

4. PREFERRED PROJECT ENVIRONMENTAL IMPACTS AND MITIGATION

The implementation of the EtoBicoke-Finch West LRT may result in both positive and negative effects. Mitigation of negative effects has been considered through the course of the study, including screening of the corridor alternatives and the development of the preferred design. However, given that some negative effects cannot be totally avoided, mitigation measures are required during construction and during LRT operations. The anticipated or potential environmental effects and the associated mitigation measures are described in the following sections and summarized in Exhibit 4-1.

4.1 Toronto Environmental Plan

In addition to the Toronto Official Plan there is a second City policy document, the Environmental Plan that is important to this process. This contains a comprehensive and wide ranging set of actions to improve the health of the natural environment. These include:

- 1. Protect
 - Conserve our environment capital and live off the interest; and
 - Protect the healthy elements of our natural environment.
- 2. Prevent
 - Anticipate and prevent pollution of the air, land and water; and
 - Be cautious in dealing with possible impacts on human and environmental health.
- 3. Reduce consumption of natural resources and strive for greater self-sufficiency.
- 4. Restore
 - Regenerate and naturalize degraded habitats and linked green spaces;
 - Remediate contaminated soils, groundwater and sediments; and
 - Restore hydrological cycles, watersheds and river systems.
- 5. Integrate environmental factors into decisions.

These principles provide the foundation for the development of the plan for the EtoBicoke-Finch West LRT.

4.2 Environmental Benefits of LRT

The EtoBicoke-Finch West LRT project will accomplish the desired improvements envisioned in the goal statement for the comprehensive Transit City program. These include enhancing the attractiveness of public transit services to reduce dependence on private automobile travel in the city. The program also encourages better urban form and design by directing growth to activity centres well served by transit. The attainment of these goals improves environmental conditions in the City of Toronto by providing mobility and access to key urban nodes at a lower environmental cost, thus raising the sustainability of the city.

In general, the benefits of a well developed transit system for the health and vitality of big cities are well documented. Transit helps cities to be more liveable and vibrant by:

- ensuring that transit is a more attractive travel option by improving travel times, comfort, and reliability of service;

- increasing the people movement capacity in all corridors, generally without the widening of roadways and in an environmentally sound manner, so that the population can take advantage of the employment, educational, recreational, and many other opportunities cities offer;
- providing alternative travel choices for non-drivers, including transit and enhanced environments for cycling and walking;
- providing opportunities to include urban design and streetscaping features in the construction of the LRT line;
- improving air quality and, in doing so, improving people's health and their ability to enjoy outdoor spaces and activities;
- freeing up road space for goods movement and reducing the wear-and-tear on city roads and the need to spend tax dollars on repairing and expanding road infrastructure; and
- ensuring long-term economic stability and environmental sustainability by reducing climate-changing emissions and reliance on fossil fuels.

A recent study named “Greenhouse Gases and Air Pollutants in the City of Toronto-Toward a Harmonized Strategy for Reducing Emissions, 2007” outlines the sources of greenhouse gases and air pollutants in the City of Toronto and indicates that close to 40 per cent of greenhouse gas emissions originate from the transportation sector. The vast majority of these emissions are from cars and trucks. Encouraging residents to choose alternatives to the automobile for as many trips as possible must be a vital part of any action plan to reduce harmful emissions and address climate change. It is expected that the construction of the EtoBicoke-Finch West LRT (EFWLRT) project will result in a reduction of emissions of all transportation related pollutants. Gaseous pollutants from within the study area corridor and particulate based pollutants will be reduced, as will carbon dioxide equivalent emissions (CO2-e), which is the unit of measure for global warming potential.

Light-rail transit technology, as proposed in this study, offers significant benefits with respect to the environment and city-building, including:

- Provision of premium quality service – quiet, smooth, comfortable, fast, and reliable – which attracts people to ride transit;
- Highly energy-efficient technology: light rail vehicles produce 92 per cent less CO2 than autos and 83 per cent less CO2 than diesel buses, and produce zero local-area or “tailpipe” emissions;
- Ample capacity for projected ridership in all proposed corridors, with the capability to expand to meet increasing demands;
- Demonstration of long-term and substantial commitment to quality transportation, to instil the confidence that landowners and investors need to invest in development and city-building, and the confidence that residents need to choose a transit-oriented lifestyle;
- Creation of a strong and highly-recognizable presence that signifies the availability of high-quality transit; and
- Association with Toronto's streetcar heritage and the positive connotations that streetcars bring to the City and its transit system.

4.3 Transportation Impacts

4.3.1 TRANSIT IMPACTS

The Etobicoke-Finch West LRT service would replace the main part of the 36 Finch West bus route on Finch Avenue between Finch Station and Highway 27.

Service on Humberwood Boulevard, Humberline Drive, and Humber College Boulevard, which is currently provided by the 36B Finch West (Finch Station-Humberwood) branch, would be retained. The limited service on Toryork Drive and Milvan Drive, which is currently provided by the 36D Finch West (Finch Station-Weston Road & Milvan) branch, would be retained. Overnight service, which is currently provided by the 309 Finch West (Finch Station-Woodbine Racetrack) route, would be retained. The limited service provided on York Gate Boulevard by the 36C Finch West (Finch Station-Jane) short turn branch would be eliminated. The limited service provided on Kipling Avenue and Albion Road by the 36A Finch West (Finch Station-Kipling) short turn branch would be eliminated.

Construction/Operations Impacts

Bus transit service will be retained and given road priority during the construction of the LRT. In addition, pedestrian management plans will be developed to support pedestrian access to bus service during construction. The Finch West 36B, 36D and 309 Finch West bus service will be maintained after the implementation of the LRT. All other Finch West service will be replaced by the new LRT service.

Mitigation Measures

LRT stop spacing will provide reasonable access to improved transit service.

Monitoring Plans

The details of how these services will be configured in the future will be the subject of analysis using the TTC's established Service Standards process, which will be undertaken approximately one year before the LRT service begins. This process includes opportunities for public consultation. All route changes require formal approval at a public meeting of the Toronto Transit Commission.

All other TTC services that intersect the Etobicoke-Finch West LRT would be unaffected by the operation of the LRT.

4.3.2 TRAFFIC IMPACTS

In general, the roadway space along Finch Avenue West will be maintained in its current configuration of general purpose through lanes with the advent of the Etobicoke-Finch West LRT project. The majority of the existing road corridor is two lanes wide in each direction for general purpose traffic. When the LRT right-of-way is constructed in the median of the road, the road will be reconstructed to accommodate the same two lanes per direction. Between Jane Street and Weston Road near the CPR line, which currently provides three lanes in each direction, the same 3 lanes will be maintained in the future for the majority of this section.

At existing non-signalized intersections and driveways there will be a right in/right out arrangement to ensure safe LRT operation by not permitting crossing of the alignment by motor vehicles. The preferred design has carefully considered each location to ensure that either an existing or new signalized intersection is nearby to provide a convenient U-turn opportunity. There will be some effect on the capacity for automobile movements because of the reassignment of some left-turn traffic to U-turn manoeuvres at signalized intersections. LRT operation will also affect the signalized intersection capacity since LRT vehicles will be given preferred protected treatment.

Even though peak hour congestion for general purpose traffic is expected to increase at some locations, the total people-carrying capacity of the corridor will be increased by introducing LRT service. Current drivers of personal motorized vehicles could be converted to transit users or use other roadways. Bicycle lanes will be provided along the LRT corridor to provide an alternate travelling mode for non-drivers.

Fire/Police/Emergency services will continue to operate at current service levels with LRT in place in the Etobicoke-Finch West corridor. The track area of the LRT will be paved and emergency vehicles can utilize this right-of-way to avoid traffic congestion.

Construction/Operations Impacts

Through commuting via Finch Avenue West will be discouraged during construction and during off peak times, service road lanes may be reduced to one in either direction in some sections. Mid block left turn lanes will be eliminated for road users with full operation of the LRT.

