

6. Monitoring and Commitments for the Undertaking

In accordance with the Minister-approved ToR, a monitoring strategy and schedule was developed for both environmental effects monitoring (see **Section 6.1**) as well as IEA compliance monitoring (see **Section 6.3**). With regards to the former, the long build-out period of the Preferred Undertaking (possibly more than twenty years) necessitates the need to phase implementation of the improvements. As a result, those sections of the Preferred Undertaking for which detailed design has not commenced within 10 years of EA approval will be reviewed to ensure that the mitigation / compensation measures are still valid. This process is described in **Section 6.2**.

Following IEA approval of the Preferred Undertaking, Environmental Management Plans (EMPs) will be prepared where required to support permit and approval applications. These EMPs will detail the environmental commitments, monitoring requirements, and approval conditions associated with construction and operation.

The results from carrying out the monitoring strategies described in the EMP for each road/transit corridor before and during the construction, operation, and maintenance of the Preferred Undertaking will be retained at York Region's office and/or their agent's office. The results will also be made available to the Ministry, upon request, in accordance with MOE's *Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario*, November 2008.

6.1 Environmental Effects Monitoring

An environmental effects monitoring strategy and schedule was developed, based on the effects assessments carried out for the Preferred Undertaking, to ensure:

- that the predicted net negative effects are not exceeded;
- that any unexpected negative effects are addressed; and
- that the predicted benefits are realized.

As a result, the type and frequency of environmental effects monitoring to be carried out in relation to the mitigation and compensation measures described in **Chapter 5** are summarized in **Table 6-1** by net effect.

Table 6-1 Summary of Monitoring Requirements Associated with the Preferred Undertaking

Location	Net Effect	Monitoring Requirement	Timing of Monitoring	Estimated Frequency of Monitoring
NATURAL ENVIRONMENT				
Terrestrial				
All locations where tree and/or vegetation removal is required	<ul style="list-style-type: none"> Tree and/or vegetation removal compensated for by restoration planting, in situ or elsewhere 	<ul style="list-style-type: none"> Undertake site inspections to ensure that only specified trees are removed, that proper tree protection barriers are in place and maintained, and that there is no damage caused to the remaining trees during construction Ensure proper barriers are established and maintained to prevent runoff from construction sites into adjacent terrestrial and aquatic features 	<ul style="list-style-type: none"> During and Post-Construction 	<ul style="list-style-type: none"> Annually (summer)
		<ul style="list-style-type: none"> Conduct initial site visit to determine the quantity and quality of plantings used 	<ul style="list-style-type: none"> Post-Construction 	<ul style="list-style-type: none"> Once
		<ul style="list-style-type: none"> Conduct site visits to determine the survival rate of restoration plantings 	<ul style="list-style-type: none"> Post-Construction 	<ul style="list-style-type: none"> Annually
Aquatic				
All locations where construction occurs in or near a surface water feature	<ul style="list-style-type: none"> Temporary impairment of surface water quality minimized with the implementation of mitigation measures 	<ul style="list-style-type: none"> Monitor on-site conditions (i.e., erosion and sediment control, spills, flooding, etc.) 	<ul style="list-style-type: none"> Construction 	<ul style="list-style-type: none"> Weekly during active construction periods Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (i.e., spring freshet) Daily during extended rain or snowmelt periods Monthly during inactive construction periods, where the site is left alone for 30 days or longer
		<ul style="list-style-type: none"> Monitor meteorological conditions from Environment Canada 	<ul style="list-style-type: none"> Construction 	<ul style="list-style-type: none"> Daily review of weather forecasts
<ul style="list-style-type: none"> All locations where construction occurs in-water (fish habitat) and does not result in a HADD 	<ul style="list-style-type: none"> Temporary minor disturbance to fish habitat due to in-water construction works minimized through the application of Best Management Practices (BMPs) 	<ul style="list-style-type: none"> Document changes to aquatic habitat as a result of construction activities and obtain photographic documentation 	<ul style="list-style-type: none"> Pre-Construction (to document existing conditions) Construction 	<ul style="list-style-type: none"> Daily during active in-water construction
<ul style="list-style-type: none"> All locations where construction occurs in-water (fish habitat) and results in a HADD 	<ul style="list-style-type: none"> No net loss of fish habitat with the implementation of appropriate enhancement and/or compensation measures 	<ul style="list-style-type: none"> As indicated in the authorization under DFO 	<ul style="list-style-type: none"> Construction and Post-Construction 	<ul style="list-style-type: none"> As required by DFO
<ul style="list-style-type: none"> All locations where short term (i.e., days) construction dewatering may be required 	<ul style="list-style-type: none"> Thermal change to receiving watercourse minimized by implementation of mitigation measures 	<ul style="list-style-type: none"> Monitor stream temperature upstream and downstream of discharge locations with the use of temperature data loggers if findings from thermal mass balance calculations (made during the permitting phase, once dewatering rates have been determined) indicate that there may be an effect on the receiving stream temperature 	<ul style="list-style-type: none"> Pre-Construction (to document conditions) During Construction Dewatering 	<ul style="list-style-type: none"> Loggers set to record every hour and downloaded at end of each day

Table 6-1 Summary of Monitoring Requirements Associated with the Preferred Undertaking

