Statistically speaking, the tabulated atmospheric pollutant concentration levels are expected to occur often on an annual basis. These results fall significantly below the allowable limits for CO, HC, NOx and PM including the 90^{th} percentile ambient levels.

Ground Vibrations

Peak recorded ground vibrations included: 0.284 mm/s at location 1; 0.198 mm/s at location 2; and 0.087 mm/s at location 3. Research indicates that ground vibration levels of 0.1 – 0.2 mm/s are just perceptible to most humans, and that 1.0 – 2.0 mm/s is generally considered to be annoying. Measured vibration levels are considered to be low and of no consequence with respect to human perception and structural or cosmetic damage thresholds for buildings and other structures.

Experience and published literature indicate that intermittent peak vibrations transmitted to people are acceptable without complaints up to 1 mm/s or more, and that old buildings on poor soil can withstand vibrations of 30 mm/s or more without triggering new damage

5.3.3 Aesthetics and Recreation

An assessment of existing aesthetic and recreation resources was carried out by Corush Sunderland Wright (CSW). The following represents a summary of the assessment.

From an aesthetic and recreational perspective, there are three distinct corridors within the study area. The northern corridor is bordered by the Crystal Beach / Lakeview community and Highway 417 and is generally a wooded area composed of well established deciduous and coniferous trees, ranging in caliper up to 300 mm. There are some specimen trees, interspersed within the woodlot. The plant material, is for the most part set back from the edge of the existing right-of way. There is a berm built adjacent to the corridor during the Highway 416/417 Interchange construction, and reforestation planting installed. Stillwater Creek meanders through the lands immediately east of Moodie Drive, in some sections close to the edge of the Highway 417 right-of-way (ROW). Two pedestrian bridges provide creek crossings. There are two distinct facilities within this northern site. There is a recreational pathway as well as several access paths leading from rear-yards of individual homeowners onto the pathway system. There is also a sports field immediately north of Corkstown Road.

The central corridor is located along the median of Highway 417. There is limited vegetated growth in this location, primarily grasses and herbaceous material. At the eastern end of the corridor, there has been coniferous and deciduous tree planting as part of the Highway 416/417 interchange construction. This material has been slowly establishing and provides a visual separation between the two directions of traffic. There is a drainage ditch from the south side of the interchange bisecting the corridor. The westerly end of the corridor is characterized by a limited quantity of woody vegetation and no recreational facilities.

The southern corridor is bordered by Highway 417 and the agricultural lands of the NCC Greenbelt. These agricultural lands are tile drained, and are actively farmed. A tributary of Stillwater Creek drains south to north, and the ravine is wooded. In addition, a hedgerow delineates the edge between the agricultural fields and the Highway 417 right of way. The easterly connection from the NCC lands to Bayshore crosses through the Highway 416/417 Interchange landscape, including the live snow fence and several woodlots. There are no recreational facilities within the alignment location.

Finally, the National Capital Commission's Greenbelt Master Plan identifies a significant vista in the vicinity of the study area. This vista includes a view of downtown Ottawa that is presented to Highway 417 travelers as they come up from the valley (Eagleson Drive) and are heading east. This vista is particularly effective in the evening hours.

5.3.4 Hydrology

The study area from Bayshore Station to Moodie Drive lies within the boundaries of both the Graham Creek watershed in the east and the Stillwater Creek watershed in the west. Graham Creek's drainage area is south of Highway 417 which drains the communities bounded by Highway 417 to the north, Hunt Club Road to the south, Greenbank Road to the east and Highway 416 to the west and ultimately discharges to the Ottawa River just east of Holly Acres Road. Stillwater Creek has a drainage area of 23 km^2 which drains the communities of Bell's Corners and Crystal Beach/Lakeview, as well as the

Stony Creek Conservation Area and ultimately discharges to the Ottawa River just east of the Britannia Yacht Club.

Continuous water quality and flow monitoring data are not available for either of these creek systems and both creek systems fall under the jurisdiction of the Rideau Valley Conservation Authority. The nature of both creek systems has been heavily impacted by urban development. The Stillwater Creek system has been threatened by erosion and has been the subject of a number of erosion studies since the mid 1980s. The creek underwent rehabilitation north of Highway 417 between 1988 and 1990 and near Bell's Corners in 2002. At an unknown date, the culverts at the western crossing of the Creek on Corkstown Road collapsed resulting in a roadway embankment slope failure which is in need of repair.

Graham Creek is not subject to the same erosion concerns as Stillwater Creek as it has been heavily modified into a gabion lined channel for most of its length upstream of Richmond Road. While both watersheds have significant urban contributions, much of the headlands of both systems lie within the National Capital Commission (NCC) Greenbelt.

There are also a number of minor watercourses in the study area which comprise the tributaries to the main creeks. There is one tributary to Graham Creek just west of Holly Acres Road and there are two tributaries to Stillwater Creek located within the NCC parkland north of Highway 417 between Moodie Drive and Holly Acres Road.

Under existing conditions, storm water in adjacent Ontario Ministry of Transportation (MTO) lands is conveyed by storm sewers and grassed swales and ditches to the adjacent creek systems. A storm water pond was constructed in 2008 in the Moodie Drive interchange which provides quality and quantity control for 14.0 ha of highway drainage as well as 9.2 ha of drainage from areas external to MTO lands on the southwest side of the Moodie Drive interchange.

5.3.5 Fluvial Geomorphology (Stillwater Creek)

This assessment of existing geomorphic conditions (Stillwater Creek) was carried out by JTBES Inc. and is based on a review of background information, an assessment of available mapping, and a reconnaissance level field survey. A general reach overview is provided for the sections of creek that were visited during the assessment. Additional data and detailed field assessments will be completed along the Stillwater Creek system as part of the overall geomorphic assessment that will form part of the analysis and evaluation of Preliminary Design alternatives and the Detail Design of the recommended plan.

The area occupied by Stillwater Creek and its tributaries lies within the physiographic region known as the Clay Plain, which is interrupted by ridges of rock and sand. These glaciomarine and marine silts and clays have resulted in areas of poor drainage. The marine deposits (also known as Leda Clay) become highly unstable after heavy rains.

Three (3) Reaches were reviewed as part of the reconnaissance level field assessment of the Stillwater Creek system within the study area and are depicted on Exhibit 15- Aquatic Features.

Reach 1 is approximately 208 m in length, located from the edge of forest boundary near the Highway 417 right-of-way to downstream. This section of the creek lies within a large forest block surrounding the Watts Creek Pathway. The topography in the area is undulating and exhibits a complex terrain of knolls, which appear to be covered with a shallow veneer of alluvium. These features partially confine the creek system along several sections within Reach 1, and at times extend in excess of 2 m.

The creek system within Reach 1 displays good morphological diversity, with a well-distributed series of pools and riffles and variable flow conditions. Along the creek bed, a mixture of fine sediments in pools and coarser gravels and sands in riffles are present. The immediate creek banks were well-vegetated and stable. The riparian zone is large on average (greater than 30 m), and mainly comprised of mixed age deciduous forest species. There are few observations of significant active erosion along the majority of the Reach. These areas occur downstream of steep grade changes along the creek. A meander bend (approximately 90 m downstream of the upper reach limit) is severally undercut and eroding with leaning and falling trees prevalent. A second significant grade change is located at the Reach 1 and Reach 2 boundary. Supercritical flow conditions were observed at both sections during the site visit. These sections are analogous to cascades or rapids, unlike the majority of the creek system. There is a small tributary (Tributary B) that enters Stillwater Creek approximately 110 m downstream of the Highway 417 right-of-way. This feature has steep vertical banks and appears to be actively eroding.

Reach 2 is approximately 376 m in length and runs adjacent to Highway 417 corridor from the edge of the forest block, upstream to Corkstown Road. A significant portion of the Reach is within 25 metres of the highway edge of pavement. The confluence with a large tributary (Tributary A) is located within this Reach and is within 15 metres of the edge of pavement. Tributary A is conveyed through a concrete culvert under the Highway 417 corridor. The Highway 417 corridor appears to have truncated the original creek planform and floodplain. The left valley (downstream direction) has limited floodplain area and is flanked by a large, well-vegetated knoll that bisects the creek system and the walking trail. The creek is predominately a bedrock lined channel with poor morphological diversity. There are little to no substrates along the creek and bedforms are absent and unnatural (i.e. steep inside meander bends, poor riffle formation). Flow diversity is minimal throughout the reach, except were width-to-depth ratios differ. Upstream of the Watts Creek Pathway culvert crossing, the creek system is more entrenched within bedrock, and displays a lower width-to -depth ratio. The bank and riparian vegetation is poor, limited to old field species, grass vegetation, and occasional trees and shrubs. At the Corkstown Road crossing the existing culvert is not visible, with a significant amount of woody debris blockage on the upstream, and a partially collapsed retaining wall downstream. Some upwelling was observed at the downstream end of the crossing, which suggests that flow is able to get through the blockage.

Reach 3 is approximately 303 m in length and runs from Corkstown Road to an upstream on-line pond/weir structure. Similar to Reach 1, is located within a large forest block and the left valley wall partially confines the creek system, and at times extends in excess of 2 m. Exposed bedrock was observed along the base of the valley wall and within the creek in several sections. The creek system displayed good morphological diversity with a well-distributed series of pools and riffles and variable flow conditions. Along the creek bed a mixture of fine sediments in pools and coarser gravels and sands in riffles is present. Exposed bedrock is found along the channel bed closer to the Corkstown Road crossing. The immediate channel banks were well-vegetated and stable. There are few observations of significant active erosion along the reach. The riparian zone is larger towards the Corkstown Road crossing, but is significantly less upstream and along the right creek bank (downstream direction). The upstream limits of the reach are located at the end of an on-line pond and weir structure.

Reach 4 was not visited during the reconnaissance level field assessment.

5.3.6 Subsurface Conditions

Golder Associates was retained to carry out a review of subsurface conditions in the study area. (See Appendix F) Based on factual data compiled from existing reports, the following provides a summary of the expected/indicated subsurface conditions along the proposed Transitway extension corridor.

The subsurface conditions vary considerably along the proposed Transitway alignment. The western portion of the corridor (i.e., west of Moodie Drive) is underlain by sensitive silty clay and glacial till extending to the surface of the bedrock at depths of about 5 to 15 metres. In the vicinity of Moodie Drive, limited thicknesses (i.e., in the order of 3 to 5 metres) of silty clay and glacial till overlie the bedrock. The depth to the bedrock surface deepens to about 10 to 15 metres within the central portion of the alignment and then deepens further to about 25 metres at the eastern limit end of the project (i.e., around Bayshore Station). The overburden material within the eastern portion of the project is indicated to consist of deposits of clay, silt, and sand.

The bedrock underlying the western and central portions of the corridor is indicated to consist of sandstone of the March formation. The bedrock underlying the eastern portion of the corridor is indicated to consist of sandstone, limestone, and shale of the Rockcliffe formation.

5.3.7 Contaminated Property

Ecoplans Limited was retained to conduct a Phase I Environmental Site Assessment (ESA) of the Study Area (See Appendix G). The principle objective of the Phase I ESA is to identify any actual or potential sources of site contamination.

The study identified the following areas of potential site contamination:

- The site is transected by Highway 417; therefore environmental impacts associated with transportation corridors (i.e. road salt) is possible;
- Background reports and historical records indicate the use of the northern portion of the site (between Holly Acres Road and Moodie Drive) as a rail line, until the late 1950s. Recommendations in the previous Phase I ESA report indicated that a Phase II ESA be carried out in the event of any future soil removal program;
- A rail line also existed in the eastern extent of the site running northeast/southwest. The berm observed in the northeast portion of the site could potentially be where the former CP rail line existed;
- Background reports indicate the use of pesticides on the agricultural fields on the south portion of the site (i.e. south of Highway 417);
- Contamination at the industrial park located at 185 Corkstown Road (northeast of the Moodie Drive/Highway 407 interchange), the location of Northern Telecom (later Nortel), was remediated in 2004 to the MOE standards. Extensive investigations have been completed at the site including, most recently a Risk Assessment. A Phase I ESA completed for NCC lands between Corkstown Road and Hwy. 417 indicates that the soil and groundwater may have been adversely affected by activities on the Nortel sites and the former railway line. No further actions were required for the Nortel site or the NCC property to the south of Corkstown Road. Any change in use or property transaction would require that a phase 2 environmental site assessment be completed.

- The site inspection identified soil stockpiles located east of Moodie Drive, adjacent to the recreational trail. It is assumed that these soil stockpiles exist due to previous on-site grading activities; however, this cannot be confirmed; and
- A spill occurred in 1993 at the Holly Acres Road/Highway 417 interchange. Two-hundred and twenty (220) litres of oil was spilled. Soil contamination was confirmed.

Since the above noted areas/issues occur across the site, a Phase II investigation is recommended and will focus on areas/issues of potential contamination that could be encountered by the preferred route. The purpose of the Phase II ESA is to confirm the presence or absence of contamination and to provide guidance to the City on appropriate management of contaminated soil and groundwater.

5.3.8 Natural Environment

Ecoplans Limited (Ecoplans) has been retained to address the natural environmental component of this study which includes assessing aquatic and terrestrial features and identifying environmental sensitivities and constraints in relation to potential Transitway route alternatives.

In this first stage of the project, the objectives of the natural environment component of the study include the following:

- Compile the natural environmental database for the study area based on secondary source information;
- Complete initial field investigations for the broader study area within which route alternatives are being generated;
- Identify key natural environmental issues, sensitivities and constraints;
- Provide input to the generation and evaluation of route alternatives in the context of the natural environment and in consideration of other factors (socio-economic, transportation).

Secondary source information has been compiled from a variety of sources including Ministry of Natural Resources (MNR) Kemptville District, Rideau Valley Conservation Authority (RVCA), and the City of Ottawa. The following provides a list of information that has been reviewed to date:

- Rideau Valley Conservation Authority (RVCA) *2001 Stream habitat and water quality monitoring reports for Stillwater and Graham Creeks*. Note: Stillwater Creek is being re-sampled in 2009 however; field data are not yet available.
- *City Stream Watch 2005 Annual Report*, RVCA
- *City Stream Watch 2004 Annual Report*, RVCA
- Project information received from MNR Kemptville District (Laura Melvin, Resource Management Planner) in a letter dated June 24, 2009
- Ministry of Natural Resources Natural Heritage Information Centre (NHIC) database - June 2009 query
- *Geotechnical Overview, West Transitway Extension Bayshore Station to West of Moodie Drive,* prepared by Golder Associates (April 2009)
- *Environmental Screening Report Stillwater Creek Remediation and Culvert Installation Activities,* prepared for the National Capital Commission by Jacques Whitford (2000)

- *Fish Habitat Assessment: Stillwater Creek Shoreline Stabilization and Repair Works*, prepared for the National Capital Commission by G.A. Packman and Associates October (2004)
- C*reek Rehabilitation Draft Management Plan*, prepared for the National Capital Commissions by Levac, Robichaud Leclerc Associates(March 2004)
- *Evaluation and Identification of Valued Ecosystems and Natural Habitats: Directory of Valued Ecosystems and Natural Habitats in the Green Belt and on Urban Lands*, prepared for the National Capital Commission by Del Degan, Masse et Associes Inc. (May 2007)
- *Biological Inventories of 23 Areas in the Ottawa Region: Volume 1 Text and Maps*, prepared for the National Capital Commission by H. Loney Dickson and Stephen Darbyshire (July 1980)
- *Biological Inventories of 23 Areas in the Ottawa Region: Volume 2 Plant Species Composition Tables*, prepared for the National Capital Commission by H. Loney Dickson and Stephen Darbyshire (December 1979)
- *Stillwater Creek Management*, prepared for the National Capital Commission Land Resource Management Division by Martha Bradburn (January 1986)
- *Rideau Valley Conservation Authority Stillwater Creek Erosion Control Study, City of Nepean, Hydrology and Hydraulics Report*, Totten Sims Hubicki Associates (May 1988)
- Ontario Breeding Bird Atlas (2001-2005), Region 24, Squares 18VR32 and 18VR3

The following provides an overview of key natural environmental issues, sensitivities and constraints. Please refer to Appendix H for the complete *Preliminary Characterization of Natural Environmental Features Report* (Ecoplans, 2009)

5.3.8.1 Designated Natural Features

The Stillwater Creek valley, north of Highway 417 is designated by MNR as a Life Science Site. This site is recognized for the narrow ravine in deep clay plain dominated by Sugar Maple-Black Maple. Brunton (1982) noted that some individual trees of the regionally uncommon Black Maple are very large (>100 cm DBH) (NHIC).

No *Provincially Significant Wetlands (*PSWs) are present within or adjacent to the study area. Stony Swamp is located approximately 5 km upstream (south) of the study area. No *Environmentally Significant Areas* (ESAs), as designated by MNR/RVCA, are present within the study area.

5.3.8.2 Species of Conservation Concern

No flora species "designated" by COSEWIC (Committee on the Status of Endangered Wildlife in Canada) and/or listed under the Canadian Species at Risk Act; species that are "designated" by COSSARO (Committee on the Status of Species at Risk in Ontario) and/or are listed under the Ontario Endangered Species Act (2007); and provincially rare species (S-rank of S1 to S3) have been recorded or observed in the study area.

A total of 7 plant species with regional rankings according to Brunton (2005) have been confirmed in the vicinity of the route alternatives, as field inventories were focused in these areas. Species identified include 2 regionally significant species (Foxtail Sedge [*Carex alopecoides*], Slender Wild

Rye [*Elymus villosus*]), 4 regionally uncommon species (Black Maple [*Acer saccharum ssp nigrum*], Red Elm [*Ulmus rubra*], Red Pine [*Pinus resinosa*], Small-fruit Bullrush [*Scirpus microcarpus*]), and 1 regionally rare species (Stinging Nettle [*Urtica dioica ssp dioica*]).

Exhibit 13 identifies the location of Regionally Rare Plant species within the study area.

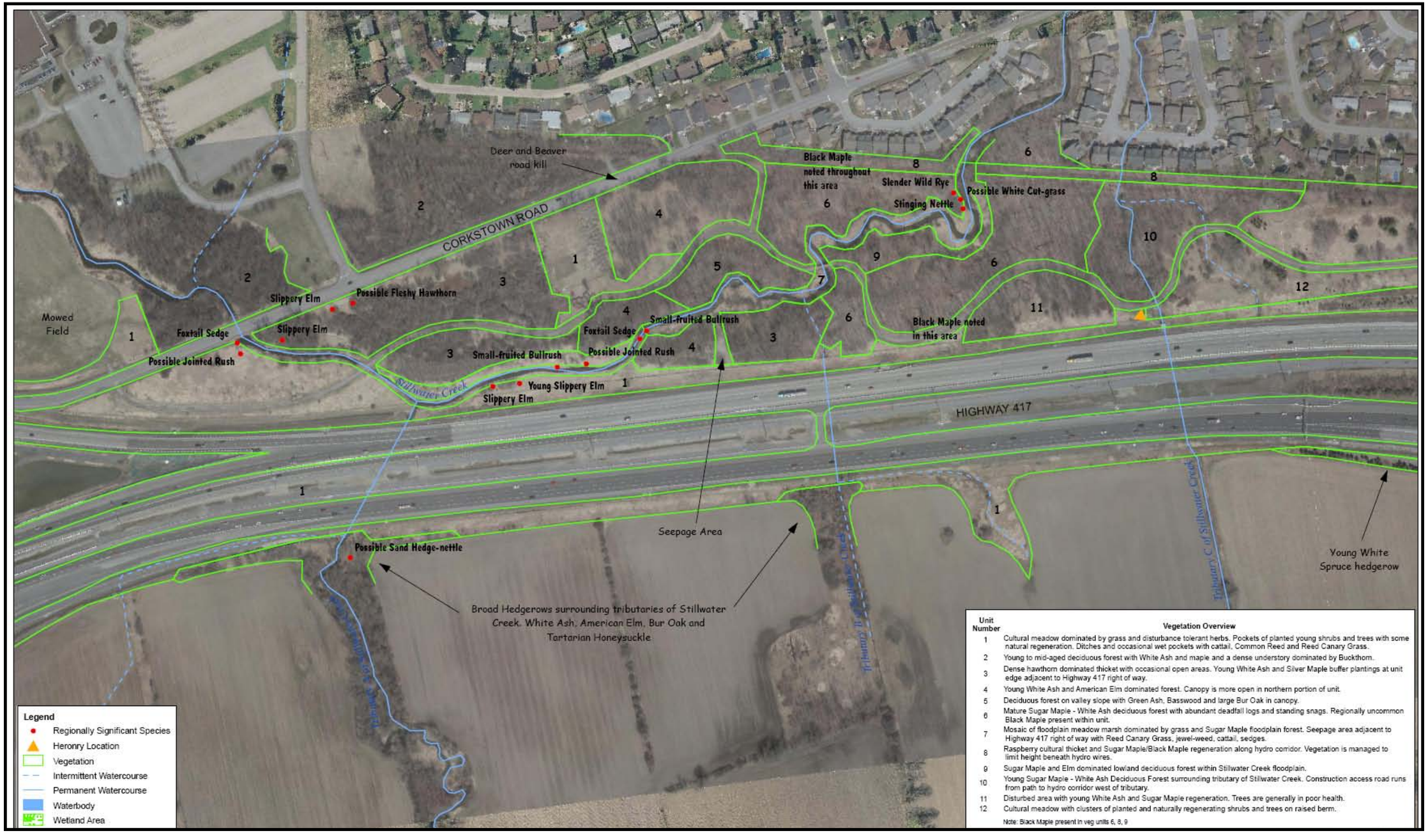


Exhibit 13-Regionally Rare Plant Species

No wildlife species "designated" by COSEWIC (Committee on the Status of Endangered Wildlife in Canada) and/or listed under the Canadian Species at Risk Act; species that are "designated" by COSSARO (Committee on the Status of Species at Risk in Ontario) and/or are listed under the Ontario Endangered Species Act (2007); and provincially rare species (S-rank of S1 to S3) have been recorded or observed in the study area, based on an NHIC query, MNR district records and previously undertaken studies. No wildlife species of conservation concern were observed by Ecoplans within the study area.

