



Toronto Transit Commission / City of Toronto

ASHBRIDGES BAY LIGHT RAIL VEHICLE (LRV) MAINTENANCE AND STORAGE FACILITY – TRANSIT PROJECT ASSESSMENT

ENVIRONMENTAL PROJECT REPORT

November, 2010

Executive Summary

Introduction

The Toronto Transit Commission (TTC) in partnership with the City of Toronto is undertaking a Conceptual Design and Environmental Assessment (EA) for a new maintenance and storage facility (MSF) for Light Rail Vehicles (LRVs). This facility will service and store new LRVs scheduled to arrive in 2013. In addition, new non-revenue service tracks are required to provide a connection from the proposed facility to the existing streetcar tracks along Queen Street East. A new maintenance and storage facility is required to ensure the new LRVs are maintained in a state of good repair. In addition, almost double the storage track currently available is required to accommodate the new LRVs.

The project is being conducted under Ontario Regulation 231/08 following the Transit Project Assessment (TPA) Process. The Transit Projects Regulation exempts the proponent of a transit project (in this case TTC) from the requirements under Part II of the *EA Act*. Under the Transit Projects Regulation, certain projects must follow the TPA Process in order to be exempt (the current project falls under this requirement). The TPA Process is a proponent-driven, self-assessment process that does not require the transit project to be approved by the Minister of the Environment before proceeding. Therefore, the TPA Process provides a defined framework for the proponent to follow in order to complete the accelerated decision-making process within the 120-day timeline for the development of the Environmental Project Report (EPR).

The TPA Process is a focused impact assessment process with prescribed requirements that include consultation, an assessment of potential positive and negative effects, an assessment of measures to mitigate negative effects and documentation.

The purpose of this study is to evaluate the design aspects of the new facility, as well as the alignment options developed to connect the LRV tracks to the existing Queen Street tracks. The assessment of the design options included expected effects, associated mitigation measures and future commitments for this transit project.

Public consultation played an integral role in this process – both in the pre-planning activities and after the study's Notice of Commencement was initiated. Consultation activities included several rounds of public workshops, individual meetings with residents, businesses and stakeholder groups and over 450 comments and questions received by staff through phone calls, e-mails and letters.

Site Selection

Several months prior to initiating the TPA Process for this undertaking, an extensive property search for potential sites of the proposed Maintenance and Storage Facility was initiated in February 2009 - guided by the following requirements:

- 22 acres of property is required to accommodate the site;
- The property must be located in close proximity to the existing streetcar network;
- The property should at a minimum – result in only minimal relocation of existing business and their facilities; and
- The property should minimize / avoid crossing of existing rail road tracks.

Fourteen potential sites, extending from Mimico to Ashbridges Bay were investigated as potential locations to accommodate the LRV Maintenance and Storage Facility.

Six of these sites met the minimum property requirements established for the maintenance and storage facility. The six sites included:

1. Ashbridges Bay – Leslie Street at Lake Shore Boulevard East
2. Eastern Avenue (#601, #629, #633)
3. TEDCO – Unwin Avenue (Lots 447-449, 451 also identified as #294, #320, #348, #400 Unwin Avenue)
4. Cascade Site – Commissioners Street at Basin Street
5. Concrete Plant – Commissioner Street at Leslie Street
6. Old Hearn Generating Plant

Further screening of the six properties was based on the following criteria:

- Community considerations
- Operational issues
- Potential for site to be developed and in service by the end of 2012¹
- Cost

Three sites were identified as those that could meet the project requirements and scheduled completion date of 2012. Two of those sites – Eastern Avenue and Ashbridges Bay – were identified as being able to meet the operational requirements.

TTC hosted three pre-consultation public open house meetings on June 16, 17 and 18, 2009 to engage residents about the site options. During the events, a series of 37 display panels was presented, identifying the rationale for the project, requirements of the new facility, the fourteen sites that were investigated, screening criteria, and selection of the three sites with the highest potential. In total, 184 people 'signed in' to the public meetings. 86 comment sheets were submitted at the events, as well as by mail and electronic mail afterwards. TTC received nearly 140 comments from the public.

In completing its evaluation, the Unwin site was considered too costly because of additional expenses attributed to extra connection tracks, the need to construct a new bridge on Unwin Avenue (to replace the one lane bridge the City had just installed one year earlier), and additional operational (deadhead) costs for the additional one kilometre one of track between Commissioners Street and the Unwin site. TTC also raised concerns that the tracks leading to the Unwin site would cross existing Class 1 railway tracks multiple times. The Eastern Avenue option was excluded from consideration because it was located adjacent to a residential community.

As a result, TTC identified the Ashbridges Bay as the technically preferred site. The recommended site is located at the southeast corner of Leslie Street and Lake Shore Boulevard East immediately north of the Ashbridges Bay Wastewater Treatment Facility. Key advantages of the Ashbridges Bay site include:

- The site is close to the existing Queen Street East streetcar tracks minimizing non-revenue deadhead operating costs;
- It is the most cost effective site relative to capital and operational costs;
- It meets the minimum requirements for property size; and
- The construction of the facility will not result in the displacements of residences and/or businesses.

On December 1, 2009, City Council approved a settlement with the Toronto Port Authority that would transfer ownership of the required property to the City for the TTC. On December 16, 2009, TTC Commission approved location of the LRV Maintenance and Storage Facility at the Ashbridges Bay site.

1. At the time the site selection analysis was completed, TTC identified 2012 as the start date for site operations. Subsequently, TTC is pursuing a 2013 start date.

In May 2010, TTC was requested to re-examine the Uniliver site which was initially included in the original 14 sites investigated. The Uniliver site (28 acres) is bounded by the CN Rail tracks on the north and south sides of the property, the Don Valley Parkway/Lake Shore Boulevard on/off ramp to the west, and Cinespace film studio, Enbridge Gas and the City of Toronto Works yard to the east. Due to past industrial use on the site, it was determined that the buildings and site would require considerable amount of environmental clean-up to make the site suitable for construction. It was also determined that the existing buildings on site would have to be demolished to accommodate the required maintenance building and storage tracks. The requirements for property acquisitions for this site, the need for demolition of existing structures and anticipated environmental clean-up on site would delay the completion of the project by three years. Further, the construction of the facility at this location was deemed to have substantially higher costs than the recommended Ashbridges Bay site. As a result, the Uniliver site was not recommended for the location of the LRV Maintenance and Storage Facility. Both the City of Toronto Council and the Toronto Transit Commission were in agreement with this recommendation.

