

11. ASSESSMENT OF THE PREFERRED DESIGN

11.1 ASSESSMENT METHODOLOGY

An impact analysis was undertaken to identify the potential effects, both positive and negative of the pre-construction, construction and operational activities required for project implementation. In the case of negative effects, mitigation opportunities and methods were also identified. The evaluation criteria and indicators established during the alternatives evaluation process were used as the basis for assessing the effects of the preferred design on the social, physical and natural environments. The effects analysis involved the application of the following steps:

- Step 1:** Identify and analyze activities where the project, as described in **Chapter 10**, may interact with the existing environmental conditions described in **Chapter 7**.
- Step 2:** Acknowledge predetermined project activities that act as built-in positive attributes and/or propose mitigation measures that can be implemented during construction or operation of the project.
- Step 3:** Identify the residual environmental effects, if any.
- Step 4:** Identify opportunities for further mitigation of residual effects, if possible/practical, including monitoring.
- Step 5:** Determine the significance of the residual environmental effects, after further mitigation. The potential effects of project implementation were described based on their level of significance.
- Step 6:** Recommend monitoring activities during the construction or operation of the project.

Professional experience, analysis, simulation and judgement formed the basis for identifying environmental effects and mitigation measures. The analysis was based primarily on comparing the existing environment condition with the anticipated future environment, prior to, during, and after construction. The prediction of effects considered:

- The interaction between a project activity and the valued environmental components;
- The effects of the project activities on the environmental values; and
- The combined effects of multiple activities and/or multiple effects.

Within this context, consideration was given to:

- The magnitude, spatial extent, and duration of effects;
- The proportion of a population or community affected;
- Direct or indirect effects; and
- The degree to which the effect responds to mitigation.

In this assessment, “residual” environmental effects are defined as changes to the environment caused by the project, and vice versa, when compared to existing conditions and taking into account all built-in mitigation measures. Potential residual environmental effects were assessed as to their significance, including spatial and temporal considerations, and were categorized according to the following definitions:

“Positive effect” means an effect that will contribute to the well-being or health of a valued environmental component.

“Negligible” means an effect that may exhibit one or more of the following characteristics:

- Nearly-zero or hardly discernible effect; or
- Affecting a population or a specific group of individuals at a localized area and/or over a short period in such a way that the effect is similar to random small changes but would have no measurable effect on the population as a whole.

“Insignificant” means an effect that may exhibit one or more of the following characteristics:

- Not widespread;
- Temporary or short-term duration (i.e., only during construction phase);
- Recurring effect lasting for short periods of time during or after project implementation;
- Affecting a specific group of individuals in a population or community at a localized area or over a short period, but not affecting the integrity of the population or community; or
- Not permanent, so that after the stimulus (i.e., project activity) is removed, the integrity of the environmental component would be resumed.

“Moderately Significant” means an effect that may exhibit one or more of the following characteristics:

- Not widespread with mostly local effects;
- Requires further consideration of mitigation;
- Permanent reduction in species diversity or population of a species, but not in sufficient magnitude to cause a decline in abundance and/or change in distribution beyond which natural reproduction or migration

would not return that population, or any species dependent on it, to its former level within several generations; or

- Could be alleviated with additional detailed design.

“Significant” means an effect that may exhibit one or more of the following characteristics:

- Widespread;
- Permanent transgression or contravention of legislation, standards, or environmental guidelines or objectives;
- Permanent reduction in species diversity or population of a species in sufficient magnitude to cause a decline in abundance and/or change in distribution beyond which natural reproduction or migration would not return that population, or any species dependent on it, to its former level within several generations (including the consequences of a short-term construction effect);
- Permanent loss of critical/productive habitat; or
- Permanent alteration to community characteristics or services, established land use patterns, which is severe and undesirable to the community as a whole.

The definitions of significance were adopted for use in this assessment because many of the impacts cannot be quantified in absolute terms, although changes and trends can be predicted. The definitions provide guidance and were intended to minimize personal bias. This is important because the analyses are sometimes based on professional judgement and limited information.

Once the potential effects were predicted, additional mitigation measures were identified. Often these mitigation measures were sufficient to reduce potential negative effects to an insignificant or negligible status.

Monitoring is important to verify the accuracy of predicting effects. Monitoring measures were recommended to determine what effects would actually occur with project implementation, and may result in the modification of mitigation measures to improve their effectiveness. Identified monitoring measures included inspection, surveillance and compliance monitoring.

11.2 ASSESSMENT RESULTS

An environmental effect requires consideration of all project activities and their interaction with the environment. Pre-construction, construction and operational activities were assessed. **Section 11.4** describes these project activities for the surface rapid transit components of the undertaking and their interaction with the environment and location, the potential effects, mitigation measures, residual effects and their significance, and monitoring recommendations. Project stages are coded as follows:

- P – Pre-construction
- C – Construction
- O – Operation

11.3 PROJECT RELATED EFFECTS AND MITIGATION

The evaluation of project-related effects was performed using the primary Rapid Transit Plan objectives and related goals developed for the evaluation of alternatives in selecting the preferred alignment. These objectives are:

- To improve mobility by providing a fast, convenient, reliable and efficient rapid transit service
- To protect and enhance the social environment in the corridor
- To protect and enhance the natural environment in the corridor
- To promote smart growth and economic development in the corridor

Goals defined by professionals on the study team are subsets of these objectives and refer to an environmental value or criterion. The effect of the proposed undertaking in terms of each environmental value was rated using a qualitative scale ranging from a positive or beneficial effect through negligible to a potentially significant negative effect as described in the above methodology.

11.4 ANALYSIS OF ENVIRONMENTAL EFFECTS AND MITIGATION

11.4.1 OBJECTIVE A: To improve mobility by providing a fast, convenient, reliable and efficient rapid transit service

The analysis relative to Objective A is tabulated in **Table 11-1**. Generally, the project has the ability to improve mobility within the Region and provide good connectivity with inter-regional transit services. It features convenient connections to GO Transit's Barrie Line at the Newmarket GO Station and East Gwillimbury GO Station. The project is also capable of connecting to future 400-series highway rapid transit services. From this point of view, the proposed rapidway will have an overall positive effect on transit ridership and accessibility in the Region. The planned alignment characteristics and geometry will provide a fast, convenient and reliable service in most respects. Although grades at some stations exceed LRT standards, the BRT technology proposed for initial implementation will be accommodated in every case. The recommended mitigation, to provide for future LRT technology when needed, will be local modifications to the running way and station platform configuration at the stations where standards are not met. Stations are located in areas with high residential density, high employment numbers or a mixture of the two to capitalize on the effectiveness of implementing the improved public transit system. The strategic locations of stations generally achieve the goal of increasing the attractiveness of the rapid transit service and make a positive contribution towards maximizing ridership. In order for all members of society to have access to the system, all stations, shelters and the transit system itself will be accessible for the mobility impaired by providing ramps, elevators, etc. Attractiveness of the rapid transit service is implicit in the design of the Undertaking, however, achieving the desired transit speed may affect the capacity for general traffic movements at certain intersections. In this respect, the effect on traffic may be moderately significant.

