



Application for Approval to Construct a Railway Line

Submitted to the Canadian Transportation Agency under Section 98 of the *Canada Transportation Act*

Submitted by the City of Ottawa

November 16, 2018

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| Project Title: | Stage 2 Light Rail Transit O-Train Trillium Line Project – Bowesville Subdivision; and, – Airport Link. |
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Section A: Application Overview



1.0 Project Overview

1.1 Description of Approval

The following application seeks approval from the Canadian Transportation Agency (“CTA”) to construct the City of Ottawa (“City”) O-Train Trillium Line Project (“Trillium Line Project”) under Section 98 of the *Canada Transportation Act* (“Act”), as part of the overall Stage 2 Light Rail Transit (“LRT”) project.

The City of Ottawa indicated its opinion that the Trillium Line Project is within the regulatory jurisdiction of the CTA in a letter sent April 20, 2018. The CTA, in consultation with Transport Canada, confirmed on May 10, 2018 that the 2011 Delegation of Authority Agreement does not apply to the Trillium Line Project. A copy of both correspondences is provided in Appendix A.

For the purposes of this application, the track construction starting just north of Leirtrim Road and running south to the terminus at Limebank Station (“Bowesville Subdivision”), and the Ottawa MacDonald-Cartier International Airport Link (“Airport Link”), require approval under *Section 98* of the *Act*.

The application extents as outlined were confirmed by a letter sent to the Canadian Transportation Agency dated May 4, 2019 from the City of Ottawa, with additional supporting information provided subsequently on August 23, 2018. The CTA confirmed the extends of the following application on September 12, 2018. A copy of all correspondences is provided in Appendix A.

Please see the following table and Figure 1 for a map of the application boundaries:

| Line | Start | End | Type |
|---|---|--|-----------------------------|
| Airport Link | Chainage: 12+920 GPS: 371441.3533m E, 5022966.3944m N | Chainage: 10+000 GPS: 369962.3681m E, 5020705.2615m N | Passenger rail service only |
| Bowesville Subdivision (Leirtrim Road to Limebank Station) | Chainage: 23+232.8 GPS: 37205.7404m E, 5020048.9235m N | Chainage: 16+964 GPS: 370084.7055m E, 5015545.8039m N | Passenger rail service only |