On June 9, 2010, the City of Toronto Council approved the use of Ashbridges Bay Site for locating the LRV Maintenance and Storage Facility. The City of Toronto currently owns the land at the Ashbridges Bay site.

Connecting Track Selection

As a result of the February 18, 2010 preliminary consultation meeting - and at the request of local residents - TTC agreed to examine several potential routes that would connect the Ashbridges Bay LRV Maintenance and Storage Facility to the existing streetcar service. Several of the options were identified by residents who attended the pre-consultation meeting. Others were developed by TTC. A total of nine connecting track route options and two sub-options were evaluated through a detailed screening process in order to determine the most feasible route.

The selection of the connecting track routes was guided by the Reasoned Argument Approach. The Reasoned Argument Approach provides a clear and thorough rationale of the tradeoffs between the various evaluation factors and criteria and the reasons why one option is technically preferred over another.

The selection of the recommended connecting tracks route was guided by the following key requirements:

- The connecting track options would not affect features of provincial importance
- No property displacements
- Cost-effective
- Operates on roads that are suitable for higher order transit service
- Potential future revenue transit corridor
- Can be built in 2013 to support the new Ashbridges Bay LRV maintenance and storage facility
- Compliance with the City of Toronto Official Plan

In evaluating the nine connecting track route options, a mixed-traffic Leslie Street route was identified as the technically preferred because it was the most balanced and reasonable option – relative to potential community, traffic and economic considerations.

What distinguished Leslie Street from all of the other route options was the limited number of operational challenges. Of the nine options, Leslie Street would provide the most direct route between the future Ashbridges Bay Maintenance and Storage Facility and existing streetcar service along Queen Street East. This would result in a lower capital and operation and maintenance costs associated with construction and operation of the track compared to the other routes examined. Most of the other track route options would incur expenditures nearly twice the cost of Leslie Street. That said, costs alone did not justify the Leslie Street route.

In evaluating the potential effects on traffic, the Leslie Street track option will have minimal effects on existing traffic operations and no effects on on-street parking. In its existing and future configurations, Leslie Street is designed to

accommodate modest traffic levels and higher-order transit such as light rail - which is also consistent with the City of Toronto's Official Plan, June 2006. Alternatively, Pape Avenue is a local road designed to carry only local traffic; Lake Shore Boulevard East is a major arterial designed to carry through trips, but because of its significant traffic volumes, would not be able to accommodate two LRV tracks in mixed-traffic operations effectively; and Connaught Avenue is too narrow to accommodate two LRV tracks without having to displace residential properties or on-street parking.

Leslie Street does have its operational challenges, specifically potential queuing at the Lake Shore Boulevard East / Leslie Street intersection, which can be addressed by transit signal priority or other measures. It is important to recognize that the majority of the LRVs will operate during off-peak periods; as a result, traffic effects should be minimal as traffic volumes are lower during off peak roadway times.

In TTC's analysis of the route options, Leslie Street registered near the top relative to the number of residential dwelling units fronting a corridor. The Connaught Avenue options had fewer residents fronting the corridor; however, the high probability of having to take property and/or on-street parking along Connaught Avenue in order to accommodate two LRV tracks made this group of options infeasible. The Coxwell Avenue option, while limited in the number of residential units fronting that particular corridor, was also not practical because of the inability to effectively operate two LRV tracks in mixed-traffic along Lake Shore Boulevard East. The Pape Avenue option had the most residential properties fronting it, although that alone was not the reason to exclude it from consideration. Significant operational challenges, tight curves and relatively high costs also justified its exclusion.

On June 2, 2010 the Toronto Transit Commission requested that TTC staff consider the Knox Avenue / Eastern Avenue / Russell Yard track route option and prepare report to Toronto City Council. The Knox Avenue / Eastern Avenue / Russell Yard route option was suggested because it would have TTC LRVs operating past fewer residential properties. However, the Knox Avenue / Eastern Avenue / Russell Yard option was not recommended, because:

- It would eliminate storage capacity that is required to accommodate 204 LRVs;
- Property acquisition requirements on Queen Street to provide the turning radius required for LRVs would delay the project beyond the LRVs delivery date and would add to the project costs;
- This option would result in disruptions to Canada Post's South Central Lettermail Processing Plant operations on the southeast corner of Knox Avenue and Eastern Avenue; and
- The creation of an access to the Ashbridges Bay LRV maintenance and storage facility on Lake Shore Boulevard East and Knox Avenue would require the construction of curved streetcar tracks along the north edge of the site, which would significantly affect the Martin Goodman Trail and the safety of trail users.

On June 9, 2010 Toronto City Council approved the TTC Knox Avenue / Eastern Avenue / Russell Yard staff report and TTC's recommendation against this option.

As a result of this comprehensive assessment undertaken for all route options, Leslie Street was identified as the technically preferred route, providing the most balanced option relative to community, traffic and economic considerations. The number of residential properties fronting Leslie Street was comparable to other options; however, Leslie Street would experience minimal operational challenges, enable more efficient service between the proposed maintenance and storage facility and existing streetcar network, and would result in reasonable capital and maintenance costs. On June 9 2010, Toronto City Council approved the connecting track alignment along Leslie Street.

The Ashbridges Bay Site

The site of the proposed Ashbridges Bay LRV maintenance and storage facility is located north of the existing Ashbridges Bay Wastewater Treatment Plant, west of Leslie Street and south of Lake Shore Boulevard East. In addition, the study area includes the Leslie Street corridor between Commissioners Street and Queen Street East for the establishment of the connecting tracks between the LRV maintenance and storage facility and the existing streetcar tracks along Queen Street East.

The Toronto Official Plan designates the project site as Employment Area and Parks and Open Space. The majority of the project site is designated Employment, and strips of land fronting on Leslie Street and Lake Shore Boulevard East are designated Parks and Other Open Space.