Mitigation Measures

Several mitigation strategies were considered at specific locations, some of which were accepted by the City of Toronto and, in the case of proximity to Highway 400, the Ontario Ministry of Transportation. In other cases, the City considered the associated negative impacts on urban design and other non-traffic aspects of the proposals to be unacceptable at this time. There is potential to initiate further mitigations in the future following review of traffic conditions. The traffic analysis is discussed in detail in Appendix C, which contains the existing and future traffic volumes and levels of service, and Appendix D, which reports the microsimulation modeling results on the Highway 400 interchange at Finch Avenue West,

Bicycle lanes will be provided along the LRT corridor to provide an alternate travelling mode for non-drivers.

Further review of traffic operations will contribute to recommended optimized intersection treatments in the area of capacity constraints to provide for the effective operations of LRVs, pedestrian and vehicular traffic.

TTC will continue to work with Fire, Police and EMS staff to develop a coordinated design to facilitate the movement of emergency vehicles. As a step towards accommodating emergency vehicles' entry/exits, modifications to the LRT right-of-way could include provision of actuated traffic signals, adjusting pole locations or lowering the raised right-of-way at the driveways of fire, police and ambulance stations.

Monitoring Plans

City Transportation Services will monitor traffic operation and consider further measures to mitigate delays if and when necessary.

4.3.2.1 Bridges and Structures

Preliminary engineering work has begun on the assessment of the modifications required to accommodate the cross-sections for all users (LRT, general traffic, bicycles, and pedestrians). No bridge replacement is foreseen at this time, although some construction impacts may occur at the West Don River bridge. The West Don River culvert is being evaluated to determine its structural adequacy for the LRT widening using perched embankments. The Black Creek culvert has been evaluated and preliminary results indicate that it is adequate for the standard LRT cross-section; however, a potential new intersection at a proposed development east of the creek will make its own demands on the cross-section of the culvert and its fill. An additional LRT stop suggested for this location will not be proposed by TTC nor encouraged by TRCA. The bridge that carries both Finch Avenue West and Islington Avenue over the East Humber River will require modest extensions at two corners of the structure. Details of the initial assessment of the impacts of the LRT on bridge and culvert widths can be found in the Structural Review, Appendix K.

Construction/Operations Impacts

Potential required structural changes to the West Don River bridge are still being determined and will depend on the final design. Should alterations be required that impact the river, the applicable permits will be obtained as further outlined in the navigable waters section below. No operations impacts are anticipated for any of the bridge crossings at this time.

Construction access, staging plans and assessments of the temporary construction impacts on vegetation communities will be prepared for the widening of the West Don River bridge, the Islington Bridge over the Humber River, and other structures if applicable.

Condition surveys of buildings, structures, and railway protection and monitoring will be undertaken prior to construction initiation.

Designated Substances Surveys for any buildings or structures that require demolition will be undertaken. Construction contract documents will include this provision.

Mitigation Measures

During the design stage, a structural analysis of the existing bridge structures where the LRT tracks will be incorporated will be undertaken to identify any potential structural modifications that may be required. The structural analysis will take into account the bridge expansion joints, impact of LRT loading and axle spacing, track infill details (depth, width, light-weight infill), pole arrangement/load etc.

Due to the potential ecological and hydraulic impacts associated with the proposed widening of the West Don River bridge, abutment protection against channel migration may need to be provided for the bridge widening and other structures. The design of the abutments will be provided to the TRCA for review.

Permit applications for in water works will be sought should they be required as a result of final design.

Monitoring Plans

The City of Toronto has an asset management plan for all structures in order to monitor their conditions. Structures within the EFWLRT right-of-way would be monitored in this manner.

4.4 Natural Environment

4.4.1 VEGETATION AND VEGETATION COMMUNITIES

The vegetation communities identified in the study area are clustered around the Humber River and the Don River valleys. These communities are predominantly cultural, meaning that they originate from or are maintained by anthropogenic influences. Further disturbance to these communities is not likely to result in any significant negative impacts to the existing vegetation. The only noted natural vegetation community type, a dry-fresh sugar maple-beech deciduous forest unit, is located away from the road and is largely separated from Finch Avenue West by the G. Ross Lord Reservoir. This unit will not be affected by the proposed LRT.

Butternut, an endangered species protected by federal and provincial species at risk legislation, occurs in the vicinity of the NE and SE corners of the Dufferin/Finch intersection. However, the proposed LRT does not directly impact

these trees, and prominent tree protection barriers will be installed should construction activities take place in their vicinity.

The NHIC identified two other plant species of conservation concern historically associated with the study area: mousetail (*Myosurus minimus*) and scarlet beebalm (*Monarda didyma*) (“imperilled” and “vulnerable” respectively, not regulated). While suitable habitat for these species may still exist in the vicinity of the study area, it is significantly reduced due to urban expansion and development. These species are not likely to occur in the Finch Avenue West right-of-way, and will therefore not be affected by the proposed LRT.

Construction/Operations Impacts

Minimal vegetation removal from urban areas is required to accommodate road widening. Ditching, grading and other drainage modifications may alter local soil moisture regimes. LRT operations are not anticipated to have any future impacts on vegetation communities.

Mitigation Measures

The quantity and species of vegetation to be removed will be determined during the design phase of the LRT system. However, it is estimated that some vegetation removal will be required in the corridor to accommodate localized road widening. This will mainly occur in urban settings and will affect common roadside plant species and street trees. To compensate for these losses, a landscape plan will be prepared detailing the locations of new street trees to be planted and replacements for street trees that are removed during construction. In addition, the following mitigation measures will be considered to further reduce the impacts of the LRT on study area vegetation:

- Reduce grading requirements to the minimal amount possible;
- Implement retaining walls, guide rails, and other measures where appropriate to avoid the need for vegetation removal; and
- Install tree protection barriers around any trees to be retained in the construction zones.

Vegetation protection/restoration/compensation plans will be prepared and implemented. Plant inventory for the rate or uncommon plant species and site-specific measures will be prepared to minimize displacement or disturbance effects.

Monitoring Plans

Future activities and monitoring of this work will include the restoration of vegetation areas disturbed during construction with native vegetation, where feasible. Compensation for vegetation removal at a 3:1 restoration will be required to meet TRCA regulations.

4.4.2 AQUATIC HABITAT AND COMMUNITIES

Work in and around water features containing fish and fish habitat have the potential to result in the harmful alteration, disruption or destruction (HADD) of fish habitat as defined in the Fisheries Act. HADD includes any changes that prevent the physical, biological or chemical attributes of fish habitat from providing food, reproduction, cover and movement corridors, or any change in fish habitat that reduces its capacity to support one or more of life processes of fish (DFO 1998). There is some evidence that the provincially and nationally endangered redbside dace (*Clinostomus elongatus*) is still present in the Humber River watershed. However, typical habitat requirements for the redbside dace were not present in the study area, and it is unlikely that the redbside dace is present within the study area of the East Humber River.

More detail on individual water crossings and the impacts associated with each will be provided as part of the design phase of this assignment.

Construction/Operations Impacts

Impacts associated with various construction operations such as excavation, bridge expansion work, excess material storage, equipment maintenance activities, and wastewater management all have the potential to negatively affect aquatic resources within the study area. In-water work may be required at the West Don River Bridge for widening to accommodate the proposed LRT cross section. It is not, however, anticipated that future LRT operations will have any negative impacts on aquatic environments.

Mitigation Measures

Aquatic habitat and fish data collection studies will be undertaken if and when detailed design of the LRT system indicates disturbance of watercourses.

Environmental protection measures to avoid and/or minimize impacts to the aquatic resources within as well as downstream of the study limits include:

- Prohibit in-water work from March 15th to July 1st to protect spawning fish, maintain viability of incubating eggs, and minimize disturbance to fish during critical periods;
- Isolate work areas from the open portion of the watercourse by conducting work “in the dry” using a temporary water passage system and/or cofferdams;
- Direct dewatering effluent to a suitable filtering mechanism (sediment basin, sediment filtering bag etc.) prior to release downstream;
- Conduct equipment maintenance and refuelling activities away from watercourses and watercourse banks;
- Provide erosion and sediment control measures such as straw bale flow checks, silt fence, and temporary rock flow checks;
- Ensure the safe removal and relocation of fish and provide screening on intake pumps to prevent entrainment of aquatic species;
- Place stockpiles well away from watercourses and watercourse banks and ensure material is stabilized to prevent entry into watercourses;
- Conduct work in a continuous fashion to minimize the duration of potential impacts and maintain the area of disturbance to a minimum; and
- Prohibit any diversion or blockage of watercourses with the exception of site specific temporary water passage systems and/or cofferdams.