Members of the Crystal Beach Lakeview Community Association indicated, in a letter dated July 17, 2009, that their members have observed Red-shouldered Hawk (*Buteo lineatus*) within the Stillwater Creek valley. Red-shouldered Hawk is considered *Not at Risk* federally and *Apparently Secure* (uncommon but not rare) provincially. MNR's Natural Heritage Information Centre (NHIC) indicates that this species is considered 'sensitive' in Ontario but has no formal 'at risk' designation. The Community Association also indicated that their members had observed Monarch (*Danaus plexippus*), which is federally and provincially designated as *Special Concern*, with its Ontario status *Generally Secure* (NHIC). It should be noted that the Monarch's Special Concern status is based on ongoing threats to wintering habitat outside of Canada rather than the rarity of is summer habitat and key host plant, Common Milkweed, which are still generally common throughout the province. Notwithstanding the status of these species, their potential presence and use of habitats in the study area is noted by the project team.

5.3.8.3 Vegetation

A large portion of the study area consists of culturally influenced and altered landscapes associated with active agriculture, existing transportation facilities (Highway 417 and local roads) and residential and commercial development. Vegetation within these areas is dominated by tolerant old-field species with occasional tree clusters and hedgerows. The area has been modified through a long history of agricultural and residential development and much of the original vegetative cover has been removed. Remnant natural vegetation communities within the study area are limited to the Stillwater Creek valley north of Highway 417, between Moodie Drive and Holly Acres Road. A portion of this natural area is within the Stillwater Creek Life Science Site. Natural vegetation communities south of Highway 417 are limited to narrow riparian vegetation along watercourses and agricultural swales, surrounded by active agriculture within the NCC Greenbelt.

Other small tributary valleys are characterized by discontinuous and patchy woody riparian vegetation cover, with some areas having relatively little or no woody riparian vegetation (especially across existing and previous agricultural areas).

Exhibit 14 identifies the location of Vegetation Features in the study area.

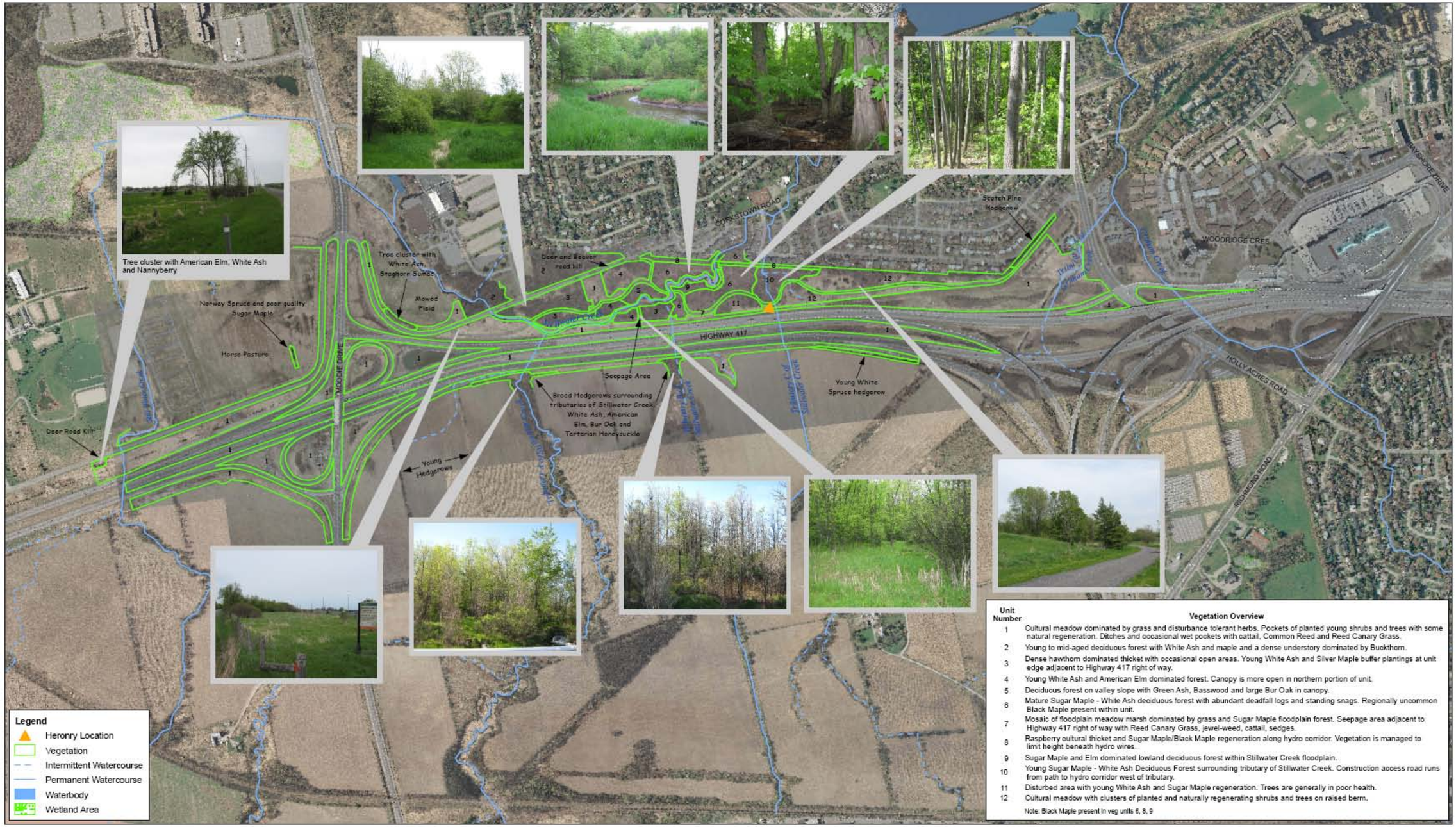


Exhibit 14 - Vegetation Features

A summary of key findings from Ecoplans fieldwork is provided:

- A total of 10 vegetation community types have been identified within the study area, including cultural meadow, cultural woodland, deciduous forest and meadow marsh. These are depicted on Figure 1A.
- One community located along the banks of Stillwater Creek is a mosaic which includes elements of Fresh-Moist Sugar Maple – Black Maple Deciduous Forest, a provincially rare vegetation community type with a provincial ranking of S3? (Rare to uncommon in Ontario, usually between 20 and 100 occurrences in the province, may have fewer occurrences, but with some extensive examples remaining) (Bakowsky, 1996). Several very large Black Maple specimens (~100cm dbh) are located within this community. The young Black Maple specimens that were observed closer to Highway 417 do not appear to be part of this ecotype/ association. No other provincially rare vegetation communities or flora were observed.
- A total of 78 vascular plant species have been identified within the study area to date. An additional 17 plants were identified only to genus. Of the 78 species identified, 67% are native to Ontario.
- As noted above, no flora species "designated" by COSEWIC and/or listed under the Canadian Species at Risk Act; species that are "designated" by COSSARO and/or are listed under the Ontario Endangered Species Act (2007); and provincially rare species [S-rank of S1 to S3]) have been recorded or observed in the study area.
- As noted above, Ecoplans confirmed a total of 7 plant species with regional rankings according to Brunton (2005) in the vicinity of the route alternatives, as field inventories were focused in these areas. Analysis of field data is ongoing so these results should be considered preliminary in nature. Species identified include 2 regionally significant species (Foxtail Sedge [*Carex alopecoides*], Slender Wild Rye [*Elymus villosus*]), 4 regionally uncommon species (Black Maple [*Acer saccharum ssp nigrum*], Red Elm [*Ulmus rubra*], Red Pine [*Pinus resinosa*], Small-fruit Bullrush [*Scirpus microcarpus*]), and 1 regionally rare species (Stinging Nettle [*Urtica dioica ssp dioica*]).

5.3.8.4 Wildlife

The broader landscape mosaic within the study area provides habitat for a range of common, generalist wildlife species that are tolerant of urban and semi-urban and rural/agricultural conditions. Aquatic and riparian areas likely provide some habitat for waterfowl, herons and other water-using species. The forested habitat mosaic associated with the Stillwater Creek valley north of Highway 417 can be expected to support a greater number of wildlife species given the higher habitat quality and diversity. This valley also likely functions for wildlife movement, as discussed further below.

A summary of key findings from Ecoplans fieldwork is provided below:

- Five common mammal species, which are disturbance tolerant and adapted to urban areas, were observed within the study area. These species include White-tailed Deer (*Odocoileus virginianus*), Eastern Cottontail (*Sylvilagus floridanus*), Woodchuck (*Marmota monax*), Grey Squirrel (*Sciurus carolinensis*), and Raccoon (*Procyon lotor*). These species are expected for site conditions and typically abundant within the Ottawa Region generally. Deer tracks and bedding areas were observed throughout the valley indicating frequent and regular use. Other species which likely use the study area but were not observed at the time of the survey include

Coyote (*Canis latrans*), Striped Skunk (*Mephitis mephitis*) and Red Squirrel (*Tamiasciurus hudsonicus*).

- Ecoplans' Avian Biologists identified a total of 21 bird species within the study area. The majority are habitat generalist, disturbance tolerant, urban-adapted species such as American Robin (*Turdus migratorius*), European Starling (*Sturnus vulgaris*), Red-winged Blackbird (*Agelaius phoeniceus*), and Song Sparrow (*Melospiza melodia*). Area sensitive bird species are noted in Section 2.3.4.1, below.
- Two amphibian species, Northern Leopard Frog (*Rana pipiens*) and Spring Peeper (*Pseudacris crucifer*), were observed in the Stillwater Creek valley. Breeding habitat is present in the Stillwater Creek valley floodplain generally however, vernal pools were not observed. These species are common, expected for site conditions and are abundant within the Ottawa Region generally. They are often observed wherever suitable habitat is present including dug ponds, ditches, natural and man-made wetlands, etc. Herpetofauna habitat is present generally, along the watercourses and associated riparian areas within the study area. These areas provide habitat for localized breeding and movement of common amphibian species.
- Typical of landscapes surrounding large urban centres of Southern Ontario, the majority of the study corridor has been heavily modified with much of the south portion in agricultural production and areas immediately north of the Stillwater Creek valley, residential. In general, the suite of wildlife recorded within the study corridor is dominated by common, generalist wildlife species tolerant of urban or semi-urban conditions. The observed species assemblage is consistent with the cultural habitat mosaic, proximity to commercial/residential development, anthropogenic history and moderate to high levels of disturbance within the study corridor. Given the landscape context, the Stillwater Creek valley north of Highway 417 offers the largest remaining natural habitat area within the Transitway study area.

5.3.8.5 Area Sensitive Wildlife

Based on the Ecoplans field surveys, three *area sensitive*[8] bird species were observed in the Stillwater Creek valley: Cooper's Hawk (*Accipiter cooperii*) and Pileated Woodpecker (*Dryocopus pileatus*) within the forested portion of the valley and Savannah Sparrow (*Passerculus sandwichensis*) in the surrounding cultural meadow habitat.

5.3.8.6 Significant Wildlife Habitat

Wildlife habitat significance is identified by MNR using the *Significant Wildlife Habitat Wildlife Habitat Technical Guide* (OMNR 2000), in which "significant wildlife habitat" is broadly categorized as:

- Seasonal concentration areas (e.g. conifer forests for deer wintering);
- Rare vegetation communities or specialized habitats for wildlife;
- Habitats of species of conservation concern, excluding the habitats of endangered and threatened species; and

8 Area Sensitivity is defined as species requiring large areas of suitable habitat in order to sustain population numbers. *From: Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section. Science Development and Transfer Branch, Southcentral Science Section. 151pp. + appendices.*

- Animal movement corridors.

No significant wildlife habitat features are identified by MNR within the Study Area. A small apparently abandoned colony (approximately 7-8 nests) of Great-blue Heron (*Ardea herodias*) nests was observed within the study area approximately 25-30m north of the Highway 417 right-of-way. This heronry is not considered to be an active breeding colony due to the lack of significant breeding evidence collected in May of 2009: no adult birds on the nests, no egg shells under the colony, no white-wash (feces) under the colony, and no hatched young in the nests. The status of the colony has been discussed with John Fischer of the Canadian Wildlife Service, Shaun Thompson of Kemptville District MNR and the Ottawa Field Naturalists Club (OFCN) Bird Records Subcommittee. MNR, CWS and the OFNC had no record or knowledge of this heronry and could not comment on how long the heronry might have been abandoned. Consultation with these groups is ongoing.

No additional areas of specialized or sensitive wildlife habitat features such as potential deer wintering habitat, vernal pools, seasonal concentration areas or habitats of rare species etc. have been identified by MNR within or directly adjacent to the study area. There is no forest 'interior' habitat (i.e. core forest areas greater than 100 m from edges) present within the study area.

Although no animal movement corridors were identified by MNR, wildlife movement opportunities were examined by Ecoplans visually at a landscape level by reviewing aerial photography.

As expected, the greatest opportunity for wildlife movement is provided by the Stillwater Creek valley, the largest valley system in the study area. The portion of this system located north of Highway 417 and east of Moodie Drive system is generally less disturbed with much greater natural vegetation cover, habitat diversity and wildlife habitat elements than other watercourses and areas within the study area. While the Stillwater Creek valley is relatively well defined habitat node, linkage quality between this portion of the valley and other large natural areas present in the broader landscape setting (e.g. Stony Swamp) is limited in terms of corridor width, natural vegetation cover, habitat diversity and wildlife habitat elements. Given the surrounding residential development to the north and cleared agricultural lands to the south, potential wildlife movement linkages are mainly associated with discontinuous hedgerows, and the narrow riparian corridors of Stillwater Creek and its tributaries up and downstream of the study area. Movement opportunities are further limited by the fragmentation by the numerous roads, including Highway 417 which bisects the study area.

The smaller tributary valleys are generally highly disturbed, narrow features with limited natural vegetation cover. As such, they may provide some local wildlife movement opportunities, but are not expected to provide important movement functions. These tributaries are crossed by Highway 417, and the existing culvert crossings may hinder movement by larger animals (e.g. White-tailed Deer) if sufficient vertical clearance at the culvert crossing is not present.

5.3.8.7 Aquatic Habitat

The watercourses present within the study area vary in their degree of anthropogenic influence, amount of riparian woody vegetation cover, permanence of flow (i.e. permanent, intermittent or ephemeral) and overall ecological sensitivity. They range from relatively undisturbed conditions with generally contiguous valley forest cover evident along the Stillwater Creek valley north of Highway 417 to open, channelized reaches with very little associated natural vegetation and associated anthropogenic land uses (e.g. sections of Graham Creek and Graham Creek tributary).

MNR considers Stillwater Creek to be *Type 2 fish habitat*. As defined in MNR's Fish Habitat Protection Guidelines for Developing Areas (1994), Type 2 habitat is important but generally

abundant (i.e. not a limiting factor for the species in the area) and include feeding areas, areas of unspecialized spawning habitat such as that used by many minnow species; and pool-riffle-run complexes that occur along a watercourse. The following provides an overview of existing conditions at 8 potential watercourse crossings. Watercourse reaches and crossing locations are identified on Exhibit 15 - Aquatic Features.

Exhibit 15 - Aquatic Features

Crossing #1 – Stillwater Creek - west of Moodie Drive

Ecoplans initially surveyed this watercourse in 2001/2002 as part of the *Highway 417 Expansion Class Environmental Assessment and Preliminary Design Study*. The watercourse flows north under Highway 417 through a 5m box culvert and under Corkstown Road through a 4m box culvert. The Corkstown Road culvert is embedded with large substrate present in the culvert. Flow is permanent and no barriers to fish movement observed (no perching). Erosion is present both up and downstream of this crossing with some exposed clay on the banks. The watercourse is confined within relatively steep banks and with little to no active floodplain. The channel and banks are densely vegetated with overhanging grasses and herbaceous vegetation.

No sensitive habitat features (e.g. spawning or nursery habitat) are identified in the reach. In 2001, Ecoplans captured warmwater baitfish including Brook Stickleback (*Culaea inconstans*) and Creek Chub (*Semotilus atromaculatus*) downstream of this crossing. In 2001, the RVCA captured warmwater baitfish in sampling stations located approximately 760m downstream of the Highway 417 culvert, and approximately 100m upstream of the Highway 417 culvert. Species captured included: Central Mudminnow (*Umbra limi*), White Sucker *(Catostomus commersonii*), Northern Redbelly Dace (*Phoxinus eos*), Common Shiner (*Luxilus cornutus*), Blacknose Shiner (*Notropis heterolepis*), Creek Chub and Brook Stickleback. In 2009, Ecoplans observed baitfish in the pools both up and downstream of the Corkstown Road crossing, but species were not identified.

Crossing #2 – Stillwater Creek

This channel forms part of the main branch of Stillwater Creek that flows from west to southeast around the Moodie Drive/ Highway 417 interchange, and along the north side of Highway 417. Flow appears permanent; however, the Corkstown Road culverts are blocked by woody debris and sediment at the upstream end and a collapsed retaining wall at the downstream end, creating barriers to upstream fish movement. A breached beaver dam was observed approximately 10 m downstream of Corkstown Road which may also act as a seasonal barrier to fish movement.

A the time of the field investigations, the Watts Creek Pathway crossing culvert was observed to be collapsed (submerged) with erosion noted on the banks. Despite these issues, the culvert did not appear to present a barrier to fish movement. The downstream portion of the channel is confined within vertical bedrock walls. Stream morphology is dominated by 'flats' with occasional pools present throughout the reach. In many cases the pools contain submergent vegetation and abundant baitfish were observed. A large, wide scour pool is located immediately downstream of the Corkstown Road crossing.

In 2009, Ecoplans observed baitfish throughout the channel between Corkstown Road and the trail system. A minnow trap (not labeled) was found immediately downstream of the breached beaver dam and contained Fathead Minnow (*Pimephales promelas*), Brook Stickleback and Northern Redbelly Dace. In 2001, the RVCA captured warmwater baitfish at sampling sites located approximately 280m upstream of Corkstown Road and 460m upstream of the Highway 417 culvert. Species captured included: Central Mudminnow, Northern Redbelly Dace and Brook Stickleback.

Crossing #3 –Tributary A of Stillwater Creek

This crossing is located on a tributary of Stillwater Creek that joins the main branch approximately 20m downstream of the Highway 417 crossing. Flow appears permanent. The southern bank of the main branch and tributary is lined with rip rap, and the northern bank is characterized by exposed bedrock. Upstream of the confluence, the tributary channel form is relatively straight, with fine substrates and minor bank erosion along the east bank. Downstream of the confluence with the main

Stillwater Creek, the channel flows through a bedrock confined straight section of channel with coarse substrates (gravel/cobble) and morphology consisting of riffles and runs. Some submergent vegetation was observed in the scour pool at the outlet of the tributary where Mallards (*Anas platyrhynchos*) were observed feeding. Deer tracks were observed along the edges of the channel and along the fence line of the highway right-of-way

No barriers to upstream fish movement, sensitive habitat features (e.g. spawning or nursery habitat) or fish were observed in the tributary during the 2009 field visit. In 2001, Ecoplans recorded warmwater baitfish with sculpin species upstream and downstream of the existing Highway 417 ROW. Species included: White Sucker, Brook Stickleback, Creek Chub, Fathead Minnow, Mottled Sculpin (*Cottus bairdii*) (typically a coldwater species), Longnose Dace (*Rhinichthys cataractae*), Blacknose Dace (*Rhinichthys atratulus*) and Central Mudminnow. In 2001, RVCA captured warmwater baitfish at sampling sites located approximately160m downstream of the Highway 417 culvert on Stillwater Creek. Species captured included Creek Chub and Brook Stickleback.