Land use designations within the study area are comprised of Regeneration Area to the west (within the Central Waterfront Area); Employment Area, Mixed Use Area, Neighbourhood, and Parks and Open Space to the north; and Employment Area to the east and south. There are no adjoining properties that are designated for residential development. The areas to the north designated Neighbourhood (i.e., residential) are separated from the proposed project site by areas of existing developed non-residential land uses and land use designations.

The entrance to Toronto's Tommy Thompson Park is located in the southernmost portion of Leslie Street near the study area. The park is located on the Leslie Street Spit, which extends five kilometres into Lake Ontario and is over 500 hectares in size. The Martin Goodman Trail stretches along the northern portion of the proposed project site along Lake Shore Boulevard East.

The Maintenance and Storage Facility

The new maintenance and storage facility will provide storage for and a maintenance building for 204 LRVs. The new LRVs are expected to begin operating in 2013. It is estimated that the LRVs would operate nearly 230 trips per weekday along Leslie Street between the Maintenance and Storage Facility and existing Queen Street East streetcar service. The portion of Leslie Street that the LRVs would operate on would not be part of a TTC revenue service route.

A majority of the LRV trips will leave the new maintenance and storage facility prior to the morning rush hour period and will return to the facility outside of the evening rush hour period. A breakdown of the Leslie Street LRV trips would include:

- 85 outbound trips, between 5:00 and 7:00 a.m.
- 30 inbound trips between 9:00 and 10:00 a.m.
- 30 outbound trips between 2:00 and 3:00 p.m.
- 45 inbound trips between 7:00 and 9:00 p.m.
- 40 inbound trips between 1:00 and 2:00 a.m.

The maintenance and storage facility would employ nearly 470 employees. A majority of the employees (300) would work during the day. The shift times will start at 7:00 a.m., 3:00 p.m., and 11:00 p.m., with corresponding end times nearly eight hours later.

The proposed design features:

- **The Main Facility** **22,642 m²**
 - Ground Floor17,441 m²
 - Second floor: administration.....2,142 m²
 - Second floor: maintenance platforms3,041 m²
- **An Electrical Substation Building** **700 m²**

The LRV maintenance and storage facility will be a state of the art complex. The building will be architecturally pleasing as well as designed to the Toronto Green Standards. Portions of the main carhouse will include a vegetative green roof. The area surrounding the site will be designed as part of a Landscape Design Competition facilitated by the City and TTC.

The shop portion of the facility is proposed to be one storey (with internal maintenance platforms and catwalks) and average 13.5 metres in height, while the office portion of the maintenance facility is to be two storeys and 9.2 metres high. The maintenance building is generally oriented in an east-west direction.

Various servicing and maintenance activities, scheduled inspections and unscheduled repairs will be performed on the new low floor LRVs at the proposed Ashbridges Bay Maintenance and Storage Facility, including:

- Daily Inspection
- Daily Sweep and Dust
- Sand Replenishment
- Exterior Washing
- Fare Extraction
- Floor Wash
- Car Interior Cleaning
- Undercar Cleaning
- Compressed Air Blow-Down
- Carbon Inspections
- Scheduled Inspections
- Life Cycle Maintenance
- Corrective Maintenance/Running Repairs
- Component Changeouts
- Body Repairs
- Vehicle Repainting
- Wheel Truing
- Special Work Instructions
- Brake Performance Rate Test
- Graffiti Removal

Preliminary estimates indicate the need for 210 parking spaces. A combination of permeable pavement, vegetated green roof, water re-use, oil and grit separator and a wet pond will also be located within the site to achieve the City's stormwater quality requirements.

An existing Hydro One duct bank currently crosses under the northwest corner of the proposed maintenance and storage facility. In order to mitigate this, the duct bank will require relocation. As part of the development for the facility, a new concrete encased duct bank will be constructed with an alignment that is outside of the maintenance and storage facility property. Following construction of the duct bank, new cabling will be installed and the tied in to the existing junction boxes.

Potential Effects of the Final Site Design

It is recognized that the proposed Ashbridges Bay LRV maintenance and storage facility will result in effects on the existing environment in the study area. The following provides an overview of the potential environmental effects associated with the project, as well as the recommended mitigative measures.

Terrestrial Natural Heritage

Although the property provides some habitat for common urban adapted plant and animal species and has been identified as part of Toronto's Natural Heritage System in the Official Plan, the site is degraded with predominantly non-native vegetation and none of the features or functions qualifies as provincially significant. The following mitigation is recommended:

- Clearing vegetation and trees between August 1 and April 14, so that no destruction of bird nests occurs, in order to be in compliance with the Migratory Birds Convention Act.

Additional mitigation for the loss of vegetation and wildlife habitat will consist of each building containing a 'green roof' on the main carhouse. This will be a low-maintenance green roof which will sustain sedums, grasses and other low herbaceous vegetation. It will provide some habitat for insects and occasionally for birds. The roof will also provide other positive environmental functions such as: stormwater retention, minimizing of urban heat island effect, and the reduction of dust and smog levels.

A Tree Inventory and Assessment for the proposed LRV maintenance and storage facility site documented 238 trees or groups of trees on the site, their size and condition (excellent, fair or poor). The total number of individual trees is estimated to be near 370. Of these trees, seven were found to have a diameter breast height (dbh) measurement of 30

centimetres or higher. Trees located on the mound within the site must be removed to accommodate the proposed development. Since the entire site will be altered during the mound removal work on site and thereafter, the only option for preserving trees is to transplant them. However, due to the issue of contaminated soil on the site, it is recommended that no trees be replanted in order to prevent spreading the contamination to other locations.

The Tree Protection By-law (Chapter 813, Article 3) of the Municipal Code requires a permit to injure or destroy any tree having a dbh (diameter at breast height – diameter measured at 1.4 metres above the ground) equal to or greater than 30 centimetres within the City. The seven trees identified with a dbh measurement of 30 centimetres or higher will require removal. Trees along the right-of-ways (Lake Shore Boulevard East and Leslie Street) will be preserved where reasonable. Many of these trees are newly planted, so the root zone is not likely to be extensive. The seven trees removed within the proposed site development will be replaced at a 3-to-1 ratio (21 trees).