TRCA, the local conservation authority has a Level 3 agreement in place with the Department of Fisheries and Oceans (DFO). The TRCA will review the final impact assessment on fish and fish habitat and will make the determination as to whether this project with the implementation of mitigation measures will result in a HADD of fish and fish habitat. It is anticipated that the implementation of mitigation measures will minimize the impacts to the aquatic resources and will not result in a HADD.

Monitoring Plans

An environmental monitoring plan for mitigating the natural environment during dewatering will be prepared if needed.

4.4.2.1 Navigable Waters

Navigation at the West Don River bridge may be affected during construction as minor in-water works associated with abutment widening are anticipated at this location. The TTC is currently in consultation with Transport Canada to determine navigability of the identified watercourses throughout the project limits. Should Transport Canada require an authorization under the Navigable Waters Protection Act, a permit will be obtained and the Contractor will be required to adhere to the requirements of the authorization. Construction contract document requirements will include maintaining a navigational envelope during construction and appropriate signage both upstream and downstream to warn the public of upcoming construction. Additional requirements may also include public notice of commencement and completion of construction.

Construction/Operations Impacts

No in water construction works impacting navigable waterways are anticipated at this time. However, mitigations measures as outlined below will be put in place if required. No operations impacts are anticipated to navigable waterways with the implementation of the LRT.

Mitigation Measures

Potential impacts include a temporary reduction in navigable areas during construction and an associated disruption of waterway traffic. Appropriate mitigation measures will be determined in consultation with Transport Canada during the permit application process.

Where widening of watercourse crossings potentially affects the watercourse, such as the West Don River bridge crossing, hydraulic assessments will be undertaken during the design stage using the latest floodplain mapping and model provided by TRCA. The details of the required analysis will be discussed with the TRCA during the design stage.

Monitoring Plans

No monitoring plans for navigable waterways are anticipated to be required at this time.

4.4.3 WILDLIFE AND WILDLIFE HABITAT

The NHIC has historic records of two wildlife species of conservation concern in the vicinity of the study area: a moth (*Syngrapha selecta* – “imperilled”, not regulated) and Henslow's sparrow (*Ammodramus henslowii* – Endangered, regulated). As was the case for plants, urban development has significantly reduced the habitat of these species in the study area. These species are not likely to occur in the Finch Avenue West right-of-way, and will not be impacted by the proposed LRT.

Potential wildlife habitat in the study area is restricted to watercourse valleys and small parks, which sometimes fall in close proximity to the Finch Avenue West right-of-way. Consultation with TRCA determined that there was not likely any significant wildlife habitat within the right-of-way. Therefore, the proposed LRT is not likely to have any affect on significant wildlife habitat.

Generally, the effects of the proposed LRT on wildlife species are anticipated to be minimal as extensive vegetation clearing is not required. Some minor vegetation clearing adjacent to the right-of-way may result in the loss of bird nesting habitat. However, bird species that would nest along the right-of-way corridor can be assumed to be tolerant

of high noise levels and disturbances, since the habitat is already developed as an urban street that exhibits urban conditions. So long as vegetation clearing does not directly remove or destroy active nests, these species are likely to adapt to the increased activity in the study area.

The effect on migratory birds nesting within structures is also minimal as no nests were observed either under or on the West Don River Bridge or the Islington Bridge. The Islington Bridge currently has measures in place to prevent unwanted nesting of bird species. However, again, vegetation that will be removed may be inhabited by nesting birds.

In all cases, the Contractor must adhere to the requirements of the Migratory Birds Convention Act (MBCA), 1994. This Act prohibits the incidental take of migratory birds and the disturbance or taking of the nests of migratory bird species. The incidental take is defined as the killing or harming of migratory birds due to economic activities. Additionally, the Ontario Fish and Wildlife Conservation Act prohibits the destruction or taking of nests or eggs of wild birds, except for rock pigeons (*Columba livia*), American crows (*Corvus brachyrhynchos*), brown-headed cowbirds (*Molothrus ater*), common grackles (*Quiscalus quiscula*), house sparrows (*Passer domesticus*), red-winged blackbirds (*Agelaius phoeniceus*) and starling species. The Act also prohibits the capturing, killing or harassment of endangered species.

Construction/Operations Impacts

Since the alignment traverses the federal quarantine area for the Asian Long-horned Beetle, all regulations regarding this quarantine area will be observed.

Mitigation Measures

To protect bird species that may nest in the right-of-way, the following measures are proposed:

- Implement timing constraints so that no vegetation will be removed during the bird breeding season (May 1st to July 31st);
- Conduct a nest search in affected areas if any construction or vegetation removal is planned to occur during the restricted period; and,
- Conduct a general site visit prior to May 1, if required, to inspect the structures; if nesting is likely, the Contractor must install bird nesting preventative measures before May 1. The measures must remain in place until July 31. The Contractor will be responsible for installing and maintaining these measures during the bird breeding season.

Other potential impacts of the LRT on wildlife species include the barrier effects, vehicle conflicts (roadkills), and light and noise disturbance. As the proposed LRT will be within the existing right-of-way for Finch Avenue West, the barrier and light/noise effects are already extant and will not increase as a result of the proposed LRT. It is not expected that the risk of mortality due to vehicle conflicts will increase.

Monitoring Plans

None planned at this time.

4.4.4 DESIGNATED NATURAL AREAS

The only ESA in the vicinity of the study area, the Rowntree Mills ESA, is located near the northwest corner of the Islington Ave. / Finch Ave. W. intersection; however, it is more than 500m from the Finch Avenue West right-of-way. As a result, no impacts to this feature are anticipated as a result of the proposed LRT.

The natural heritage features identified by the City of Toronto's Terrestrial Natural Heritage System (the Humber River Valley, Duncan Woods Greenbelt, Derrydowns Park and the West Don River Valley) also occur outside of the Finch Avenue. West right-of-way, and therefore will not be directly affected by the proposed LRT.

It is not anticipated that any TRCA property will be required for this project, though temporary access may be required during the construction phase. This temporary access may result in a minor disturbance of some roadside vegetation and localized increase in noise and dust. No permanent or significant impacts to TRCA property are anticipated as a result of the proposed LRT.

Construction/Operations Impacts

None anticipated at this time.

Mitigation Measures

None anticipated at this time.

Monitoring Plans

None anticipated at this time.

4.4.5 GEOTECHNOLOGY

Potential impacts on geology will be determined during the detailed design process as additional subsurface investigations are completed within the study area.

The near-surface soils along the proposed alignment consist mainly of till deposits which are generally broadly graded soils that range in composition from non-plastic sands and silts containing gravel and trace clay, to plastic clayey silt to silty clays containing traces or some sand and gravel. Gravelly sands and silts are predominantly encountered near the existing watercourses such as the Don River, Black Creek and the Humber River.

The native granular and cohesive soils encountered would generally be suitable for support of the widened pavement and new track beds in the median. In general, the existing fills forming the existing road subgrade are also suitable however if, as indicated at two boreholes, organic clay or humus is encountered some sub-excavation and replacement could be required at some locations. Water levels recorded during prior investigations indicate that the water table is very near the surface in some areas. Some extent of local groundwater control will be necessary for construction where the LRT grade is at or near the existing roadway grade along Finch Avenue.

Additional subsurface investigations will be required as the design progresses, especially in the vicinity of the Humber College terminal. These will provide geotechnical engineering design parameters, identify areas requiring special design considerations and provide sufficient information for costing and selection of subsequent construction methods.

4.4.5.1 Surface and Groundwater

Potential groundwater impacts and the associated mitigation measures will be further analyzed during the detailed design phase. For the most part, the LRT construction will involve widening of the existing roadway with minor cut and fill site grading operations, typically less than one metre. Consequently, major dewatering will not be required along most of the length of the project. However, the preferred design requires the LRT to be taken underground at the Yonge Street terminal station and at Keele Street where the line connects with the Spadina Subway Extension.

If required in the shallow grading portions of the line, the management of extracted groundwater may include discharging to storm or sanitary sewers or to watercourses. Any discharge of dewatering to Toronto Water sewers will be in accordance with Section 681 of the Municipal Code-Sewers. The potential volumes, environmental chemistry and temperature of such discharges will be carefully assessed prior to construction to define the environmentally, technically and economically suitable management method.