Table 11-1
Effects and Mitigation for Mobility

GOAL	Environmental Value/ Criterion	Environmental Issues/Concerns	Project Phase ¹			Location	Potential Environment Effects	Proposed Mitigation Measures			Level of Significance after Mitigation	Monitoring and Recommendation
			P	C	O			Built-In Positive Attributes and/or Mitigations	Potential Residual Effects	Further Mitigation		
OBJECTIVE A: To improve mobility by providing a fast, convenient, reliable and efficient rapid transit service												
A1	Increase attractiveness of rapid transit service	Travel time and service reliability	✓		✓	Entire Corridor	Adjustments to signal timing to achieve progression and minimize delay to rapid transit.	Micro-simulation of rapid transit operation and general traffic movements during detailed design will be used to optimize signal timing. Transit speed will be increased to maximum achievable with reasonable intersection operation.	Delay to transit or intersecting traffic may be unacceptable. May affect intersection capacity for general traffic movements.	Modification of intersection signal timing.	Moderately significant	Pursue an on-going intersection performance monitoring program
						Yonge Street (Davis Drive to Green Lane)	Dedicated median transit lanes are not proposed for this segment initially	Curb-lane High-Occupancy Vehicle (HOV) lanes will improve transit speeds; increased road capacity will minimize congestion.	Some delays may occur due to right turning traffic in HOV lanes	Ensure HOV lanes are enforced	Positive effect	None
A2	Maximize transit connectivity	Connections to inter-regional services and future gateways	✓		✓	Newmarket GO Bus Terminal	Direct rapid transit connection is not provided to Newmarket GO Bus terminal on Davis Drive west of Yonge Street.	Local transit services will continue to be provided along Davis Drive. Inter-regional connections may also be made at East Gwillimbury GO Station	Level of transit service at Newmarket bus terminal may be reduced	None	Positive effect	Adjust local transit routes accordingly
			✓		✓	East Gwillimbury GO Station	Improved transit connections to East Gwillimbury GO Station	North Yonge transit service will provide a direct connection to the GO Rail network at the Green Lane Station.	Increased potential for intensified development around this transfer point.	None	Positive effect	None
			✓		✓	Newmarket GO Rail Station	Improved transit connections to Newmarket GO Station	North Yonge transit service will provide a direct connection to the GO Rail network at the Davis Drive Station.	Increased potential for traffic congestion around this station due to bus and pedestrian activity	Improve signage and intersection geometry	Positive effect	Monitor traffic performance and pedestrian-vehicle safety
			✓		✓	Aurora GO Station	Direct rapid transit connection is not provided to Aurora GO Station	Local transit services will continue to be provided along Wellington Street	None	None	Positive effect	None
		✓		✓	Entire Corridor	Inconvenient transfer between local transit and North Yonge Transit may discourage transit ridership	Stations generally located on local transit routes ensuring convenient transfers between services. Integrated fare system proposed.	Project may change the configuration of local transit.	Local services configured as grid where practical, to provide both community coverage and feeder roles	Positive effect	Regular review of effectiveness of local service plans.	
A3	Alignment geometry that maximizes speed and ride comfort and minimizes safety risks and maintenance costs	Grade at station in excess of standard	✓		✓	Davis Drive and Parkside Drive	Running way grade at platform exceeds max grade (actual is 4.9%)	Platform grade is adequate for BRT operations. Could be modified in future for LRT.	None expected.	None	Insignificant	Review situation if LRT is considered

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OBJECTIVE A: To improve mobility by providing a fast, convenient, reliable and efficient rapid transit service												
A5	Station locations that maximize ridership potential of rapid transit service	Residents/Employees within walking distance of station locations. Accessibility for mobility impaired.	✓		✓	Entire Corridor	Stations at locations without transit-oriented land use and convenient access could discourage rapid transit use.	Station locations selected to serve supportive land use. Facilities designed with weather protection, direct barrier free access and attractive streetscapes within surrounding residential neighbourhoods.	Continued dependence on automobile if land use objectives not achieved	Implement transit-supportive land use and parking policies through Official Plans	Positive effect	Regular review of land use and new or infill development potential during detailed design phases for rapidway and stations.

Notes:

P – Pre construction, C – Construction, O – Operation

11.4.2 OBJECTIVE B: To protect and enhance the social environment in the corridor

Overall, the various goals set to protect and enhance the social environment are largely achieved. The assessment in terms of the related environmental values indicates that most adverse effects are generally mitigated by the built-in attributes of the design and benefits for the communities within the corridor can be maximized. The assessment for Objective B is tabulated in **Table 11-2**.

In particular, the undertaking will very likely improve community cohesion as well as access to municipal and community facilities within the corridor. In general, overall intersection capacity for vehicular traffic in the Study Area will be reduced due to the required operational changes and the effects of traffic using modified access to adjacent properties. Offsetting somewhat is an anticipated reduction in vehicular demand over time. As a result, the intersections in the Study Area can continue to serve a high volume of vehicular traffic, the needs of a broad range of pedestrians and adjacent businesses with the implementation of the rapid transit. While some improvements to road traffic and pedestrian circulation safety are anticipated, the removal of random left turn access inherent in the adoption of a median location for the rapidway requires road users to modify their travel patterns. This rapidway configuration, although preferable to curb-side options, will restrict left turn access to regularly spaced signalized intersections for vehicles and widen the roadway for pedestrians. In both cases, these effects are significantly mitigated by permitting U-turns at the signalized intersections for general traffic and by the introduction of a centre median refuge to allow for a two-stage pedestrian crossing where necessary. Ultimately, the implementation of a median rapidway will increase the person carrying capacity along the corridor.

Preserving and improving public safety and security in the corridor was an important consideration in the development of the design concept. Again, several features of the median rapidway design were able to, not only allow frequent access across the median for Emergency Response Vehicles, but also provide pedestrians with a safer environment.

In addition, noise and vibration studies at representative sensitive receptors have demonstrated that the combined effect of median rapidway operation and general traffic on the widened Corridor roadways will not result in a noticeable increase in noise or vibration levels for residents. Station shelters should be consistent in design throughout all of the Viva corridors. A Stage 1 Archaeological Assessment, conducted during the study, indicated the absence of archaeological sites within the project impact area. As is usually the case, a Stage 2 archaeological study will be conducted during the construction phase for the rapidway.

Finally, the introduction of a rapidway, even in a highly developed urban context, has the potential to worsen the visual aesthetics of the road. In consultation with the municipalities and the public, a concerted effort was made to establish landscaping and streetscaping principles to be followed in rapidway insertion design for the entire corridor, offering the potential for a significantly enhanced street environment.