Crossing #4 – Tributary B of Stillwater Creek

This crossing is located on a small swale tributary of Stillwater Creek feeding into the main branch approximately 110m downstream of the Highway 417 right-of-way. Banks of the swale are steep and actively eroding/slumping/undercutting possibly indicating a 'flashy' ephemeral flow regime. Woody debris and fallen trees along the banks and in the channel have created seasonal barriers to upstream movement. Water depths are very shallow and it appears that the tributary flows periodically, draining the agricultural fields south of the highway. The Highway 417 culvert is a 0.8m black plastic corrugated pipe. The channel narrows significantly as it approaches the main branch of Stillwater Creek. Riparian vegetation is a mixed forest with a fairly dense canopy cover; however, groundcover/understory vegetation is limited.

No fish were observed in the tributary, and there was no refuge habitat (deeper pools) or sensitive habitat features noted. The RVCA does not have any sampling stations located on this tributary.

Crossing #5 – Tributary C of Stillwater Creek

This crossing is located on a relatively wide tributary of Stillwater Creek that drains the agricultural fields from the south through the Highway 417 right-of-way. In its open reaches, channel form is meandering as the system transitions from a narrow, confined channel with steep eroding banks, to a wider, flatter channel with low lying stable banks. Flow appears to be permanent.

The creek flows under the highway through a large 2-3m concrete box culvert and then through a small 1.5m culvert under the Watts Creek Pathway, (then into a large grated concrete drop culvert connected to the storm sewer system at the edge of the residential area). All three of the existing culvert crossings on this tributary have rip-rap lined banks for stability, with minimal vegetation around the culvert inlets and outlets. Downstream from the trail culvert, to about 100m upstream of the residential area, the watercourse is confined within a relatively deep channel setting with steep, eroding walls through a mixed forest area with limited understory vegetation.

Sections of the watercourse upstream of the Watts Creek Pathway and the 100m upstream of the residential lands displayed low-lying banks with fine sediment accumulation on the tops both banks, indicating possible recent high flows. The culvert at the trail was slightly perched, but had a small rocky ramp leading into the culvert outlet and is therefore not considered a barrier to fish movement.

No fish were observed in the watercourse during the 2009 field investigations. In 2001, Ecoplans observed warmwater baitfish (Creek Chub) within the channel downstream of the recreational trail. The RVCA does not have any sampling stations on this watercourse.

Crossing #6 – Main Stillwater Creek at Hydro Corridor

In this reach, Stillwater Creek is relatively wide and highly meandering system with low lying banks and evidence of flows of overtopping banks (i.e. good connection to the surrounding floodplain). Flow is permanent and banks appear locally unstable, with erosion and slumping typically found on the outside of meander bends. There is evidence of recent beaver activity and abundant woody debris on banks and across the channel. There is also evidence of deer crossing (tracks) and deer bedding areas.

The downstream section of the channel, located within the residential area, is lined by bedrock fragments and rip-rap bank protection. Potential spawning, rearing or nursery habitat was observed within this reach. Ecoplans observed unidentified baitfish species during their 2009 field investigation. In 2001, the RVCA reported capture of baitfish including sculpin species at their sampling site located approximately 570m downstream of the study area. Other species captured at this location included: Central Mudminnow, White Sucker, Common Carp (*Cyprinus carpio*), Common Shiner (*Luxilus cornutus*), Spottail Shiner (*Notropis hudsonius*), Mimic Shiner (*Notropis volucellus*), Creek Chub, Pearl Dace (*Phoxinus eos x Margariscus margarita*), Brook Stickleback, Bluegill (*Lepomis macrochirus*) , Yellow Perch (*Perca flavescens*) and Johnny Darter (*Etheostoma nigrum*). This species assemblage reflects the proximity of this sampling station to the Ottawa River and use of the lower reaches of Stillwater Creek by Ottawa River fish species.

Crossing #7 – Tributary A of Graham Creek

This tributary of Graham Creek appears to have been historically modified/straightened and channelized. The banks are graded at a 3:1 slope and lined with rip-rap protection. The flow was slow moving and an abundance of algae growing on the rocks lining the channel bed was observed. A rock check dam likely impedes seasonal movement of fish upstream, and has created a stagnant backwater area immediately upstream.

There are some overhanging trees, but for the most part the channel has full sun exposure. Baitfish spawning habitat was noted in this reach; Ecoplans observed small pool areas where baitfish appeared to be forming nests in the large substrate. Ecoplans dip netted the area during the 2009 field season and caught Brook Stickleback that were gravid and in spawning condition within the reach downstream of the rock check dam. The RVCA does not have any fish sampling stations on this tributary.

Crossing #8–Graham Creek

Graham Creek appears to have been historically straightened/channelized, as the banks are graded to a 3:1 slope, the toe of banks are lined with rip-rap, and the channel is confined within a straight valley. The top of banks are low lying and display minor toe erosion and undercutting around the rip-rap bank materials. There are constructed riffle features that have been created by the placement of fragmented bedrock in a ‘straight line’ across the channel. These do not appear to hinder fish movement.

Abundant organic debris and leaf litter was observed on the streambed, covering some of the finer substrates, and offering some instream cover for baitfish. Water clarity was poor and flow was turbid during the 2009 field investigation. No sensitive habitat features (e.g. spawning, nursery habitat) were observed during the field visit and no fish were captured. In 2001, the RVCA reported the capture of baitfish at their sampling locations located approximately 670m downstream of the highway ROW,

and approximately 750m upstream of the highway. Species captured included: White Sucker, Longnose Dace, Creek Chub, Johnny Darter and sculpin species. American Eel (*Anguilla rostrata*), designated by COSEWIC as *Special Concern*, by MNR as *Endangered* (although Ontario general status is *Secure*) has been captured near the mouth of Graham Creek approximately 670m downstream of the study area. This species has not been recorded within the study area.

5.3.9 Land Use

5.3.9.1 Greenbelt Master Plan

The Greenbelt Master Plan is designed to provide strategic policy guidance for land use, programming and landscape character in order to ensure the long-term relevance and quality of the Greenbelt. The Master Plan applies to all federally owned Greenbelt lands and is intended to form the basis for all decisions relating to the Greenbelt. Land use is the basis of the plan, as with municipal plans; but the Master Plan also provides guidance for landscape character, public programming and other concerns related to the planning and animation of the nation's Capital. The Plan is intended to be flexible enough to guide decision-making in changing contexts and therefore serves as a framework for decision-making and not as a rigid blueprint. In addition to NCC planners and land managers, provincial agencies and the local municipality are expected to use the plan to address Capital and Greenbelt planning objectives and to ensure that transportation, servicing, land-use, and recreation plans respect Greenbelt land uses, activities, and special features.

Originally adopted in 1996, the National Capital Commission is currently undertaking a review of the Greenbelt Master Plan.

The 1996 plan builds from the general to the specific. The land designation plan elaborates on an overall philosophy and concept plan, and describes a range of land functions, future characteristics, and activities for the Greenbelt. The Greenbelt designations that occur within the study area are as follows:

- Highway 417 is designated as an Infrastructure Corridor
- The lands south of Highway 417 are designated as Cultivated Landscape
- The lands north of Highway 417 are designated as Rural Landscape
- A parcel of land located along the east side of Moodie Drive, north of Corkstown Road is designated as **Buildable Site Area**

These designations, as described in the Greenbelt Master Plan (1996) are as follows:

Infrastructure Corridor - This designation identifies lands that are used to move people, services and goods through the Greenbelt without fragmenting valuable cultivated or natural areas. Appropriate uses include roads, Transitways and sewers, water mains and natural gas pipelines. Infrastructure such as hydro lines will be as unintrusive as possible, and public access to the Greenbelt will be improved via such facilities as bicycle parking or farm produce stands at Transitway stations. Most infrastructure corridors or will be owned by levels of government other than federal.

Cultivated Landscape - This designation consists of the best agriculture and forestry lands in the Greenbelt. Appropriate uses include intensive farming and forestry and, where appropriate, a diversity of other activities such as bed-and-breakfasts and pick-your-own farms, where compatible with farming and forestry objectives.

Rural Landscape - This designation identifies lands of lesser natural importance or with lower farming and forestry potential. These lands protect the physical and visual continuity of the Greenbelt and allow the public to use and enjoy it. It conserves open, rural landscapes and provides recreation and visitor services for public use and enjoyment. Appropriate uses and facilities include rural recreation (for example, cross-country skiing, golf or horseback riding) and small rural commerce (such as farmers' markets, plant nurseries, hobby farming, bed-and-breakfasts, farm vacations), as well as hamlets, farming and grazing and institutional safety buffers.

Buildable Site Area - This designation identifies locations for uses that require an extensive open area, isolation or a rural environment close to the decision-making centres of the Capital. These uses also provide a source of revenue that helps to maintain the Greenbelt and implement the Master Plan. Appropriate uses include large institutions, businesses and compatible developments with special site requirements or Capital significance, or those that support an existing institutional use. Most of the land so designated will stay in a rural or natural state. Building design, layout and parking will complement the surrounding rural landscape.

The Implementation section of the Greenbelt Master Plan provides detailed plans for a precise interpretation of the extent and location of Land Designations and Experience Network elements. Opportunities, strategies and development guidelines are provided for specific areas and sites by way of geographic sector plans. The study area is contained within the Western Farm Sector. The Western Farm Sector plan recognizes the (recently completed) six-lane widening of Highway 417 (with Transitway on the north side) as part of the "Highway 417 Capital Arrival". The widening of Highway 417 and the addition of a Transitway was recognized as having the potential to affect the quality of the Capital panorama and compromise the natural link crossing.

5.3.9.2 City of Ottawa Official Plan

The Official Plan (OP) provides a vision of the future growth of the city and a policy framework to guide its physical development to the year 2021. It is a legal document that addresses matters of provincial interest defined by the Provincial Policy Statement under the Ontario Planning Act. But beyond this legal purpose, the Plan serves as a basis for a wide range of municipal activities including the planning and approval of public works to be carried out by the City in support of future growth, including sewage and water treatment infrastructure, roads and transit facilities, and public parks.

Municipal land use designations present in the study area are as follows:

- The lands south of Highway 417 are designated as **Agricultural Resource Area**;
- The lands north of Highway 417 are designated as **Greenbelt Rural**;
- A parcel of land located along the east side of Moodie Drive, north of Corkstown Road is designated as **Greenbelt Employment and Institutional Area.**

Specific policies guiding land use in these designations are as follows:

Agricultural Resource Area- Lands designated as Agricultural Resource Areas are shown on Schedules A and B with the intent of:

a. Protecting major areas of agricultural and other lands suitable for agriculture from loss to other uses;
b. Ensuring that uses, which would result in conflicts with agricultural operations, are not established in productive farming areas.

Greenbelt Rural- Lands designated Greenbelt Rural on Schedule B are to be used for farming, forestry, recreation, and small-scale commercial uses directly related to rural activities within the Greenbelt, such as bed and breakfasts, farm-gate sales, and farmer and artist markets. Lot creation is not permitted.

Lands designated Greenbelt Rural, and located adjacent to a Greenbelt Employment and Institutional Area, may also be used for operational uses ancillary to the main permitted uses in the Greenbelt Employment and Institutional Area, provided the ancillary uses have limited employment associated with them.

Greenbelt Employment and Institutional Area- Lands designated Greenbelt Employment and Institutional Area on Schedule B permit institutional, cultural, recreational and research facilities provided that:

a. The programming, land use, and landscape character of these facilities respect the Greenbelt's rural character and benefit from an extensive open area, isolation or a rural environment;
b. Activities that do not require an extensive open area, isolation or a rural environment, such as office employment, are only permitted as uses accessory to the primary use;
c. The grounds surrounding such facilities are used for farming, forestry, conservation, recreation, resource management, or other uses compatible with the rural character of the Greenbelt.

5.3.10 Existing Transportation Environment

This section documents the existing transit and transportation conditions within the study area. Information has been drawn from the Transit and Transportation Review prepared by McCormick Rankin Corporation (MRC) and included as Appendix A.

5.3.10.1 Study Area

The study area for the review of existing transportation conditions is depicted in Exhibit 16. It includes Highway 417 (Eagleson Road to Holly Acres Road), the Highway 416/417 interchange, Holly Acres Road, and Moodie Drive. The study area is located within the Greenbelt and consequently limits the potential for future development immediately adjacent to the proposed Transitway facility. Any increase in traffic travelling through the study area is therefore due to development growth occurring on either side of the Greenbelt.

Relevant to the discussion herein, it should be noted that employment levels at the former Nortel Campus are significantly reduced from previous years. The result is that previously established existing and future traffic projection data no longer remains valid, and as such has been re-assessed within the study area for this analysis.

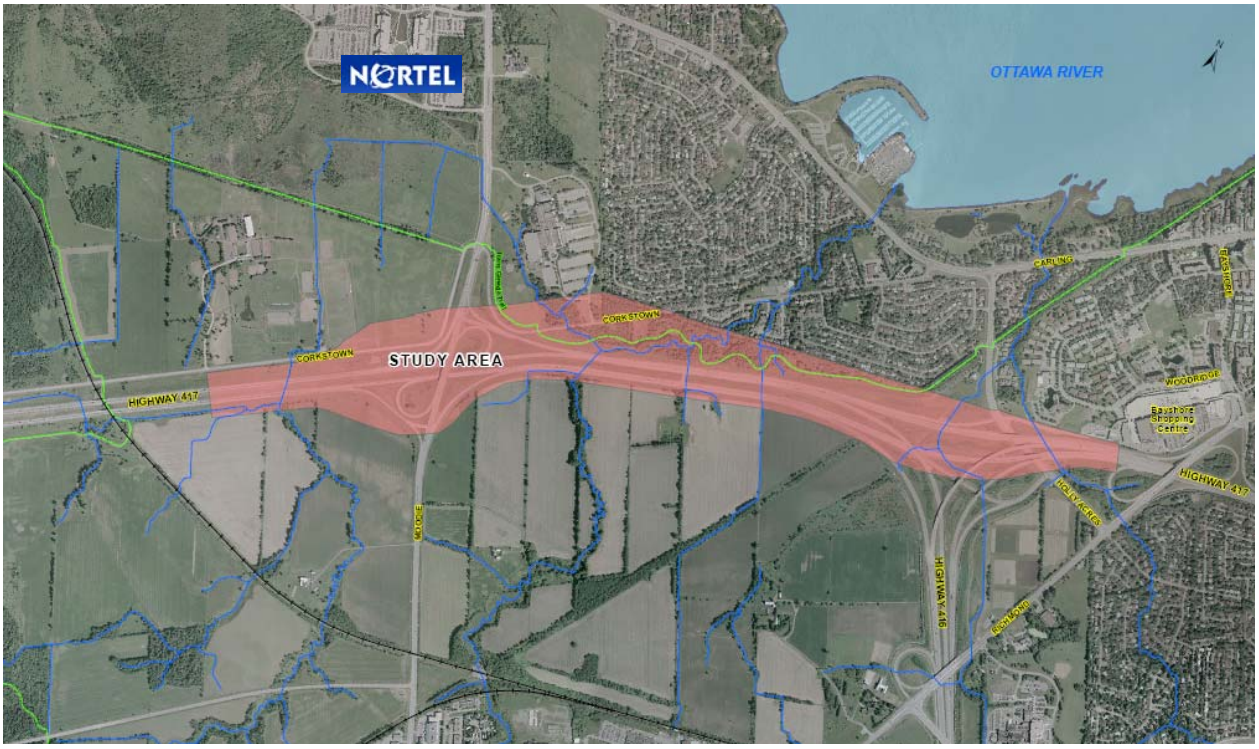


Exhibit 16 - Study Area for Transportation Review

5.3.10.2 Transit Operations & Infrastructure

Several bus routes operate in the Queensway corridor between Moodie Drive and Bayshore Station including Transitway Routes 96 and 101, which operate frequently, and express and rural services such as Routes 60, 61, 62, 63, 64, 65, 66, 68, and 261, 262, 263 that circulate through communities west of the study area and provide direct connections to downtown. Peak services such as Routes 167 and 182, which operate eastbound in the a.m. and westbound in the p.m. respectively, also currently travel through the corridor on Highway 417. West of Moodie Drive, Transitway services operate on Highway 417 within exclusive bus-only shoulder lanes.

West of Moodie Drive, Routes 66 and 182 operate on Richmond Road and Carling Avenue respectively to travel to/from Kanata.

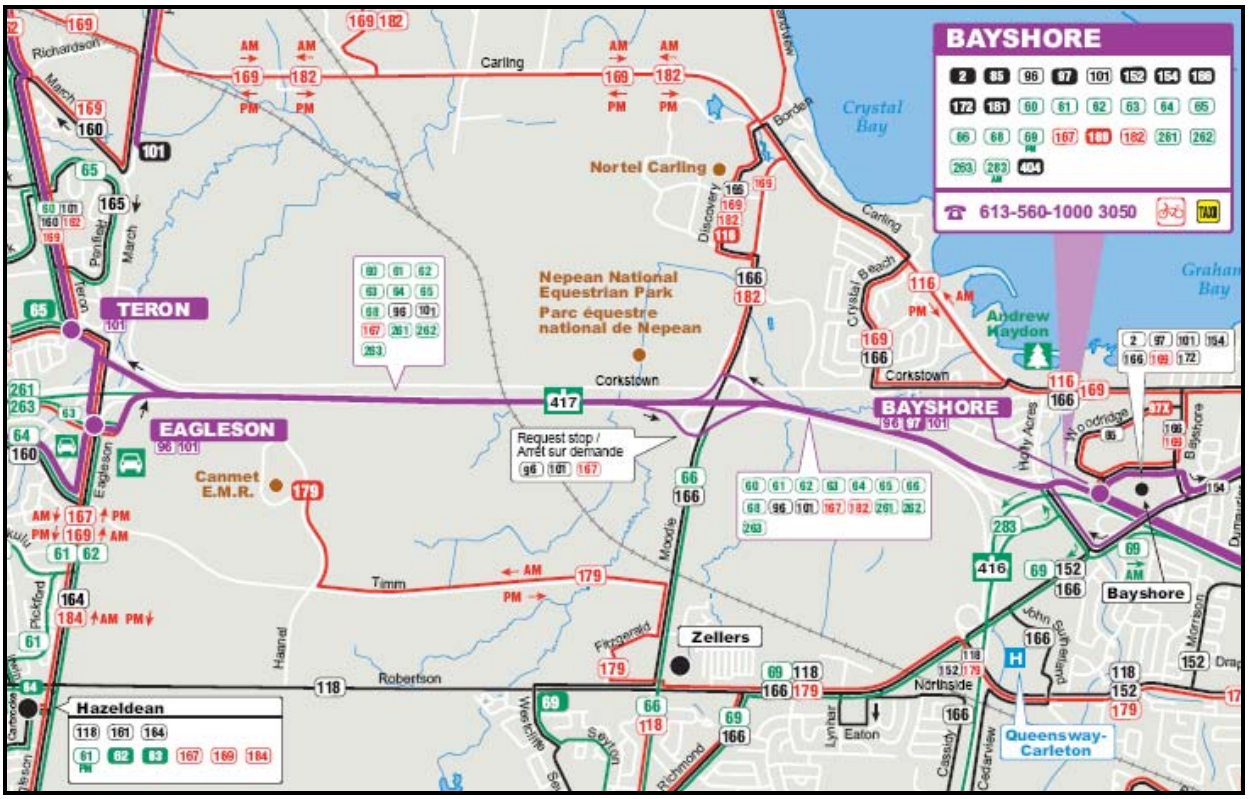


Exhibit 17 - OCTranspo System Map (2009)

As part of the construction of the Phase 1 West Transitway extension project (Pinecrest to Bayshore), Bayshore Transitway Station (located north of Highway 417) has been modified to include separate platforms for Transitway and local services. Accordingly, all bus routes that travel to/from Kanata have shifted onto this newly constructed section of Transitway. As a result, all eastbound buses exit Highway 417 at Holly Acres Road, turn left to travel north on Holly Acres Road and then turn right into Bayshore Station. Westbound buses exit at Bayshore Station crossing Holly Acres Road to the existing highway access ramp onto Highway 417.

There is an eastbound bus stop at the Highway 417/Moodie Drive interchange that utilizes a Demand for Service Indicator Signal (DSIS). This service allows the eastbound buses on Highway 417 to exit the highway when the illuminated DSIS indicates passengers are waiting at the bus stop. Currently, eastbound Routes 96, 101 and the a.m. peak Route 167 exit the highway to service this stop. If the DSIS is not activated buses remain on the Highway and bypass the stop.

Route 166 is an all-day local bus route that travels north-south along Moodie Drive and services the former Nortel Campus and the Crystal Beach community north of Highway 417; Bells Corners and the Queensway Carleton Hospital south of Highway 417; and ultimately connects to the Bayshore Transitway Station.

Table 5 presents the volume of buses in the Highway 417 corridor throughout the day in both the eastbound and westbound directions.