In the areas where dewatering is required, the groundwater quality will be further assessed through the installation of shallow monitoring wells, particularly in areas where a high risk of potential contamination has been identified. This will verify that the groundwater quality is suitable to be discharged to the municipal sewer system or into surface watercourses and/or to provide appropriate treatment measures that may be required prior to disposal.

At the existing Finch Subway Station, prior investigations indicate that the groundwater table is generally below the station base slab. The proposed underground LRT station will be at shallow depth above the existing subway tunnels and significantly above the subway station base, hence, temporary construction dewatering, if needed, may consist of conventional sump pits and pumps to control seepage of water contained within discontinuous granular layers.

At the proposed underground LRT station at Keele Street to connect with the Finch West Subway Station, sub-surface investigation for the Spadina Subway Extension indicates that the LRT station base slab could be up to 5 metres below the groundwater table in the station area. Consequently, conventional cut-and-cover construction of any underground section will require measures to limit dewatering requirements such as the use of continuous excavation support wall systems to prevent groundwater flow into excavations.

The need for dewatering and the potential flow quantities will be determined during the design phase through investigations, including pump tests, to define conditions sufficiently below the excavation base to confirm any potential influence of water-bearing strata below the excavations on dewatering needs. Should dewatering be required and the predicted taking exceed 50000 litres/day, a permit to take water will be secured from MOE with input from TRCA.

Construction activities, such as re-fuelling, may increase the potential for accidental fuel or lubricant spillage and subsequent contamination of surface water. They also have the potential to result in litter and debris accumulation within watercourses along and crossing the LRT alignment.

During construction activities there is a potential for sediment-laden stormwater to enter watercourses along the LRT route such as the West Don River, Black Creek and the East Humber River, resulting in erosion and sedimentation. Although the extent of exposed soil during construction of the LRT extension will be limited to the narrow widths of the future median trackway and the associated road widening, erosion and sedimentation control measures will be a requirement to ensure construction activities do not result in unacceptable contamination of surface watercourses.

This potential effect will be mitigated by reference to the requirements of guidelines used within the TRCA jurisdiction including the most current editions of:

- MNR Technical Guideline: Erosion and Sediment Control (ESC);
- TRCA's Erosion and Sediment Control Guidelines for Urban Construction Sites;
- City of Toronto Sewer Use By-law; and
- MTO Drainage Management Manual.

Some specific examples of the mitigation measures detailed in these documents include: phasing construction to limit the duration of soil exposure where possible; minimizing nonessential clearing and grading; and stockpiling soil more than 15 metres from watercourses, other drainage features and the top of steep slopes.

Construction/Operations Impacts

Groundwater levels and aquifers may be affected due to temporary dewatering activities during construction. There may also be redirection of groundwater movement with groundwater discharge and recharge areas being affected. During operations there may be a decrease in pervious area due to the widening of paved roadway to accommodate new bike lanes and streetscape features. Potential impacts on surface water resources during construction include fish kills due to chemical spills resulting in short term population decline. No operations impacts are anticipated on surface water resources.

Potential impacts on sedimentation during construction in addition to fish kills as a result of sediment laden storm water entering watercourses during construction include degradation of soil quality, structure, stability and texture may be affected by the loss of soil.

LRT construction contract documents will address the mitigation according to TRCA's Erosion and Sedimentation Control (ESC) guidelines that explain the design, function and installation, maintenance and removal procedure for ESC measures such as sediment traps, interceptor swales/dykes, sediment control fences, straw bales and sodding etc.

Mitigation Measures

Excavation support systems will be designed to minimize the extent of dewatering around underground sections of the LRT at the Yonge and Keele stations. A ground and soil management strategy will also be developed during detailed design. Required stormwater management facilities, such as permeable surfaces where practical, grassed swales and stormwater ponds will be designed where appropriate during detailed design. To support the mitigation of effects on surface water resources, construction contract documents will not permit refuelling of construction equipment within 30 m of a watercourse. In addition, an Emergency Response Plan will be developed and implemented.

An Erosion and Sediment Control Plan will also be developed in accordance with the Greater Golden Horseshoe Area Conservation Authorities' Erosion and Sediment Control Guidelines for Urban Construction (2006). Potential options include using geotextiles in watercourse area to enhance slope stability, using sediment fence at work area.

To prevent surface water contamination during construction, care will be taken to avoid accidental spillage or discharge of chemical contaminants (e.g. gasoline, oils and lubricants). Equipment re-fuelling will take place no closer than 30 m from any watercourse to prevent water contamination due to accidental fuel spills. All equipment operating near any watercourses shall be properly maintained to avoid contaminant leakage and will be free of excess oil/grease. In the event that a spill occurs, proper containment, clean up and reporting, in accordance with provincial requirements, will be completed. The contractor will also take all necessary precautions to prevent the accumulation of litter and construction debris within the watercourse.

Monitoring Plan

Monitoring plans will include:

- Developing a well monitoring program to monitor the construction impacts, provide compensation if required
- Monitoring sediment accumulation after rain events during construction to ensure that the proposed mitigation measures have been satisfied.
- Monitoring sediment accumulation in storm water management facilities

4.4.6 CONTAMINATED SOILS

Section 3.1.4.3 indicated that 77 properties within the study area have a high potential to contribute to environmental contamination, 48 properties medium potential, and 107 properties have low potential (see also Appendix J: Contaminated Sites Assessment). Where removal of potentially contaminated soil must take place, soils will be tested for those chemicals that may have been used or dumped within the area, and will be handled in accordance with Part XV.I of the Environmental Protection Act (EPA) and Ontario Regulation 153/04, Records of Site Condition.

Potential impacts associated with disturbance of contaminated soils include runoff of contaminated materials into watercourses, the airborne transmission of fine contaminated particulates, and leaching of contaminants into ground water. The Ministry's Guidelines for Use at Contaminated Sites in Ontario, February 1997, will be applied with respect to the removal and/or movement of soils to minimize the potential impacts. If contaminated sites are positively identified in or adjacent to the construction area, the MOE District Office will be contacted. Appendix J provides a copy of the full contaminated soils inventory.

Construction/Operations Impacts

There is the potential for construction works to encounter contaminated soil and/ or ground water during construction. No impacts are anticipated during future LRT operations.

Mitigation Measures

As noted above, disposal of any contaminated soil and water encountered during construction will be done in accordance with the applicable regulations.

Monitoring Plans

Phase 1 Environmental Site Assessment and potentially Phase 2 Environmental Assessments will be undertaken during detailed design if required.

4.4.7 STORMWATER

The majority of the proposed alignment will have surface run-off collected and fed into the City of Toronto's storm sewer system. The study area is urbanized and the LRT alignment remains within existing roadway allowances and with a majority of the road sections of the proposed alignment already built to urban standard. As such, the impacts on stormwater drainage are not expected to be significant.

Construction/Operations Impacts

In those sections of the proposed alignment where existing road cross-sections are built to a rural standard (ditches), detailed designs will include the upgrading of those cross-sections to urban standards (e.g. curb and gutter with storm sewers) where an existing storm sewer system is available to receive it. This improvement will be considered along the portion of the proposed alignment on Highway 27 between Finch and Humber College Boulevard only.

Transit City will also work with Toronto Water to identify any adverse impacts and mitigate them in accordance with cost-effective solutions and the City's List of CSO/Stormwater Control Alternatives (July 2003), West Weather Flow Management Policy (August 2003), West Weather Flow Management Guidelines (November 2006).

Mitigation Measures

Alternative mitigation measures that will be evaluated during detailed design may include:

- Incorporation of vegetated drainage swales along the Highway 27 boulevard area immediately adjacent to the roadway to act as filters and provide quality treatment to the water prior to entering the storm sewer system;
- Incorporation of roadway conveyance control measures;
- Consideration of alternative end-of-pipe approaches to serve as a form of water quality treatment at the outflow end of the stormwater system. This approach will only be considered when conveyance control measures are unable to improve the quality of stormwater runoff to permitted levels. Every effort will be made to address quality and quantity concerns within the constraints of the right-of-way.
- Improvements to the stormwater drainage system and any other alternative mitigation measures that may be evaluated during the detailed design stage of the LRT should be able to address the impacts and any quality and quantity concerns. These improvements and mitigation measures will have to be reviewed and approved by regulatory agencies where deemed necessary in order to ensure that the impacts are addressed.