Once construction is nearing completion, TTC will plant new trees around the perimeter of the operations area. TTC anticipates that these new trees will be recognized as a healthy contribution to the Toronto's urban forest.

Hydrogeology and Groundwater

Given that this site is not the major source of groundwater recharge in the area and contaminated fill is being left in place below the final grade of the site, maintaining recharge through natural infiltration in the area where the mound will be removed is not required.

In fact, reducing recharge at this site will likely result in a net benefit. Installing an impermeable layer that will restrict downward vertical migration of precipitation over the site and collecting the runoff generated in stormwater retention ponds will help minimize the transportation of adversely affected groundwater off-site.

Vehicle parking areas to the south of the investigated fill area are proposed to be constructed with an impermeable sub layer to reduce on-site infiltration. Though a portion of the northwest corner of the site outside of the investigated fill area is being maintained as parkland that will not be covered by impermeable surfaces (i.e., pavement). However, given the groundwater quality at the site, a liner to restrict the downward vertical migration of precipitation would further minimize infiltration and the transportation of adversely affected groundwater off-site.

With approximately 83% of the site capped or covered with an impermeable layer (concrete, asphalt, or geo-membrane, etc.), the potential for the mobilization of contaminants remaining in the fill material off-site will be reduced and result in a net benefit.

Following removal of the fill mound, shallow groundwater elevations should be verified through the installation of groundwater monitoring wells. Updated groundwater elevation data will assist in determining the requirements for dewatering during construction of the facility and the stormwater management pond.

Temporary construction dewatering may be required when constructing the stormwater management pond and on-site features. However, no significant effects were identified as a result of temporary construction dewatering, although an assessment should be conducted to determine the need for a Permit to Take Water (PTTW). No other specific mitigation measures are proposed related to groundwater.

In accordance with applicable legislation, spills that occur during construction and or during the operation of the facility will be cleaned up immediately and/or appropriate mitigative measures put in place to limit the potential for adverse affects to groundwater quality. Furthermore, during construction, the contractor will be required to have a contingency plan for control and clean-up of spills.

Contaminated Soils

The proposed Ashbridges Bay LRV maintenance and storage facility and particularly the mound area were delineated in subsurface investigations in 2009^{2,3} and 2010⁴. Soil and groundwater results provided in the subsurface investigations indicated that the mound and fill material at the site are contaminated with metals/inorganics, VOCs, petroleum hydrocarbon compounds, PAHs and PCBs above the applicable MOE Table 3 Site Condition Standards. Additional insight was also provided on the composition of fill materials at the site, which included wood, glass, paper, cardboard, plastic, rubber, brick, concrete rubble, block, clay pipe, rebar and tires. Evidence of coal, ash, and peat were also found in the lower layers of the mound. While the subsurface investigations noted that the soil impacts at the site are primarily limited to the imported fill materials or the native soils lying directly below the fill material and generally do not extend into the underlying native soils.

Subsurface investigations, completed by Terraprobe in 2009 and AMEC in 2010⁵, for the purpose of characterizing soil for disposal indicated representative fill samples, were within the *O.Regulation 558/00* Schedule 4 Leachate Quality Criteria for metals and inorganics, VOCs, SVOCs, and PCBs and as such the fill would be classified as non-hazardous per *O.Reg. 347* for the purpose of waste disposal. In addition, based on the results of bulk PCB analyses, the soil would not be classified as PCB waste per *O.Reg.362*.

The contaminated nature of the on-site soils present challenges for the development of the site including:

- Transportation and disposal of excavated soils
- Health and safety of workers during excavation or construction
- Off-site migration of soils from surface erosion, and surface soil contamination of trucks and equipment
- Potential for dust generation from excavation and construction activities and dust migration beyond the construction zone
- Containment and treatment of groundwater may be necessary if dewatering is required
- Potential requirement for mitigating methane gasses and VOC vapours; and
- Possible human health risk to the workers and occupants using the constructed facilities

Testing from the Terraprobe 2009 and AMEC 2010 subsurface investigations indicate that materials excavated from the site exceed the applicable MOE Table 3 Site Condition Standards and must be treated as waste material. However, the material is classified as non-hazardous waste per *Ontario Regulation 347* for the purpose of waste disposal. Therefore, the excavated materials will be disposed of an MOE approved facility licensed to accept this type of waste. Due to the unknown origin, significant volume and inherent heterogeneity of the fill materials that are present at the Site, the excavation and removal of fill will be monitored continuously. As conditions warrant, additional assessment of the fill materials will be undertaken to verify that appropriate soil handling and disposal methods are utilized.

TTC has commissioned a human health risk assessment for the operation of the maintenance and storage facility, which will address TTC indoor and outdoor workers as well as sub-surface construction workers (i.e., utility workers). The human health risk assessment is being conducted in general accordance with the technical requirements of Schedule C – Risk Assessment of Ontario Regulation 153/04 as amended under Ontario Regulation 511/09. The human health risk assessment is to be finalized following removal of the soil mound and confirmation, through additional soil and groundwater sampling, that worst case conditions have been addressed.

2. Terraprobe Limited (2009). *Preliminary Subsurface Investigation TTC LFLRV Maintenance & Storage Facilities, Lakeshore Blvd. E & Leslie Street, Toronto, Ontario.*
3. Aqua Terre Solutions Inc. (2009). *Soil and Groundwater Sampling, Lakeshore Boulevard East, Toronto, Ontario.*
4. AMEC Earth and Environmental (2010) *Phase II Environmental Site Assessment, LFLRV Maintenance and Storage Facilities – Fleet Replacement Project, Lake Shore Boulevard East and Leslie Street, Toronto, Ontario*
5. AMEC Earth and Environmental (2010) *Soil Investigation for Waste Characterization, LFLRV Maintenance and Storage Facilities – Fleet Replacement Project, Lake Shore Boulevard East and Leslie Street, Toronto, Ontario*

The preliminary findings of the human health risk assessment for the site identified unacceptable risks associated with direct soil and indirect soil contact pathways and direct and indirect groundwater contact pathways. As such, risk management measures are required to block these exposure pathways and reduce risks to acceptable levels. Risk management measures to be implemented include the following:

- a cap across the site to prevent direct access to impacted soil,
- a sub-slab ventilation system, and
- a health and safety plan to protect subsurface utility workers.