Location	Net Effect	Monitoring Requirement	Timing of Monitoring	Estimated Frequency of Monitoring
Surface Water				
All locations where short term (i.e., days) construction dewatering may be required	<ul style="list-style-type: none"> Temporary stream erosion and sedimentation minimized with the implementation of mitigation measures 	<ul style="list-style-type: none"> Monitor erosion and sedimentation at locations where construction dewatering is discharged, including cross-sections, bank erosion pins and bed material (if discharge rate approaches erosion threshold of immediate downstream reach, as determined during detailed design) 	<ul style="list-style-type: none"> Pre-Construction (to document conditions) 	<ul style="list-style-type: none"> Three times during the seasonal period in which discharge is proposed
			<ul style="list-style-type: none"> During Construction De-watering 	<ul style="list-style-type: none"> Approximately three times per week
	<ul style="list-style-type: none"> Temporary impairment of surface water quality minimized with the implementation of mitigation measures 	<ul style="list-style-type: none"> Monitor surface water quality at proposed discharge locations for general chemistry (e.g., measurements of field temperature, pH, dissolved oxygen and conductivity), suspended solids, turbidity, nutrients, and total metals (e.g., iron, zinc and aluminum) 	<ul style="list-style-type: none"> Pre-Construction (to document conditions) 	<ul style="list-style-type: none"> Three times during the seasonal period in which discharge is proposed
			<ul style="list-style-type: none"> During Construction De-watering 	<ul style="list-style-type: none"> Approximately three times per week (frequency depends on groundwater quality and monitoring results)
	<ul style="list-style-type: none"> Temporary loss of stream baseflow avoided with the implementation of mitigation measures 	<ul style="list-style-type: none"> Monitor water level and streamflow at proposed discharge locations using staff gauges, water level data loggers, and manual in-stream flow measurements tools to calculate watercourse assimilation capacity 	<ul style="list-style-type: none"> Pre-Construction (to document conditions) 	<ul style="list-style-type: none"> Manual streamflow measurements (three times) during low flow conditions to establish baseflow as needed Continuous stream level loggers logging at 1 hour intervals, installed 2 weeks prior to dewatering to document water level trends
			<ul style="list-style-type: none"> During Construction 	<ul style="list-style-type: none"> Continuous stream level loggers logging at 1 hour intervals and downloaded daily; daily manual staff gauge readings; and manual flow measurements, as required
<ul style="list-style-type: none"> Post-Construction (if baseflow loss was observed – monitor until returned to normal) 			<ul style="list-style-type: none"> Continuous stream level loggers logging at 1 hour intervals and downloaded weekly until water levels recover 	
All locations where watercourse is re-aligned	<ul style="list-style-type: none"> Stream erosion and sedimentation minimized with the implementation of natural channel designs 	<ul style="list-style-type: none"> Monitor erosion and sedimentation of realigned watercourse (including cross-sections, bank erosion pins and bed material) 	<ul style="list-style-type: none"> Post-Construction 	<ul style="list-style-type: none"> 3 times in the year following construction (only), specific timing to be determined upon completion of construction
All locations where construction occurs in or near a surface water feature	<ul style="list-style-type: none"> Temporary impairment of surface water quality minimized with the implementation of mitigation measures 	<ul style="list-style-type: none"> Monitor surface water quality at construction locations, including collection of surface water samples and documentation of site conditions 	<ul style="list-style-type: none"> Pre-Construction (to document conditions) 	<ul style="list-style-type: none"> 4 times per year during anticipated construction period
			<ul style="list-style-type: none"> During Construction 	<ul style="list-style-type: none"> Frequency depending on site conditions, location of construction, and previous sampling results

Table 6-1 Summary of Monitoring Requirements Associated with the Preferred Undertaking

Location	Net Effect	Monitoring Requirement	Timing of Monitoring	Estimated Frequency of Monitoring
All surface water features that had mini-piezometers (MP2 – MP11) installed as part of the field investigation	<ul style="list-style-type: none"> None – establishing baseline conditions 	<ul style="list-style-type: none"> Monitor the existing mini-piezometers to determine the baseline water level to aid in the determination of groundwater baseflow and gradients 	<ul style="list-style-type: none"> Ongoing until Construction 	<ul style="list-style-type: none"> Quarterly
Groundwater				
Major Mackenzie Drive: Huntington Road to Highway 27	<ul style="list-style-type: none"> None – establishing baseline conditions 	<ul style="list-style-type: none"> Monitor the baseline water levels of the two existing groundwater monitoring wells installed as part of the field investigation 	<ul style="list-style-type: none"> Ongoing until Construction 	<ul style="list-style-type: none"> Quarterly
All locations where construction dewatering may be required	<ul style="list-style-type: none"> Temporary reduction in groundwater levels in water wells within 500 metres of the right-of-way or associated grading will be minimized by installing trench plugs and compensated for by providing alternate water supply to affected well users The loss of any water wells or longer – term reduction of groundwater yield will be compensated for Negligible effect on groundwater quality due to dewatering 	<ul style="list-style-type: none"> Monitor the water level in all shallow (< 15 metres deep) residential wells within 100 metres of the proposed dewatering (within 500 metres if a permit to take water is required) and any new groundwater monitoring wells installed as part of detailed design that are located within 100 metres of the proposed dewatering (well locations to be determined during detailed design) Monitor pre-construction groundwater quality in all shallow (< 15 metres deep) residential wells within 100 metres of the proposed dewatering (within 500 metres if a permit to take water is required) and any new groundwater monitoring wells installed as part of detailed design that are located within 100 metres of the proposed dewatering (well locations to be determined during detailed design) 	<ul style="list-style-type: none"> Pre- Construction 	<ul style="list-style-type: none"> Once a week for a period of four weeks
			<ul style="list-style-type: none"> Construction 	<ul style="list-style-type: none"> Daily for the period of dewatering (anticipated to be a few days at most for each location) and bi-weekly during the rest of construction
			<ul style="list-style-type: none"> Post-Construction 	<ul style="list-style-type: none"> Once a week for a period of four weeks
			<ul style="list-style-type: none"> Pre-Construction 	<ul style="list-style-type: none"> 3 times before the permitting phase, as close to construction as possible
SOCIO-ECONOMIC ENVIRONMENT				
Noise				
All locations where structures (i.e., bridges, railway grade separations) will be constructed in the vicinity (within 100 metres) of residences and other noise-sensitive land uses	<ul style="list-style-type: none"> Disturbance to residences and other noise-sensitive land uses associated with construction of structures will be minimized through BMPs 	<ul style="list-style-type: none"> Monitor noise levels during construction 	<ul style="list-style-type: none"> Pre-Construction Construction 	<ul style="list-style-type: none"> Once Daily during construction of structures
Vibration				
All locations where pile-driving will be required during construction (i.e., bridges, railway grade separations) in the vicinity (within 50 m) of buildings	<ul style="list-style-type: none"> Disturbance to buildings associated with pile-driving will be minimized through BMPs 	<ul style="list-style-type: none"> Carry out a survey of building(s) including identified built heritage features within 50 metres of pile-driving activity prior to construction to document structural conditions Monitor vibration levels during construction (this would include installation of vibration monitors inside building(s) as well) 	<ul style="list-style-type: none"> Pre-Construction 	<ul style="list-style-type: none"> Once
			<ul style="list-style-type: none"> Construction 	<ul style="list-style-type: none"> Daily during pile-driving activities