Monitoring Plans

A detailed stormwater management plan will be prepared and used for monitoring throughout construction.

4.4.8 AIR QUALITY

Overall emissions are expected to decrease with LRT implementation as a substitute for existing bus service.

Construction/Operations Impacts

Effects on air quality as a result of this project will include dust and emissions caused by construction and construction related activities. These impacts can be successfully mitigated through the use of proper dust controls.

The implementation of the electric LRT service will result in a reduction in greenhouse gas and other tailpipe emissions through this corridor as this service will replace the existing diesel-fuelled bus service. The LRT service will also increase public utilization of this transportation service, reducing the need for personal vehicle use. The improvements to air quality within this corridor at the conclusion of this project will result in overall improved air quality along the right-of-way and consequently the health of local residents.

Mitigation Measures

A dust management plan will be required of the contractor during construction and monitored by the TTC also.

Monitoring Plans

Future monitoring can be done to determine if additional tree planting adjacent to the roadway and increasing road vacuum sweeping and flushing during LRT operations can help to improve air quality in the area.

4.5 Socio-Economic Environment

4.5.1 LAND USE

EFWLRT has the potential to deliver significant land use benefits by supporting the City of Toronto's Official Plan vision for a more liveable city within the Greater Toronto Area. That vision will steer future growth within Toronto to areas that are well served by transit and the existing road network, and that have a number of properties with redevelopment potential.



Having a safe, fast and reliable transit service like the Etobicoke-Finch West LRT serving as a viable alternative to vehicular travel will attract new business to the area based on providing increased people movement capacity. The LRT project will also provide employment opportunities during the 4 year construction period and increase employment opportunities over the operating life of the LRT.

The mixed-use areas within designated Avenues will perform a “Main Street” function and become meeting places for local neighbours and the wider community. By promoting alternative forms of travel, these areas become vibrant communities centred on the people and uses instead of automobiles. By directing growth to areas such as Avenues, the Official Plan provides greater certainty for land owners, businesses, and residents about what type of growth can be anticipated, and where growth will occur.

Potential impacts to the Study Area during construction are expected to be short-term, localized road diversions, and / or closures during construction. This may make travelling by car more difficult, during and post-construction. There may also be limited noise impacts, dust and exhaust emissions during construction. Recommended mitigation during the construction of the Etobicoke-Finch West LRT is to implement and monitor effective management plans for traffic, noise, dust, etc.

Construction/Operations Impacts

Construction impacts to land uses are outlined in the property section below. Operations impacts are not anticipated.

Mitigation Measures

Mitigation measures associated with traffic and with property are outlined in those sections specifically in the document.

Mitigation measures associated with land use changes will be done as part of the building permit and development application process in accordance with the City’s Official Plan.

The team will develop an urban design layout and select the appropriate streetscaping elements for EFWLRT.

Monitoring Plans

Monitoring of land use changes will be done through the official planning process and the development application approval process.

4.5.2 NOISE AND VIBRATION

The scope of this Transit Project Assessment study included an analysis of the effect of LRT operations on the future ambient noise and vibration levels along the proposed right-of-way. The objective of the analysis was to determine whether any mitigation of increased noise and vibration levels was necessary based on the MOE/TTC Protocol criteria.

4.5.2.1 Noise Analysis

The noise analysis was performed using the STAMSON Noise Model, which is based on the Ontario Road Noise Analysis Method for Environmental and Transportation (ORNAMENT). The major parameters utilized by STAMSON in the calculation of road noise include vehicle speed, road surface, topography gradient, ground surface conditions, angle of exposure and the presence of noise barriers.

For the most part, the areas adjacent to the Finch LRT alignment are characterized by commercial and residential uses with pockets of industrial uses. Several office and institutional buildings also front onto Finch Avenue West, but

none are closer to the centre line of Finch Avenue West than the residential receptors selected. Potential sensitive receptor locations along the corridor were identified using the Protocol guidelines and ambient noise levels were measured and modelled at these locations to establish a baseline condition without LRT implementation.

The Noise and Vibration Study report in Appendix F identifies the five locations, representative of the above types of sensitive receptor, selected for analysis. The report presents results of analysis of predicted daytime and night time noise levels from a combination of general traffic and LRT operations. These show a predicted increase due to the addition of LRT service ranging from 0.6 to 1.9 dB with the exception of the Humber College location where a night-time increase of 4.8 dB is possible. Since the MOE/TTC protocol specifies that mitigation measures need only be instituted when the noise level increase due to the project exceeds 5 dB, mitigation of the lower incremental levels predicted is not considered necessary since the LRT can be operated within the provincial noise guidelines.

Temporary, short-term increases in noise and vibration can be expected as a result of construction activities. Noise from construction activity and construction equipment may have potential to be noticeable, particularly if construction occurs outside of the normal weekday construction period. According to the Toronto Municipal Code, construction must occur within time and place restrictions or an exemption must be sought prior to commencement of construction.

Any potential adverse effects during construction can be mitigated by instituting the following measures:

- Include general noise control measures in the Contract requiring the Contractor to maintain construction equipment and noise muffling devices to limit noise emissions and comply with the noise limits outlined in NPC-115 and NPC-118 guidelines.
- Restrict the idling of equipment to the minimum necessary required to perform the specified work.

If the contractor is required to work outside of permitted times outlined in the City’s by-law, an exemption from the City of Toronto will be required.

Construction/Operations Impacts

During construction noise levels increases due to construction equipment and the construction process may occur. Based on the noise and vibration study conducted for this study, it is not anticipated that noise sensitive areas will be subject to noise increases greater than 5 dba during the LRT operation.

Noise and vibration during construction will be monitored by the TTC in accordance with the City of Toronto Noise By-law (Chapter 591) and City of Toronto By-Law No.514-2008 with respect to vibrations from construction activity.

The TTC will continue to follow practices for the routine maintenance of train wheels to eliminate “wheel flats” that can contribute to ground-borne noise and vibration. All tracks will have regular evaluation to maintain the rail tracks to satisfy TTC standards so that noise and vibration impacts can be minimized.

Mitigation Measures

Mitigation measures during construction will include ensuring proper maintenance of construction equipment to limit noise emissions and comply with the noise limits outlined in NPC-115 and NPC-118 guidelines. Contractors will also be required to comply with construction noise by-laws (Toronto Municipal Code) to provide means of limiting excessively noisy operations and equipment. Noise by-laws exemptions will be obtained prior to construction if required.

The location of the electrical substations will be finalized and an additional noise and vibration analysis will be undertaken to determine any impacts and the associated mitigation measures, if required.

Monitoring Plans

The City and TTC will be responsible for monitoring and investigating noise complaints both during construction and after LRT operations begin.

4.5.2.2 Vibration Analysis

Background vibration levels were measured at the same five sensitive receptor locations adopted for the determination of ambient noise levels. The measurements indicated that current levels due to traffic conditions are, as expected, well below the 0.1mm/sec limit specified in the MOE/TTC Vibration Protocol.

Vibration levels when the EFWLRT service is in operation were predicted using the results of vibration studies completed for previous TTC projects and deemed applicable to the conditions anticipated in the Finch Avenue and Highway 27 rights-of-way. It is expected that the vibration levels from the new LRT cars to be operated on the Transit City lines will be less than those measured in the previous studies of streetcar vibration effects. Adjustment of the results of streetcar operation at 30 km/h to reflect the proposed LRT service speed of 60 km/h showed that vibration levels would not exceed the MOE/TTC protocol limit of 0.1 mm/sec unless the receptor was within 9 metres of the track centre-line.

Since all receptors along the EFWLRT line will be significantly further from the median LRT track, (15 metres minimum) it is evident that vibration levels experienced will be well below the threshold of perception as well as the MOE/TTC protocol limit.

Construction/Operations Impacts

As a result of the vibration analysis, no construction or operations vibration impacts are anticipated at this time.

Mitigation Measures

No mitigation measures are considered necessary at this time.

Monitoring Plans

As a result of the vibration analysis, no monitoring plans are proposed at this time.