Table 11-2
Effects and Mitigation for Social Environment

GOAL	Environmental Value/ Criterion	Environmental Issues/Concerns	Project Phase ¹			Location	Potential Environment Effects	Proposed Mitigation Measures			Level of Significance after Mitigation	Monitoring and Recommendation
			P	C	O			Built-In Positive Attributes and/or Mitigations	Potential Residual Effects	Further Mitigation		
OBJECTIVE B: To protect and enhance the social environment in the corridor												
B1	Minimize adverse effects on and maximize benefits for communities in corridor	Potential displacement of community features		✓	✓	Entire Corridor	Potential displacement or loss of unique features.	Avoid known distinct community features to minimize impact; incorporate landscaping and furniture into streetscape to enhance corridor and community environment.	None expected	None expected	Negligible	None
		Effect on community cohesion			✓	Entire corridor	Median rapidway in widened Yonge Street may be perceived as a barrier between east and west communities. Median rapidway in widened Davis Drive and Green Lane may be perceived as a barrier between north and south communities.	Design rapidway to facilitate safe pedestrian road crossings with median refuge. Improved streetscaping in order to create a friendlier pedestrian environment.	During initial operation, vehicle/pedestrian incidents may occur due to the introduction of new traffic facilities and patterns.	Emphasis on education programs, signage, and stricter enforcement.	Negligible	Continue to monitor traffic behaviour and causes of incidents involving pedestrians.
		Effect on adjacent properties		✓	✓	Entire corridor	Potential encroachment on property frontages. Potential loss of parking. Need to acquire property and displace business and/or residents.	Rapidway and widened roadway designed to minimize encroachment of property frontages or need for acquisition of property. Rapidway and widened roadway designed to minimize loss of parking. Where acquisition of entire property is unavoidable negotiation and/or expropriation to establish fair market value and business loss compensation with property owners will be used to mitigate effects.	Implementation of rapidway and widened roadway will require property acquisition.	None	Moderately significant	Work with affected property owners during detailed design to minimize impacts to existing business operations.
		Community facility utilization			✓	Entire corridor	Improved transit access could increase demand on services within the corridor.	Municipality can expand community services as needed	None expected	None Expected	Positive effect	None

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			P	C	O			Built-In Positive Attributes and/or Mitigations	Potential Residual Effects	Further Mitigation		
OBJECTIVE B: To protect and enhance the social environment in the corridor												
B2	Maintain or improve road traffic and pedestrian circulation	Reduction in main street intersection capacities due to rapid transit operations			✓	Davis Drive	Implementation of dedicated transit lanes reduces the intersection capacity after future growth.	Dedicated left turn lanes are provided at key intersections where a capacity deficiency has been identified.	Capacity conditions resulting from high projected traffic volumes are projected at several intersections.	None.	Positive effect on traffic operation from implementation of turning lanes at key intersections	Monitor intersection operations.
					✓	Yonge Street (Mulock Drive to Davis Drive)	Yonge Street to be widened for transit only resulting in a potential deficiency in road capacity for general traffic	Left turn lanes are maintained at major signalized intersections. Rapidway implementation significantly increases person carrying capacity in the corridor	Mainline traffic may continue to experience delays during PM peak period	None	Moderately Significant	Monitor intersection operations.
		Right turn lanes			✓	Mulock Drive to Green Lane	Existing right turn lanes at minor intersections will not be replaced after road widening in order to minimize roadway width and to avoid the need for regular YRT buses to transition from right turn lanes into general traffic lanes.	Six lane (HOV) configuration north of Davis Drive reduced need for right turn lanes	Minor delays for right turning vehicles at some locations	None required	Moderately significant	Further review of need for right turn lanes during detailed design phase.
		NB/SB (Yonge Street) and WB/EB (Davis Drive and Green Lane) U-turn movements and the corresponding side street right-turn-on-red (RTOR) movements	✓	✓	✓	Entire Corridor	Median rapidway will eliminate random left turns into developments fronting on the three roadways	U-turns provided at adjacent intersections for safe manoeuvres into side streets and to properties. Random permissive left turns eliminated thus increasing safety. Develop traffic management plans for construction.	Conflict with U-turns and Right Turns on Red from side streets.	None required	Insignificant	Monitor the intersection operations and conflict potential. Develop traffic management plan for construction.
		Pedestrian Crossings			✓	Yonge Street/Davis Drive intersection; various locations	The required pedestrian crossing times at this location cannot be accommodated in a single crossing. A two-stage crossing is required.	A centre median refuge will allow for a two-stage pedestrian crossing decreasing the green time loss for transit and regular vehicles.	Reduction in pedestrian level of service	None necessary	Moderately significant	Monitor pedestrian crossing times and adjust signal timing if required
		Potential conflict at transition points between mixed-traffic operations and median rapidway operations			✓	Davis Dr at Roxborough Rd; Yonge St at Henderson Dr; Yonge St at Orchard Heights Blvd; Yonge St at Davis Dr	Rapid transit may have to wait for opportunity to merge with the general through traffic resulting in service delay. New signal phase will be required to facilitate a safe transit movement among the general traffic.	New signal phase is introduced to accommodate transit movements.	None expected	None Expected	Insignificant	None required
		Access to minor side streets and properties along the North Yonge St Corridor transit routes	✓	✓	✓	Entire Corridor	Median rapidway will eliminate random left turns into minor side streets and properties thereby requiring an alternative access route	In many cases, alternative access can be obtained to a site via another site access or an adjacent roadway with signalized access to North Yonge St Corridor. The travel patterns for the major traffic generators will be changed. U-turns provided at major signalized intersections for safe manoeuvres into side streets and to properties. Random permissive left turns are eliminated thus increasing safety. Develop traffic management plans for construction.	Conflict with U-turns and Right turns may decrease safety	None necessary	Moderately significant	Monitor traffic and prohibit Right Turns On Red movements from the side street at these locations if necessary. Develop traffic management plan for rapidway operation.
B3	Maintain a high level of public safety and security in corridor	Access for emergency vehicles				Entire Corridor	Incorporation of median and construction will have adverse effects on Emergency Response Services (ERS) access and time.	Provided U-Turns at intersections. Meet with emergency representatives. Median breaks to be provided to allow access to Emergency Response Vehicles only.	Some risk may remain as access type will change after implementation of mitigation.	Address during detail design in conjunction with ERS.	Insignificant	Obtain feedback from ERS.