Table 6-1 Summary of Monitoring Requirements Associated with the Preferred Undertaking

Location	Net Effect	Monitoring Requirement	Timing of Monitoring	Estimated Frequency of Monitoring
CULTURAL ENVIRONMENT				
Archaeological Resources				
Elder Mills and Coleraine Cemeteries	<ul style="list-style-type: none"> Unmarked grave shafts will be identified within or adjacent to the cemeteries and avoided or relocated in accordance with sub-Section 8.2 of the Ontario <i>Cemeteries Act</i> 	<ul style="list-style-type: none"> Engage a licensed archaeologist to monitor topsoil stripping to check for unmarked grave shafts beyond the visible cemetery perimeter using a Gradall or equivalent machinery to strip topsoil and inspect the subsoil for archaeological deposits 	<ul style="list-style-type: none"> Pre-Construction/ Construction 	<ul style="list-style-type: none"> Once
Major Mackenzie Drive (Islington Avenue to Pine Valley Drive)	<ul style="list-style-type: none"> Disturbance to the Dybal (AIGv-71) and the AIGv-304 archaeological sites will be avoided or minimized, where possible, through completion of a Stage 3 archaeological assessment and Stage 4 mitigation (i.e., avoidance or salvage excavation), if required and through the installation of a fence within the 20 metre protective buffer zone and monitoring within the adjacent 50 metre monitoring zone. 	<ul style="list-style-type: none"> Retain a licensed archaeologist to monitor any construction activities within a 50 metre monitoring zone that may affect cultural resources and submit a Stage 4 (monitoring) archaeological assessment report to the Ministry of Tourism and Culture detailing the results of any monitoring activities 	<ul style="list-style-type: none"> Construction 	<ul style="list-style-type: none"> Daily during construction within the 50 metre monitoring zone
Rutherford Road (Islington Avenue to Pine Valley Drive)	<ul style="list-style-type: none"> Loss of or disturbance to the archaeological site AkGv-307 and the Caragana site - AkGv-72 will be avoided or minimized, where possible, through the completion of Stage 3 archaeological assessment and Stage 4 mitigation (i.e., avoidance or salvage excavation), if required and through the installation of a fence within the 20 metre protective buffer zone and monitoring within the adjacent 50 metre monitoring zone. Disturbance to the ossuary potential zone will be minimized through the monitoring of grading by a licensed archaeologist 	<ul style="list-style-type: none"> Retain a licensed archaeologist to monitor any construction activities within a 50 metre monitoring zone that may affect cultural resources and submit a Stage 4 (monitoring) archaeological assessment report to the Ministry of Tourism and Culture detailing the results of any monitoring activities. Engage a licensed archaeologist to monitor grading, in accordance with the City of Vaughan ossuary burial avoidance protocol. Monitoring would involve a licensed archaeologist working with a Gradall or equivalent machinery to strip topsoil and inspect the subsoil for archaeological deposits 	<ul style="list-style-type: none"> Construction 	<ul style="list-style-type: none"> Daily during construction within the 50 metre monitoring zone
Cultural Heritage Resources				
All locations where built heritage resources will be disturbed by construction activities	<ul style="list-style-type: none"> Disturbance to built heritage resources will be minimized with the implementation of appropriate mitigation measures 	<ul style="list-style-type: none"> Engage a qualified cultural heritage specialist to conduct on-site monitoring to ensure construction operations do not negatively impact character-defining elements of the resource, if mitigation measures are deemed necessary at these locations 	<ul style="list-style-type: none"> Construction 	<ul style="list-style-type: none"> Determined by detailed site analysis, structural assessment, and/or vibration study

6.1.1 Natural Environment

6.1.1.1 Terrestrial Monitoring

The removal of trees and/or vegetation will be off-set through compensation plantings, either within the same location or elsewhere. As a result, where post-construction planting is prescribed, monitoring will target the restoration objective to ensure the success of the program. For example, a plant survivorship monitoring program will be conducted following construction to ensure planting success and will include the following activities:

- a. Site inspection and plan review;
- b. Species identification prior to planting;
- c. Monitoring of plant survivorship to determine;
 - Decline in invasive species;
 - Regeneration of native species;
 - Species composition;
 - Change in vegetation structure and/or cover; and
 - Change in floristic quality.

During tree and/or vegetation removal, site inspections will be conducted to ensure that: the proper protocol is being followed to prevent damage to remaining trees and/or vegetation; and only those plants identified for removal are in fact removed.

6.1.1.2 Aquatic Monitoring

The impairment of surface water quality in a watercourse could affect the aquatic environment. To ensure the success of construction mitigation measures used to prevent surface water impairment, monitoring of all on-site conditions, such as erosion and sediment control measures, spills, and flooding, as well as weather conditions, will take place at all construction sites in or near surface water features.