4.5.3 PROPERTY

The preliminary identification of property requirements has been included in Appendix E. Some property requirements may be reduced through potential realignments of the LRT and roadway alignments during the design stage. The temporary property needs for construction will be identified during the detailed design stage. Property acquisition required for this project will be undertaken by the City of Toronto on behalf of the TTC. In acquiring property, the City of Toronto balances community need with the rights of the property owner. The objective is to ensure that individual rights are respected and protected and to provide fair compensation within the framework of the Expropriations Act for any property acquired or affected by civic projects. The acquisition process emphasizes negotiation and the achievement of a mutually satisfactory agreement between the City and the owner. If necessary, in order to protect the ability to proceed with the Finch West LRT project, expropriation may be required to acquire the necessary property. In general, property acquisition uses the following steps:

1. The City of Toronto contacts the property owner to indicate its interest in the property and to identify issues and concerns;
2. The City conducts surveys, appraisals, and other property-related assessments;

3. An offering price is discussed. If a tentative agreement is reached, an Offer to Sell is signed by the owner. The Offer is then sent to City of Toronto Council for approval and acceptance;
4. If discussions do not result in agreement, the City initiates expropriation procedures. The expropriation process may be initiated while negotiations are occurring;
5. If expropriation is pursued, the owner has a right to an independent inquiry called a Hearing of Necessity, which determines whether the property requirements are fair, sound and reasonably necessary;
6. The City approves the settlement and / or expropriation, and acquires the property; and
7. If expropriated, the owner has the right to have compensation payable referred to arbitration at the Ontario Municipal Board.

The objective of the Expropriations Act is to put tenants and property owners in the same position that they were in prior to the beginning of the civic project directly affecting their properties. Compensation is determined having regard to the Expropriations Act by experienced, qualified appraisers and other experts. Compensation is generally based on three factors:

1. Market Value: Market value is defined as “the amount that the land will be expected to realize if sold on the open market by a willing seller to a willing buyer”. The date of expropriation is usually determined as the date to determine market value.
2. Damages Attributable to Disturbance: These damages refer to the economic loss suffered by an owner as a result of having to vacate expropriated property. This can include moving costs, temporary accommodation, redundant furnishings, or loss of business revenues and profitability. Compensation for damages of this type is determined after expropriation.
3. Damages for Injurious Affection: Injurious affection is sometimes referred to as “consequential damages”. It has very precise and limited applications according to the law and can include items such as reduced market value and increased business operating expenses. Injurious affection is usually determined after expropriation.

The total property acquisition process and resulting compensation is intended to leave the affected owner “whole” and thereby mitigate the negative impact.

Construction/Operations Impacts

Approximately 200 partial land parcels are required on Finch Avenue and some additional property may be required for construction staging purposes temporarily. Property owners will be contracted during the detailed design phase.

Mitigation Measures

As noted above, compensation for residential and commercial property will be provided. Expropriation may be required if negotiations fail. In addition, realignment of the EFWLRT and roadway lanes will be considered during the design stage to reduce property impacts, where feasible.

Refinement of the design details including structural, stormwater management, natural environmental mitigations, traffic operation improvements, and geotechnical investigations will determine the final property impacts/requirements.

Monitoring Plans

Property owners will be contacted during the detailed design phase. No additional monitoring is required.

4.5.4 ECONOMIC IMPACTS

The overall effect on the economic environment following construction and implementation of the LRT service will be an improvement in the corridor’s overall transportation capacity and connectivity to the City’s rapid transit network. The partially exclusive LRT service will increase connectivity in the corridor, provide reliable and efficient transportation services and in turn support and spur economic development and growth along the route.

The existing Etiobicoke-Finch Avenue West corridor provides the essential visibility and accessibility needed by businesses and other economic activities along the corridors. The planned EFWLRT will enhance this accessibility with improved transit service, bringing more patrons to and through the corridors. By stimulating land use redevelopment and intensification along these corridors, the EFWLRT will attract more business activity, resulting in positive economic benefits.

Experience from other large LRT projects in the City has suggested that an important business issue is the possible reduced vehicle access to the area and potential loss of on-street parking. The design of the project has been developed to minimize these impacts. The City / TTC are committed to accelerating construction as much as possible to reduce the construction period in order to minimize construction related impacts to residents and businesses. Auto and transit traffic will be maintained throughout the construction period with a minimum of a single lane of travel in each direction. Pedestrian access may be detoured at times but will also be maintained throughout construction. Every attempt will be made to replace any short term parking loss for individual homes and businesses.

The City / TTC will form a “Construction Liaison Committee” (CLC) during construction to provide quick access to construction related information, specifically schedule and timing information for the business owners and residents. The CLC will be made up of City / TTC and Contractors staff who will meet bi-weekly on site. Business owners and residents directly affected by the current / future construction activity will be invited and encouraged to attend these meetings where the day to day issues affecting their home / business will be discussed and resolved. Issues such as business deliveries, local parking, and garbage pick-up will often be topics of concern. Further, construction schedule and activity timing is also a prime topic. Besides the CLC, the City and TTC will undertake, prior to each phase of construction, a comprehensive public awareness campaign. Keeping the area up to date and well informed in advance of construction can dramatically reduce the inevitable disruption brought about by this project.

Construction/Operations Impacts

Through the CLC as noted above, the TTC will work with local business and community representatives to mitigate any construction impacts to local business. The construction staging plans will also be developed to ensure that access to all business is provided throughout construction. Increased commercial and retail traffic is anticipated with the operation of the LRT.

Mitigation Measures

Deployment of a CLC and up to date construction information during the construction period

Monitoring Plans

The CLC will be responsible for monitoring the economic impacts during construction. No additional monitoring is anticipated after the start of LRT operations.

4.6 Cultural Environment Impacts

4.6.1 ARCHAEOLOGY

In general, soil disturbances associated with grading, excavation and the placement of fill may result in the loss of archaeological resources. However, a Stage 1 archaeological assessment of the EFWLRT corridor found only a single registered archaeological site adjacent to, but not in the corridor and four additional sites within two kilometres of it (described in Appendix G). The field review of the Finch Avenue and Highway 27 right-of-way assessed that the right-of-way does not retain archaeological site potential due to previous road, commercial and residential disturbances or the excessive slopes of the roadway environment.

The study concluded that additional assessment is not required within the existing right-of-way and that the corridor can be cleared of further archaeological concern. The following Ministry of Culture conditions would however, still apply:

- Should deeply buried archaeological remains be found during construction activities, the Cultural Program Unit of the Ontario Ministry of Culture should be notified immediately; and
- In the event that human remains are encountered during construction, the proponent should immediately contact both the Ministry of Culture, and the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Government Services, Consumer Protection Branch at (416) 326-8404 or toll-free at 1-800-889-9768.

In accordance with the Ontario Heritage Act, the assessment report was filed with the Minister of Culture for review and any necessary documentation for approval and clearance from the Ministry of Culture will be obtained prior to construction. In view of these results, the following recommendation is made:

- The Finch West right-of-way does not retain archaeological site potential due to previous road, commercial, and residential disturbances, or excessive slope. Additional archaeological assessment is not required within the existing right-of-way, and the study corridor can be cleared of further archaeological concern.

Construction/Operations Impacts

During construction soil disturbances associated with grading, excavation and placement of fill may result in the loss of archaeological resources. However, as noted above, no evidence of surviving archaeological sites was discovered during a Stage 1 investigation of the areas that will be affected by LRT construction works.

Mitigation Measures

Potential adverse effects to known or potential archaeological resources would be avoided or mitigated.

Monitoring Plans

In the event that previously unknown or unassessed deeply buried archaeological remains are encountered during construction activities, the office of the Regulatory and Operations Group, Ministry of Culture will be notified immediately. The proponent or person discovering the resources will cease alteration of the site immediately and initiate archaeological fieldwork in compliance with Section 48(1) of the Ontario Heritage Act.