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			P	C	O			Built-In Positive Attributes and/or Mitigations	Potential Residual Effects	Further Mitigation		
OBJECTIVE B: To protect and enhance the social environment in the corridor												
B4	Minimize adverse noise and vibration effects	Noise effect for BRT due to widening of Yonge Street			✓	Entire Corridor in proximity of receptors	Combine effect of median rapidway operation and general traffic on the widened Yonge Street roadway may result in increased noise levels at receptors.	Modeling of future traffic activities indicated that expected noise increases will not exceed the 5dB threshold at which mitigation measures are required. BRT sound levels expected to be marginal to none.	None expected	None necessary	Negligible	None
		Noise effect for BRT due to widening of Davis Drive			✓	Entire Corridor in proximity of receptors	Combine effect of median rapidway operation and general traffic on the widened Davis Drive roadway may result in increased noise levels at receptors.	Modeling of future traffic activities indicated that expected noise increases will not exceed the 5dB threshold at which mitigation measures are required. BRT sound levels expected to be marginal to none.	None expected	None necessary	Negligible	None
		Noise effect for BRT due to widening of Green Lane			✓	Entire Corridor in proximity of receptors	Combine effect of median rapidway operation and general traffic on the widened Green Lane roadway may result in increased noise levels at receptors.	Modeling of future traffic activities indicated that expected noise increases will not exceed the 5dB threshold at which mitigation measures are required. BRT sound levels expected to be marginal to none.	None expected	None necessary	Negligible	None
		Noise and vibration to be experienced during construction activities		✓		Entire Corridor	Potential adverse environmental effects from noise and vibration resulting from construction activities.	Construction equipment to comply with MOE NPC-115 noise emission standards. Further, construction activities to comply with local noise by-laws, especially time and place restrictions.	Short-duration noises from safety devices such as back-up beepers.	If practicable, measures such as temporary hoarding may be used to mitigate residual noise under certain limited circumstances.	No significant effect is anticipated after mitigation. However, due to the very nature of the work, certain noise sources are likely to be audible at nearby receptors.	Site review may be undertaken in response to certain specific complaints relating to noise and vibration. However, on-going or continuous monitoring is not recommended. Include requirement in contract documents for Contractor to comply with local noise by-laws.
B5	Improve regional air quality and minimize adverse local effects	Degradation of existing local and regional air quality when compared to MOE standards			✓	York Region	Situation expected to be unchanged or marginally better through implementation of the project	The fleet average emissions will drop significantly due to technological improvements balancing the increase in traffic volumes. The proposed Rapid Transit will divert commuters from individual highly polluting sources (single passenger automobiles).	Anticipated improvement in all gaseous pollutants assessed (NO _x , CO, Various VOCs) and potential small increase in particulate based emissions when comparing 2021 forecasts with and without the proposed Rapid Transit. Subject to verification through modelling.	Increase vegetation along roadways to mitigate particulate based emissions.	Positive Effect	None required
		Increase in emissions of Greenhouse Gases (GhG)			✓	York Region	Fewer GhGs are expected to be emitted	Compared to the status quo (no additional transit) there will be far less GhGs emitted per commuting person	Reduction per capita emissions of GhGs (overall annual reductions to be estimated through modelling)	None required	Positive Effect	None required
		Degradation of air quality during construction		✓		Yonge Street Corridor, Davis Drive and Green Lane	Some dust is expected during the construction period.	The law requires that all possible pollutant emission mitigation steps possible be taken during construction activities	Some PM emissions locally.	None required.	Negligible	None recommended
B5	Minimize adverse effects on cultural heritage resources	Displacement of Built Heritage Resources (BHR)	✓	✓	✓	Aurora Cemetery (includes the Keepers House (1879))	Widened roadway could displace some of the cemetery's graves, unless alignment is modified.	Alignment is shifted up to 3.5 m to the west.	Displacement of cemetery property is completely avoided.	None required	Negligible	None required
			✓	✓	✓	Quaker Cemetery	Widened roadway could displace some of the cemetery's graves, unless alignment is modified.	Alignment is shifted up to 4.6 m to the east.	Displacement of cemetery property is completely avoided.	None required	Negligible	None required
			✓	✓	✓	Hicksite Quaker burial Ground	Widened roadway could displace some of the cemetery's graves, unless alignment is modified.	Alignment is shifted up to 5.0 m to the east.	Displacement of cemetery property is completely avoided.	None required	Negligible	None required

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			P	C	O			Built-In Positive Attributes and/or Mitigations	Potential Residual Effects	Further Mitigation		
OBJECTIVE B: To protect and enhance the social environment in the corridor												
B5 (con't)	Minimize adverse effects on cultural heritage resources (continued)	Displacement of Built Heritage Resources (BHR) (continued)	✓	✓	✓	Cultural Heritage Resources in Newmarket ▪ 330 Davis Dr. (2a BHR) ▪ 338 Davis Dr. (3a BHR) ▪ 355 Davis Dr. (5a BHR) ▪ 425 Davis Dr. (11a BHR) <i>Listed</i> ▪ 556-558 Davis Dr. (15 a BHR) ▪ 560 Davis Dr. (16a BHR) ▪ 564 Davis Dr. (17a BHR) ▪ 572 Davis Dr. (18a BHR) <i>Listed –Cane House</i>	The potential introduction of rapid transit operation may cause changes in visual, audible and atmospheric environment around the cultural heritage features.	None required – rapidway will be integrated with existing streetscape and road traffic operations.	Davis Drive- 330; 338; 355; 425 <i>Listed</i> ; 556-558; 560; 564; and, 572 <i>Listed</i> . <i>Permanent loss of cultural heritage resources</i>	Cultural Heritage Resource Documentation Reports for each displaced building including individual site histories and photo documentation recording of the interior and exterior of the buildings. 425 and 572 Davis Drive (11a & 18a BHR) <i>Listed</i> -Union Hotel, Cane House. This building should be relocated and preserved outside of the right-of-way.	Significant	None required
		Displacement of Cultural Landscape Units (CLU)		✓		None expected	None expected	None expected	None expected	None expected	None expected	None expected
		Disruption of Built Heritage Resources (BHR)		✓		Entire corridor	The potential introduction of rapid transit operation may cause changes in visual, audible and atmospheric environment around the cultural heritage features.	None required – rapidway will be integrated with existing streetscape and road traffic operations.	None expected	None necessary	Insignificant	None required
		Disruption of Built Heritage Resources (BHR)		✓		Cultural Heritage Resources in Richmond Hill: ▪ 11575 Yonge St. (#30 BHR); <i>Listed</i> , ▪ 11666 Yonge St. (#29 BHR); <i>Listed</i> ▪ 11901 Yonge St. (#28 CHL); <i>Listed</i> , ▪ 12001 Yonge St. #27 (BHR) <i>Listed</i> , ▪ 12125 Yonge St. (#26 CHL) <i>Listed</i> , ▪ 12261 Yonge St. (#25 BHR) <i>Listed</i> , ▪ 12761, 12764, 12800, 12850, 12919 Yonge St. (#21 CHL Former Hamlet of Oakridges) <i>Listed</i>	The potential introduction of rapid transit operation may cause changes in the visual, audible and atmospheric environment around the cultural heritage resources.	None required – rapidway will be integrated with existing streetscape and road traffic operations.	Limited encroachment on property will disrupt the existing cultural heritage context. * At 12125 Yonge St. An Ontario Heritage Trust commemorative plaque exists that may require moving back on the property. Must be confirmed through inspection.	None necessary	Insignificant	None required

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			P	C	O			Built-In Positive Attributes and/or Mitigations	Potential Residual Effects	Further Mitigation		
OBJECTIVE B: To protect and enhance the social environment in the corridor												
B5 (con't)	Minimize adverse effects on cultural heritage resources (continued)	Disruption of Built Heritage Resources (BHR) (continued)				Cultural Heritage Resources in Newmarket: <ul style="list-style-type: none"> ▪ 1786? Yonge St. (34 CHL) Plaque on Building. ▪ 309 Davis Dr. (1a BHR) ▪ 341 Davis Dr. (4a BHR) ▪ 359 Davis Dr. (6a BHR) ▪ 371 Davis Dr. (7a BHR) <i>Listed</i> ▪ 385 Davis Dr. (8a BHR) ▪ Bridge Culvert 33+220 Davis Dr. (9a BHR) ▪ 415 Davis Dr. (10a BHR) <i>Listed</i> ▪ Bridge 33+420 Davis Dr. (14a BHR) ▪ 641 Davis Dr. (19a BHR) ▪ 655 Davis Dr. (20a BHR) ▪ 665 Davis Dr. (21a BHR) 	The potential introduction of rapid transit operation may cause changes in the visual, audible and atmospheric environment around the cultural heritage resources.	None required – rapidway will be integrated with existing streetscape and road traffic operations.	Limited encroachment on property will disrupt the existing cultural heritage context.	None necessary	Insignificant	None required
		Disruption of Cultural Landscape Units (CLU)		✓		Entire Corridor	The potential introduction of rapid transit operation may cause changes in visual, audible and atmospheric environment to the cultural heritage features in the Cultural Landscape – former centre of settlement.	None required – rapidway will be integrated with existing streetscape and road traffic operations.	None expected	None necessary	Insignificant	None required