Table 5 - Volume of Buses within the Highway 417 Corridor (OC Transpo: Winter 2009)

Rte	Eastbound		Westbound	
	Time Period	# of Buses	Time Period	# of Buses
60	a.m. Peak Period	14	p.m. Peak Period	14
61	a.m. Peak Period	10	p.m. Peak Period	18
62	a.m. Peak Period	8	p.m. Peak Period	11
63	a.m. Peak Period	9	p.m. Peak Period	10
64	a.m. Peak Period	10	p.m. Peak Period	9
65	a.m. Peak Period	8	p.m. Peak Period	8
66	a.m. Peak Period	12	p.m. Peak Period	12
68	a.m. Peak Period	12	p.m. Peak Period	9
96	All Day	115	All Day	118
101	All Day	31	All Day	29
167	p.m. Peak Period	2	a.m. Peak Period	2
182	p.m. Peak Period	16	a.m. Peak Period	15
261	a.m. Peak Period	4	p.m. Peak Period	4
262	a.m. Peak Period	6	p.m. Peak Period	8
263	a.m. Peak Period	4	p.m. Peak Period	4
TOTAL		**261**		**271**

GREEN = Express Routes RED = Peak Only Routes BLACK = All Day Routes

OC Transpo's 2009 service schedule indicates that 60 eastbound buses are in service between Moodie Drive and Holly Acres Road during the a.m. peak hour and 15 during the p.m. peak hour. An estimate of the number of passengers carried by OC Transpo during the a.m. and p.m. peak hours was obtained from the 2005 Origin-Destination survey and shows that there are approximately 3,000 eastbound passengers during the a.m. peak hour and 900 eastbound passengers during the p.m. peak hour. The westbound direction shows 16 buses in service during the a.m. peak hour and 63 buses during the p.m. peak hour, accommodating 625 and 2,700 passengers per hour respectively.

5.3.10. 3 Traffic Operations & Infrastructure

The primary road network in the study area is comprised of the following roadways:

- Highway 417 (WB = 3 (reg) + 1 (aux) + 2 (416); EB = 4 (reg) + 1 (aux)
- Moodie Drive (4 lanes)
- Holly Acres Road (2 lanes)
- Highway 416/417 Interchange
- Corkstown Road (2 lanes)

Highway Traffic

The 2006 Average Annual Daily Traffic (AADT) volume on Highway 417 (as reported by MTO) between Bayshore and Moodie is 104,400 vehicles. Table 6 presents the AADT volumes

for this roadway segment, as well as for the highway segments immediately east and west of this section.

Table 6 – Average Annual Daily Traffic on Highway 417 (2006 MTO)

Highway	Between	AADT
417	Eagleson - Moodie	94,600
417	Moodie - Bayshore	104,400
417	Bayshore - Pinecrest	125,200

Local Traffic

Traffic counts and signal-timing information was assembled for the major intersections within the study area from information provided by the City of Ottawa. This information is important in understanding the existing traffic operations as well as identifying areas where congestion may result in unacceptable traffic delays and queues at intersections.

Historical traffic counts obtained from the City of Ottawa based on their annual count program were analyzed for the past 5 years to identify the annual rate of growth in traffic, as well as the associated impacts of various levels of employment in the area (e.g. Nortel).

The construction of a westbound barrier wall on Highway 417 in 2008 to restrict the weaving of traffic from northbound 416 exiting to Moodie Drive was considered in the analysis. This new barrier requires northbound vehicles on Highway 416 to exit the Highway at Holly Acres Road, turn left and use Holly Acres Road to cross under Highway 417, and then use the westbound ramp to enter Highway 417 on the north side to connect to Moodie Drive. MRC performed additional traffic counts on Holly Acres Road in April 2009. The counts show a total of 225 northbound vehicles per hour turning left from Holly Acres onto the Highway on-ramp during the a.m. peak period (100 vehicles per hour during the p.m. peak period). This volume reflects the reduced current employment levels at the former Nortel campus compared against the 2001 MTO prediction of 360 veh/hr that would have been diverted onto Holly Acres Road when Nortel was fully operational.

Figure 5 identifies the traffic volumes used in the analysis. These volumes include the traffic diverted onto Holly Acres Road from the 416 as well as a reduction in employment levels at the former Nortel facility.

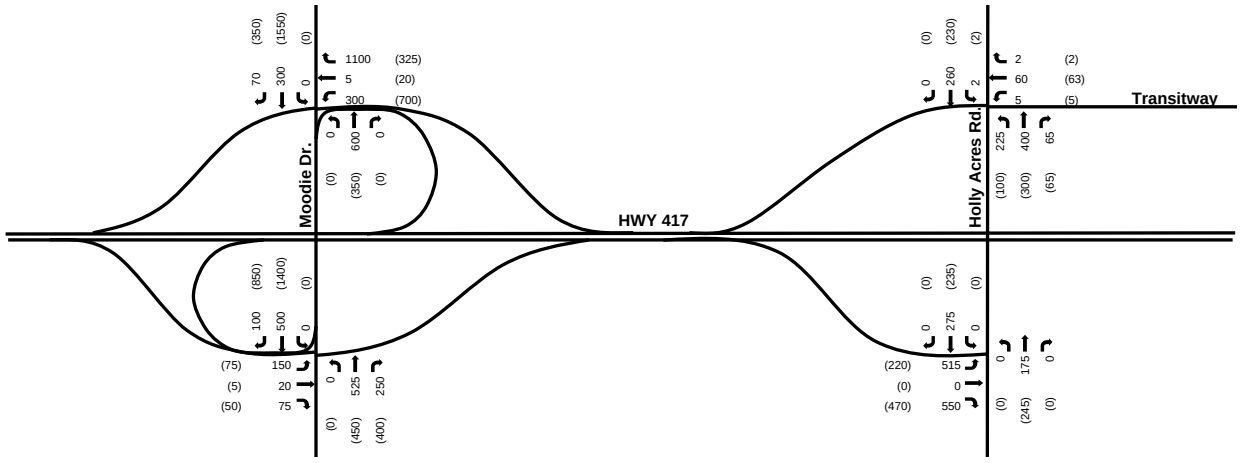


Exhibit 18 - Existing a.m. (p.m.) Peak Hour Traffic Volumes

Synchro 7, a traffic operational planning software package designed to assist in the identification of intersection level of service (LOS) according to the Highway Capacity Manual (HCM) was used. The LOS at the major intersections within the study area was analyzed using detailed traffic volume data, traffic signal timings and lane geometry. Table 7 presents the results of the Synchro Analysis.

Table 7 - Existing LOS and V/C at Major Intersections

Intersection / Turning Movement	a.m. Peak Hour			p.m. Peak Hour		
	Volume	LOS (SYNCHRO)	V/C (SYNCHRO)	Volume	LOS (SYNCHRO)	V/C (SYNCHRO)
Moodie Drive & Highway 417 S						
SBTR	500/100	A	0.26	1400/850	A	0.61
NBT	525	A	0.26	450	A	0.20
NBR	250	A	0.18	400	A	0.28
EBL	150	C	0.53	75	C	0.41
EB-TWAY	**20**	**C**	**0.07**	**5**	**C**	**0.02**
EBR	75	C	0.05	50	C	0.10
Moodie Drive & Highway 417N						
NBTR	600/75	A	0.30	350/175	A	0.17
SBT	300	A	0.15	1550	A	0.76
SBR	70	A	0.06	350	A	0.24
WBL	300	D	0.67	700	D	0.87
WB - TWAY	**5**	**C**	**0.03**	**20**	**C**	**0.07**
WBR	1100	A	0.86	325	A	0.22
Holly Acres Road & Highway 417S						
NBT	175	A	0.11	245	A	0.14
SBT	275	A	0.18	235	A	0.13
EBL	**515**	**E**	**1.06**	**220**	**C**	**0.67**
EBR	550	B	0.22	470	B	0.19
Holly Acres Road & Highway 417N / Transitway						
NBL	225	D	0.83	100	D	0.59
NBTR	400/65	A	0.46	300/65	A	0.22
SBT	260	B	0.15	230	A	0.14
WB-TWAY	**60**	**D**	**0.65**	**63**	**D**	**0.63**

The analysis of existing operations demonstrates the relatively high level of service provided to traffic operations within the study area during the morning and afternoon peak hours. All of the intersection approaches achieve a LOS of E or better. The only movements operating at a level of service D or E are actuated minor-street movements and these approaches have additional capacity available for higher volumes of vehicles. The approaches used by Transitway Buses at Moodie Drive and Holly Acres Road operate at acceptable levels service during existing conditions.

5.3.10.3 Existing Service Reliability

This subsection documents the existing reliability of transit services between Moodie Drive and Bayshore Transitway Station. It has been recognized that there are existing traffic and transit issues during the a.m. peak periods for eastbound transit services (inbound to Ottawa).

Transit Data

Data collected through OC Transpo's Automated Passenger Counting (APC) system reports the actual travel times between stations and compares these results with the scheduled travel time. The two transit facilities that were selected in this analysis are the existing Eagleson Park and Ride facility and Bayshore Transitway Station. Eagleson was selected instead of Moodie since not all buses service the DSIS at Moodie Drive, as the DSIS allows buses to skip the stop and stay on the highway. For the purpose of this exercise, Transitway Route 96 was selected to represent transit services since it services both the Eagleson Park and Ride and Bayshore Station. At the time when the data collection was undertaken, many routes from the west end did not service Bayshore station; rather they stayed on Highway 417 until Queensway Station where they accessed the Southwest Transitway.

Scheduled Travel Times

The scheduled travel time for eastbound buses in the a.m. peak periods (6:00-9:00) between the existing station at the Eagleson Park and Ride facility and Bayshore Station for Route 96 is 9 minutes. During the off-peak the scheduled travel time is 7 minutes. This suggests that the schedule has already been modified to account for 2 minutes of delay in the a.m. peak.

Actual Travel Time

Actual travel times between the Eagleson Park and Ride and Bayshore Station have been documented and range from 6 to 11 minutes during the a.m. Peak Period in the eastbound direction.

The variability of travel times can be represented by the standard deviation (SD) from the mean travel time for all bus trips. A lower SD indicates that the travel time data tend to be very close to the same value (low variability = high service reliability), while a higher SD indicates that the data is spread out over a large range of values (high variability = low reliability). For the section between the existing station at the Eagleson Park and Ride facility and Bayshore Station, the current SD is generally 1 or more during the peak periods. This can be compared to other existing exclusive Transitway sections which generally have a standard deviation of less than 0.8. This shows that the transit service from Eagleson to Bayshore section is not as reliable as other Transitway sections.

During the fall 2008 booking, 61 per cent of all a.m. Peak Period buses took longer than the theoretical 7 minutes that could be achieved in an uncongested environment. Nine per cent of all the buses take longer than the scheduled 9 minute travel time. Since this data was collected, additional lanes have been in operation on Highway 417. OCTranspo has confirmed that, although there has been some improvement in the service resulting from the widening of the highway, reliability of service is still an issue. The morning eastbound queues begin upstream and sometimes extend westerly through the 416/417 interchange.

5.4 Assessment of Effects and Comparative Evaluation of Route Alternatives

This section is organized in two parts. The first part (subsection 5.4.1) describes the overall comparative evaluation of route alternatives and presents the final recommendation. The second part (subsection 5.4.2) provides the detailed assessment of effects that has informed the comparative evaluation and final recommendation.

5.4.1 Comparative Evaluation of Route Alternatives (Summary)

The four alternative routes previously described in Section 5.2.1 were pre-screened based on their ability to meet study objectives and considering their potential effects to the natural environment and social/cultural environment. Based on the pre-screening process, the ***Queensway North*** and ***Queensway South*** route alternatives were carried forward for further assessment and evaluation. For these route alternatives, preliminary concept drawings have been prepared and are included in Appendix I.

The Former Railway route alternative was not carried forward due to potential effects to the Stillwater Creek Valley and the adjacent community that can not be avoided or mitigated through design. The Queensway Median route alternative was not carried forward due to constraints associated with the provision of a station at Moodie Drive and due to complications with the implementation of the interim project configuration.

Through the final assessment of effects and comparative evaluation process, **the *Queensway North* route is being recommended as the preferred route alternative**. This alternative is preferred because it:

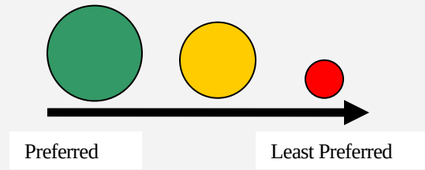
- Satisfies interim and ultimate study objectives;
    - Is consistent with the City of Ottawa's vision and objectives for transit as identified in the approved 2008 Official Plan and Transportation Master Plan;
    - Provides a cost effective interim solution to current transit service reliability issues by removing buses from mixed highway traffic and providing flexibility to potentially defer costly grade separations until warranted;
    - Does not preclude plans for the ultimate westerly extension of the Transitway to Kanata (including conversion to rail); and
    - Presents an opportunity to attract new transit riders from nearby employment areas.
- Minimizes effects to the natural environment and avoids effects that can not be mitigated through design.
    - Borders the southern edge of the Stillwater Creek Valley and thereby avoids the majority of this natural feature and will not result in further habitat fragmentation. This alternative may require minor edge removal/tree trimming potentially including regionally uncommon Black Maple along the edge of the Stillwater Creek valley. The young Black Maples located in close proximity to the highway do not appear to be part of the Black/Sugar Maple ecotype/association located in the main wooded portion of the valley. Edge mitigation measures can effectively mitigate impacts to terrestrial vegetation, wildlife and wildlife habitat.
    - Depending on the final alignment (to be determined during the preliminary design assessment stage), an extension of the existing culvert may be required at the confluence of Stillwater Creek and its tributary (C3). Mitigation measures, which may include minor channel realignment, will vary depending on the scale of impact which will be assessed in more detail in the development of a Recommended Plan. This route also requires four other (less complex) culvert extensions at C1, C4, C5 and C7.

- May require the minor removal of wetland vegetation from a small meadow marsh inclusion abutting Highway 417. If a minor channel realignment is required at crossing C3, additional removal of vegetation from the floodplain meadow marsh may be required including the potential removal of regionally significant flora. In the event that these impacts can not be avoided, transplantation of these species to similar areas not impacted by the Transitway will be investigated.

- Minimizes effects to existing recreational resources and avoids effects that can not be mitigated through design.
  - Will not affect the playing fields near Moodie Drive.
  - Maintains community access to the Watts Creek Recreational Pathway. Minor realignment of the pathway is required in the vicinity of Corkstown Road. Plans for any pathway realignment would need to be developed by Project Team specialists (Landscape Architect, Ecologist etc.) in consultation with the NCC to ensure that potential effects to the natural environment and pathway user are avoided or minimized.
- Minimizes potential effects to the social/cultural environment and avoids effects that can not be mitigated through design.
  - The contribution to environmental noise from this route alternative will be indistinguishable from local background traffic noise in the horizon year. This route is expected to result in <1 dBA increase over ambient noise levels. An increase of 3 dBA is considered to be just perceptible to most people.
  - May result in minor visual impacts. The City of Ottawa will work with the National Capital Commission and the Ministry of Transportation to minimize these impacts through design.
- Minimizes effects on Greenbelt lands and supports land use planning objectives.
  - To the greatest extent possible, the preferred route is clustered within the existing Highway 417 transportation corridor. Impacts to the NCC Greenbelt are limited to a 0.1 ha to 1.2 ha property impact in the vicinity of Corkstown Road and the Highway 417 off-ramp which is required to accommodate sub-option B (through the Moodie Drive interchange) and associated potential station locations. Sub-option A would result in a 2.9 ha property impact, with additional property being required west of Moodie Drive to accommodate the relocation of Corkstown Road.
- Minimizes effects to highway infrastructure and the travelling public.
  - While adjustments will be required to existing highway ramps, this alternative largely avoids impacts to the main travelled portion of Highway 417.
- Represents a responsible use of taxpayer dollars
  - An exclusive, fully grade separated Transitway can be implemented within this route for an estimated capital cost of between $50M and $60M (depending on the final design and station configuration). Comparatively, the Queensway South route alternative is expected to cost an additional $35M to $45M (60% to 90%) to construct.

The comparative evaluation of route alternatives is presented in Table 8.

The preliminary concept for the preferred ***Queensway North*** route is illustrated in Exhibits 19 to 24. Opportunities to reduce the footprint of this facility will be explored during the subsequent assessment and evaluation of preliminary design alternatives.

	FACTORS AREAS/CRITERIA	TABLE 8- COMPARATIVE EVALUATION OF ROUTE ALTERNATIVES				
		Former Railway	**Queensway North**	**Queensway Median**	**Queensway South**	**Rationale**
PRE-SCREENING STAGE	**Factor Area 1: Overall Study Objectives** • Travel Time Savings • Near Term Project Objective • Long Term Project Objectives • Provision of Community Transit Service					All route alternatives provide acceptable travel time savings over the existing condition. Only the Former Railway, Queensway North and Queensway South route alternatives are capable of meeting both interim and ultimate project study objectives. The Queensway Median is not capable of accommodating a station at Moodie Drive without a major relocation of Highway 417. The Median Route alternative is therefore not a viable option. (See Appendix B- Operational Review of Queensway Median Route Alternative.
		Good Performance	**Good Performance**	**Poor Performance**	**Good Performance**	
	Factor Area 2: Natural Environment • Fish and Fish Habitat • Species At Risk • Designated Natural Environment Features • Wetlands • Upland Vegetation • Wildlife • Fluvial Geomorphology • Drainage/Hydrology					The Queensway Median Route is preferred from a natural environmental perspective as it is located within an existing transportation corridor and therefore has minimal impacts to natural features. The Queensway South Route results in the relatively minor removal of riparian vegetation/habitat along the tributaries located south of Highway 417. Impacts to watercourses are limited to the potential extension of existing highway culverts. The Queensway North Route is less preferred because it may require minor edge removal/tree trimming potentially including regionally uncommon Black Maple along the edge of the Stillwater Creek valley and possible removal of other regionally rare flora. The young Black Maple specimens located in close proximity to the highway do not appear to form part of the Black/Sugar Maple ecotype located within the main wooded valley. This alternative avoids the majority of the Stillwater Creek valley feature and avoids fragmenting that feature. It does, however, potentially require a complex culvert extension at the Stillwater Creek and tributary confluence which needs to further assessed in Preliminary Design. The Former Railway Route is the least preferred from a natural environmental perspective because it results in the greatest potential for impacts to wetlands, upland vegetation and associated terrestrial habitat, and the Stillwater Creek valley, some of which are not mitigable (direct removal of vegetation and further fragmentation within the main valley forest).
		Significant Potential Effects	**Moderate Potential Effects**	**No Potential Effects**	**Minor Potential Effects**	
	Factor Area 3: Social/ Cultural Environment • Heritage/ Archaeology • Contaminated Property • Agriculture • Noise • Ground Vibration/ Air Quality • Aesthetics • Land Use					As the Median route is contained within previously disturbed lands it is not anticipated to have a measurable impact on cultural heritage resources, recreational facilities or the adjacent community. It is therefore the preferred route for this factor area. There is no perceptible contribution to future noise levels associated with the Queensway North, Queensway Median and Queensway South Route Alternatives. The Queensway North and Queensway South route alternatives may result in minor visual impacts that must be mitigated through design. The Queensway South route will also impact agricultural lands in the NCC Greenbelt. Due to its proximity to the adjacent community, impacts to the Greenbelt, and impacts to existing recreational facilities, the Former Railway route is least preferred for this factor area.
		Significant Potential Effects	**Minor Potential Effects**	**No Potential Effects**	**Minor Potential Effects**	
	Pre-Screening Recommendation	The Former Railway Route alternative results in potential effects to the natural environment (Stillwater Creek Valley) and adjacent community (recreation access, proximity to residential receivers, Greenbelt) that are considered moderate/ significant, some of which are not considered mitigable. These effects are not justifiable considering the availability of lower impact alternatives that achieve the same study objectives. **Do Not Carry Forward**	The Queensway North route alternative meets overall study objectives. While potential effects to the natural (Stillwater Creek) environment are expected, they are considered mitigable through design. **Carry Forward**	By traveling through previously disturbed lands, the Queensway Median route alternative avoids all effects to the natural, social and cultural environment. However, due to the existing configuration of Highway 417 and the Moodie Drive structure, a station cannot be accommodated in the median. This alternative therefore does not satisfy overall study objectives. **Do Not Carry Forward**	The Queensway South route alternative results in effects to the natural, social and cultural environment are that are considered mitigable through design. **Carry Forward**	
FINAL EVALUATION	**Factor Area 4: Technical Considerations** • Property Impacts • Constructability/ Capital Cost	N/A		N/A		Both route alternatives have a similar potential property impact on NCC Greenbelt lands and MTO lands. The Queensway North route is preferred from a technical perspective as it minimizes construction staging impacts, avoids complex structural issues, and therefore minimizes construction cost. Due to significant construction constraints and impacts to existing infrastructure, the Queensway South route is expected to cost 60-90% more to construct than the Queensway North route (an additional $35-45M).
		N/A	**Good Performance**	N/A	**Poor Performance**	
	Final Recommendation	N/A	When considering that the potential environmental effects associated with this alternative are considered mitigable through design, the difference in estimated construction cost ($35-45M) is a decision relevant factor. The Queensway North route alternative is therefore recommended. **Recommended Route**	N/A	The requirement for large highway grade separations results in complex construction staging and increased capital cost. The additional cost is not justifiable when considering that the potential effects associated with the Queensway North route alternative can be mitigated through design. **Not Recommended**	