Specifically, the soil removal contract will include capping of the site with a 1.5 metre layer of clean fill and/or pavement structure. The health and safety plan will be developed in accordance with the final human health risk assessment, prior to opening of the maintenance and storage facility.

Additional soil and groundwater sampling will be conducted following completion of the soil removal contract and prior to the risk assessment being finalized to ensure that the human health risk assessment addresses the final worst case on-site conditions.

Continued air and groundwater monitoring during construction, and routine air and/or groundwater monitoring following construction may be required long term.

While additional mitigation measures, as described above, are required soil removal and the construction of the facility, if proper mitigation measures are implemented prior to construction, the functionality of the Ashbridges Bay LRV maintenance and storage facility will not be affected, although ongoing monitoring or treatment activities will be required at the site.

Stormwater Management

For the purposes of stormwater management, the site will be developed in accordance to the requirements of the Toronto Green Development Standard and the Toronto and Region Conservation Authority (TRCA). Discharge rates from the site need to be controlled for up to the two year storm (post to pre) and water balance up to the reduction of 50% of the annual volume of runoff is required. The site is required to reduce the annual pollutant load of sediment up to 80% in accordance with the MOE enhanced water quality criteria.

During the construction phase, a temporary erosion and sediment control pond will be used on the site. Any dewatering required for the installation of sewer pipes shall be contained in holding tanks, monitored and treated (if required) prior to discharge from the study area.

Both stormwater quality and quantity reductions from the site will be addressed in a multi component approach utilizing low impact development (LID) best management practices (BMPs) and traditional end of pipe technologies. Low impact development is a term used in stormwater management for the selection of technologies to manage stormwater runoff that reduces runoff from being conveyed to the storm sewer system. Some examples of unit processes common to LID techniques include infiltration, evaporation, and water re-use. The implementation of LID BMPs (green roof, permeable pavement and water re-use) will reduce the annual runoff volume by 50% and reduce the annual pollutant load.

The wet pond will be lined in order to prevent uplifting due to the potential high groundwater table. In addition, it will serve to prevent exfiltration in the surrounding granular bedding and vertical migration of water into the existing soils. Likewise the permeable pavement will be lined to prevent vertical migration of stormwater runoff.

The study area will be separated into two separate catchments intended to discharge stormwater to Lake Shore Boulevard East and Leslie Street trunk sewers. The Lake Shore Boulevard East Catchment is 6.48 hectares in size and

the Leslie Street Catchment is 1.43 hectares. The Lake Shore Boulevard East catchment incorporates a vegetated green roof, water re-use, evaporation and a wet pond in a multi-component approach to address both quality and quantity control. Likewise, the Leslie Street connection incorporates permeable pavement followed by an oil and grit separator.

As an outcome of the proposed stormwater management mitigation measures, a Certificate of Approval (C of A) from the Ministry of the Environment will be required. The C of A will define the requirements (frequency of sampling and water quality samples) to monitor the discharge of the stormwater after the site is developed.

As the site is located within the Lower Don Lands floodplain, proposed means to mitigate flood effects on the site will be accomplished when the final site grade is set at an elevation of 79.0 mASL. The final finished grade is higher than the estimated regional flood water level of 77.4 mASL.

The site drainage system will be designed to account for the partial submergence and sediment found in the Leslie Street storm sewer and Lake Shore Boulevard East storm sewer system. This will include connecting the site's storm sewer to Lake Shore Boulevard East by matching pipe obverts in order to minimize backwater to the site. As the site is located at a much higher elevation than Lake Shore Boulevard East, the sewer system will be raised to a higher elevation to minimize the effects of back water.

Water quantity control measures implemented on the site will keep post development flow rates down to pre-development flow rates as per the requirements of the City of Toronto. Water quantity will be managed by both LID practices and the wet pond.

The strategy of employing a multi component approach to address stormwater quality ensures that the City of Toronto requirements for stormwater quality are achieved. The combination of permeable pavement, vegetated green roof, water re-use, oil and grit separator and a wet pond are the principle systems in place to achieve this requirement.

Land Use

The Toronto Official Plan designates the project site as Employment Area and Parks and Open Space. The majority of the project site is designated Employment, and strips of land fronting on Leslie Street and Lake Shore Boulevard East are designated Parks and Other Open Space.

The Employment Areas are "places of businesses and economic activity", and is the primary designation for industrial-type land uses, such as is proposed for the project site and related supporting uses. The proposed use of the project site is a permitted use within the Employment Area designation, and supports the Development Criteria policies for the designation. The Parks and Other Open Space designations permit a variety of public uses, including public transit where supported by appropriate assessment.

Lake Shore Boulevard East is designated a Major Street with a right-of-way of at least 45 metres. Leslie Street, from Commissioner Street to Queen Street East, is identified as a future higher-order transit corridor expansion element.

The proposed project site is placed in the I3.D2 (Industrial-3) zone by the former City of Toronto Zoning By-law 438-86, as amended. The I3 zone is generally described as one of the "heavier" industrial zones, in terms of the range of permitted uses. The I3 zone permits the development of public transit uses, as well as a range of industrial uses, including city works yard, motor vehicle repair shop, and railway (including service and repair yard). The by-law applicable to the project site contains a permissive exception which allows "public service" uses by the former Corporation of the Municipality of Metropolitan Toronto, which includes the TTC. As such, the proposed use of the project site is a permitted use of the property under the I3 zoning.

Air Quality

During construction of the facility, there will be a potential for nuisance dust at the construction sites that can be mitigated. Sources of dust would include material handling and construction site activities. A formalized dust management plan would be implemented during construction would include dust suppression (water), road sweeping, and cleaning of vehicle tires before leaving the construction site to control track-out. Site inspections of dust generation would be carried out as part of the program to ensure mitigation is effective at the source. For increased community protection, the program would also incorporate ambient monitoring of fence line air concentrations of dust (particulate) and other compounds identified as potentially being released during construction. The monitoring equipment will sample for dust 24 hours a day, seven days a week. A contingency plan will be developed and implemented in order to address protocols and procedures to be followed in the event that monitoring detects dust and other compounds at or above alert levels.