4.6.2 CULTURAL HERITAGE

A Cultural Heritage Resource Assessment was conducted for the Etobicoke-Finch West Corridor and determined that the study corridor has origins in nineteenth century survey and settlement and has been substantially altered by urbanization. However, a select number of cultural heritage resources continue to exist within the study corridor limits. A total of five built heritage resources (BHR) and seven cultural heritage landscapes (CHL) were identified in the study corridor. Of these, one has been designated under the Ontario Heritage Act, three have been listed on the City of Toronto's Heritage Property Inventory, and one is currently recommended for designation under the Ontario Heritage Act. Additionally, two built heritage resources and seven cultural heritage landscapes were identified through a combination of historic mapping, field review techniques, contextual contribution of the feature, and documented architectural or material detailing. Based on these results, the following mitigation measures are recommended:

1. The proposed light rail transit infrastructure should be designed so as to avoid identified cultural heritage resources. Where loss or displacement is expected, further research should be undertaken to evaluate the impacted feature's specific cultural heritage significance. Based on the results of evaluation, appropriate mitigation measures should be developed.
2. Based on a preliminary review of design plans, it is understood that one feature may be indirectly affected (BHR 3) to accommodate construction of a stop facility and may result in a reduced buffer zone between the structure and the road right-of-way and potential visual impacts. Given that this structure is listed on the City of Toronto's Heritage Properties Inventory and has been recommended for designation under the Ontario Heritage Act, a heritage impact statement study is recommended if the site is impacted by the LRT. However, based upon this report, the Grantbrook Street/Senlac Road stop, close to this listed property, has been redesigned to follow this recommendation and the project will initiate a further heritage impact study, if warranted by the design.
3. Based on a preliminary field review of the study corridor, indirect impacts to cultural heritage resources via introduction of visual, audible, and/or atmospheric elements associated with light rail transit are not a concern from a cultural heritage point of view. With the exception of BHR 1, all of the identified resources that would be subject to introduction of such elements were constructed during the twentieth century and are contextually congruent with a modern transit corridor. Indirect impacts to BHR 1, via introduction of audible and atmospheric elements associated with light rail transit infrastructure, are considered negligible given that Finch Avenue West currently functions as a high traffic arterial road in the vicinity of this structure.

Construction/Operations Impacts

The potential impact of the Grantbrook/ Street/Senlac Road stop on BHR-3 was minimized through redesign of the stop platform locations. No impact beyond expansion of the street allowance to 36 m is expected.

Mitigation Measures

A Heritage Impact Assessment (HIA) will be carried out during design phase, if required.

Monitoring Plans

If applicable, recommendations from the HIA will be monitored.

4.7 Summary of Preferred Project Net Effects

Exhibit 4-1 summarizes the impacts, proposed mitigation measures and net effects of implementing an LRT line in the Etobicoke-Finch West corridor.

Exhibit 4-1 Summary of Preferred Project Net Effects

Factor	Environmental Issue / Concern	Potential Approval Requirements	Location	Effect / Impact	Mitigation Measures	Potential Net Effect / Impact	Monitoring / Future Work / Contingency
				(During Construction; During Operations)			
Protect and Enhance the Natural Environment in the corridor							
Potential Effects on Fisheries and Aquatic Ecosystem	Loss of site-specific habitat	TRCA / MOE	West Don River Crossing	Potential loss of fish habitat as a result of widening of existing bridge over the river	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 may result. Negligible if mitigation measures are implemented	On-site environmental inspection during in-water work. Post-construction monitoring of fish habitat compensation measures if any required.
	Impacts on fish mortality during construction	TRCA / MOE	West Don River Crossing	Fish may potentially be injured or killed by dewatering. Dewatering extent will be minor.	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.	Potential impacts during construction can be managed and reduced with the appropriate mitigation measures as well as the drainage and stormwater management design	On-site environmental inspection during in-water work.
	Barriers to fish movement	TRCA / MOE	Creek Crossings	None expected	Not Required	None expected	On-site environmental inspection during any in-water work. Because of abutment location, most work will not occur in the Creek.
	Baseflow alterations	TRCA / MOE	River and creek crossings	New impervious surfaces can lead to changes in the frequency, magnitude and duration of flows. Increase due to trackway installation is minor	Reduce the area of impervious surfaces to the extent possible. Use storm water management practices that encourage infiltration and recharge of groundwater.	Potential impacts during construction can be managed and reduced with the appropriate mitigation measures as well as the drainage and stormwater management design	Post-construction inspection of storm water management facilities to evaluate their effectiveness. On-going maintenance as required.
	Increased water temperature	TRCA / MOE	West Don River Crossing	Clearing of riparian vegetation and storm water management practices can impact temperature regimes.	Minimize the area of stream bank alteration to the extent possible. Use storm water management practices that encourage infiltration and recharge of groundwater. Restore riparian areas disturbed during construction with native vegetation.	Shading lost through removal of riparian vegetation will be short term	Post-construction inspection of storm water 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	TRCA / MOE	Finch Avenue,	No R,T,E species identified	None required.	No net impacts	None required.

Exhibit 4-1 Summary of Preferred Project Net Effects

Factor	Environmental Issue / Concern	Potential Approval Requirements	Location	Effect / Impact	Mitigation Measures	Potential Net Effect / Impact	Monitoring / Future Work / Contingency
				(During Construction; During Operations)			
Potential Effects on Vegetation Communities	Loss of vegetation resulting from road widening to accommodate LRT	TRCA / MOE	Finch Avenue, Highway 27	Minimal vegetation removal from urban areas is required to accommodate road widening. Ditching, grading and other drainage modifications may alter local soil moisture regimes.	Delineate work zones using construction fencing/tree protection barrier. Minimize the area of vegetation removals to the extent possible. Develop and carry out a landscape plan to replace some aesthetic trees removed to permit road widening along right-of-way.	No net impacts	Restore vegetation areas disturbed during construction with native vegetation, where feasible. Compensation for vegetation removal at a 3:1 ratio will be required to meet TRCA objectives
	Rare, threatened or endangered flora	TRCA / MOE	Finch Avenue, Highway 27	No regionally rare plant species are located within the project limits. Communities immediately adjacent to the right-of-way are cultural in origin and will not be negatively impacted	None required	None expected	Monitor during construction to ensure mitigation is followed.
Potential Effects on Wildlife Habitat		TRCA / MOE	ESA –ANSI	None in corridor	None required	No net impacts	None required.
	Destruction/ Disturbance of wildlife habitat	TRCA / MOE	Finch Avenue, Highway 27	Minor removal of vegetation and the wildlife habitat that it supports to allow widening of roadway in a few locations. Total amount of habitat loss is minimal.	Minimize the area of vegetation removals 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 guide rail, curbs, etc. to prevent removal. Restore natural areas disturbed during construction with native vegetation, where feasible. Replace ornamental vegetation as part of landscaping.	Low potential for displacement of resident wildlife species	Post-construction inspection of vegetation plantings to confirm survival.
	Impacts on wildlife mortality during construction	TRCA / MOE	Finch Avenue	Removal of wildlife habitat may result in wildlife mortality. Vegetation removal will be minimal	Perform vegetation removals outside of wildlife breeding seasons (typically April 1 to July 31).	Low potential for displacement of resident wildlife species	Bird survey in all wildlife habitats prior to construction.
	Barriers to wildlife movement.	TRCA / MOE	Finch Avenue,	Small increase in the width of right-of-way to accommodate the LRT and associated facilities could create an additional impediment to wildlife movement.	No established corridors identified	None expected	None expected
	Disturbance to rare, threatened or endangered wildlife	TRCA / MOE	Finch Avenue, Highway 27	No rare, threatened or endangered wildlife identified within study area.	None required.	No net impacts	None required.