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			P	C	O			Built-In Positive Attributes and/or Mitigations	Potential Residual Effects	Further Mitigation		
OBJECTIVE B: To protect and enhance the social environment in the corridor												
B5 (con't)	Minimize adverse effects on cultural heritage resources (continued)	Disruption of Cultural Landscape Units (CLU) (continued)		✓		Cultural Heritage Resources in Richmond Hill: <ul style="list-style-type: none"> ▪ 11901 Yonge St. (#28 CHL); <i>Listed</i>, ▪ 12125 Yonge St. (#26 CHL) <i>Listed</i>, ▪ (#21 CHL Former Hamlet of Oakridges) <i>Listed</i>, Cultural Heritage Resources in East Gwillimbury <ul style="list-style-type: none"> ▪ 574 Green Lane (#1 CHL); Farm Complex Cultural Heritage Resources in Newmarket: <ul style="list-style-type: none"> ▪ Railscape Corridor CHL 1a 33+320 ▪ Waterscape CHL 2a 33+420 	The potential introduction of rapid transit operation may cause changes in the visual, audible and atmospheric environment around the cultural heritage resources.	None required – rapidway will be integrated with existing streetscape and road traffic operations.	Permanent change in the cultural heritage environment.	Some landscape screening or edge of property restoration may be required.	Positive	None required
		Possible impacts to areas with potential for identification of archaeological sites	✓			Entire Corridor	There is potential for identification of archaeological sites within the project impact area.	<ul style="list-style-type: none"> ▪ Stage 1 Archaeological Assessment has been conducted. ▪ Stage 2 Archaeological Assessment will be performed in detailed design: field survey in accordance with Ministry of Culture Stage 1-3 Archaeological Assessment Technical Guidelines to identify any sites that may be present within the proposed impact area. ▪ If areas of further archaeological concern are identified during Stage 2 assessment, such areas must be avoided until any additional work required by the Ministry of Culture has been completed. Mitigation options, including avoidance, protection, or salvage excavation must be determined on a site-by-site basis. ▪ If no potentially significant archaeological sites are identified during Stage 2, it will be recommended to the Ministry of Culture that the areas assessed be considered free of further archaeological concern. 	<ul style="list-style-type: none"> ▪ Archaeological sites may be identified during the course of Stage 2 Archaeological Assessment. ▪ In the event that deeply buried archaeological remains are encountered during construction activities, the office of the Regulatory and Operations Group, Ministry of Culture should be notified immediately. ▪ In the event that human remains are encountered during construction, both the Ministry of Culture and the Registrar or Deputy Registrar of the Cemeteries Regulation Unit, Ministry of Consumer and Commercial Relations should be notified immediately. 	Needs for further mitigation, possibly including Stage 3 Archaeological Assessment (test excavation) and Stage 4 Archaeological Assessment (further mitigative work, including mitigative excavation), must be determined following Stage 2 Archaeological Assessment, if archaeological resources are identified during survey.	Negligible for stage 1 Archaeological Assessment	No requirement for monitoring has been identified as a result of Stage 1 Archaeological Assessment. Monitoring may be required, depending on the result of Stage 2 Archaeological Assessment.

Table 11-2
Effects and Mitigation for Social Environment

GOAL	Environmental Value/ Criterion	Environmental Issues/Concerns	Project Phase ¹			Location	Potential Environment Effects	Proposed Mitigation Measures			Level of Significance after Mitigation	Monitoring and Recommendation
			P	C	O			Built-In Positive Attributes and/or Mitigations	Potential Residual Effects	Further Mitigation		
OBJECTIVE B: To protect and enhance the social environment in the corridor												
B5 (con't)	Minimize adverse effects on cultural heritage resources (continued)	Possible impacts to areas with potential for identification of archaeological sites (continued)	✓	✓		Quaker cemetery along the west side of Yonge St., north of Mulock Drive	There is potential for identification of archaeological site adjacent to this area.	<ul style="list-style-type: none"> Stage 2 Archaeological Assessment of this site as part of the Yonge St. Watermain EA was conducted. Ministry of Culture approved the assessment and concurred with the recommendation that there are no further concerns for impacts to the site. Prior to any land-disturbing activities in the vicinity of the site, additional investigation is recommended to confirm the presence or absence of unmarked graves within the ROW. This would initially involve archival research of cemetery records to investigate grave locations, followed, if necessary, by monitoring of the ROW for grave shafts by a licensed archaeologist, either during construction, or in advance of construction. The latter involves the removal of the topsoil with a Gradall followed by the shovel shining of the exposed surfaces and inspection for grave shafts. 				
B6	Minimize disruption of community vistas and adverse effects on street and neighbourhood aesthetics	Visual Effects	✓		✓	Entire Corridor	Introduction of rapidways may reduce visual aesthetics of road	Introduction of a comprehensive landscaping and streetscaping plan for the corridor.	Narrow sections of ROW where property cannot be acquired may limit incorporation of streetscaping	None required	Significant	Monitor redevelopment and acquire property through redevelopment applications
		Landscaping	✓		✓	Entire Corridor	Landscaping species may not survive in winter months	Choose appropriate species for both winter and other months to maintain greenery throughout corridor. Place landscaping in planters and incorporate buried irrigation systems.	Species may still not survive	Change species, irrigation patterns, etc	Insignificant	Monitor health of landscaping continuously

Notes: P – Pre construction, C – Construction, O – Operation

11.4.3 OBJECTIVE C: To protect and enhance the natural environment in the corridor

The protection and enhancement of the natural environment, as shown in **Table 11-3**, within the corridor has been entirely achieved. By definition, the project along the North Yonge Street Corridor roadways rights-of-way is set in a highly developed urban environment, where natural features have mostly been disturbed by previous development. Nevertheless, small river tributaries or creeks still cross Yonge Street, Davis Drive and Green Lane, connecting to the much larger Holland, Humber and Don watersheds. Similarly, nearby urban green spaces still exist and must be protected. Of great importance and sensitivity is the Oak Ridges Moraine, which the rapidway travels through on Yonge Street through the south end of the study area in Richmond Hill. The project is considered to have insignificant environment effects on the Oak Ridges Moraine because the impacts have been avoided, minimized or mitigated. In terms of all valued environmental components to be considered, effects on aquatic and terrestrial ecosystems are either negligible or insignificant when built-in mitigation measures are implemented or sensitive construction and operation methods are respected.