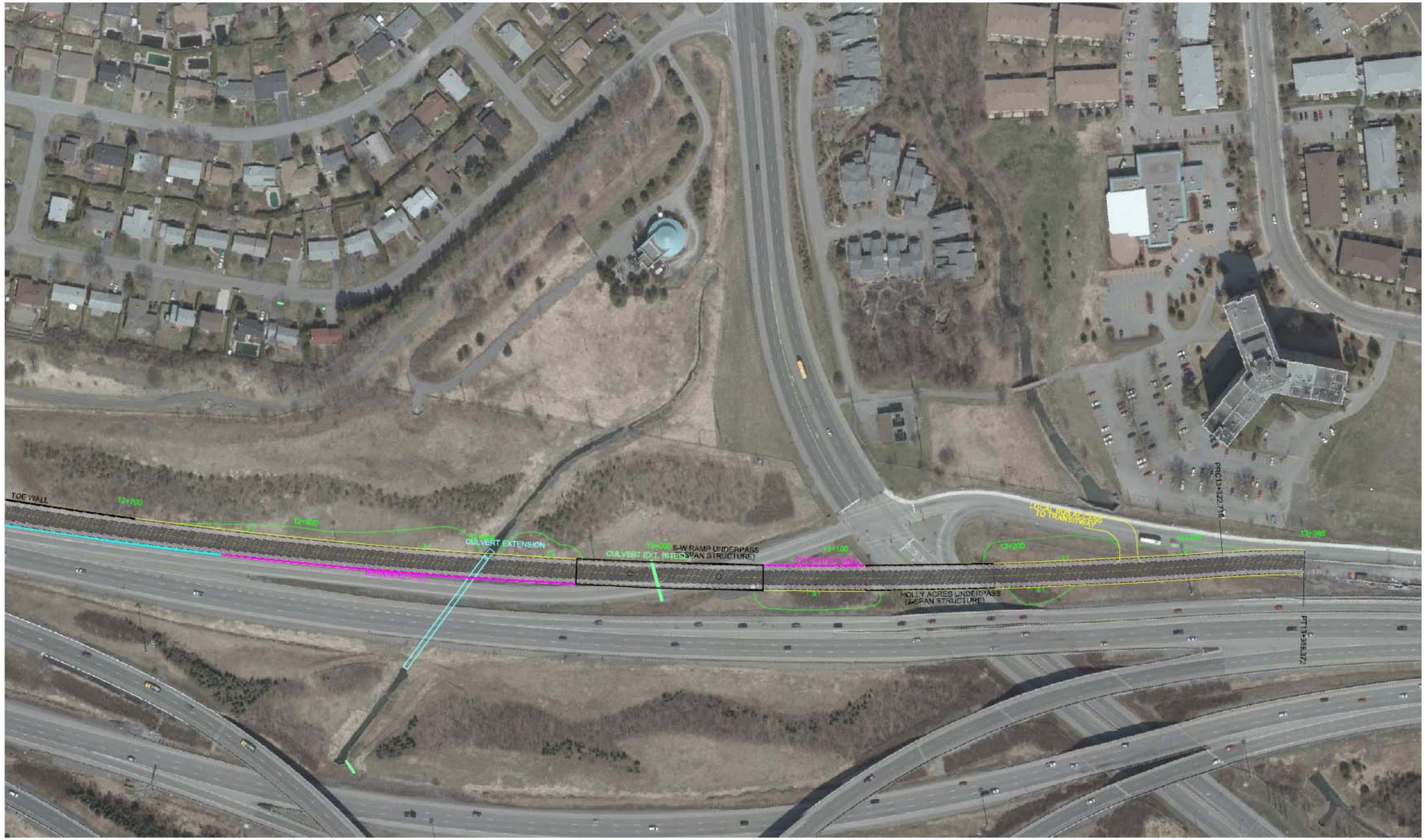


Exhibit 19- Preliminary Concept Drawing (1 of 6)

Exhibit 20- Preliminary Concept Drawing (2 of 6)

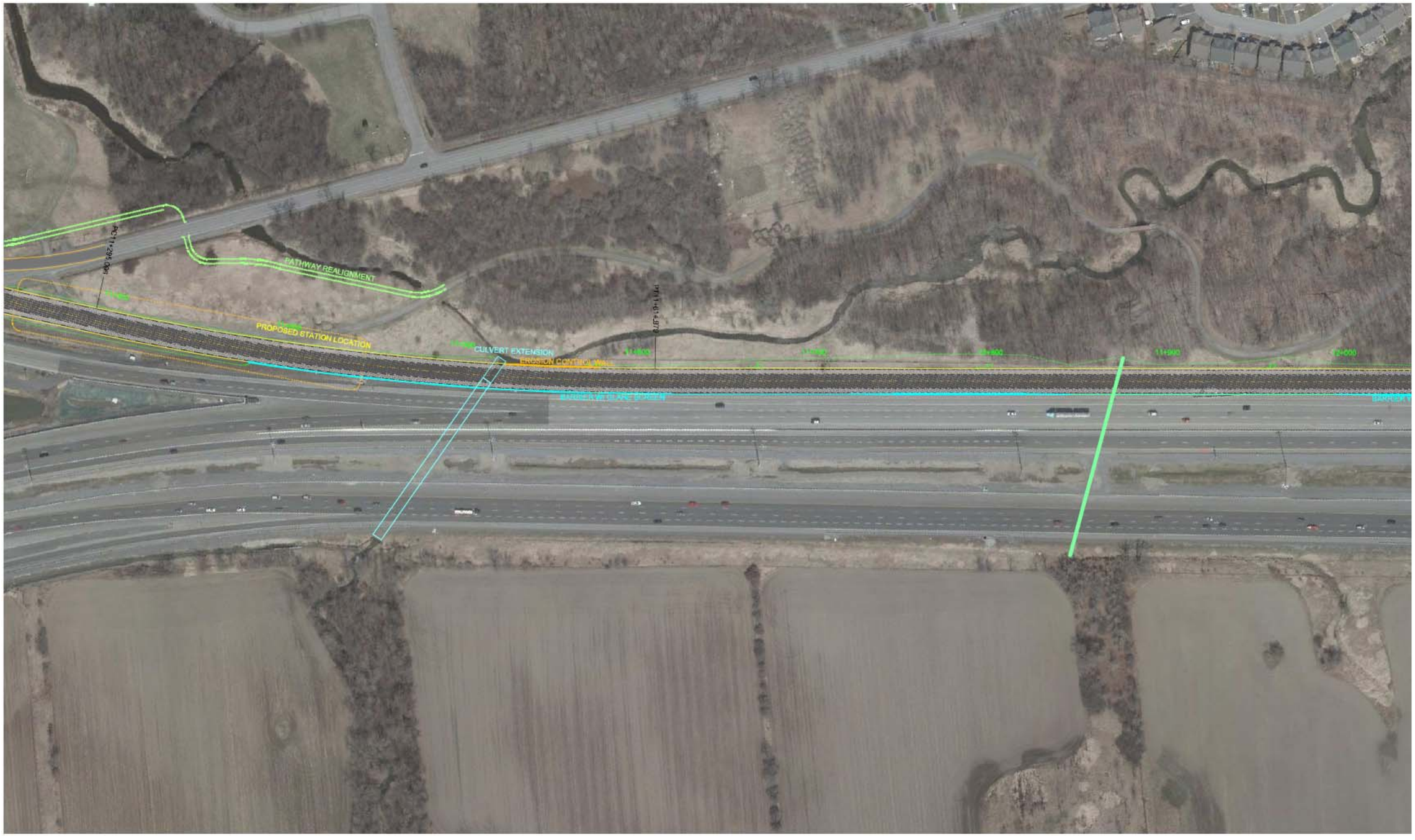


Exhibit 21- Preliminary Concept Drawing (3 of 6)

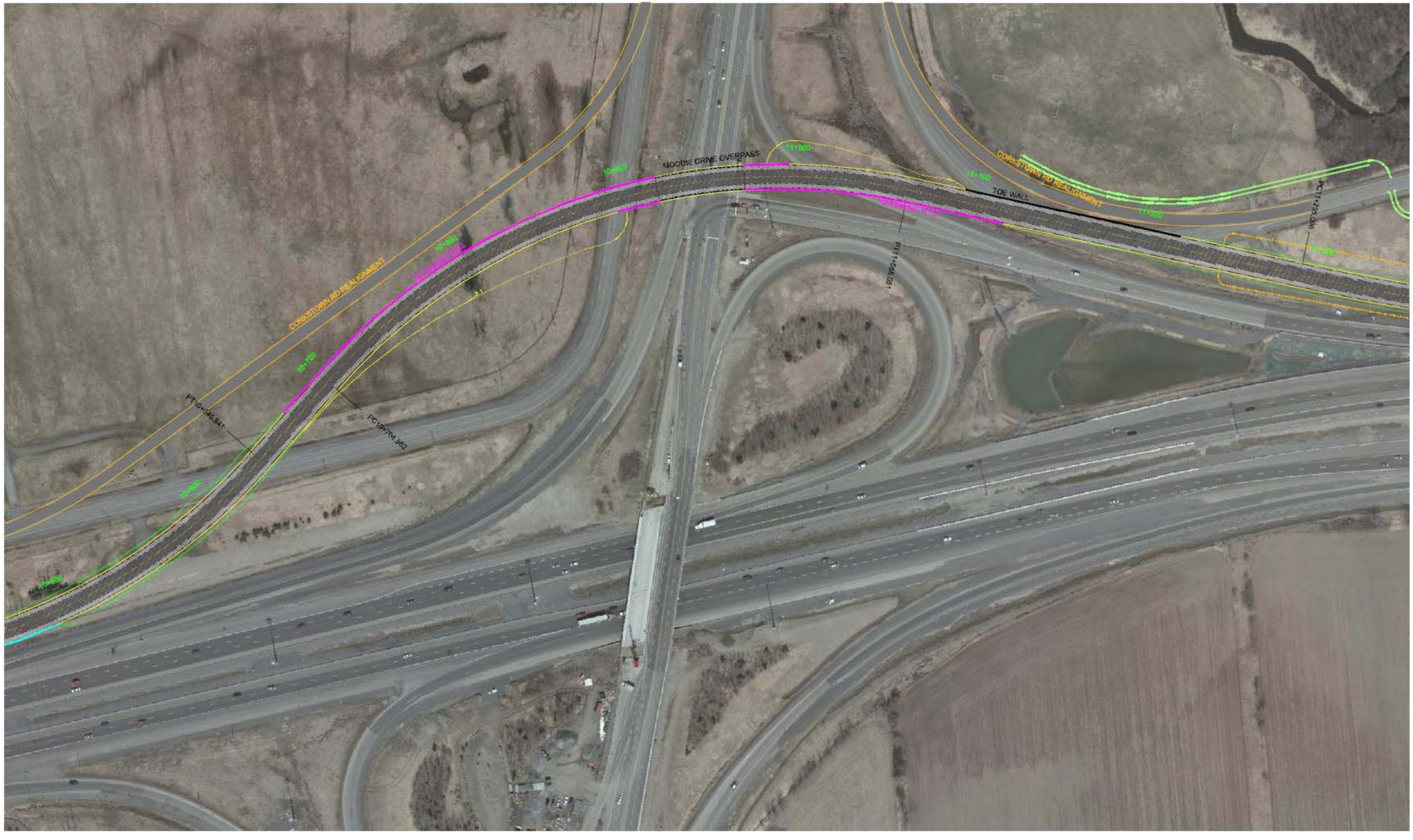


Exhibit 22- Preliminary Concept Drawing (4 of 6) Sub-option A @ Moodie Drive

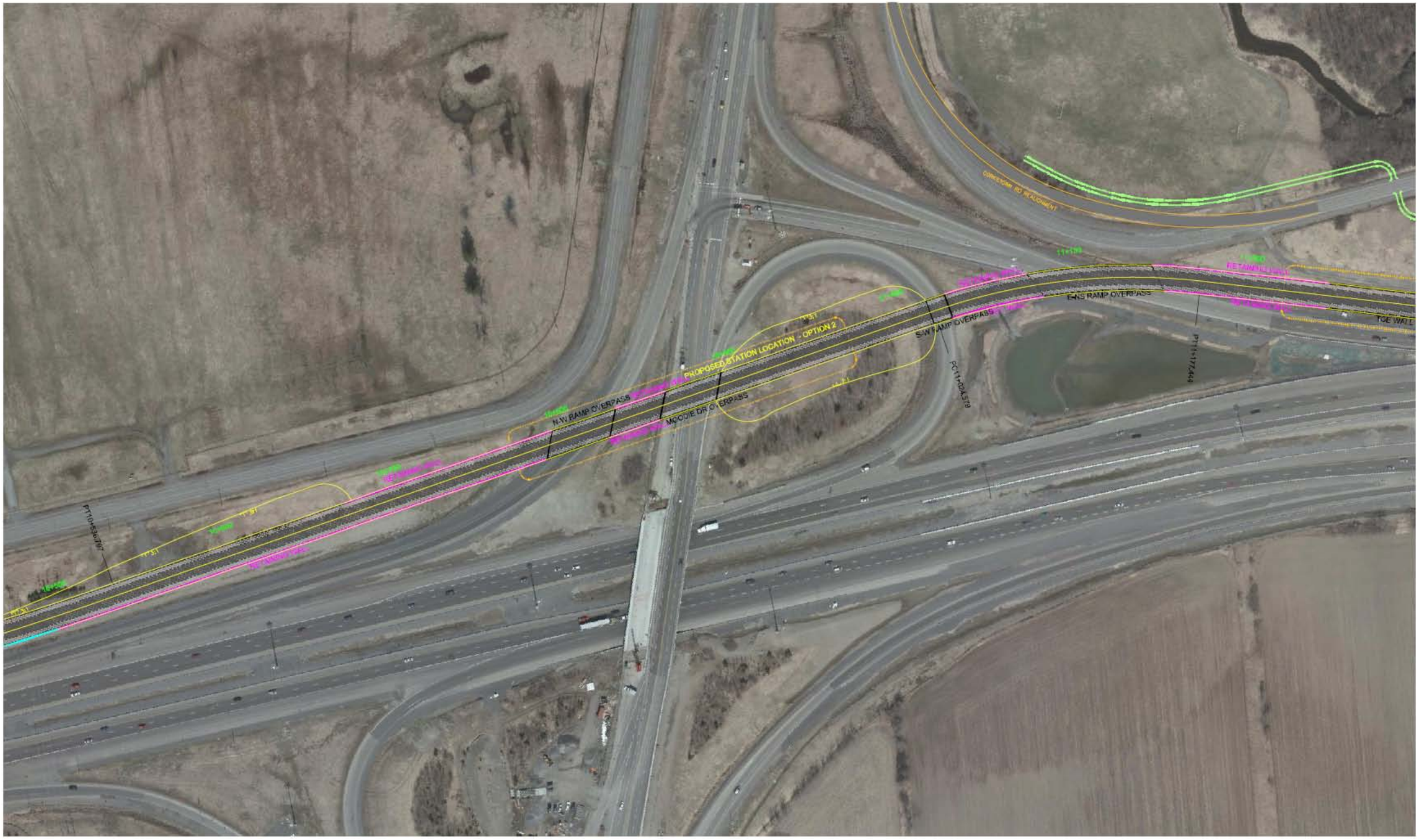


Exhibit 23- Preliminary Concept Drawing (5 of 6): Sub-Option B @ Moodie Drive

Exhibit 14- Preliminary Concept Drawing (6 of 6)

5.4.2- Assessment of Effects

This assessment of effects contains the technical justification for the comparative evaluation presented in previous sub-section. Potential effects that are considered relevant to the selection of a preferred route are identified below. These effects are considered decision relevant either due to the magnitude of the effect, or due to the fact that a particular effect is unique to one alternative and not others.

Overall Study Objectives:

- Only the *Queensway Median* route alternative does not satisfy study objectives as a station can not be reasonably accommodated at Moodie Drive without major realignment of Highway 417, an extension of the Moodie Drive underpass, and partial relocation of the highway access ramps at the Moodie Drive interchange.

Natural Environment:

- The *Former Railway* route will result in significant effects to the north edge of the Stillwater Creek valley including the removal of mature forest and regionally uncommon plant species, increased valley fragmentation, and increased risk of secondary effects extending into the valley.
- The *Queensway North* route borders the southern edge of the Stillwater Creek Valley and thereby avoids the majority of this natural feature and will not result in further habitat fragmentation. However, this alternative may require minor edge removal/tree trimming potentially including regionally uncommon Black Maple along the edge of the Stillwater Creek valley. The young Black Maples located in close proximity to the highway do not appear to be part of the Black/Sugar Maple ecotype/association located in the main wooded portion of the valley. Edge mitigation measures can effectively mitigate impacts to terrestrial vegetation, wildlife and wildlife habitat.
- The *Former Railway* route will require two new crossings of Stillwater Creek, one of which is located in a sensitive reach of Stillwater Creek.
- The *Queensway North* route may require the extension of an existing highway culvert at the confluence of Stillwater Creek and its tributary (C3) which may require a realignment of the creek in this immediate area. While this reach does not exhibit good morphological diversity, it is located directly upstream from a sensitive reach. This impact is considered mitigable through design. For the purpose of developing comparative cost estimate, an additional $150,000 was added to the cost of this alternative to account for the potential additional mitigation required at this crossing. Mitigation measures will vary depending on the scale of impact which will be assessed in more detail following the selection of the route alternative.
- Both the *Former Railway* and *Queensway North* routes may require the minor removal of small floodplain meadow marsh inclusions. If impacts can not be avoided, transplantation of these species will be investigated.

Social/Cultural Environment:

- Roadway noise is a major concern to the public. Aside from the *Former Railway* route, predicted noise level increases obtained from the noise analysis do not indicate a perceptible difference among alternatives. Furthermore, the analysis has indicated that predicted future noise levels associated with the *Queensway North*, *Queensway Median* and *Queensway South* route alternatives do not represent a significant increase over the "do nothing" alternative.

Due to its proximity to sensitive receivers (25m), the *Former Railway* route alternative has the potential to result in moderate-significant noise level increases (>5 dBa).

- The *Former Railway* route has the greatest potential to impact recreational resources as it would sever access to the Stillwater Creek Valley for the adjacent community. Access could be provided via pedestrian grade separations. The *Queensway North* route will require a minor realignment to the recreational pathway near Corkstown Road.

Technical Considerations (Queensway North and Queensway South only):

- The *Queensway South* route alternative requires that the Transitway pass over Highway 417 in the east and back under Highway 417 in the west. The required grade separations would result in major impacts to highway operations.
- Due to the required large-span highway overpass at the eastern study limit and the large underpass at the western study limit, the *Queensway South* route is estimated to cost approximately $35M to $45M (60%-90%) more than the Queensway North route alternative.

The detailed assessment of effects is presented in Tables 9-12. Where applicable, supporting technical information has been appended to this document. References to supporting technical information are included in the applicable 'Criteria' column.