Exhibit 4-1 Summary of Preferred Project Net Effects

Factor	Environmental Issue / Concern	Potential Approval Requirements	Location	Effect / Impact	Mitigation Measures	Potential Net Effect / Impact	Monitoring / Future Work / Contingency
				(During Construction; During Operations)			
Potential Effects on Groundwater	Potential effects on groundwater during construction Baseflow in surface water courses	TRCA / MOE	Yonge Street intersection underground works and areas located hydraulically down gradient of LRT alignment with receiving surface watercourses	Groundwater levels and aquifers may be affected due to temporary dewatering activities during construction. Potential redirection of groundwater movement Groundwater discharge and recharge areas being affected. Decrease in pervious area due to widening of paved roadway to accommodate LRT	Design excavation support system to minimize extent of dewatering around underground sections of LRT (Yonge Street and possibly Keele Street stations) Develop ground and soil management strategy during detailed design Develop all required stormwater management facilities. such as permeable surfaces where practical, grassed swales and stormwater ponds during detailed design	Potential permanent changes to subsurface drainage patterns in the long term. However, no adverse effects are anticipated if mitigation measures are implemented	Develop well monitoring program to monitor the construction impacts, provide compensation if required
Potential Effects on Surface Water Resources	Fuel spills, due to accidents during construction refuelling and accidents during operation, entering the watercourses.	TRCA / MOE	Finch Avenue, Highway 27	Potential situation during construction resulting in fish kills due to chemical spills resulting in short term population decline.	Construction contract documents will not permit refuelling of construction equipment within 30 m of a watercourse. Develop and implement an Emergency Response Plan	Short term population decline. Some contaminants within storm water system.	None required
Potential Effects on Contaminated Sites	LRT construction works encountering of contaminated soils	TRCA / MOE	Finch Avenue, Highway 27	Potential for construction works encountering contaminated soil and/or groundwater	Disposal of the contaminated soil and water will be done in accordance with the authority regulations	Identify site specific impacts during the detailed design stage	Undertake Phase 1 Environmental Site Assessment and potentially Phase 2 Environmental Site Assessment during detailed design, if required.
Erosion Control	Sediment laden storm water entering watercourses during construction.	TRCA / MOE	All creek or river crossings	Fish kills and loss of aquatic habitat resulting in short term population decline. Soil quality, structure, stability and texture may be affected by the loss of soil	Develop Erosion and Sediment Control Plan. Potential options include using geotextiles in watercourse ravine area to enhance slope stability using sediment fence at work area	Short term population decline.	Monitor sediment accumulation after rain events during construction to ensure that the proposed mitigation measures have been satisfied.
	Sediment laden storm water entering watercourses during operation.	TRCA / MOE	All creek or river crossings	Loss of aquatic habitat resulting in population decline. Soil quality, structure, stability and texture may be affected by the loss of soil	Develop and implement the Erosion and Sediment Control Plan in accordance with the GTA CA's Erosion and Sediment Control Guideline for Urban Construction (2006) (example OPSS 577). Potential options include using geotextiles in watercourse area to enhance slope stability, using sediment fence at work area. Storm water management facilities such as grassed swales, oil and grit separators, and storm water ponds. Opportunities to improve stormwater quality will be investigated.	Short term population decline.	Monitor sediment accumulation in storm water management facilities.

Exhibit 4-1 Summary of Preferred Project Net Effects

Factor	Environmental Issue / Concern	Potential Approval Requirements	Location	Effect / Impact	Mitigation Measures	Potential Net Effect / Impact	Monitoring / Future Work / Contingency
				(During Construction; During Operations)			
Minimize Adverse Impacts on Socio- Economic Environment							
Archaeology	Possible impacts to areas with potential for identification of archaeological resources	MCL	Finch Avenue, Highway 27	Soil disturbances associated with grading, excavation and placement of fill may result in the loss of archaeological resources.	No evidence of surviving archaeological sites was identified during a Stage 1 investigation of the areas that will be affected by LRT construction works. The EFWLRT right-of-way does not retain archaeological site potential due to previous road, commercial and residential disturbances or excessive slopes. Additional archaeological assessment is not required within the existing right-of-ways and the Stage 1 report will be filed with the Minister of Culture.	Potential adverse effects to known or potential archaeological resources would be avoided or mitigated.	In the event that previously unknown or unassessed deeply buried archaeological remains are encountered during construction activities, the office of the Regulatory and Operations Group, Ministry of Culture will be notified immediately. The proponent or person discovering the resources will cease alteration of the site immediately and initiate archaeological fieldwork in compliance with sec 48 (1) of the Ontario Heritage Act.
Built Heritage and Cultural Landscapes	Loss of built heritage features	MCL	Finch Avenue,	Potential impact of Senlac stop on BHR-3 was minimized through redesign of the stop platform locations. No impact beyond expansion of street allowance to 36m is expected.	Potential displacement and disruption to identified cultural heritage resources. A Heritage Impact Assessment (HIA) will be carried out during design phase, if required.	Potential displacement and disruption to identified cultural heritage resources.	Monitor recommendations of Heritage Impact Assessment, if applicable.
Noise and Vibration	Increase in noise level greater than 5 dBA	MOE	Finch Avenue, Highway 27	No noise sensitive areas will be subject to noise increases greater than 5 dBA during the LRT operation.	None required.	None expected	Monitor and investigate complaints on noise and vibration issues
	Noise effects during construction	MOE	Finch Avenue and Highway 27	Noise level increases during construction due to the construction equipment and the construction process.	Ensure proper maintenance of construction equipment to limit noise emissions and comply with the noise limits outlined in NPC-115 and NPC-118 guidelines. Comply with construction noise by-laws (Toronto Municipal Code) to provide means of limiting excessively noisy operations and equipment. Specify hours of operation during construction. Noise by-law exemptions will be obtained prior to construction if required.	Noise level increase during construction is temporary and can be mitigated	Monitor and investigate complaints on construction noise issues
Air Quality	Impacts on air quality due to implementation of LRT	MOE	Finch Avenue and Highway 27	Overall emissions are expected to decrease with LRT implementation.	Air quality is anticipated to be improved after the LRT implementation. Pollutants, gases and particulate based pollutants are anticipated to be decreased during LRT operations	None are anticipated during LRT operations. Dust impacts can be successfully mitigated through the use of proper dust controls.	Additional measures include increasing tree planting adjacent to the roadway and increasing road vacuum sweeping and flushing during LRT operations can help to improve the air quality in the area



Exhibit 4-1 Summary of Preferred Project Net Effects

Factor	Environmental Issue / Concern	Potential Approval Requirements	Location	Effect / Impact	Mitigation Measures	Potential Net Effect / Impact	Monitoring / Future Work / Contingency
				(During Construction; During Operations)			
Property	Loss of Property	MOE	Finch Avenue,	Approximately 200 partial land parcels required on Finch Avenue	Compensation for residential and commercial impacts will be provided for temporary and permanent property requirements. For permanent property taking, compensation will be provided at fair market value, which is determined at the time of purchase with a property appraisal report forming the basis for negotiations. Other ancillary costs are negotiated on a case-by-case basis. Compensation will be provided for the temporary property requirements. Upon completion of construction, temporary property will be returned to the owner and as near as reasonably possible restored to its original condition. Realignment of the LRT and roadway lanes will be considered during the design stage to reduce property impacts, where feasible.	Expropriation may be required if negotiations fail	The property owners will be contacted during the detailed design stage.



Exhibit 4-1 Summary of Preferred Project Net Effects

Factor	Environmental Issue / Concern	Potential Approval Requirements	Location	Effect / Impact	Mitigation Measures	Potential Net Effect / Impact	Monitoring / Future Work / Contingency
				(During Construction; During Operations)			
Minimize adverse Impacts on Transportation and Other Technical Issues							
Potential Effects on Traffic	Reduced level of services for vehicular traffic	City of Toronto	Finch Avenue	General preservation of existing traffic lanes through most of the right-of-way will result in future traffic volumes remaining near or at current capacity levels of service. LRT is expected to address the future transit demand as well as to attract some existing and future auto vehicle trips	Although peak hour congestion will increase, the overall corridor people-moving capacity will be greater with the improved transit service provided by LRT. Replacement of curb-lane Finch Avenue bus service with segregated median LRT will improve the traffic flow and through capacity of general purpose lanes. Certain suggested mitigation measures for traffic at specific locations have associated impacts that the City considered unacceptable at this time.	Traffic congestion related delays may require initiation of measures previously deemed undesirable following further analysis of traffic and LRT operations.	City Transportation Services will monitor traffic operation and consider further measures to mitigate delays if and when necessary.
Potential Effects on Existing Transit Services	Replacement of existing corridor bus routes and elimination of some TTC stops	TTC	Finch Avenue	A high-order transit service will replace the existing TTC route. The elimination of frequent bus stops and segregation of transit from general purpose traffic will allow TTC to provide higher speed, more reliable LRT services.	LRT stop spacing will provide reasonable access to the improved transit service.	N/A	TTC to continue to monitor the future transit service demands