Future air quality, except for PM, is expected to be better than current air quality mainly due to improvements in engine technology and fuels. The forecast increase in PM10 from 2005 to 2021 can be attributed to the increase in fugitive emissions from traffic due to population and employment growth built into the model. As noted in **Appendix L**, future 2021 air quality was forecasted both with and without the proposed rapid transit alternative. When future (2021) air quality without transit improvements are compared with future (2021) air quality with transit improvements, the results show a small net decrease for all gaseous pollutant concentrations including greenhouse gases and a small net decrease in particulate based pollutant concentrations.

**Table 11-3
Effects and Mitigation for Natural Environment**

GOAL	Environmental Value/ Criterion	Environmental Issues/Concerns	Project Phase ¹			Location	Potential Environment Effects	Proposed Mitigation Measures			Level of Significance after Mitigation	Monitoring and Recommendation
			P	C	O			Built-In Positive Attributes and/or Mitigations	Potential Residual Effects	Further Mitigation		
OBJECTIVE C: To protect and enhance the natural environment in the corridor												
C1	Minimize adverse effects on Aquatic Ecology	Fuel spills, due to accidents during construction refuelling and accidents during operation, entering the watercourses		✓	✓	Entire Corridor	Fish kills due to chemical spills resulting in short term population decline.	No refuelling within 10 m of a watercourse. Emergency Response Plan.	Short term population decline. Some contaminants within storm-water system.	None practical	Insignificant	None required
		Sediment laden stormwater entering watercourses during construction		✓		Entire Corridor	Fish kills and loss of aquatic habitat resulting in short term population decline.	Construction fencing at work areas near watercourses limiting area of disturbance. Erosion and Sedimentation Control Plan.	Short term population decline.	None practical	Insignificant	None required
		Sediment laden stormwater entering watercourses during operation			✓	Entire Corridor	Loss of aquatic habitat resulting in population decline.	Stormwater management facilities such as grassed swales, oil and grit separators, stormwater ponds. Detailed Storm Water Management Plan will be prepared during the detailed design stage.	Short term population decline.	Clean-out facilities as required.	Insignificant	Monitor sediment accumulation in stormwater management facilities. York Region will work with TRCA during the design phase to provide enhanced treatment, particularly in sensitive areas, where feasible.
		Loss of site-specific habitat		✓		All watercourses within entire corridor.	Potential loss of fish habitat as a result of culvert extensions, replacements or repairs, and bridge replacement at one location, YDD2.	Design rapidway cross-sections to reduce footprint area. Use headwalls, wingwalls and guiderail to reduce length of culvert extension. Avoid in-water work to the extent possible. Minimize the area of in-water alteration to the extent possible. Follow in-water construction timing restriction. Perform all in-water work in the dry using a temporary flow bypass system. Establish new bridge footings out of watercourse to span channel. Provide erosion and sedimentation control.	A harmful alteration of fish habitat will likely result from culvert extensions and from bridge replacement on Davis Drive	Negotiations with regulatory agencies during detail design. Compensate for the harmful alteration of fish habitat. TRCA has indicated where culverts/structures will be removed in their entirety and replaced, there is a requirements to provide a 100 year meander belt analysis. These details will be confirmed at the detail design phase.	Negligible if mitigation measures are implemented	On-site environmental inspection during in-water work. Post-construction monitoring of fish habitat compensation measures.

Table 11-3
Effects and Mitigation for Natural Environment

GOAL	Environmental Value/ Criterion	Environmental Issues/Concerns	Project Phase ¹			Location	Potential Environment Effects	Proposed Mitigation Measures			Level of Significance after Mitigation	Monitoring and Recommendation
			P	C	O			Built-In Positive Attributes and/or Mitigations	Potential Residual Effects	Further Mitigation		
OBJECTIVE C: To protect and enhance the natural environment in the corridor												
C1 (con't)	Minimize adverse effects on Aquatic Ecology (continued)	Baseflow alterations		✓	✓	All watercourses within entire corridor.	New impervious surfaces can lead to changes in the frequency, magnitude and duration of flows.	Reduce the area of impervious surfaces to the extent possible. Use stormwater management practices that encourage infiltration and recharge of groundwater.	None expected.	None	Negligible	<ul style="list-style-type: none"> Post-construction inspection of stormwater management facilities to evaluate their effectiveness. On-going maintenance as required.
		Fish mortality		✓		All watercourses within entire corridor.	Fish may be injured or killed by dewatering or physical harm..	Design rapidway cross-sections to avoid modifications at culverts/bridges. Avoid in-water work to the extent possible. Perform all in-water work in the dry using a temporary flow bypass system. Capture fish trapped during dewatering of the work zone and safely release upstream. Prohibit the entry of heavy equipment into the watercourse.	None expected.	None	Negligible	On-site environmental inspection during in-water work.
		Barriers to fish movement.		✓	✓	All watercourses within entire corridor.	Culvert extension, repair or replacement may create a barrier to fish movement.	Install the culvert extension to match the inverts of the existing culvert and stream bed; if possible, the culvert should be open bottom or countersunk a minimum of 20 % of the culvert height and then backfilled with native substrate; The culvert extension will be designed to maintain fish passage.	None expected	Negotiations with regulatory agencies during detail design.	Negligible	On-site environmental inspection during in-water work.
		Increased temperature		✓	✓	All watercourses within entire corridor	Clearing of riparian vegetation and stormwater management practices can impact temperature regimes.	Minimize the area of stream bank alteration to the extent possible. Use stormwater management practices that encourage infiltration and recharge of groundwater.	Shading lost through removal of riparian vegetation.	Restore riparian areas disturbed during construction with native vegetation.	Negligible	<ul style="list-style-type: none"> Post-construction inspection of stormwater management facilities to evaluate their effectiveness. On-going maintenance as required. Post-construction inspection of riparian plantings to confirm survival.
		Disturbance to rare, threatened or endangered species		✓	✓	Not identified within any watercourse.	None	No species-specific mitigation required.	None expected.	None required.	No net impacts	None required.