Fish habitat monitoring will be implemented before and during in-water construction, such as extension or replacement of culverts, to identify any minor or major disturbances caused by construction activities. Any harmful alteration, disruption or destruction (HADD) of fish habitat will be mitigated or compensated for, the implementation and monitoring of which will take place according to Department of Fisheries and Oceans Canada (DFO) authorization and in consultation with TRCA and MNR.

Effects to the thermal character of watercourses due to short-term construction dewatering will be prevented by the implementation of mitigation measures. Thermal monitoring at short-term construction dewatering sites will include the deployment and analysis of data loggers, positioned strategically up- and down-stream of discharge locations, to record stream conditions before and during dewatering events.

6.1.1.3 Surface Water Monitoring

Short-term construction dewatering can cause stream erosion, sedimentation, impairment of surface water quality and short-term loss of stream baseflow. Mitigation measures will be implemented to prevent these actions; however, monitoring will nevertheless be required to ensure their success. Construction dewatering discharge locations will be tested before and during dewatering events using cross-sections, bank erosion pins, and bed material to monitor stream erosion and sedimentation. Water level and stream flow monitoring will also occur at these locations to test watercourse depth and flow speed before, during, and potentially

after construction. Surface water samples from discharge locations will be analyzed for general chemistry (e.g., temperature, pH, dissolved oxygen, and conductivity), suspended solids, turbidity, nutrients and total metals (e.g., copper, iron, zinc and aluminum). These data will be used to determine background watercourse water quality at discharge locations. In conjunction with the streamflow measurements, these data will allow for site-specific loading calculations to determine watercourse assimilation capacity. Where construction occurs in or near a surface water feature, water samples will be analyzed similarly, both before and during construction.

Stream channel re-alignment is required in some locations within the Study Area in order to accommodate the transportation improvements. Mitigation measures to prevent stream erosion and sedimentation will be employed in these locations, requiring cross-sections, bank erosion pins, and bed material to monitor their success following construction.

The ongoing monitoring of mini-piezometers (including those installed in some Study Area watercourses during field investigations) prior to construction activities will be instrumental in determining groundwater baseflow and gradient baseline conditions. Background streamflow and water level measurements are key to establishing monitoring criteria that are based on natural stream conditions and not estimated target streamflow. As background monitoring continues, streamflow criteria will be developed that protect the healthy and natural function of the aquatic habitat in the rivers, streams and creeks that intersect the transportation improvements. These criteria will be incorporated into a monitoring program complete with mitigation responses to address measured potential adverse environmental effects due to construction.

6.1.1.4 Groundwater Monitoring

Although no loss of groundwater baseflow is expected in any of the watercourses intersecting the transportation improvements, with the implementation of construction mitigation measures; and minimal to no effect on groundwater quantity is anticipated, based on the assumption that construction dewatering will be short-term (i.e., less than five days), groundwater monitoring will continue before, during, and after construction. Actions will include monitoring of: the two existing groundwater monitoring wells; mini-piezometers; all shallow residential wells within 500 metres of proposed short-term dewatering; and new groundwater monitoring wells within 100 metres of proposed short-term dewatering. Monitoring will be implemented prior to and during construction and will be concluded following construction once it has been demonstrated that there are no residual adverse environmental effects.

6.1.2 Socio-Economic Environment

6.1.2.1 Noise

Sample monitoring will be conducted at each new or replacement bridge or railway grade separation location that is within 100 metres of residential or other noise sensitive land uses, during typical construction activity and once all control measures have been implemented for the location. A noise monitor will be located at specific sites identified in this assessment, and noise measurements during construction activity will be compared to the ambient condition without construction activity, to determine the difference in noise level. This noise monitoring sample would be co-ordinated with the first week of construction at the construction site under consideration. Should the noise level difference be sufficient to generate noise complaints, then site-specific noise control measures will have to be identified and implemented to address this. In addition, noise level compliance in accordance with MOE guideline NPC-115 will have to be conducted at each construction site, and for each piece of construction equipment identified in the guideline.

Once sample monitoring has been completed, and any noise issues addressed with the construction activity, a noise monitor will be left at each site during the length of the construction activity to continuously monitor the noise level from the construction. The closest sensitive receptor or residence to the structure will be used as a location for continuous monitoring. Continuous noise monitoring will be evaluated on a daily basis to ensure that noise levels are not exceeded during construction. Status reports will be prepared to update the project on issues or compliance with construction noise levels at the closest sensitive receptor or residence.

6.1.2.2 *Vibration*

Prior to construction, a pre-construction survey of all sensitive receptors of concern for vibration will be carried out. This will include requests to the property owners to access their sites to survey their properties and document the existing conditions of building constructions (including foundations and pools). This documentation will be used in the case where concerns regarding building damage have been made, and where vibration levels at specific buildings and structures may exceed the building damage criteria outlined in this assessment.

Sample monitoring will then be conducted at each new or replacement bridge or railway grade separation location that is within 50 metres of buildings, during typical construction activity. A vibration monitor will be located at specific buildings and structures identified in this assessment, and vibration measurements during pile-driving will be measured at the sensitive receptors of interest and compared to the building damage criteria outlined in this assessment. If vibration levels exceed these limits, then vibration issues will be assessed and specific vibration control measures may be considered as part of the project's ongoing construction. This vibration monitoring sample would be co-ordinated within the first week of construction at each structure under consideration. A status report will be prepared to include all findings from the sample monitoring.

Once sample monitoring has been completed, and any vibration issues addressed with the construction activity, a vibration monitor will be left at each site during the length of the construction activity to continuously monitor the vibration level from the construction. The closest receptors to the structures may be used as a location for continuous monitoring. Continuous vibration monitoring will be evaluated on a daily basis to ensure that vibration levels are not exceeded during construction. Status reports will be prepared to update the project on issues or compliance with construction vibration levels.