During construction, the net effect on air quality will be localized to the construction area for the duration of the construction activities. The implementation of the measures detailed in the dust management plan, will ensure any potential for off-site effects is minimized.

During operations, there will be several servicing and maintenance activities at the Ashbridges Bay LRV maintenance and storage facility that have the potential to produce emissions. These activities include washing and cleaning services, compressed air blow-down, body repairs and vehicle painting and maintenance welding. The washing activities will be with water-based cleansers, which are generally considered an insignificant source of contaminants. The compressed air cleaning of the traction motors and selected roof-mounted components will generate dust emissions. The body repair activities will include minor collision repairs, panel replacements, door and window replacements and other system parts replacements. The parts replacements will not result in emissions, but the minor collision repairs will generate insignificant releases of dust from body work repair work. Vehicle repainting for either touch-up painting of collision repairs or complete vehicle repainting will generate releases of paint solvents and paint overspray particulate. Maintenance welding will generate fumes containing particulate and metals.

In addition to the servicing and maintenance activities, there will be emissions from the combustion of natural gas used for comfort heating in the building.

During operations of the facility, particulate generated from the compressed air cleaning will be controlled with a ventilation/dust capture and control system. Painting will be conducted inside the spray paint booth which will contain the emissions and will be equipped with an exhaust system with overspray filters and an exhaust stack. Welding stations will have fume capture and control systems. Energy conservation measures will be incorporated into the design and operation of the facility in order to reduce energy requirements and resultant combustion gas emissions.

The Ontario Ministry of the Environment procedure for preparing air emissions applications outlines a methodology to assess whether sources are significant or negligible sources of air contaminants. A list of sources considered negligible includes minor surface coating operations, maintenance welding stations and natural gas fired heating units with capacities of less than 20 million kilojoules per hour. The facility building, designed with conventional energy conservation measures, will not exceed 20 million kilojoules per hour. As a result, the *operations* of the touch-up painting of minor collision repairs, the maintenance welding and the heating of the building are considered negligible sources of air contaminants with negligible net effects on air quality.

The compressed air blow-down and the paint booth will be intermittent controlled sources of air contaminants with negligible net effects on air quality.

Noise and Vibration

During operation, noise effects will be mitigated by an acoustic barrier to be installed along the north and west end of the site. The top of the acoustic barrier will be approximately 3.5 metres extending upwards from the elevation of the site. The site elevation is modelled as 1 metre above the exterior elevation. The elements of the acoustic barrier will be addressed as part of a design competition for the site in the Fall of 2010. With this mitigation measure in place, the predicted sound level at each sensitive receptor around the site will be below applicable MOE sound level limits.

Vibrations from LRV pass-bys can be affected by the condition of the wheels, the corrugation of the rail, and the presence of any switches and/or rail joints in proximity to a receptor. Soil conditions can also affect the vibration effect at the receptor. LRVs only produce significant vibration levels within a distance of approximately 40 metres. The closest sensitive receptor to the maintenance and storage facility is located at a distance of approximately 240 metres. Therefore, no significant vibration effect is expected at any receptor.

It is anticipated that there would be potential short-term noise and vibration related effects due to construction. These effects will be short term and will be mitigated by standard mitigation measures and in compliance with City of Toronto Noise By-law No. 1400-2007, 514-2008, as well as City of Toronto Municipal Code Chapter 591 and 363.

A Certificate of Approval from the MOE for noise will also be obtained for the facility.

Traffic and Transportation

The proposed maintenance and storage facility will accommodate approximately 100 LRVs with a potential of 85 LRVs in service at any one time. The LRVs are intended to provide revenue service along Queen Street, and will enter into service from the facility via Leslie Street northbound early in the morning and will return to the facility via Leslie Street southbound primarily during the mid to late evening and again late at night. The section of Leslie Street that the LRVs will run on is not part of a TTC revenue service route, and therefore, its use will be limited to trips to/from the maintenance facility. Light rail vehicle access to the facility will be provided via tracks located along the north leg of the Leslie Street/Commissioners Street intersection, and the southbound to eastbound left turn movement (entering the facility) and the westbound to northbound right turn movement (exiting the facility) will be part of the intersection traffic control (signalized intersection).

There will be approximately 470 employees at the facility, who will work during three shifts with the majority of workers (300) on the day shift. The shift times will start at 7:00 a.m., 3:00 p.m., and 11:00 p.m., with corresponding end times approximately eight hours later. Employee vehicular access to the facility will be provided via Commissioners Street east of Leslie Street, and as such, all employee traffic will travel through the Leslie Street/Commissioners Street intersection. The intersection currently provides access to the Ashbridges Bay Wastewater Treatment Plant.

To alleviate circulation and access issues at the proposed maintenance and storage facility site as well as at the Leslie Street / Lake Shore Boulevard intersection, the following mitigation measures are recommended:

- Lengthen northbound left turn lane on Leslie Street at Lake Shore Boulevard to facilitate turning movements.
- Provide an exclusive southbound left turn lane on Leslie Street at Commissioners Street to facilitate LRV and vehicle movements; provide an exclusive westbound right turn lane and a shared left through lane for the east leg of Commissioners Street. The functional plan for the Ashbridges Bay LRV maintenance and storage facility in **Figure 4-2** below presents these requirements.
- Combine LRV access into the site with vehicular access at the Commissioners Street intersection, minimizing the number of conflict points between vehicles and pedestrians and cyclists using the Martin Goodman Trail.

Potential Effects of the Connecting Tracks

The following section provides an overview of the potential environmental effects associated with the proposed connecting track, as well as the recommended mitigative measures.

Hydrogeology and Groundwater

Relative to hydrogeology and groundwater, the potential adverse effects of the connecting track along Leslie Street are anticipated to be minimal. Since construction of the tracks will not occur below the water table, and the overall footprint of Leslie Street will not be altered, no effects are anticipated during construction and operation of the connecting tracks. As such, any potential changes to groundwater recharge, groundwater flow, groundwater quality and aquifer/wells are not expected to be significant.