TABLE 9- ASSESSMENT OF EFFECTS
FACTOR AREA 1: OVERALL STUDY OBJECTIVES

Criteria		Performance Measures	Assessment of Effects and Comparative Evaluation			
			Former Railway Route	**Queensway North Route**	**Queensway Median Route**	**Queensway South Route**
1	Travel Time Savings (see Appendix A)	Provides the greatest travel time savings over existing conditions (Note: Existing travel time is 3m 46s)	Savings due to physical design = 1 min Savings due to elimination of signal/congestion delay = 2 mins Total time savings = 3 mins	Savings due to physical design = 1 min Savings due to elimination of signal/congestion delay = 2 mins Total time savings = 3 mins	Savings due to physical design = 1 min Savings due to elimination of signal/congestion delay = 2 mins Total time savings = 3 mins	Savings due to physical design = 1 min Savings due to elimination of signal/congestion delay = 2 mins Total time savings = 3 mins
		PERFORMANCE GRADE	Good	Good	Good	Good
		PREFERENCE	1st	1st	1st	1st
		RATIONALE	Estimated travel time savings were calculated based on distance, route geometry, and physics (acceleration/deceleration) and the anticipated reduction in congestion/signal delay. There is no measurable difference in travel time savings amongst alternatives. As all four alternatives provide significant travel time savings over existing conditions, all are given equal preference.			
2	Interim study objective	Capable of accommodating interim project configuration. (See section 1.1)	This route is capable of accommodating an exclusive BRT facility that connects Bayshore Station to shoulder bus lanes on Highway 417 west of Moodie Drive and can provide a passenger transfer facility at Moodie Drive in the interim.	This route is capable of accommodating an exclusive BRT facility that connects Bayshore Station to shoulder bus lanes on Highway 417 west of Moodie Drive and can provide a passenger transfer facility at Moodie Drive in the interim.	This route is capable of accommodating an exlclusive BRT facility in the interim, however, due to the configuration of Highway 417 and the Moodie Drive structure, a transfer station can not be accommodated at Moodie Drive. This route therefore does not meet the interim study objective. Furthermore, an interim configuration connecting to HOV lanes on Highway 417 west of Moodie Drive would require buses to operate in mixed traffic as they weave from the HOV lanes to the shoulder bus lanes and highway exit ramps. This interim configuration does not solve existing operational concerns as it shifts the potential for congestion delays from the Bayshore Station to Moodie Drive sector further west (Moodie Drive to Eagleson Road).	This route is capable of accommodating an exclusive BRT facility that connects Bayshore Station to shoulder bus lanes on Highway 417 west of Moodie Drive and can provide a passenger transfer facility at Moodie Drive in the interim.
		PERFORMANCE GRADE	Good	Good	Poor	Good
		PREFERENCE	1st	1st	2nd	1st
		RATIONALE	The Former Railway, Queensway North and Queensway South route alternatives are capable of meeting the interim study objective. The Queensway Median route can not accommodate a transfer station at Moodie Drive (both in the interim and ultimate configurations) and, in the interim configuration, does not address current operational delays associated with running scheduled bus service in mixed traffic on Highway 417. The Queensway Median route alternative is therefore least preferred for this criterion.			
3	Ultimate study objectives	Capable of accommodating the ultimate project configuration. (See section 1.1)	This route alternative is capable of accommodating an exclusive fully grade separated BRT facility that is convertible to rail technology and includes a transfer station in the vicinity of Moodie Dr.	This route alternative is capable of accommodating an exclusive fully grade separated BRT facility that is convertible to rail technology and includes a transfer station in the vicinity of Moodie Dr.	This route alternative is capable of accommodating an exclusive BRT facility that is convertible to rail technology, but can not accommodate a transfer station at Moodie Drive. The current configuration of the Moodie Drive structure does not provide adequate space between bridge piers for station platforms. The station could be accommodated but would require significant highway relocation and bridge reconstruction/modification.	This route alternative is capable of accommodating an exclusive fully grade separated BRT facility that is convertible to rail technology and includes a transfer station in the vicinity of Moodie Dr.
		PERFORMANCE GRADE	Good	Good	Poor	Good
		PREFERENCE	1st	1st	2nd	1st
		RATIONALE	The Former Railway, Queensway North and Queensway South route alternatives are capable of meeting the ultimate study objective. Due to the existing configuration of piers on the Moodie Drive structure, the Queensway Median route cannot accommodate the ultimate configuration which includes transfer station at Moodie Drive (The piers are 18 m apart and the station requires a 30 m cross-section). The Queensway Median route alternative is therefore least preferred for this criterion.			
4	Provision of community transit service	Has the greatest potential service catchment with the highest level of station accessibility	600 m catchment area has potential to improve transit access for the Abbott Point-of-Care facility (formerly Nortel)	600 m catchment area has potential to improve transit access for the Abbott Point-of-Care facility (formerly Nortel)	600 m catchment does not capture any residential or employment lands.	600 m catchment does not capture any residential or employment lands.
		PERFORMANCE GRADE	Fair	Fair	Poor	Poor
		PREFERENCE	1st	1st	2nd	2nd

		RATIONALE	None of the proposed route alternatives provide an opportunity for a transit station with a large walk-in service catchment. However, both the Former Railway and Queensway North routes would provide some service to the existing employment node located east of Moodie Drive and are therefore given preference over the Queensway Median and Queensway South routes.			
Factor Area 1 Summary		**OVERALL PERFORMANCE GRADE**	**Good**	**Good**	**Poor**	**Fair-Good**
		OVERALL PREFERENCE	**1st**	**1st**	**3rd**	**2nd**
		RATIONALE	**There is little measureable difference in potential travel time savings amongst alternatives. The Queensway North, Queensway South and Former Railway route alternatives are capable of meeting study objectives. Due to the configuration of the existing Moodie Drive structure, the median alternative cannot accommodate the ultimate configuration which includes a station at Moodie Drive. Furthermore, in the interim, the Median route alternative simply shifts the problem of operating buses in mixed traffic further to the west and therefore does not meet the interim study objective.**			

TABLE 10- ASSESSMENT OF EFFECTS
FACTOR AREA 2: NATURAL ENVIRONMENT

Criteria		**Performance Measures**	**Assessment of Effects and Comparative Evaluation**			
			Former Railway Route	**Queensway North Route**	**Queensway Median Route**	**Queensway South Route**
5	Fish, fish habitat, and stream processes	Minimizes effects to fish and fish habitat considering sensitivity and relative magnitude of potential effect.	***This route requires:*** • ***2 new crossings*** • ***2 extensions of existing crossings*** Will likely require an extension of the existing Highway 417 culvert crossing of Stillwater Creek located west of Moodie Drive (C1). An extension of the existing Corkstown Road culvert crossing of Stillwater Creek is likely also required (C2). Route extends along northern edge of the Stillwater Creek valley and will require a new crossing of Stillwater Creek within the wooded valley area (C6). The potential requirement for creek realignment is not known and would depend on the structure design (e.g. culvert or bridge). A section of Stillwater Creek would effectively be "contained" between this alignment and existing Highway 417, which increases the risk of water quality concerns. Stillwater Creek supports a warmwater baitfish community with Sculpin, has permanent flow conditions, and is therefore considered to have a relatively higher sensitivity, in terms of fish and fish habitat, compared to other watercourses crossed by the various Route options. Route may also require new crossing at Tributary C of Stillwater Creek (just south of where the watercourse drops into a storm sewer system at the edge of the residential development). Tributary C has permanent flows, but a less diverse warmwater baitfish community downstream of the perched culvert (downstream of the recreational trail crossing). A new crossing is also required on Tributary A of Graham Creek (C7). The new crossing would be located on a previously modified (straightened/channelized) reach. This watercourse is considered to have lower relative sensitivity in	***This route requires:*** • ***5 extensions of existing crossings*** Will likely require an extension of the existing Highway 417 culvert crossing of Stillwater Creek located west of Moodie Drive (C1). Route extends along the south edge of the Stillwater Creek valley and may require an extension of the existing culvert at the confluence of Stillwater Creek and Tributary A of Stillwater Creek (C3). Route will also require the extension of Highway 417 culverts at tributaries B and C of Stillwater Creek. (C4 and C5). Stillwater Creek supports a warmwater baitfish community with Sculpin, has permanent flow conditions, and is considered to have a relatively high sensitivity in terms of fish and fish habitat. Tributary A of Stillwater Creek is considered to have a warmwater baitfish community, permanent flows and considered to be relatively good fish and fish habitat. Tributary B is a swale feature with intermittent/ephemeral flow and no direct fish use. Tributary C has permanent flows, but a less diverse warmwater baitfish community downstream of the perched culvert (downstream of the recreational trail crossing). These two tributaries have relatively low quality fish habitat and/or no direct fish use. Will require an extension of the existing Highway 417 culvert along a previously modified (straightened/channelized) reach of Tributary A of Graham Creek (C7). This tributary is considered to have permanent flow and a less diverse warmwater baitfish community. Baitfish spawning habitat was noted just downstream of	***This route requires:*** • ***1 extension of an existing crossing*** Will require an extension of the existing Highway 417 culvert along a previously modified (straightened/channelized) reach of Tributary A of Graham Creek (C7). This tributary is considered to have permanent flow and a less diverse warmwater baitfish community. Baitfish spawning habitat was noted just downstream of Highway 417; within the reach downstream of the rock check dam.	***This route requires:*** • ***4 extensions of existing crossings*** This route requires the extension of four watercourse crossing culverts: one over a tributary of Graham Creek and the other 3 on tributaries A, B and C of Stillwater Creek. All are located in previously modified reaches of these channels and are considered to be less sensitive reaches. Will require extensions of the Highway 417 culverts at Tributaries A and B of Stillwater Creek. Tributary A has permanent flow and a diverse warmwater baitfish community including Sculpin upstream (south) of the existing Highway 417 crossing, and is considered to be relatively good fish and fish habitat. Tributary B has intermittent/ephemeral flow and functions as a drainage swale with no direct fish use. A crossing of Tributary C of Stillwater Creek will also be required but it is uncertain whether this crossing would be an extension of the Highway 417 culvert or a new crossing immediately downstream of Highway 417. Tributary C has a less diverse warmwater baitfish community downstream of the perched culvert (downstream of the recreational trail crossing), and is considered to have relatively low fish and fish habitat compared to Tributary A of Stillwater Creek. Will require an extension of the existing Highway 417 culvert along a previously modified (straightened/channelized) reach of Tributary A of Graham Creek (C7). This tributary is considered to have permanent flow and a less diverse warmwater baitfish community. Baitfish spawning habitat was noted just downstream of Highway 417; within the reach downstream of the rock check dam.

TABLE 10- ASSESSMENT OF EFFECTS
FACTOR AREA 2: NATURAL ENVIRONMENT

Criteria		Performance Measures	Assessment of Effects and Comparative Evaluation			
			Former Railway Route	**Queensway North Route**	**Queensway Median Route**	**Queensway South Route**
			terms of fish and fish habitat.	Highway 417, within the reach downstream of the rock check dam.		
		PERFORMANCE GRADE	Poor	Fair	Good	Good
		PREFERENCE	4th	3rd	1st	2nd
		RATIONALE	The Queensway Median route is preferred from a fish and fish habitat perspective as it is contained within an existing transportation corridor and does not require new watercourse crossings other than a culvert extension over a previously modified reach of Tributary A of Graham Creek, which is also required for the Queensway North and South routes. The Queensway South route is expected to have the second lowest impact on fish and fish habitat as it avoids impacts to the main branch of Stillwater Creek and crossings are likely limited to extension of existing highway culverts. The Queensway North route may require the extension of an existing culvert at the confluence of Stillwater Creek and Tributary A (C3), which may require a realignment of the tributary in this immediate area. This effect is considered mitigable through design. Mitigation measures will vary depending on the scale of impact which will be assessed in more detail following the selection of the route alternative. The Former Railway route requires two new watercourse crossings including a new crossing of Stillwater Creek in the wooded valley. A section of Stillwater Creek would effectively be "contained" between this alignment and existing Highway 417, which increases the risk of water quality concerns. This alternative also requires an extension of the culverts at C1 and C2 and at the Corkstown Road crossing of Stillwater Creek. All watercourse crossings must be designed and constructed to minimize the risk of Harmful Alteration, Disruption or Destruction of fish and fish habitat, in accordance with the Federal Fisheries Act.			
6	Species at Risk (designated by COSEWIC/listed in SARA or designated by COSSARO/listed in SARO) and/or provincially rare species (species with an S rank of S1-S3)	Avoids effects to known federally or provincially designated flora or fauna species and/or habitat	No known federally or provincially designated flora or fauna species and/or habitat will be directly affected by the Route options.			
		PERFORMANCE GRADE	Good	Good	Good	Good
		PREFERENCE	1st	1st	1st	1st
		RATIONALE	There is no measurable difference between alternatives for this criterion. All routes are therefore given equal preference.			
7	Designated natural environmental features/areas	Minimizes effects to designated natural environmental features/areas including ESAs, ANSIs.	Route extends through the north portion of the Stillwater Creek valley *Life Science Site* and will further fragment the forested valley for which the area is designated.	Route extends along the southern edge of the Stillwater Creek valley *Life Science Site* but has less impact than the Former Railway route as it largely avoids the main wooded valley. However, the potential need to realign Stillwater Creek or Tributary A may require some edge encroachment into the valley and associated disturbance.	No impacts to designated natural environmental features/areas.	No impacts to designated natural environmental features/areas.
		PERFORMANCE GRADE	Poor	Fair	Good	Good
		PREFERENCE	3rd	2nd	1st	1st
		RATIONALE	The Stillwater Creek *Life Science Site* is the only designated natural environmental feature in the study area. Both the Queensway Median and Queensway South routes avoid this feature and are therefore preferred over all other routes. When comparing the Former Railway and Queensway North routes, Queensway North is preferred as it avoids the main part of the Life Science Site. However, the potential need to realign Stillwater Creek or its tributary may require some encroachment into the valley – resulting in a Fair rating for Queensway North.			
8	Wetlands	Minimizes effects to wetland vegetation/communities considering sensitivity, quality and significance of wetland vegetation (including regionally rare/uncommon plant species) and relative magnitude of potential effect	There are no Provincially Significant or Locally Significant wetlands within or adjacent to the route. The culvert extension at Corkstown Road may result in the removal of wetland vegetation including Foxtail Sedge and Slippery Elm, (considered regionally significant) which are located near the existing Corkstown Road crossing. One regionally significant species may also be impacted (Jointed Rush). Confirmation of the field specimen is pending. This route will require a new crossing of Stillwater Creek in the vicinity of a floodplain meadow marsh and lowland deciduous forest community. The new crossing of Stillwater Creek may result in the direct removal of wetland vegetation from the northern	There are no Provincially Significant or Locally Significant wetlands within or adjacent to the route. This route may require direct removal of wetland vegetation from a small meadow marsh inclusion abutting the Highway 417 right of way (at culvert C3). This meadow marsh inclusion is dominated by tolerant species and is moderately disturbed by close proximity to Highway 417. If realignment of Stillwater Creek or Tributary A is required, additional removal of vegetation from the floodplain meadow marsh surrounding the creek may be necessary. Several regionally significant species are located along Stillwater Creek in close	No impacts to wetlands	No impacts to wetlands

[9] Additional small wetland inclusions or wetland vegetation may be present in other vegetation units. However, these areas were not large enough to be delineated as 'units' and therefore are not discussed. All regionally rare species, including wetland species are indentified and highlighted.

TABLE 10- ASSESSMENT OF EFFECTS
FACTOR AREA 2: NATURAL ENVIRONMENT

Criteria		Performance Measures	Assessment of Effects and Comparative Evaluation			
			Former Railway Route	**Queensway North Route**	**Queensway Median Route**	**Queensway South Route**
			edge of these communities, including regionally significant plant species such as Slender Wild Rye and Stinging Nettle. Other regionally significant species that require additional confirmation in the field include White Cut-grass. It may be possible to avoid the meadow marsh community through the design of a large spanning structure. Based on a general footprint of the route (without considering crossing design mitigation) the total area of floodplain meadow marsh and lowland deciduous forest, including seepage areas, that may be removed within the ROW is approximately 0.06 ha.[9] If wetland vegetation is removed, this represents a permanent impact. The overall significance of these potential impacts to the broader ecosystem of Stillwater Creek Valley are low because: potentially impacted wetland features are small and peripheral to the larger and more pristine wetlands located downstream of potentially impacted areas, potentially impacted wetland features are already disturbed by close proximity to Highway 417 and potentially impacted wetland features are dominated by disturbance tolerant species that will rapidly re-establish following disturbance. If impacts to wetland vegetation cannot be avoided, transplantation of these species to similar habitat areas not impacted by the proposed Transitway could be investigated. Other associated edge effects and indirect effects such as contaminant drift (salt spray) expected in areas where the transit facility is brought closer to the remaining portion of the valley.	proximity to the ROW. Every effort should be made to keep the ROW as narrow as possible in this area to avoid direct removal of plants such as Slippery Elm, Small-fruited Bullrush, Foxtail Sedge, and possibly Jointed Rush. If wetland vegetation is removed, this represents a permanent impact. The overall significance of these potential impacts to the broader ecosystem of Stillwater Creek Valley are low because: potentially impacted wetland features are small and peripheral to the larger and more pristine wetlands located downstream of potentially impacted areas, potentially impacted wetland features are already disturbed by close proximity to Highway 417 and potentially impacted wetland features are dominated by disturbance tolerant species that will rapidly re-establish following disturbance. If impacts to wetland vegetation cannot be avoided, transplantation of these species to similar habitat areas not impacted by the proposed Transitway will be investigated. Other associated edge effects and incremental increase in indirect effects such as contaminant drift (salt spray) beyond that attributable to the existing Highway 417 are expected in remaining portions of the wetland inclusion and adjacent floodplain meadow marsh community. Potential station locations in the vicinity of Moodie Drive (and associated footprint impacts), as well as overall Transitway cross-section alternatives (rural/urban) have negligible differences in impact to wetland vegetation.		
		PERFORMANCE GRADE	**Poor**	**Fair (Poor if creek realignment is required)**	**Good**	**Good**
		PREFERENCE	3rd	2nd	1st	1st
		RATIONALE	The Former Railway route will likely result in the direct removal of wetland vegetation along Stillwater Creek, including regionally significant grasses and other regionally uncommon plant species. The Queensway North route may require direct removal of wetland vegetation from a small meadow marsh inclusion abutting the Highway 417 right of way. If realignment of Stillwater Creek or Tributary A is required, additional removal of vegetation from the floodplain meadow marsh surrounding the creek may be necessary including potential removal of a regionally significant flora. If impacts cannot be avoided, transplantation of these species to similar habitat areas not impacted by the proposed Transitway will be investigated. The Queensway Median and Queensway South route alternatives are preferred for this criterion because they have no wetland effects.			
9	Upland vegetation	Minimizes effects to upland vegetation (including wooded tablelands and valleys and culturally influenced communities such as cultural thicket, meadow and hedgerows) considering sensitivity, quality and significance of vegetation (including regionally rare/uncommon plant species) and relative magnitude of potential effect	Approximately 6.5 ha of upland vegetation within the ROW is proposed for removal in this alternative. Outside of the wooded Stillwater Creek valley, upland vegetation removals are mainly associated with cultural meadow, hedgerows and landscape plantings along Highway 417 and within the Moodie Drive and Highway 416 interchanges. Route extends through the north portion of the	Approximately 5.2 ha of upland vegetation within the ROW is proposed for removal in this alternative. Outside of the wooded Stillwater Creek valley, upland vegetation removals are mainly associated with cultural meadow, hedgerows and landscape plantings along Highway 417 and within the Moodie Drive and Highway 416 interchanges.	Route is located within the grassed highway median. Impacts are limited to minor removals of previously disturbed vegetation in the highway median and are limited to the removal of cultural meadow vegetation. An incremental increase in indirect effects such as contaminant drift (salt spray) may	Vegetation removals are mainly associated with previously disturbed culturally influenced vegetation communities including cultural meadow, hedgerows and landscape plantings along Highway 417 and within the Moodie Drive and Highway 416 interchanges. Route extends along the south edge of the Highway 417 ROW. Natural vegetation impacts are associated with the removal of narrow riparian communities along the watercourses, associated with the culvert