6.1.3 *Cultural Environment*

6.1.3.1 *Archaeological Environment*

Construction of the transportation improvements will occur within some areas that potentially contain residual archaeological resources. At these locations, and at locations where there are known archaeological sites, monitoring will be required within a 50 metre zone surrounding the 20 metre protective buffer zone to ensure that mitigation measures designed to protect any remaining archaeological resources are properly implemented and maintained. In archaeologically-sensitive areas where topsoil will be disturbed, such as the Elder Mills and Coleraine cemeteries, the presence of a licensed archaeologist will be required to strip and inspect topsoil and subsoil for any archaeological deposits.

6.1.3.2 *Cultural Heritage Resources*

Detailed site analyses will be carried out for several cultural heritage resources within the Study Area, as described in **Chapter 5**. Should these analyses indicate a need for mitigation, monitoring will be undertaken

at these locations. Monitoring activities will require the presence of a cultural heritage specialist on-site to ensure, for example, that protective bracing is sufficient and that construction operations do not negatively impact character-defining elements of the resource.

6.2 EA Compliance Monitoring

Similar to environmental effects monitoring, a monitoring strategy and schedule was developed to ensure that the commitments made during the Western Vaughan Transportation Improvements IEA will be fulfilled prior to and during the construction, operation, and maintenance of the Preferred Undertaking. With this in mind, York Region has made a number of commitments that will need to be followed through before and during the construction, operation, and maintenance of the transportation improvements based on the effects assessment of the Preferred Undertaking and in response to issues raised and comments received during the Western Vaughan Transportation Improvements IEA.

In accordance with the *Code of Practice for Preparing and Reviewing Environmental Assessments in Ontario*, November 2008, **Table 6-2** lists each of these commitments along with the following information:

- timing of the commitment (i.e., when the commitment will be implemented);
- location within the Study Area (i.e., where the commitment will be implemented)
- section of the EA Report where the commitment is mentioned in greater detail;
- source of the commitment; and
- how the commitment will be monitored for compliance (i.e., fulfilled).

Annual compliance reports will be submitted to the Ministry to report on compliance with the commitments listed in **Table 6-2**, along with any other conditions imposed by the Minister as part of EA approval.

6.3 Updating Provisions for the Preferred Undertaking

As mentioned, it is presently anticipated that the Preferred Undertaking will be implemented over a relatively long period of time (possibly more than twenty years). There is a need to provide provisions within the Western Vaughan Transportation Improvements Individual EA for reviewing the approved Undertaking and associated mitigation / compensation measures to ensure they are still valid given the potential lapse of time from the Minister of the Environment's *Notice of Approval to Proceed with the Undertaking* to the start of detailed design.

If the period of time from the *Notice of Approval to Proceed with the Undertaking* to the start of detailed design for the improvements, or sections of improvements, exceeds ten years, York Region will review the purpose and rationale for the approved improvement and environmental setting to ensure that the approved improvement and associated mitigation / compensation measures are still valid given the context at the time.

The updates will be documented and provided to the MOE's Environmental Assessment and Approvals Branch for inclusion in the public record file within the Ministry for information purposes.

Table 6-2 IEA Commitments and Compliance Monitoring

ID No.	Timing of Commitment	Location	EA Commitment	EA Report Reference	Source of Commitment	EA Compliance Monitoring
1.	Prior to Detailed Design	Major Mackenzie Drive: Huntington Road to Highway 27 - <i>Main Humber River Bridge</i>	Undertake hydraulic investigations to explore options to address the small increase in water levels at the Main Humber River due to the installation of the new bridge.	Section 5.6.1.2	York Region	Confirm that hydraulic investigations have been undertaken
2.	Prior to Detailed Design	All improvements	Assess air quality impacts of 4 additional contaminants of concern and submit the assessment to the MOE for review.	Appendix 4C-8	MOE	Ensure that MOE is consulted on appropriate contaminants to assess and the assessment is completed, documented and provided to MOE for review
3.	Detailed Design	All improvements (or sections of improvements), where detailed design has not been initiated by the 10 year anniversary of EA approval	Undertake and document the following activities prior to initiating detailed design: <ul style="list-style-type: none"> • Confirm the purpose and rationale for the improvement; • Confirm / update existing conditions; and, • Confirm / update environmental effects and mitigation / compensation measures. 	Section 7.6	MOE	Ensure that documentation of any required updates is completed and provided to MOE for their information
4.	Detailed Design	All watercourse structures	Review the design of each structure in coordination with TRCA and refine the design as appropriate.	Section 5.3.1.1	TRCA	Ensure that design of each structure is reviewed in coordination with TRCA and refined as appropriate
5.	Detailed Design	All improvements	Undertake detailed hydrology analyses to identify if stormwater quantity controls are required due to the increase in impervious areas.	Section 7.6	MOE	Confirm that detailed hydrology analyses have been undertaken
6.	Detailed Design	All improvements	Develop the stormwater management strategy for quality and quantity control for each section of roadway, in consultation with the MOE and TRCA	Section 5.3.1.2	MOE / TRCA	Ensure that MOE and TRCA are consulted on the stormwater management strategy for quality and quantity control for each section of roadway
7.	Detailed Design	All improvements	Obtain the permits and approvals as per Chapter 8, as applicable.	Chapter 8	York Region	Confirm that permits and approvals for the Preferred Undertaking are obtained, as applicable.
8.	Detailed Design	All improvements	Notify affected property owners in locations where property is required to construct the Preferred Undertaking.	Section 7.8	York Region	Ensure that affected property owners are notified during detailed design.
9.	Detailed Design	All improvements	Prepare an Environmental Management Plan(s) (EMP) where required to support permit and approval applications, including compensation and restoration requirements, based on the mitigation/compensation measures identified in Table 5-8 and monitoring requirements identified in Table 6-1 as part of the detailed design process.	Section 5.6	York Region / TRCA	Confirm that an EMP has been prepared and submitted to TRCA for review and approval prior to the start of construction for each road/transit corridor.