In addition, no potential effects to stormwater quantity are anticipated as a result of the proposed track connection. The catchment area will not increase in size and the level of imperviousness will not change.

Contaminated Soils

Limited soil chemical analyses were conducted on soil samples collected from the track connection area by AMEC in 2010⁶. Soil samples were determined to exceed the MOE Table 3 Site Condition Standards for electrical conductivity and sodium adsorption ratio. The exceedances of electrical conductivity and sodium adsorption ratio are attributed to the use of road salt along Leslie Street. Table 3 Site Condition Standard exceedances were noted for electrical conductivity, sodium adsorption ratio, boron, petroleum hydrocarbons, tetrachloroethylene and xylenes which may be an indicator of some localized impacts. As only a limited number of samples from the track area were tested, additional soil sampling may be required as the excavation progresses to verify the soil conditions.

Based on soil samples collected from the track connection area, the soil would be classified as being non-hazardous waste for disposal purposes.

Inspection and/or additional soil sampling during excavation for the connecting tracks should be conducted to verify the suitability of the soil for reuse and/or soil disposal options.

The excavated material should be replaced with clean fill or reused clean soil, if found suitable, prior to the laying of the tracks or underground structures and utilities. If contamination is encountered during excavation, a health and safety specialist should assess if special health and safety requirements are necessary for construction workers and the general public.

The potential presence of contamination along Leslie Street does not eliminate or promote either of the connecting track design options. Encountering contaminated soils within the construction limits may have cost, health and safety, and site controls implications. Consideration should be given to ensuring that the contractor(s) has the experience and qualifications to work on contaminated sites to protect the health and safety of the workers and the public.

Air Quality

During construction of the connecting track, there will be a potential for nuisance dust at the construction sites. Sources of dust would include material handling and construction site track-out onto the public roads. Mitigation of dust during construction would be in accordance with the measures detailed in the dust management plan, and would include actions such as dust suppression (water), road sweeping, and cleaning of vehicle tires at wash stations prior to leaving

the construction site to control track-out onto public roadways. The plan will include opportunities for adaptive management, in which the intensity of the control measures would be increased if site inspection or the ambient monitoring indicate this is warranted to prevent off-site effects on air quality.

Noise and Vibration

Sound level calculations were performed in accordance with the Ministry of Environment Guidelines outlined in Reference 4 and by the Guidelines of the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) using STAMSON prediction software. A speed of 50 kilometres/hour and a vehicle type of the Canadian Light Rail Vehicle (CLR), representing an existing streetcar model, was used in the prediction calculations.

The table below summarizes the potential noise effects on properties as a result of LRVs travelling along Leslie Street. Noise effects that exceed the MOEE/TTC sound level limit are underlined and **bold**.

Noise Effect Summary for Transportation Sources

Time Period	Noise Effect at Nearest Properties West of Leslie Street (7 m from track Centre Lane)	Noise Effect at Nearest Properties East of Leslie Street (10 m from track Centre Lane)	Sound Level Limit
Day (0700– 2300)	<u>65 dBA</u>	62 dBA	63 dBA
Night (2300 – 0700)	<u>67 dBA</u>	<u>65 dBA</u>	59 dBA

The predicted night time noise effect of LRV operations on the nearest properties along Leslie Street exceeds the sound level limits by 8dBA and 6dBA during the night time and day time respectively. Alternatively, the predicted daytime noise effect exceeds the sound level limit by 2dBA at seven metres away from the LRV centre lane. As described in the TTC/MOEE protocol, mitigation should be considered for impacts exceeding the sound level limits by greater than 5dBA where it is determined to be technologically, economically, and administratively feasible to implement.

TTC will test the new prototype LRV vehicles in early 2012. Following testing, if it is determined that an acoustic impact in excess of 64dBA (5 dB over the limit) is predicted for the nearest residents, TTC will enforce a maximum speed limit of 25 kilometres/hour for all LRVs operating along Leslie Street between the maintenance and storage facility and Queen Street East. According to acoustic modelling results, this will reduce the predicted impact below the 64dBA allowable limit.

The centreline of the LRV track running along Leslie Street is expected to run within seven metres of nearest properties along Leslie Street. The vibration effect is predicted to be 0.25 mm/s at 50Hz, which exceeds the MOEE/TTC vibration limit of 0.14 mm/s. At further distances, the occasional LRV pass-by may generate vibration levels above the limit in the event of a LRV that requires maintenance is still operating in service. The predicted vibration effects from different distances are summarized below:

Vibration Effects Summary

Distance	Vibration Effect
0 to 7 metres	Greater than or equal to 0.25 mm/s
7 to 15 metres	0.25 to 0.14 mm/s
15 to 30 metres	Less than or equal to 0.14 mm/s
Greater than 30 metres	Less than 0.14 mm/s

6. AMEC Earth and Environmental (2010) DRAFT Summary of Geotechnical Investigation – Environmental Soil Sampling Program, TTC Fleet MSF – Leslie Street Track Connection, Queen Street East to Commissioners Street, Toronto, Ontario

In order to meet the MOEE/TTC vibration limit, TTC will include in the design of the LRV tracks a slab which is floated on vibration isolation rubber pads or a mat. The slab will extend along Leslie Street between Queen Street East and Lake Shore Boulevard. With this measure in place, the vibration levels are expected to drop by 0.11 mm/s to 0.17 mm/s to below the vibration limit. In addition to the mitigation measures described above, the LRV track design will be continuously-welded with the necessary joints placed away from residential properties along Leslie Street. If prototype testing identifies the need for mitigation beyond those noise and vibration measures provided at the source (i.e., track or LRV), TTC will identify mitigation measures for affected residents and businesses.

With appropriate mitigation measures in place, the net effects on residences along Leslie Street from noise and vibration associated with the proposed LRV tracks will comply with applicable standards.

It is anticipated that there would be potential short-term noise and vibration related effects due to construction. These effects will be short term and will be mitigated by standard mitigation measures and compliance with City of Toronto Noise By-law No. 1400-2007, 514-2008, as well as City of Toronto Municipal Code Chapter 591 and 363.