TABLE 10- ASSESSMENT OF EFFECTS FACTOR AREA 2: NATURAL ENVIRONMENT						
Criteria		**Performance Measures**	**Assessment of Effects and Comparative Evaluation**			
			Former Railway Route	**Queensway North Route**	**Queensway Median Route**	**Queensway South Route**
			Stillwater Creek valley and results in the highest relative impacts to the wooded valley vegetation (approximately 1.7 ha removed). The valley will be further fragmented as a result. This route will result in removal of some large regionally uncommon Black Maple present within the valley. Regionally uncommon Slippery Elm may also be impacted. One regionally significant species may also be impacted (Fleshy Hawthorn.). Confirmation of the field specimen is pending. Vegetation removals represent a permanent impact that cannot be mitigated, although they may be minimized through careful design and construction. Effects to other regionally uncommon flora may occur depending on final footprint. This would be confirmed during design. Possible mitigation for regionally rare plants includes transplant/salvage. Mitigation recommendations will depend on the species and success expected. Other associated edge effects and indirect effects such as contaminant drift (salt spray) are expected in areas where the transit facility is brought closer to the remaining portion of the valley. Edge impacts may be partially mitigated through edge management strategies. Transitway station location options for this route alterative include an area adjacent to the Stillwater Creek valley, south of Corkstown Road, and an area within the Moodie Drive/Hwy 417 interchange. The option to locate the Transitway station in the Moodie Drive interchange, as part of the Transitway underpass, is preferred as impacts would be limited to the removal of culturally influenced and planted vegetation (landscape plantings in the loop ramps and cultural meadow vegetation in the interchange) and would avoid additional vegetation removals from areas adjacent to the Stillwater Creek valley.	Route extends along south edge of the Stillwater Creek valley, adjacent to the Highway 417 ROW. In this area, the valley is dominated by culturally influenced vegetation including meadow, early successional growth (forest edge naturalization program and plantings) and scattered shrubs. Vegetation removals will avoid the main treed portion of the valley and are largely limited to culturally influenced and early successional vegetation communities. However, this option may still result in some minor edge removal/tree trimming potentially including regionally uncommon Black Maple and Slippery Elm (approximately 0.02 ha potentially affected). It should be noted that the young Black Maples located in close proximity to the highway do not appear to be part of the Black/Sugar Maple ecotype/association located in the main wooded portion of the valley. Other associated edge effects and indirect effects such as contaminant drift (salt spray) expected in areas where the transit facility is brought closer to the remaining portion of the valley. Effects to other regionally uncommon flora may occur depending on final footprint. This would be confirmed during design. Possible mitigation for regionally rare plants includes transplant/salvage. Mitigation recommendations will depend on the species and success expected. General Transitway station location options include an area adjacent to the Stillwater Creek valley south of Corkstown Road and an area within the Moodie Drive/Hwy 417 interchange. The option to locate the Transitway station in the Moodie Drive interchange, as part of the Transitway underpass, is preferred as impacts would be limited to the removal of culturally influenced and planted vegetation (landscape plantings in the interchange loop ramps and cultural meadow vegetation in the interchange) and would avoid additional vegetation removals from areas adjacent to the Stillwater Creek valley. A rural cross section for the Transitway would involve more removal of upland vegetation associated with a larger grading footprint to accommodate the drainage system. If a rural cross section is pursued, every effort should be made to minimize the footprint adjacent to the Stillwater Creek valley.	occur. However, since the Transitway would be within the highway right-of-way, this is considered minor (relative to other options).	extensions. These areas are surrounded by active agricultural lands within the NCC Greenbelt. Impacts are limited to minor removals of meadow, thicket and scattered trees that are located within narrow riparian zones along agricultural swales and watercourses. These areas have been previously disturbed by adjacent agricultural clearing and tillage. Portions of hedgerows associated with agricultural lands may also be impacted. This option may still result in removal of regionally significant species along Tributary A of Stillwater Creek, such as Sand Hedge-nettle (pending confirmation of field specimen). An incremental increase in indirect effects such as contaminant drift (salt spray) is expected, however, this is limited to areas that are currently experiencing these effects from the adjacent highway. Effects to other regionally significant flora may occur depending on final footprint. This would be confirmed during design. Possible mitigation for regionally rare plants includes transplant/salvage. Mitigation recommendations will depend on the species and success expected. The Transitway station associated with this route alternative would likely be located in the Moodie Drive/Hwy 417 interchange and as such would result in the removal of culturally influenced and planted vegetation (landscape plantings in the interchange loop ramps and cultural meadow vegetation in the interchange). However, since the station is incorporated in the Transitway underpass design at Moodie Drive, impacts to natural vegetation communities outside of the interchange are avoided. A rural cross section for the Transitway would involve more removal of upland vegetation associated with a large grading footprint to accommodate the drainage system. If a rural cross section is pursued, every effort should be made to minimize the footprint adjacent to the watercourses in order to minimize the culvert extensions required.
		PERFORMANCE GRADE	**Poor**	**Fair**	**Good**	**Good-Fair**
		PREFERENCE	4th	3rd	1st	2nd

TABLE 10- ASSESSMENT OF EFFECTS FACTOR AREA 2: NATURAL ENVIRONMENT						
Criteria		**Performance Measures**	**Assessment of Effects and Comparative Evaluation**			
			Former Railway Route	**Queensway North Route**	**Queensway Median Route**	**Queensway South Route**
		RATIONALE	The Queensway Median route is the preferred option from a vegetation perspective as it avoids direct impacts to the Stillwater Creek valley as well as to the narrow riparian systems located south on the NCC lands. The South Queensway route results in removal of riparian vegetation but impacts remain outside of the more botanically diverse/sensitive Stillwater Creek valley north of Highway 417. The North Queensway Route is located along the south edge of the Stillwater Creek valley and although it does not fragment the main wooded area, it will encroach along the edge and may result in minor removal of more mature vegetation. A rural cross section of this option would result in greater removal of valley vegetation and may impact regionally uncommon species. The Former Railway route is least preferred due to direct impacts to the north edge of the Stillwater Creek valley including the removal of mature forest and regionally uncommon plant species, increased valley fragmentation, and increased risk of secondary effects extending into the valley.			
10	Wildlife	Minimizes effects on habitat considering sensitivity, quality and significance (including migratory birds and known habitat for regional wildlife species of conservation concern) and relative magnitude of potential effect.	Route extends through the north portion of the Stillwater Creek valley and results in the highest relative impacts as it will further fragment the valley habitat. The route is located in an area dominated by forest habitat with lowland forest and meadow marsh located in areas along the creek. Deer tracks were abundant throughout this area and evidence of deer bedding was noted. Two forest area sensitive bird species were noted by Ecoplans in 2009: Pileated Woodpecker, and Cooper's Hawk. These species may be more sensitive to an increase in noise/activity within the valley associated with this route. Reduction in habitat quality associated with increased light and noise may be expected with this route[10]. This route will not only fragment the habitat but will also superimpose incremental traffic noise along the north side of the feature in addition to the highway noise already present on the south side. That is, the remaining habitat area between the Transitway and the highway will receive traffic noise from both north and south sides. An apparently abandoned heronry of about 8 nests is located in large deciduous trees along the south edge of the valley, just north of the existing trail. The heronry was not active in 2009 and Kemptville District MNR and the Ottawa Field Naturalists Club (and Breeding Bird Atlas) has no previous records or information about the heronry and when it might have last been active. Consultation with the Canadian Wildlife Service, MNR and knowledgeable stakeholder groups is ongoing. No direct removal of this apparently abandoned heronry would occur. Indirect impacts possible due to increased disturbance and noise generally, within the Stillwater Creek valley. The route results in a new transportation corridor crossing through the Stillwater Creek valley and is expected to reduce the quality of the valley as a potential wildlife linkage by removing vegetation	Route extends along south edge of the Stillwater Creek valley directly adjacent to the Highway 417 ROW in an area dominated by previously cleared and culturally influenced vegetation communities. Route results in the removal of cultural meadow habitat although some removal of woody vegetation along the edge of the valley forest may occur within the overall ROW (including an apparently abandoned heronry, described below). Localized clearing of riparian vegetation also associated with the culvert extensions at Tributary A of Graham Creek. One meadow area sensitive species, observed by Ecoplans, is potentially affected by the removal of cultural meadow vegetation and habitat (Savannah Sparrow). This species is common and often observed by Ecoplans in similar habitats. Some reduction in habitat quality associated with an incremental increase in indirect effects including light and noise may be expected. However, this incremental increase is superimposed on the existing highway traffic noise source already located on the south side of the valley. The noise source would continue to remain concentrated on the south side of the valley (unlike the Former Railway route that would effectively "surround" the valley feature with the noise envelope). An apparently abandoned heronry of about 8 nests located in large deciduous trees along the south edge of the valley would be directly impacted by this route. The heronry was not active in 2009 and Kemptville District MNR and the Ottawa Field Naturalists Club (and Breeding Bird Atlas) has no previous records or information about the heronry and when it might have last been active. Consultation with the Canadian Wildlife Service, MNR and knowledgeable stakeholder groups is ongoing. The relative rating is based upon the heronry	Minimal impact on wildlife species and habitat as the median is narrow, sparsely vegetated and noisy. One meadow area sensitive species, observed by Ecoplans, is potentially affected by the removal of cultural meadow vegetation and habitat (Savannah Sparrow). This species is common and often observed by Ecoplans in similar habitats. Given the location of this route within the highway median, no impact to potential wildlife movement linkages is anticipated.	For the portion of this route south of Highway 417, minimal impact on wildlife habitat is expected due to historic clearing for agricultural practices and adjacent Highway 417. Effects are mainly associated with highway culvert extensions and associated riparian vegetation removal. Impacts to potential wildlife linkages are limited to extensions on existing Highway 417 culverts. Culvert extensions may have some effect on use by wildlife by increasing the 'tunnel effect' (decreasing the "Openness Ratio" defined as the cross sectional area/length – as a measure of the 'tunnel effect'). The impact of this change could only be quantified once new culvert lengths were determined in the design phase. Minor removals of previously disturbed cultural meadow habitat, hedgerows and landscape plantings within the Moodie Drive and Highway 417/416 interchanges. One meadow area sensitive species, observed by Ecoplans, is potentially affected by the removal of cultural meadow vegetation and habitat (Savannah Sparrow). This species is common and often observed by Ecoplans in similar habitats.

[10] It should be recognized that the existing hwy 417 operation already generates traffic noise in this area and has so for several years. The wildlife species utilizing this area have undoubtedly had to respond and adapt to this noise environment. Such adaptations may have included leaving the area, shifting to another habitat area that is less noisy, adjusting behavior patterns around the current noise or acclimating to the current noise levels. The resulting assemblage of species present reflects a group that has persisted/adapted under these current conditions. .

TABLE 10- ASSESSMENT OF EFFECTS FACTOR AREA 2: NATURAL ENVIRONMENT						
Criteria		**Performance Measures**	**Assessment of Effects and Comparative Evaluation**			
			Former Railway Route	**Queensway North Route**	**Queensway Median Route**	**Queensway South Route**
			cover and creating a new barrier/hindrance to movement.	being considered abandoned. Impacts to potential wildlife linkages are mainly limited to extensions on existing Highway 417 culverts or to new watercourse crossings adjacent to the Highway 417 ROW. Culvert extensions may have some effect on use by wildlife by increasing the 'tunnel effect' (decreasing the "Openness Ratio" defined as the cross sectional area/length – as a measure of the 'tunnel effect'). The impact of this change could only be quantified once new culvert lengths were determined in the design phase.		
		PERFORMANCE GRADE	Poor	Fair	Good	Good
		PREFERENCE	4th	3rd	1st	2nd
		RATIONALE	The Queensway Median route is the preferred alternative from a wildlife habitat perspective as it avoids direct impacts to the Stillwater Creek valley as well as to the narrow riparian systems located south on the NCC lands. In contrast, the Former Railway route results in the highest relative impacts in terms of habitat removal and valley fragmentation and increased light and noise disturbance to the remaining valley habitat, and is therefore least preferred. The Queensway North route does avoid the majority of the creek valley, although some removal of woody vegetation along the edge of the valley forest may be expected within the overall ROW. An apparently abandoned small heronry may also be affected. The Queensway South Route is the second most preferred alternative as it avoids the creek valley and has limited impact on wildlife habitat/linkages.			
11	Fluvial Geomorphology (Stillwater Creek)	Minimize impacts on Stillwater Creek and its Tributaries with respect to: • Flow regime (timing and volumes) • Energy regime • Sediment transport • Erosion and/or sedimentation • Quality and functioning of existing fluvial features	This alternative will require two crossings of Stillwater creek. The first crossing, at the upstream location where Corkstown Road currently crosses the creek, will require removal of the existing blocked culvert and the creation of a new crossing, which will either be an open-bottom culvert or a span. The opening of the existing blocked culvert will eliminate the flow blockage which currently exists at higher flow and will allow for a less protracted flow energy regime from upstream. This will lead to an acceleration of meander processes in the downstream reaches (particularly Reach 3) as the creek adjusts to revised energy budgets. The impacts of the opening of the blockage on the downstream reaches is mitigable, however mitigation will require considerable assessment and in-stream works in the downstream areas as well as a prolonged period of monitoring, due to the proximity of Stillwater Creek to the existing 417 corridor. The second crossing is located in the downstream section and is within a sensitive area with respect to fluvial process. In order to cross the creek in this location and have no impact on the creek, it will be necessary to have a full span of the meander belt with no footings in the floodplain. This alternative also requires extensions to two existing culverts, which will require detailed assessment to ensure no additional impact to the watercourses.	This alternative will require one new crossing of the junction of Tributary A and Stillwater Creek, a realignment of Stillwater Creek in the vicinity of the junction with Tributary A, and four culvert extensions. The principle impact in this alternative is related to the proximity of the route to Stillwater Creek along Reach 2 and a portion of Reach 1. The proposed route will encroach on the existing floodplain of these reaches, altering the process relationship between the creek and floodplain. This will create adjustments in response to flow events by the creek in the downstream direction, which has a high potential for impacting sensitive fluvial process areas downstream in Reach 1 (which currently displays a high degree of morphological diversity) as well as a potential impact on the existing trail crossing further downstream. Because there is no opportunity to extend floodplain area to the north side of the creek due to the landsurface elevation and the nature of the vegetation cover, under floodplain-accessing flows there will be an increase in flow energy (erosive power) due to the decreased potential floodplain area, which will alter sediment budgets and increase erosion downstream. Reach 3 is characterized as having a bedrock substrate with vertical banks displaying some undercutting. This reach has been realigned in the past as part of the 417 works, and it is currently	This alternative will require one culvert extension. This which will require detailed assessment to ensure no additional impact to the watercourse occurs.	This alternative will require four culvert extensions; each will require detailed assessment to ensure no additional impact to the watercourses occur. This alternative also requires crossing of Tributary A to Stillwater Creek. This watercourse is an actively meandering system with a significant flow and energy/sediment regime. As such, traversing this tributary will require a span as opposed to a culvert to maintain processes that contribute to, and enhance, downstream reaches of Stillwater Creek. This crossing should span the meander belt of the tributary to ensure no impact to the existing condition.

TABLE 10- ASSESSMENT OF EFFECTS FACTOR AREA 2: NATURAL ENVIRONMENT						
Criteria		**Performance Measures**	**Assessment of Effects and Comparative Evaluation**			
			Former Railway Route	**Queensway North Route**	**Queensway Median Route**	**Queensway South Route**
				attempting to acquire a meandering path in response to upstream energy inputs. The nature of the downstream reaches are an appropriate surrogate for what the upper reach is attempting to achieve. The proximity of the corridor to the creek, given these processes will continue (and will be exacerbated if the culvert blockage at Corkstown Road is removed), will require either continual monitoring to ensure the toe of the transitway embankment is not undermined by meander processes or will require hardening of the south bank of the creek. Monitoring is an ongoing, perpetual cost; hardening will alter flow pathways and result in reverberation erosion on the opposite bank and downstream. The realignment potential of Stillwater Creek at the location of the junction with Tributary A is problematic in that there is an existing height of land immediately adjacent to the north side of the creek, which limits the amount of distance the creek can be moved away from the corridor. In order to extend the creek to the north, that height of land will need to be cut into, creating potential side slope issues which will need to be addressed. In addition, whether the creek is cut into the slope or not, this location results in a 'pinch-point' for the creek and the potential for impacts upstream and downstream will need to be addressed. Mitigation measures will vary depending on the scale of impact which will be assessed in more detail following the selection of the route alternative. The current junction between Tributary A and Stillwater Creek is perpendicular. Existing conditions assessment shows that this junction is continuing to erode rapidly and will continue to do so if the perpendicular connection is maintained. A realignment of the tributary downstream of the proposed route would be required. Given the proximity of the creek to the proposed route, there is a high potential for construction impacts as the construction envelope will be wider than the route footprint upon completion, leaving little buffer between the construction area and the creek. There will be five culvert extensions required for this route; each will need to be assessed in detail to ensure that there is no impact on the surface watercourses.		
		PERFORMANCE GRADE	Fair	Poor	Good	Fair

TABLE 10- ASSESSMENT OF EFFECTS FACTOR AREA 2: NATURAL ENVIRONMENT						
Criteria		**Performance Measures**	**Assessment of Effects and Comparative Evaluation**			
			Former Railway Route	**Queensway North Route**	**Queensway Median Route**	**Queensway South Route**
		PREFERENCE	3rd	4th	1st	2nd
		RATIONALE	The Queensway Median Route affords the least potential impact to Stillwater Creek and its tributaries, and as such is the preferred route from a fluvial geomorphology perspective. The Queensway South Route is preferred over the remaining two alternatives because the potential impacts are well understood and mitigable with little or no long-term assessment or monitoring/maintenance other than the standard culvert maintenance. The potential requirement for minor channel realignment at the Stillwater Creek/Tributary A junction to accommodate the *Queensway North Route* makes it the least preferred route.			
12	Drainage/Hydrology	Minimizes TSS loading to watercourses and provides greatest opportunity to implement SWM best practices.	Extensions of existing culverts, potential new crossings, in creek works, potential hydraulic effects but potential to use grassed swales for treatment on both sides of the Transitway.	Extensions of existing culverts, in creek works, potential hydraulic effects, removal of existing treatment facilities (ditches, wet swale, impacts to existing pond) but potential to use grassed swales for treatment on one side of the Transitway.	Extensions of existing structures, in creek works, potential hydraulic effects, removal of ditches but potential to use grassed swales for treatment on one side of the Transitway.	No culvert extensions required, no impacts to hydraulic structures, but no potential to treat runoff using swales.
		PERFORMANCE GRADE	Good	Fair	Good	Good
		PREFERENCE	2nd	3rd	1st	2nd
		RATIONALE	The Queensway Median Route alternative is preferred as it has no impact on existing crossing and will provide opportunities to use grassed swales for treatment. The Queensway North route is least preferred due to potential hydraulic effects at crossings. All drainage/hydrology effects can be mitigated for all route alternatives.			
Factor Area 2 Summary						
		OVERALL PERFORMANCE GRADE	**Poor**	**Fair**	**Good**	**Good**
		OVERALL PREFERENCE	**4th**	**3rd**	**1st**	**2nd**
		RATIONALE	**The Queensway Median Route is preferred from a natural environmental perspective as it is located within an existing transportation corridor and therefore has minimal impacts to natural features.** **The Queensway South Route results in the relatively minor removal of riparian vegetation/habitat along the tributaries located south of Highway 417. Impacts to watercourses are limited to the potential extension of existing highway culverts.** **The Queensway North Route is less preferred because it may require minor edge removal/tree trimming potentially including regionally uncommon Black Maple along the edge of the Stillwater Creek valley and possible removal of other regionally rare flora. The young Black Maples located in close proximity to the highway do not appear to be part of the Black/Sugar Maple ecotype/association located in the main wooded portion of the valley. This alternative avoids the majority of the Stillwater Creek valley feature and avoids fragmenting that feature. It may, however, require the extension of an existing culvert at the confluence of Stillwater Creek and its tributary (C3). Measures to mitigate the potential effects of this extension, which may include a minor channel realignment, will vary depending on the scale of impact which will be assessed in more detail following the selection of the route alternative.** **The Former Railway Route is the least preferred from a natural environmental perspective because it results in the greatest potential for impacts to wetlands, upland vegetation and associated terrestrial habitat, and the Stillwater Creek valley, some of which are not mitigable (direct removal of vegetation and further fragmentation within the main valley forest).**			

TABLE 11- ASSESSMENT OF EFFECTS FACTOR AREA 3: SOCIAL ENVIRONMENT						
	Criteria	**Performance Measure**	**Assessment of Effects and Comparative Evaluation**			
			Former Railway Route	**Queensway North Route**	**Queensway Median Route**	**Queensway South Route**
13	Heritage/ Archaeology (Appendix C)	Avoids areas with heritage and archaeological potential.	Routed through lands deemed to exhibit moderate potential for pre-contact and historic sites resources (wooded area adjacent to Stillwater Creek & lands west of Moodie Drive).	A short section of the alignment is routed through an area adjacent to Stillwater Creek with moderate potential for pre-contact and historic sites. The area west of Moodie Drive also has potential for pre-contact and historic sites.	Previously disturbed area within highway median has low potential for archaeological resources.	This route crosses a previously undisturbed, wooded area adjacent to a tributary of Stillwater Creek that is considered to exhibit moderate archaeological potential.
		PERFORMANCE GRADE	Poor	Fair	Good	Fair