Table 6-2 IEA Commitments and Compliance Monitoring

ID No.	Timing of Commitment	Location	EA Commitment	EA Report Reference	Source of Commitment	EA Compliance Monitoring
10.	Detailed Design	All improvements	Complete a contaminated sites screening survey within the future right-of-way during detailed design to determine if there are any undocumented contaminated properties/waste disposal sites. If required, complete a Phase I and/or Phase II Environmental Site Assessment (ESA) to determine the specific location and extent of any identified contaminated properties and to recommend appropriate avoidance/mitigation strategies.	Section 5.6	York Region	Confirm that a contaminated sites screening survey has been completed within the future right-of-way during detailed design and that further Phase I and/or Phase II ESAs be undertaken if required
11.	Detailed Design	All improvements	Conduct a tree inventory to determine the species, quantity and quality of the trees to be removed.	Section 5.6	York Region	Confirm that a tree inventory has been conducted in areas where trees will be removed
12.	Detailed Design	All improvements	Develop a vegetation restoration/recovery plan(s) that considers the cumulative effects of each improvement and the potential for off-site restoration, in discussion with TRCA and other appropriate agencies as required.	Section 5.6	York Region / TRCA	Ensure that a restoration / recovery plan is developed in discussion with TRCA and other appropriate agencies as required.
13.	Detailed Design	All improvements	Develop an edge management plan to reduce the effect of creating a new edge along forests and woodlots.	Section 5.6	York Region	Confirm that an edge management plan has been prepared
14.	Detailed Design	Major Mackenzie Drive: Highway 50 to Huntington Road Huntington Road to Highway 27 Highway 27 to Islington Avenue Rutherford Road: Huntington Road to Highway 27 Weston Road: Rutherford Road to Langstaff Road Highway 27: Nashville Road to Major Mackenzie Drive Major Mackenzie Drive to Rutherford Road Highway 7 to Steeles Avenue	Develop enhancement/compensation measures related to permanent removal or alteration of fish habitat due to watercourse modifications, in co-ordination with TRCA and other appropriate agencies as required.	Section 5.6.1.1, 5.6.1.2, 5.6.1.3, 5.6.2.2, 5.6.3.2, 5.6.4.1, 5.6.4.2, and 5.6.4.5	York Region / TRCA	Confirm that enhancement/compensation measures were developed during detailed design in coordination with TRCA and other appropriate agencies
15.	Detailed Design	Major Mackenzie Drive: Huntington Road to Highway 27 Islington Avenue to Pine Valley Drive Pine Valley Drive to Highway 400 Rutherford Road: Huntington Road to Highway 27	Complete a Stage 2 archaeological assessment to determine the presence of archaeological sites in areas exhibiting archaeological potential, as described in Chapter 5	Section 5.6.1.2, 5.6.1.4, 5.6.1.5, and 5.6.2.2	York Region	Confirm that Stage 2 archaeological assessment has occurred in areas exhibiting archaeological potential and reports have been submitted to the Ministry of Tourism and Culture

Table 6-2 IEA Commitments and Compliance Monitoring

ID No.	Timing of Commitment	Location	EA Commitment	EA Report Reference	Source of Commitment	EA Compliance Monitoring
16.	Detailed Design	Major Mackenzie Drive: Highway 50 to Huntington Road Rutherford Road: Huntington Road to Highway 27	Undertake a Stage 3 archaeological assessment, involving mechanical topsoil stripping under archaeological supervision, to check for unmarked grave shafts at the Elder Mills (CHR 317) cemetery prior to the completion of detailed design.	Section 5.6.1.1 and 5.6.2.2	York Region	Confirm that a Stage 3 archaeological assessment has occurred at Elder Mills (CHR 317) cemetery and that a report has been submitted to the Ministry of Tourism and Culture
17.	Detailed Design	Major Mackenzie Drive: Highway 50 to Huntington Road Rutherford Road: Highway 50 to Huntington Road	Coordinate detailed design of Major Mackenzie Drive and Rutherford Road to the west of Highway 427 (including the intersections at Highway 50) with Peel Region	Section 7.6.4	Peel Region	Ensure that detailed design of Major Mackenzie Drive and Rutherford Road to the west of Highway 427 (including the intersections at Highway 50) is coordinated with Peel Region
18.	Detailed Design	Major Mackenzie Drive: Highway 50 to Huntington Road	Conduct photographic documentation of the Coleraine cemetery by a qualified heritage professional for the purposes of recording the property's current setting.	Section 5.6.1.1	York Region	Confirm that photographic documentation has occurred
19.	Detailed Design	Major Mackenzie Drive: Highway 50 to Huntington Road Rutherford Road: Huntington Road to Highway 27	Conduct a vibration study to determine potential damage to the monument/any gravestones (should avoidance of the interior of the Coleraine cemetery not be possible)	Section 5.6.1.1 and 5.6.2.2	York Region	Confirm that vibration study has occurred should avoidance of a monument within the Coleraine cemetery and to grave stones at the Elder Mills cemetery not be possible
20.	Detailed Design	Major Mackenzie Drive: Pine Valley Drive to Highway 400 Rutherford Road: Huntington Road to Highway 27 Highway 27 to Islington Road Islington Road to Pine Valley Drive Pine Valley Drive to Weston Road Weston Road All Improvements Highway 27 Nashville Road to Major Mackenzie Drive Major Mackenzie Drive to Rutherford Road Langstaff Road to Highway 7 Highway 7 to Steeles Ave	Conduct a water well survey to confirm the location of wells within the right-of-way or associated grading and to determine if they are active	Section 5.6.1.5 5.6.2.2 5.6.2.3 5.6.2.4 5.6.2.5 5.6.3 5.6.4.1 5.6.4.2 5.6.4.4 5.6.4.5	York Region	Confirm that a water well survey has been conducted