Table 11-3
Effects and Mitigation for Natural Environment

GOAL	Environmental Value/ Criterion	Environmental Issues/Concerns	Project Phase ¹			Location	Potential Environment Effects	Proposed Mitigation Measures			Level of Significance after Mitigation	Monitoring and Recommendation
			P	C	O			Built-In Positive Attributes and/or Mitigations	Potential Residual Effects	Further Mitigation		
OBJECTIVE C: To protect and enhance the natural environment in the corridor												
C2	Minimize adverse effects on Terrestrial Ecology	Destruction/ Disturbance of wildlife habitat		✓	✓	Entire corridor.	Construction of the rapidway and associated facilities may result in the removal of vegetation and ecological functions it supports. Activities such as site grubbing, staging & stockpiling during construction could result in destruction or disturbance of migratory birds	Minimize the area of vegetation removals to the extent possible. Minimize grade changes to the extent possible. Use close cut clearing and trimming to minimize the number of trees to be removed. Delineate work zones using construction fencing/tree protection barrier. Protect trees within the clear zone using guiderail, curbs, etc. to prevent removal. TRCA comments dated November 27, 2008 (item 11) identified a concern with additional row requirements in the vicinity of the Phillips-Bond-Thompson wetland complex. A commitment to further work has been added in the monitoring and recommendations column.	Displacement of resident wildlife species.	Restore natural areas disturbed using construction with native vegetation, where feasible. Replace ornamental vegetation as part of landscaping.	Negligible	Post-construction inspection of vegetation plantings to confirm survival. The lateral alignment within the existing ROW, and any additional ROW requirements in the vicinity of the Phillips-Bond-Thompson wetland complex will be determined through the detailed design phase to minimize encroachments into, and impacts to this key natural heritage feature. York Region commits to work with TRCA during design to minimize the footprint of the project within Regulated Areas and in the vicinity of Key Natural Heritage Features.
		Wildlife mortality		✓		Entire corridor.	Removal of wildlife habitat may result in wildlife mortality.	Perform vegetation removals outside of wildlife breeding seasons (typically April 1 to July 31). Perform culvert/bridge extension, repair and replacement outside of wildlife breeding season.	None expected.	None required.	Negligible	None required.
		Wildlife/vehicle conflicts			✓	Entire corridor.	Increase in the width of Yonge Street to accommodate rapidway and associated facilities may increase the potential for wildlife/vehicle conflicts.	Use oversized culverts to promote wildlife passage under the road. Stagger culvert inverts to create wet and dry culverts.	Rapidway represents an incremental increase in road width compared to existing hazard to wildlife created by Yonge Street.	None required.	Insignificant.	None required.
		Barriers to wildlife movement		✓	✓	Entire corridor	Increase in width of Yonge Street to accommodate rapidway and associated facilities may create an additional impediment to wildlife movement	Enhance wildlife passage under rapidway, where feasible through culvert/bridge modifications. The TRCA noted in a letter dated November 27, 2008 (item #6) that the design of the Corridor will incorporate improvements to provide for wildlife passage across the segment of Yonge Street that bisects the Ridges Moraine through areas identified as Natural Core and Natural Linkage in the Oak Ridges Moraine Conservation Plan (ORMCP), in the vicinity of Bond Lake in particular, and other areas as appropriate.	Rapidway represents an incremental increase in road width compared to existing barrier created by Yonge Street.	Use of existing culverts/bridges maintains wildlife passage under rapidway and does not offer opportunities to enhance wildlife passage. Commitment to review during detail design phase opportunities to provide wildlife passage in the Oak Ridges Moraine area.	Moderately significant.	York Region commitment to work with TRCA during design to provide improvements to wildlife passage within areas of concern.
		Disturbance to rare, threatened, or endangered wildlife		✓	✓	Entire corridor.	No rare, threatened or endangered wildlife identified within study area.	No species-specific mitigation required	None expected.	None required.	No impacts expected.	None required.

Table 11-3
Effects and Mitigation for Natural Environment

GOAL	Environmental Value/ Criterion	Environmental Issues/Concerns	Project Phase ¹			Location	Potential Environment Effects	Proposed Mitigation Measures			Level of Significance after Mitigation	Monitoring and Recommendation
			P	C	O			Built-In Positive Attributes and/or Mitigations	Potential Residual Effects	Further Mitigation		
OBJECTIVE C: To protect and enhance the natural environment in the corridor												
C2 (con't)	Minimize adverse effects on Terrestrial Ecology (continued)	Disturbance to vegetation through edge effects, drainage modifications and road salt		✓	✓	Entire corridor.	New forest edges may result in sunscald, windthrow, and invasion of exotic species. Ditching, grading and other drainage modifications may alter local soil moisture regimes. Road salt may result in vegetation mortality and die back.	Minimize the area of vegetation removals to the extent possible. Minimize the grade changes and cut/fill requirements to the extent possible. Use close cut clearing and trimming to minimize encroachment on remaining vegetation. Delineate work zones using construction fencing/ tree protection barrier. Manage the application of road salt to the extent possible.	Vegetation communities within the study area are primarily cultural in origin and have been impacted by Yonge Street. Rapidway represents an incremental encroachment into these already disturbed communities.	Landscape treatments.	Insignificant.	York Region will work with TRCA during detail design phase do develop an edge management plan/vegetation compensation where forest edges are removed.
		Rare, threatened or endangered flora		✓		Entire Corridor.	Twenty-two regionally rare plant species are located within the study limits. Individual occurrences of these species are beyond the zone of influence of this project. One threatened species, Kentucky coffee- tree, was identified within the zone of influence of this project. Since this species was planted and not naturally occurring the significance of its removal is diminished. One endangered species, butternut, was identified south of Bond Lake. The individual occurrence of this species is well beyond the zone of influence of this project and will therefore not be removed or disturbed.	Provide fencing/ tree protection barrier for Kentucky coffee-tree	None expected.	None required.	Insignificant.	None required.
C3	Minimize adverse effects on corridor hydro- geological, geological, and hydrological conditions	Water quality in shallow groundwater that can affect quality in surface watercourses			✓	Areas located hydraulically down gradient of transit alignment, where receiving surface watercourses are present.	Rapidways will require de-icing salt and will accumulate various chemical substances that can impact water quality of runoff. Impacted runoff that infiltrates can increase concentrations in shallow groundwater. Potential to affect shallow groundwater that discharges to surface watercourses.	Dilution and other natural processes will attenuate elevated parameters in groundwater.	Potential effects to water quality of surface watercourses. Groundwater quality effects are anticipated to be detectable.	Reduce application of road salt, where possible. Use of curbs and gutters to convey impacted runoff away from permeable soil areas.	Moderately significant.	None required. Water quality effects are anticipated to remain acceptable within Ontario Drinking Water Standards.
		Water quality in shallow groundwater that can affect quality in water supply wells			✓	Areas located hydraulically down gradient of transit alignment, where shallow water supply wells in active use are present.	Rapidways will require de-icing salt and also will accumulate various chemical substances that can impact water quality of runoff. Impacted runoff that infiltrates can increase concentrations in shallow groundwater. Potential to affect shallow groundwater that is extracted by down-gradient supply wells.	Dilution and other natural processes will attenuate elevated parameters in groundwater.	Potential effects to groundwater quality used as drinking water. Groundwater quality effects in water wells may be detectable.	Reduce application of road salt, where possible. Use of curbs and gutters to convey impacted runoff away from permeable soil areas.	Moderately significant	None required. Water quality effects are anticipated to remain acceptable within Ontario Drinking Water Standards. Well inspection will be performed during the detailed design phase to confirm the relationship of the widened roadway to existing active water well will not have an adverse affect on water quality. If it does, use of domestic well is confirmed, a contingency plan will be developed.
		Baseflow in surface water courses		✓	✓	Recharge areas within proposed alignment, particularly in areas of Newmarket Till and sand textured glacial lake deposits.	Increase of pavement area decreases the pervious area that existed prior to construction, resulting in proportionally decreased recharge to shallow groundwater.	N/A	Decreases in recharge can decrease baseflow in surface watercourse(s). Reduced baseflow in surface watercourses.	Construction of pervious surfaces where practical, including grassed areas and permeable pavements.	Negligible	None required. The degree of impact is anticipated to be undetectable.