TABLE 11- ASSESSMENT OF EFFECTS FACTOR AREA 3: SOCIAL ENVIRONMENT						
	Criteria	**Performance Measure**	**Assessment of Effects and Comparative Evaluation**			
			Former Railway Route	**Queensway North Route**	**Queensway Median Route**	**Queensway South Route**
		PREFERENCE	3rd	2nd	1st	2nd
		RATIONALE	As the Queensway Median route travels through previously disturbed areas there is very low risk of encountering heritage/archaeological resources. It is therefore the preferred route from this perspective. The Former Railway route has the greatest potential to impact heritage and archaeological resources and is therefore least preferred. There is no measurable difference between the Queensway North and Queensway South routes from this perspective.			
14	Contaminated property (Appendix G)	Avoids potentially contaminated property	Routed along an abandoned rail line. A Phase II investigation is recommended in the event of any future soil removal program.	The site is adjacent to Highway 417; therefore, environmental impacts associated with transportation corridors (i.e. road salt) are possible.	The site is located within the median of Highway 417; therefore, environmental impacts associated with transportation corridors (i.e. road salt) are possible.	Background reports indicate the use of pesticides on the agricultural fields to the south of Highway 417). The site is adjacent to Highway 417; therefore, environmental impacts associated with transportation corridors (i.e. road salt) are possible.
		PERFORMANCE GRADE	Poor	Good	Good	Fair/Good
		PREFERENCE	3rd	1st	1st	2nd
		RATIONALE	There is no measurable difference between the Queensway North and Queensway Median routes from a contaminated property perspective as the only known source of potential contamination is road salt associated with highway de-icing operations. The Former Railway route has the greatest potential to encounter contamination due to the former use of the route as a railway. The Queensway South route exhibits the potential to encounter soil contamination resulting from road salt and pesticide use.			
15	Agriculture	Avoids productive agricultural lands	Avoids productive agricultural lands.	Avoids productive agricultural lands.	Avoids productive agricultural lands.	Impacts 2.0 ha of productive agricultural lands currently farmed by NCC lessees. In addition to the loss of agricultural land, there also exists the potential to impact tile drains during construction.
		PERFORMANCE GRADE	Good	Good	Good	Fair-Good
		PREFERENCE	1st	1st	1st	2nd
		RATIONALE	As the Former Railway, Queensway North and Queensway Median routes all avoid productive agricultural lands; they are all given equal preference. The Queensway South route will impact productive agricultural lands and is therefore least preferred.			
16	Noise (Appendix J)	Minimizes noise level increases at sensitive receivers	Results in a potential noise increase of 0.6 to 6.3 dBA at sensitive receivers by 2031	Results in a potential noise increase of 0.0 to 0.6 dBA at sensitive receivers by 2031	Results in a potential noise increase of 0.0 to 0.6 dBA at sensitive receivers by 2031	Results in a potential noise increase of 0.0 to 0.8 dBA at sensitive receivers by 2031
		PERFORMANCE GRADE	Poor	Good	Good	Good
		PREFERENCE	2nd	1st	1st	1st
		RATIONALE	Due to the separation from noise sensitive receivers, there is no discernable difference in anticipated noise level increases between the Queensway North, Queensway Median and Queensway South route alternatives. While noise levels associated with Highway 417 will continue to increase over time, the contribution to future noise conditions of all three of these route alternatives is too low to be perceptible (an increase of 3.0 dBA is just perceptible to most people). There is the potential for moderate to significant noise level increases associated with the Former Railway route. This is due to the proximity of this route to sensitive receivers.			
17	Air Quality and Ground Vibration	Maximum distance from sensitive receivers (measured from the closest point west of the MTO landform).	Located approximately 25 m from adjacent to residential receptors.	Located approximately 150 m from adjacent residential receptors.	Located approximately 200 m from adjacent residential receptors.	Located approximately 250 m from adjacent residential receptors.
		PERFORMANCE GRADE	Poor	Fair	Good	Good
		PREFERENCE	3rd	2nd	1st	1st
		RATIONALE	Due to the separation from sensitive receivers, there is not expected to be a significant air quality or ground vibration effects associated with the Queensway North, Queensway Median or Queensway South route alternatives. Due to its close proximity to sensitive receivers and absence of existing attenuation, the Former Railway route is least preferred.			
18	Potential Visual Impacts	Maintains/ enhances buffer areas and scenic vistas	The offset from Highway 417 will provide a visual screen between the two transportation corridors. This will maintain the current visual aesthetic on Highway 417 as part of the arrival route to the Nation's Capital.	The alignment immediately north of the current Highway 417 will visually separate the northern portion of the Greenbelt lands, and generally increase the appearance of a major transportation corridor.	Compressing the transit corridor within the existing right-of-way will minimize the visual impact of the corridor.	A visual impact is anticipated for vehicles entering the National Capital Region. The eastbound lanes will be framed on either side by transportation facilities, reducing the visual connection to the rural landscape.
		PERFORMANCE GRADE	Good	Fair	Good	Fair
		PREFERENCE	2nd	3rd	1st	3rd
		RATIONALE	None of the route alternatives are expected to have a significant impact on existing vistas or viewsheds. As the Median route is entirely contained within the existing transportation corridor, it is preferred over all others. Both the Queensway North and Queensway South routes have the potential to visually separate rural/natural areas located north and south of the highway.			

TABLE 11- ASSESSMENT OF EFFECTS FACTOR AREA 3: SOCIAL ENVIRONMENT						
	Criteria	**Performance Measure**	**Assessment of Effects and Comparative Evaluation**			
			Former Railway Route	**Queensway North Route**	**Queensway Median Route**	**Queensway South Route**
19	Recreation Resources	Maintains/ enhances recreational resources	Requires modification of the recreational pathway at two locations, and may disconnect the local community from the pathway. The individual access points from the rear yards will be discontinued Potential impact to the sports fields adjacent to Corkstown Road	All current community pedestrian connections would be retained. Requires minor realignment of the existing pathway in the vicinity of Corkstown Road. Plans for any pathway realignment would need to be developed by Project Team specialists in consultation with the NCC to ensure that potential effects to the natural environment and pathway user are minimized or avoided. The alignment would not impact the sports fields adjacent to Corkstown Road	No recreational facilities are located within the highway median.	No recreational facilities are located south of highway 417.
		PERFORMANCE GRADE	Poor	Good	Good	Good
		PREFERENCE	3rd	1st	1st	1st
		RATIONALE	The Queensway Median and Queensway South routes do not impact any recreational resources. The Queensway North route may require a small portion of the recreational pathway to be realigned. This is not expected to result in a permanent impact and may present an opportunity to introduce improvements to the existing pathway. The Former Railway route would potentially sever access to the recreational pathway system for adjacent residents and may impact sports fields east of Moodie. It is therefore the least preferred alternative.			
20	Land Use	Compatibility with Greenbelt Master Plan land use designations and associated policies.	This route passes through lands designated as *Rural Landscape* in the Greenbelt Master Plan. Transportation facilities are generally permitted in this designation and are assigned a compatibility level of M (Use of medium importance to the land designation. Complements or supports H-designated uses, and encouraged in lesser amounts).	This route passes through lands designated as *Rural Landscape* in the Greenbelt Master Plan. Transportation facilities are generally permitted in this designation and are assigned a compatibility level of M (Use of medium importance to the land designation. Complements or supports H-designated uses, and encouraged in lesser amounts).	This route passes through lands designated as *Infrastructure Corridor* in the Greenbelt Master Plan. Transportation facilities are encouraged in this designation and are assigned a compatibility level of H (Use of high importance to the land designation). Guidelines for transportation facilities indicate that all major facilities should be located within the infrastructure corridor designation.	This route passes through lands designated as *Cultivated Landscape* in the Greenbelt Master Plan. Transportation facilities are generally permitted in this designation but are assigned a compatibility level of L (Use of low importance that may make little or no contribution to the Land Designation. Potential conflicts with Land Designations can be mitigated).
		PERFORMANCE GRADE	Fair	Fair	Good	Poor-Fair
		PREFERENCE	2nd	2nd	1st	3rd
		RATIONALE	The Greenbelt Master Plan does not prohibit the proposed transportation facility in any of the route alternatives. Based on a review of land use compatibility criteria contained in Table 5.1 of the GMP, the Queensway Median Route alternative is located within lands where transportation facilities are encouraged, and is therefore preferred. When comparing lands to the north and south of Highway 417, the proposed transportation facility is generally considered more compatible in the Rural Landscape land designation to the north.			
Factor Area 3 Summary		**OVERALL PERFORMANCE GRADE**	**Poor**	**Fair-Good**	**Good**	**Fair-Good**
		OVERALL PREFERENCE	**3rd**	**2nd**	**1st**	**2nd**
		RATIONALE	**As the Median route is contained within previously disturbed lands it is not anticipated to have a measurable impact on cultural heritage resources, recreational facilities or the adjacent community. It is therefore the preferred route for this factor area. There is no perceptible contribution to future noise levels associated with the Queensway North, Queensway Median and Queensway South Route Alternatives. The Queensway North and Queensway South route alternatives may result in minor visual impacts that must be mitigated through design. Both the Queensway North and Queensway South route alternatives have the potential to impact some Greenbelt Lands. Due to its proximity to the adjacent community, impacts to the Greenbelt, and impacts to existing recreational facilities, the Former Railway route is least preferred for this factor area.**			

TABLE 12- ASSESSMENT OF EFFECTS
FACTOR AREA 4: PROPERTY, COST AND CONSTRUCTABILITY

	Criteria	Key Measure	Assessment of Effects and Comparative Evaluation			
			Former Railway Route	**Queensway North Route**	**Queensway Median Route**	**Queensway South Route**
21	Property Impacts (Appendix I)	Bundles transportation corridors and requires least amount of Greenbelt land (ha)	Not Carried Forward	MTO: 4.7 ha (sub-option A); 5.5 ha to 6.1 ha (sub-option b) NCC: 2.9 ha (sub-option A); 0.1 ha to 1.2 ha (sub-option b)	Not Carried Forward	MTO: 6.5 hectares NCC: 2.0 hectares
		PERFORMANCE GRADE	N/A	Fair	N/A	Fair
		PREFERENCE	N/A	1st	N/A	1st
		RATIONALE	The City of Ottawa and the Ministry of Transportation (MTO) are currently working to develop a corridor sharing framework to ensure the bundling of municipal/provincial transportation infrastructure. Both the Queensway North and Queensway South route alternatives have a similar impact to NCC Greenbelt lands. Depending on the ultimate configuration of the Queensway North route (sub-option A or sub-option B) and the ultimate station location, there is the potential to limit Greenbelt property impacts to approximately 0.1 ha (sub-option B w/ station under Moodie Drive). For the purpose of the route selection process, however, the greatest possible impact (sub-option A with a station near Corkstown Road) has been used.			
22	Constructability/Cost (Appendix I)	Minimizes impacts to existing transportation facilities and public utilities. Avoids complex construction staging. Can be constructed at the lowest capital cost.	Not Carried Forward	Requires realignment of Corkstown Road and Moodie E-N/S ramp. Medium to complex foundations and retaining walls. Some impact to existing highway signage and ATMS plant. Some highmast light pole relocations required. Conflict with stormwater management pond outlet at Moodie interchange. Glare screening required between Transitway and WBLs. Minor impacts to overhead utilities and potential conflicts with underground utilities. Minor intersection reconfiguration required. Additional property required to maintain local bus route access at Bayshore Station. Geotechnical constraints (i.e. presence of unstable soils) may limit the ultimate size of new watercourse crossing structures required to span the creek systems. Potential impacts of undersized structures to the creek system may need to be further addressed. The requirement for realignment along Stillwater Creek, near the Tributary A confluence, may be highly constrained by local geological and natural environment features. If further investigations determine a realignment to be impracticable, a bridge crossing structure may be required along the Highway 417 corridor, adjacent to the creek system. Estimated Cost: **$50,000,000 (sub-option A) to $59,000,000 (sub-option B)**	Not Carried Forward	Highway grade separations will result in significant impacts on highway traffic, poor site access, ramp closures. Requires realignment of Moodie W-NS ramp. Medium to complex foundations and retaining walls. Highway grade separations result in severe impacts to sight lines along Hwy 416 and 417. Medium to high structure complexity. Some impact to existing highway signage and ATMS plant. Some highmast light pole relocations required. Minor impacts to overhead utilities and potential conflicts with underground utilities. Minor intersection reconfiguration required. Additional property required to maintain local bus access at Bayshore Station. Geotechnical constraints (i.e. presence of unstable soils) may limit the ultimate size of new watercourse crossing structures required to span the creek systems. Potential impacts of undersized structures to the creek system may need to be further addressed. Estimated Cost: **$95,000,000**
		PERFORMANCE GRADE	N/A	Good	N/A	Poor
		PREFERENCE		1st	N/A	2nd
		RATIONALE	The Queensway North route alternative is preferred from a cost and constructability perspective. Due to the requirement for two large highway grade separations and the potential for significant			

			highway traffic impacts during construction (staging), the estimated construction cost for the Queensway South route is 60% to 90% higher than the Queensway North route alternative. Due to profile and station requirements, the Queensway South route will require a cut and cover tunnel grade separation under Highway 417 at the west end of the study area which results in increased capital costs. The Queensway South route, therefore, is least preferred from a cost/constructability perspective.			
Factor Area 4 Summary						
	OVERALL PERFORMANCE GRADE	**N/A**	**Good**	**N/A**	**Poor**	
	OVERALL PREFERENCE	**N/A**	**1st**	**N/A**	**2nd**	
	RATIONALE	**Both route alternatives have a similar potential property impacts on NCC Greenbelt lands and MTO lands. The Queensway North route is preferred from a technical perspective as it minimizes construction staging impacts, avoids complex structural issues, and therefore minimizes construction cost. Due to significant construction constraints and impacts to existing infrastructure, the Queensway South route is expected to cost 60-90% more to construct than the Queensway North route (an additional $35-45M).**				

CHAPTER 6: CONSULTATION

The consultation process is integral to the planning and design of this facility. Consultation with the Technical Advisory Committee and the Crystal Beach/Lakeview Community Association (CBLCA) has been organized around project milestones scheduled to coincide with key decision making points in order to ensure stakeholder participation in the determination of a recommended plan. In addition, individual meetings with external agencies have also been held as needed to share information and provide project updates.

Consultation for this project is therefore following an iterative process whereby input is sought and integrated into the evaluation and assessment of alternatives as planning and design progresses through decision-making stages. To date, stakeholders have been kept informed of the project and have been asked for input through the use of conventional, effective consultation methods.

6.1 Agency Consultation

6.1.1 Technical Advisory Committee

A technical advisory committee (TAC) was formed for this project to ensure on-going coordination with relevant technical agencies, including representatives from:

- City of Ottawa
- Ministry of Transportation (MTO)
- National Capital Commission (NCC)
- Rideau Valley Conservation Authority (RVCA)

To date, four meetings with the TAC have been held. Meeting notes are included in Appendix K.

The City of Ottawa, the MTO and the NCC were invited to the first TAC meeting on February 25, 2009 to discuss the project scope, the work plan, the schedule, the EA process, constraints and opportunities, and alternative solutions.

The City of Ottawa, the MTO, the NCC and the RVCA were invited to the second TAC meeting. The meeting was held after the Pubic Open House No. 1 (POH No. 1) on July 9, 2009 to discuss the project scope and need, comments from POH No. 1, the overview of the route evaluation, and the identification of preferred route. The TAC reviewed the analysis of effects and comparative evaluation of route alternatives and discussed in detail the route alternatives. Potential impacts to property and potential impacts to the natural environment were identified as important discussion points.

The third TAC meeting was held on October 19, 2009 and was used to discuss the Draft AECERA Report. A brief overview of the report findings was provided and discussion focused on the route selection process and the preliminary concept plans for the *Queensway North* route alternative.

The fourth TAC meeting was held on February 4th, 2010 to discuss the upcoming Public Open House.

6.1.2 External Agency Meetings

In addition to the scheduled TAC meetings, individual meetings with the NCC and the MTO have been held as needed to share information and provide project updates as the study progresses through detail design. Meetings with NCC on June 30, September 8, and December 18, 2009 and with the

MTO on September 2, 2009 and January 11, 2010 have been held to ensure coordination and obtain feedback on the project.

6.2 Public Consultation

6.2.1 Community Group Meetings

The community immediately adjacent to the study area is represented by the Crystal Beach Lakeview Community Association (CBLCA). Recognizing that the adjacent community has the greatest potential to be affected by a proposed Transitway extension, meetings with the CBLCA have been scheduled to present study progress and discuss community issues as the project progresses. To date, five meetings with the CBLCA have been held. Notes from these meetings have been included Appendix K.

The first meeting was held on April 30, 2009 to provide the community association with an introduction to the project and to discuss the EA process and the project schedule. A number of issues relating to traffic, noise and impacts to property and infrastructure were raised by the CBLCA and discussed with project team members. The second meeting with the CBLCA was held after Public Open House (POH) No. 1 on September 1, 2009 to review the progress undertaken since the Open House, demonstrate an understanding of the community's concerns, present background materials and provide an update of on-going activities. The third meeting was held on November 2, 2009 to review progress to date, provide an overview of the findings from the Draft AECERA Report and discuss the noise assessment process. The fourth meeting was held on January 12, 2010 to review progress to date since the third CBLCA meeting and to obtain input and further discuss comments on the Draft AECERA Report. The fifth meeting was held on February 4th, 2010 to review the upcoming Public Open House (POH #2) and to confirm the *Queensway North* route as the preferred alternative within which preliminary design alternatives are being assessed and evaluated.

6.2.2 Public Open Houses

Three formal Public Open Houses have been scheduled for this project. POH No. 1 took place on June 25, 2009 and was used to gather public input into the analysis and evaluation of route alternatives. POH No. 2 will be held at the end of February 2010 and will be used to gather public input into the analysis and evaluation of preliminary design alternatives. POH No. 3 will also be held in the spring of 2010 and will be used to present the Recommended Plan.

Public Open House No. 1

POH #1 was held on Thursday, June 25 from 6:00 pm to 9:00 pm at the Crystal Beach Community Association's Maki House, located at 19 Leeming Drive. The open house was organized as a drop-in style session with a half hour formal presentation by the Project Team, followed by a question and answer session with Project Team specialists and Bay Ward Councilor Alex Cullen.

Notification for POH No. 1 was provided through the following methods:

- *Project Update Newsletter*: The second project update newsletter advised residents in the vicinity of the study area of the date and time, as well as the proposed agenda, of POH No. 1. This newsletter was distributed through Canada Post unaddressed ad mail the week of June 15, 2009.
- *Newspaper Notices*: The notice for the first "Public Open House West Transitway Extension from Bayshore Station to Moodie Drive" was advertised as follows:
    - Ottawa Citizen June 13, 2009 and June 17, 2009

- Le Droit June 13, 2009 and June 17, 2009
- Nepean This Week June 19, 2009
- Kitchissippi Times Week of June 15 to 19, 2009
- New EMC Week of June 15 to 19, 2009

- *City of Ottawa Project Website*: The City of Ottawa established a project website to advise members of the public of on-going project activities. The website can be accessed at the following link: http://www.ottawa.ca/residents/public_consult/wte_bayshore_to_moodie/index_en.html.

Information presented at POH No. 1 included: project need; project history; study process; study schedule; existing noise, ground vibration and air quality assessments; alternative corridors under consideration; evaluation criteria and methodology; analysis and evaluation of alternative corridors; and next steps. A copy of the notification and presentation material from POH No. 1 is included in Appendix L.

Members of the project team were available before the presentation to answer questions informally and also following the presentation during a formal question and answer period. Attendees were encouraged to sign the project register and to submit their comments in writing. A total of 87 people signed the register.

The main issues brought forward at POH No. 1 included:

- Project need
- Process
- Preferred corridor
- Impacts to the natural and social environment
- Concerns about noise/vibration
- Requests for additional information, relating to: material presented at POH No.1, additional evaluations/studies, cost analysis, MTO, technical transit planning methodology, the role of the NCC in the project, the role of the RVCA in the project and questions about process
- Suggestions
- Traffic and lighting

A detailed summary of comments and key issues raised by stakeholders at POH No. 1 is also included in Appendix L. To the greatest extent possible, comments and questions have been answered in the summary table and incorporated into the assessment and evaluation presented in this report. A consultation record with a copy of all public comments is on file with the City of Ottawa and will be included in the Environmental Project Report.

CHAPTER 7: NEXT STEPS

Now that a preferred route has been recommended, the next stage in the study will involve the generation and evaluation of preliminary design alternatives within the *Queensway North* route. Design alternatives will consider issues such as the grade separations at Holly Acres Road and Moodie Drive, mainline Transitway alignment alternatives, and Transitway station configurations.

Design alternatives will be assessed and evaluated using the same process that was used to select a preferred route and in accordance with the same guiding principles. The preliminary assessment of design alternatives will be presented at the POH No. 2, scheduled for February 2010. Following the open house, the assessment will be refined, a detailed impact assessment will be carried out and specific mitigation measures will be identified.

The Recommended Plan, including mitigation plan and recommended phasing strategy will be presented to Committee and Council for endorsement in spring/summer 2010.

The Transit Project Assessment Process (TPAP) will be formerly initiated once Council has endorsed the recommended plan and the City has a 'defined project' for this phase of the West Transitway Extension. The TPAP includes a maximum 120-day documentation and consultation period that begins with a Notice of Commencement and concludes with a 30-day public review period of the Environmental Project Report (EPR). During the 120 day documentation and consultation period, a third Public Open House will be held to present the Draft Environmental Project Report (EPR) to members of the public which will document all aspects of the study including the Route Selection Process, the Evaluation of Design Alternatives, the Recommended Plan and Commitments to Mitigation.

If no objection is received by the Minister of Environment during the 30 day public review period regarding a potential negative impact on a matter of provincial importance that relates to the natural environment or has cultural heritage value or interest or on a constitutionally protected aboriginal or treaty right, and that cannot be resolved, the project will be considered to have satisfied the requirements of the TPAP.

Concurrent with the provincial EA approval process described above, the City will also work with the National Capital Commission (NCC) to coordinate federal and provincial EA requirements.

It is currently anticipated that the design for the interim project configuration will be ready for tender in the fall of 2010. Implementation of the ultimate Moodie Drive grade separation is not anticipated until the exclusive grade separated Transitway is warranted from Moodie Drive to Eagleson Road, which is not identified for implementation within the current TMP planning horizon (2031).