Table 6-2 IEA Commitments and Compliance Monitoring

ID No.	Timing of Commitment	Location	EA Commitment	EA Report Reference	Source of Commitment	EA Compliance Monitoring
21.	Detailed Design	<p>Major Mackenzie Drive: Huntington Road to Highway 27 Islington Avenue to Pine Valley Drive Pine Valley Drive to Highway 400</p> <p>Rutherford Road: Highway 27 to Islington Avenue</p> <p>Highway 27 Major Mackenzie Drive to Rutherford Road Langstaff Road to Highway 7</p> <p>Pine Valley Drive Highway 7 to Steeles Ave.</p>	Conduct a water well survey to confirm the location of wells within 100 metres of the road improvements (and up to 500 metres if a PTTW is required) and determine if they are active	Section 5.6.1.2 5.6.1.4 5.6.1.5 5.6.2.3 5.6.4.2 5.6.4.4 5.6.5	York Region	Confirm that a water well survey has been conducted
22.	Detailed Design	<p>Major Mackenzie Drive: Huntington Road to Highway 27 Pine Valley Drive to Highway 400</p> <p>Highway 27: Major Mackenzie Drive to Rutherford Road</p>	Drill boreholes in the proposed locations for structure piles/foundations to confirm soil characteristics and to determine requirements for groundwater dewatering and Permit to Take Water (PTTW), if applicable	Section 5.6.1.2, 5.6.1.5, and 5.6.4.2	York Region	Confirm that boreholes have been drilled in the proposed locations for structure piles / foundations
23.	Detailed Design	<p>Major Mackenzie Drive: Huntington Road to Highway 27 Pine Valley Drive to Highway 400</p> <p>Highway 27: Major Mackenzie Drive to Rutherford Road</p>	Install groundwater monitoring (observation) wells within 100 metres of proposed dewatering locations	Section 5.6.1.2, 5.6.1.5, and 5.6.4.2	York Region	Confirm that groundwater monitoring wells have been installed within 100 metres of proposed dewatering locations
24.	Detailed Design	<p>Major Mackenzie Drive: Huntington Road to Highway 27</p>	Complete a Phase I and/or Phase II ESA to determine the specific location of the closed Waste Disposal Site No.230602 and design the alignment to avoid it.	Section 5.6.1.2	York Region	Ensure that Phase I or II ESA has been completed and that alignment has been designed to avoid site
25.	Detailed Design	<p>Major Mackenzie Drive: Huntington Road to Highway 27</p>	Continue to work with the developer of approved Draft Plan of Subdivision (19T-88095 - Lake Rivers Inc.) and the City of Vaughan to provide access to the new alignment of Major Mackenzie Drive.	Section 5.6.1.2	York Region and the City of Vaughan	Ensure that access from the approved Draft Plan of Subdivision to the new alignment of Major Mackenzie Drive is provided.
26.	Detailed Design	<p>Major Mackenzie Drive: Islington Avenue to Pine Valley Drive</p> <p>Rutherford Road: Islington Avenue to Pine Valley Drive</p>	<p>Undertake the following measures for the Dybal site - AIGv-71, and site AkGv-307:</p> <ul style="list-style-type: none"> Undertake a Stage 3 archaeological assessment should it be determined during detailed design that construction activity will take place within the 20 metre protective buffer zone, and consult with Aboriginal communities in accordance with Ministry of Tourism and Culture guidelines; A Stage 4 mitigation (i.e., avoidance or salvage excavation) will be completed, if required, following the Stage 3 archaeological assessment. 	Section 5.6.1.4 and 5.6.2.4	York Region / TRCA	Confirm that a Stage 3 archaeological assessment (and Stage 4 archaeological assessment if required) has occurred for AIGv-71 and AkGv-307 and that reports have been submitted to the Ministry of Tourism and Culture.