Table 11-3
Effects and Mitigation for Natural Environment

GOAL	Environmental Value/ Criterion	Environmental Issues/Concerns	Project Phase ¹			Location	Potential Environment Effects	Proposed Mitigation Measures			Level of Significance after Mitigation	Monitoring and Recommendation
			P	C	O			Built-In Positive Attributes and/or Mitigations	Potential Residual Effects	Further Mitigation		
OBJECTIVE C: To protect and enhance the natural environment in the corridor												
C3 (con't)	Minimize adverse effects on corridor hydro-geological, geological, and hydrological conditions (continued)	Increased pavement; decreased infiltration			✓	Entire corridor	Minor increase in quantity of surface runoff and minor decrease in quantity of groundwater.	Storm water management facilities such as grassed swales and storm water ponds.	Minor increase in peak stream flows. Minor decrease in groundwater.	None practical	Negligible	None required
		Changes in flood levels from the widening of existing bridges and culverts			✓	East Branch – Humber River crossing at Sta 19+131	It is anticipated that this culvert will likely have minimal impact on the overall flooding regime due to a dam control downstream to Lake Wilcox.	No increase in Regional storm or return period flood levels upstream of the crossing. See Appendix G for results of the analysis.	N/A	N/A	Negligible	None required.
					✓	Main Branch – Tannery Creek crossings at Sta 26+332 & 26+534	HEC-RAS model provided by LSRCA was used to assess changes in flood level due to widening the existing culvert by 15 m.	See Appendix G for results of the analysis.	Minor increase in Regional storm flood level. Widening will not adversely impact upstream water levels.	N/A	Negligible	None required.
					✓	Main Branch – Tannery Creek crossing at Sta 27+900	HEC-RAS model provided by LSRCA was used to assess changes in flood level due to widening the existing culvert by 15 m.	See Appendix G for results of the analysis.	Minor increase in return period flood levels. Widening will not adversely impact upstream water levels.	N/A	Negligible	None required.
					✓	Western Creek Crossing at Sta. 33+050	HEC-RAS model provided by LSRCA was used to assess changes in flood level due to widening the existing culvert by 20 m.	See Appendix G for results of the analysis.				
		Changes in flood levels due to construction of new bridge			✓	Proposed New East Holland River crossing at Sta. 33-425	HEC-RAS model provided by LSRCA was used to assess changes in flood level due to a proposed bridge width of 34 m and a span of 31 m.	See Appendix G for results of the analysis.				

Notes: P – Pre construction, C – Construction, O – Operation

11.4.4 OBJECTIVE D: To promote smart growth and economic development in the corridor

One of the main purposes of the rapid transit system is to support the smart growth policies of the Provincial and Regional Governments and simultaneously encourage economic development. From this perspective, the North Yonge Street Corridor strongly supports Regional and Municipal planning policies, such as the Centres and Corridors urban form. In many respects, the project will contribute to the intensification of under-utilized sites within the corridor and encourage transit-oriented development at infill locations and vacant land along the route. At the same time, several built-in design characteristics are aimed at reducing the potential for adverse effects on business or access to residential neighbourhoods and community facilities.

The transit system will support the overall objective of the Region's Planning Policies to ensure that form follows function. The transit system must contribute to a sustainable environment by improving access to new and existing development leading to increased business and economic activity along the corridor. Through this increase in business activity, infill locations and vacant land is more likely to be developed, maximizing the desired concentration of development within municipal zoning controls and leading to a more viable alternative of rapid transit in York Region. The assessment in terms of Objective D is tabulated in **Table 11-4**.

Table 11-4
Effects and Mitigation for Smart Growth and Economic Development

GOAL	Environmental Value/ Criterion	Environmental Issues/Concerns	Project Phase ¹			Location	Potential Environment Effects	Proposed Mitigation Measures			Level of Significance after Mitigation	Monitoring and Recommendation
			P	C	O			Built-In Positive Attributes and/or Mitigations	Potential Residual Effects	Further Mitigation		
OBJECTIVE D: To promote smart growth and economic development in the corridor												
D1	Support Regional and Municipal Planning Policies and approved urban structure	Need for pedestrian-friendly streets and walkways for access to stations		✓	✓	Entire corridor	Streetscape will create a more pedestrian-friendly atmosphere.	Signalized pedestrian crosswalks will be provided at all station locations at an appropriate number of intersections; Pedestrian safety will be considered in the design of station precincts and road signage will be highly visible to both pedestrians and vehicles.	Potential for jaywalking in vicinity of stations, which could lead to increase in number of vehicle/pedestrian incidents.	Platform edge treatment will discourage illegal access	Negligible	Monitor traffic accidents involving pedestrians to establish whether cause is transit related.
D2	Provide convenient access to social and community facilities in corridor	Potential barrier effects during construction and operation		✓	✓	Entire corridor	Rapidway could be perceived as a barrier in access to future community centres, hospital(s), malls, parks, etc.	Construction Traffic and Pedestrian Management Plan will avoid wherever possible, barriers to entrances/exits to large attractors along Yonge Street, Davis Drive and Green Lane. Rapidway median design will recognize pedestrian access requirements, particularly in proximity to community facilities.	Alternative access routes to facilities may affect adjacent properties	Mark detours and alternative access points clearly	Insignificant	Monitor congestion levels during construction and traffic patterns during operations.
D3	Minimize adverse effects on business activities in corridor	The potential for an increase in business activity.	✓	✓	✓	Entire corridor	Increased pedestrian traffic via the implementation of a rapid transit system will increase the potential for business activity.	A higher density of development on underutilized sites, infill locations and on vacant land should increase the market for some business activity.	Increase in vehicular traffic; increase in workforce/ population.	Encourage intensification meeting urban form objectives.	Insignificant and positive	None
		The potential for a decrease in business activity.		✓	✓	Entire corridor	Modification of road access could lead to displacement and/or business loss.	Implement procedures to address requests of affected businesses; incorporate design solutions and construction methods to minimize number of businesses affected.	Decrease in traffic; decrease in workforce/population	Encourage alternative compatible development	Moderately significant	Cooperative response to business loss concerns addressed to municipalities.
D4	Protect provisions for goods movement in corridor	Ease of Truck Movement		✓		Entire Corridor	Construction may limit access for trucks	Traffic Management Plan to ensure truck access at all times	May not be possible in some areas	Designate alternative truck routes	Negligible	None required
					✓	Entire Corridor	Median rapidway will restrict truck movement in corridor	Provided U-turns at major intersections to allow for truck access to side streets and properties. Traffic analysis at intersections indicated sufficient capacity for trucks using U-turns.	In areas of 4-lane cross-section, intersections with no station or landscaping in median do not allow sufficient turning width for WB 17 (articulated trucks).	Traffic signs prohibit large truck at these intersections (see next entries). Designate truck routes.	Insignificant	None
D5	Promote transit-oriented development	Locating higher density and transit-oriented development where it can be served by rapidway			✓	New and redevelopment/infill locations	Current landowners could object to implementation of existing land use pattern changes along transit corridor.	Regional/Municipal land use controls and approval processes to encourage transit-oriented development or re-development in support of OP objectives.	Redevelopment pressure on surrounding areas	Apply Municipal Site Plan approval process	Insignificant	None