The complete Noise & Vibration Assessment for the Ashbridges Bay LRV maintenance and storage facility is provided in Technical Report # 8- Environmental Noise & Vibration Assessment Report, September 2010.

Traffic and Transportation

Overall, there are minimal operational deficiencies anticipated for Leslie Street during times when the LRVs will be most active along the corridor (outside of the morning and evening rush hour periods). The Leslie Street/Lake Shore Boulevard East intersection is projected to continue to operate at acceptable levels of service (LOS "C") during these time periods. The intersections at each end of the service line (i.e., Commissioners Street and Queen Street East) are projected to continue to exhibit good traffic flow.

The following mitigation measures will be explored further to enhance the mobility and safety of Leslie Street during the operation of the LRVs, including:

- Review signal timings and vehicle detection capabilities along Leslie Street between Commissioners Street and Queen Street to determine where it would be beneficial to incorporate any transit priority signal phases or extensions that would be actuated by LRVs.
- Provide LRV detection equipment as required to actuate any special signal phases or longer green extensions that may be required to clear LRV traffic through the signalized intersections.

The majority of the LRV traffic to and from the proposed maintenance facility will occur either well before or well after the typical peak periods of street traffic. As such, LRV traffic movements between the proposed facility and Queen Street East will have negligible effects on traffic operations along Leslie Street and associated intersections.

Consultation

TTC proactively engaged residents, businesses, agencies, and other interest groups throughout the study and during the pre-planning stages. Project information was posted on the project web site, and a dedicated TTC Community Liaison Officer actively participated in the study process. TTC hosted one Public Open House (on July 28, 2010) after the study had officially commenced. During the preliminary planning stage, TTC held three workshops with residents and stakeholders to gauge their interest in the study, discuss the TPA Process in more detail, and present information on the need for the new maintenance and storage facility and low-floor LRVs. The following provides a more detailed overview of the consultation activities undertaken to date:

- Dedicated project web site, with up-to-date information on the project developments.

- Dedicated TTC Community Liaison Officer whom individuals could contact via telephone, fax, or email.
- The City of Toronto and TTC hosted three Public Open Houses/Workshops during the Preliminary Planning process, including:
 - June 16, 17 & 18, 2009 – these events discussed the rationale for the project, requirements of the new maintenance and storage facility, the fourteen sites that were assessed to accommodate the facility, the screening criteria used in the site selection process and the preliminary designs for each of the three sites with highest potential.
 - February 18, 2010 – this event introduced the proposed maintenance and storage facility project, including potential layouts, existing site conditions and criteria to be used in the future TPA process.
 - April 8, 2010 – this event focused on the alternative design options for the Ashbridges Bay LRV maintenance and storage facility and the connecting tracks to link the facility to the existing streetcar network. During the February 18, 2010 Open House, some residents expressed concerns that Leslie Street would be recommended for the connecting track between the proposed maintenance and storage facility and existing Queen Street service. As a result, TTC agreed to undertake an analysis to review other track options. The April 8, 2010 Open House presented the results of this analysis.
 - The City of Toronto and the TTC hosted a Landscape Design Competition Meeting on May 19, 2010 to announce the launch of a landscape design competition to generate an exciting vision for landscaping at the future Ashbridges Bay maintenance and storage facility. The May 19 event was designed to provide participants with the opportunity to contribute suggestions and ideas for consideration by the landscape design firms that will take part in the design competition.
 - TTC hosted a meeting with residents of the Marigold Properties (1209 Queen Street East) on July 14, 2010 at the EMS Academy (895 Eastern Avenue) to discuss the potential effects and mitigation strategies developed for the Leslie Street and the proposed route of the connecting tracks. The Marigold Properties include condominiums that front Leslie Street.
 - TTC hosted a meeting with Leslie Street property owners and businesses on July 15, 2010 at the EMS Academy to discuss the potential effects and mitigation strategies developed for the Leslie Street connection track.
 - The TTC hosted a public meeting on July 28, 2010 at the Toronto Fire and EMS Training Centre to discuss all aspects of the TPA Process, including an overview of the preliminary planning and Transit Project Assessment Process, the recommended maintenance and storage facility and connecting track designs, proposed measures to mitigate any potential negative project effects (and resulting net effects), and proposed monitoring to verify the effectiveness of the mitigation measures.
 - TTC hosted two drop-in sessions in the local community on August 8 and 10, 2010 to present the three landscape designs developed by the firms engaged in a competition to enhance the Lake Shore Boulevard and Leslie Street edge (adjacent to the maintenance and storage facility).
- TTC held individual meetings and/or correspondence with key agencies, including the Toronto and Region Conservation Authority, the City of Toronto, Lea Consulting on behalf of Loblaw Properties Limited, Canada Post, Film Ontario, Enbridge Gas Distribution, Hydro One, Indian and Northern Affairs Canada (INAC) and the Ministry of Aboriginal Affairs.
- Correspondence with the following Aboriginal communities:
 - Alderville First Nation
 - Beausoleil First Nation

- Chippewas of Georgina Island First Nation
- Chippewas of Rama First Nation
- Conseil De La Nation Huronne-Wendat (Huron-Wendat First Nation)
- Curve Lake First Nation
- Hiawatha First Nation
- Kawartha Nishnawbe First Nation
- Metis Nation of Ontario
- Mississaugas of the New Credit First Nation
- Mississaugas of Scugog Island First Nation
- Moose Deer Point First Nation
- Williams Treaty First Nations Legal Counsel

Monitoring and Future Commitments

During the Transit Project Assessment, the TTC and the City of Toronto have worked closely with key stakeholders to address and resolve all issues or concerns identified. However, not all issues can be addressed within the context of a Transit Project Assessment since the design of the maintenance and storage facility has been prepared at a conceptual level only. Accordingly, the TTC and the City, with stakeholder input, have developed a list of future commitments and monitoring. Supplemental commitments have also been developed under the direction of the Toronto Transit Commission board and Toronto City Council. Sections 6 and 7 of the Environment Project Report detail the monitoring and future commitments.