Table 6-2 IEA Commitments and Compliance Monitoring

ID No.	Timing of Commitment	Location	EA Commitment	EA Report Reference	Source of Commitment	EA Compliance Monitoring
27.	Detailed Design	Major Mackenzie Drive: Islington Avenue to Pine Valley Drive	Undertake the following measures for the AIGv-304 archaeological site <ul style="list-style-type: none"> Undertake a Stage 3 archaeological assessment within the portion of the 20 m protective buffer zone located within the Region's right-of-way; A Stage 4 mitigation (i.e., avoidance or salvage excavation) will be completed, if required, following the Stage 3 archaeological assessment. Invite a First Nations liaison(s) to participate in the assessment prior to construction; and, 	Section 5.6.1.4	York Region / TRCA	Confirm that a Stage 3 archaeological assessment (and Stage 4 archaeological assessment if required) has occurred for AIGv-304 and that a report has been submitted to the Ministry of Tourism and Culture. Confirm that a First Nations liaison(s) has been invited to participate in the assessment
28.	Detailed Design	Major Mackenzie Drive: Pine Valley Drive to Highway 400 Weston Road: Rutherford Road to Langstaff Road	Discuss the possibility of providing access to the approved Draft Plans of Subdivision 19T-97V23 and 19T-03V03 and to the Draft Plans of Subdivision 19T-87014, 19T-89001 and 19T-09V01 with the City of Vaughan	Section 5.6.1.5 and 5.6.3.2	York Region and the City of Vaughan	Confirm that discussions with the City of Vaughan occurred regarding providing access to the Draft Plans of Subdivision
29.	Detailed Design	Major Mackenzie Drive: Pine Valley Drive to Highway 400 Rutherford Road: Huntington Road to Highway 27 Islington Avenue to Pine Valley Drive Highway 27: Rutherford Road to Langstaff Road	Undertake detailed site analysis and archival research (as part of a Cultural Heritage Evaluation and/or Heritage Impact Assessment) of the following resources / landscapes to determine their specific heritage significance and to develop appropriate mitigation measures (should avoidance of the resources / landscapes not be possible): CHR 329, CHR 325, CHR 317, CHR 94, CHR 318, CHR 109, CHR 245, and CHR 315	Section 5.6.1.5, 5.6.2.2, 5.6.2.4 and 5.6.4.3	York Region	Confirm that site analysis and archival research has occurred should avoidance of the resources / landscapes not be possible and Cultural Heritage Evaluations and/or Heritage Impact Assessment are submitted to MTC for review
30.	Detailed Design	Rutherford Road: Huntington Road to Highway 27 Highway 27: Rutherford Road to Langstaff Road	Conduct a survey of the area associated with the realignment of the CP Rail line to determine the presence of any cultural heritage resources associated with CHR 282.	Section 5.6.2.2 5.6.4.3.	York Region	Confirm that a survey of the area associated with the realignment of the CP Rail line has been undertaken
31.	Detailed Design	Rutherford Road: Highway 27 to Islington Avenue	Discuss the possibility of providing an off-road bicycle path on Rutherford Road near the Emily Carr Secondary School with the City of Vaughan.	Appendix 7E	Local Residents	Confirm that discussions with the City of Vaughan occurred regarding the possibility of providing an off-road bicycle path on Rutherford Road, near the Emily Carr Secondary School
32.	Detailed Design	Rutherford Road: Pine Valley Drive to Weston Road	Discuss the possibility of providing streetscaping between Rutherford Road and neighbouring residences from Weston Road to Pine Valley Drive with the City of Vaughan.	Appendix 7G-2	Local Residents	Confirm that discussions with the City of Vaughan occurred regarding streetscaping along Rutherford Road, between Weston Road and Pine Valley Drive
33.	Detailed Design	Weston Road: Major Mackenzie Drive to Rutherford Road	Conduct structural assessments and vibration analyses of CHR 1 and CHR 2 to develop appropriate conservation measures	Section 5.6.3.1	York Region	Confirm that structural assessments and vibration analyses were undertaken

Table 6-2 IEA Commitments and Compliance Monitoring

ID No.	Timing of Commitment	Location	EA Commitment	EA Report Reference	Source of Commitment	EA Compliance Monitoring
34.	Detailed Design	Weston Road: Major Mackenzie Drive to Rutherford Road	Design post-construction landscaping plans for CHR 1, CHR 2, and CHR 145 in a manner sympathetic with the cultural heritage values of the properties.	Section 5.6.3.1	York Region	Confirm that landscaping plans were developed in a manner sympathetic with the cultural heritage values of the properties during detailed design
35.	Detailed Design	Weston Road: Major Mackenzie Drive to Rutherford Road	Conduct photographic documentation of CHR 145 by a qualified heritage professional (if removal of fencing and vegetative cover cannot be avoided).	Section 5.6.3.1	York Region	Confirm that photographic documentation by a qualified heritage professional was undertaken if removal of fencing and vegetative cover could not be avoided
36.	Pre-construction	Major Mackenzie Drive: Islington Avenue to Pine Valley Drive	Invite all First Nations representatives who were notified during the EA to participate in the assessment of the AIGv-304 archaeological site and any other archaeological sites identified through future Stage 2 archaeological assessments prior to topsoil disturbance at those locations.	Section 5.6.1.4	TRCA	Ensure that an invitation to participate in the assessment of the AIGv-304 archaeological site and any other archaeological sites identified through future Stage 2 archaeological assessments is extended to First Nations prior to topsoil disturbance at those locations.
37.	Construction	All improvements	Notify property owners within 500 metres of the Preferred Undertaking of planned construction activities	Section 7.8	York Region	Ensure that property owners within 500 metres of the Preferred Undertaking are notified of planned construction activities
38.	Construction	Major Mackenzie Drive: Islington Avenue to Pine Valley Drive Rutherford Road: Islington Avenue to Pine Valley Drive	Undertake the following measures for two archaeological sites on Major Mackenzie Drive (Dybal site (AIGv-71) and the AIGv-304 site) and two sites on Rutherford Road (AkGv-307 and AkGv-72): <ul style="list-style-type: none"> Erect a fence within the 20 metre protective buffer zone to protect the archaeological sites and send photographs of the fence to the Ministry of Tourism and Culture during construction; and, Retain a licensed archaeologist to monitor any construction activities within a 50 metre monitoring zone that may affect cultural resources and submit a Stage 4 (monitoring) archaeological assessment report to the Ministry of Tourism and Culture detailing the results of any monitoring activities. 	Section 5.6.1.4 and 5.6.2.4	York Region / TRCA	Ensure that photographs of the fence erected within the 20 metre protective buffer zone for AIGv-71, AIGv-304, AkGv-307 and AkGV-72 sites are sent to the Ministry of Tourism and Culture. Confirm that a Stage 4 (monitoring) archaeological assessment report has been submitted to the Ministry of Tourism and Culture for AIGv-71, AIGv-304, AkGv-307 and AkGV-72 sites.

Table 6-2 IEA Commitments and Compliance Monitoring

ID No.	Timing of Commitment	Location	EA Commitment	EA Report Reference	Source of Commitment	EA Compliance Monitoring
39.	Construction	Rutherford Road: Highway 27 to Islington Avenue Islington Avenue to Pine Valley Drive	Monitor the grading within ossuary potential zones by a licensed archaeologist, in accordance with the ossuary burial avoidance strategy developed for the City of Vaughan.	Section 5.6.2.3 and 5.6.2.4	York Region	Ensure that a licensed archaeologist is present to monitor grading within ossuary potential zones in accordance with the ossuary burial avoidance strategy developed for the City of Vaughan.