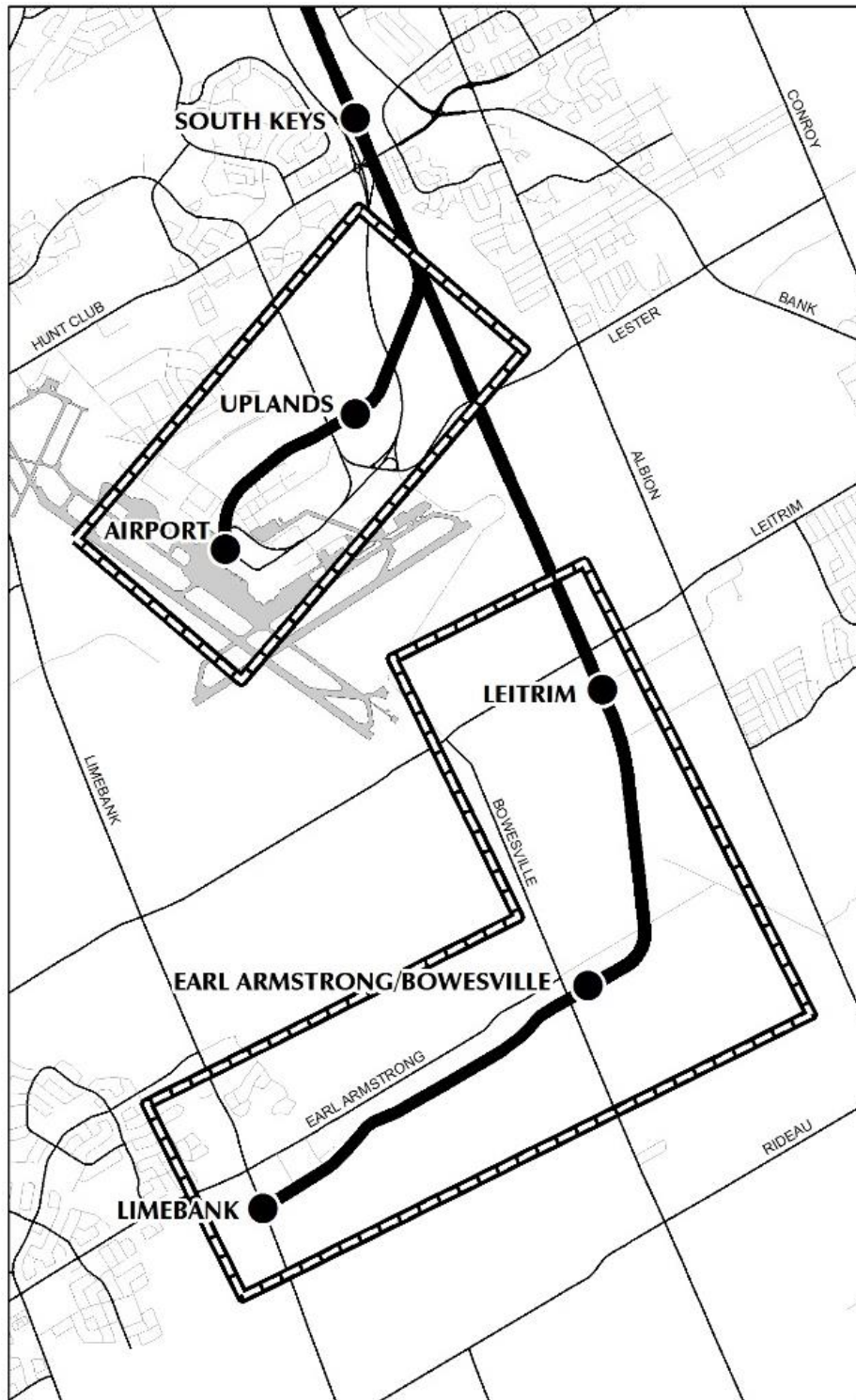


Figure 1 - Application Boundaries

1.2 Description of Operations

The Trillium Line Project includes an approximately 12km extension of the existing single-track, diesel-powered north-south passenger service from its present terminus at Greenboro Station to Limebank Station, and an addition of a 4km passenger service line connecting to the Ottawa Macdonald-Cartier International Airport (“OMCIA”).

The Trillium Line will provide regular passenger service on the mainline from Bayview to Limebank stations, and from South Keys to Airport stations at the OMCIA. Section C (“Railway Operations and Services”) of this application will describe the operations of the Trillium Line in detail.

1.3 Construction Timelines

The construction of the Trillium Line Project is expected to begin in Q2 2019, with passenger service operation anticipated to commence in 2021 or 2022. The Trillium Line Project and related works is being tendered as a full Public-Private Partnerships (P3) Design-Build-Finance-Maintain (DBFM) contract with Project Agreement (PA) contract award expect in Q1 2019. The contract includes a 27-year maintenance contract with an end date on or near 2048. Capital Railway, on behalf of the City of Ottawa, will continue to operate the service.

1.4 Procurement Model

As noted, the procurement of the Trillium Line Project is being undertaken as a full P3 DBFM contract, which will allow the City to deliver the project efficiently and share the project risk with private-sector partners. This model increases accountability and transparency, while ensuring the best value for the high-quality infrastructure.

As part of the Request for Proposal (RFP) process, the City has provided detailed Project Specific Output Specifications (PSOS) to the proponent teams as part of the PA, which set out the specific technical requirements and parameters for the project in an effort to achieve high quality in service delivery. Furthermore, the PSOS also embeds all required environmental mitigations as identified during the environmental assessment process. At the same time, however, the PSOS provides for some flexibility to encourage innovation and efficiencies on the part of the successful consortium. Following the completion of the procurement process, the successful consortium

selected for the Trillium Line Project will develop final designs and manage other aspects of the project to the City's expectations within the established affordability requirements. As a result, and as it pertains to this application, the information provided in the following sections are based wholly in the PSOS documents provided to the proponent teams.

Certain aspects of the information below not identified in the PSOS documents will be informed by City By-Laws and Standards.

1.5 City of Ottawa Oversight Mechanisms

The City of Ottawa, as the municipal regulatory authority for the area encompassing the project limits, is uniquely empowered to ensure that the project has full oversight and that the system is compliant with all standards, codes, and regulations. Throughout all phases of the Trillium Line Project, the City will retain active and robust oversight over Project Co. and the execution of all aspects of work. The City has established a project management office, the Rail Construction Program, to oversee and monitor the work of Project Co. in all areas of the project, including contract management, design and construction management, and communications and stakeholder engagement.

The Rail Construction Program office will constitute approximately seventy-five full-time project management, design, and construction professionals who will oversee and ensure that Project Co. executes the Trillium Line Project in full compliance with the PA. The Rail Construction Program will be supported by an Owner's Engineer ("OE") joint venture team comprised of STV, Morrison Hershfield, and AECOM who will provide a pool of subject matter experts to provide engineering support and review of any specialized engineering or technical activities. The combination of complimentary City and OE teams will ensure that the City is effectively prepared to oversee contract management, and the design and construction of all project requirements, including, but not limited to:

- Utility works;
- Traffic management plans and detours;
- Property acquisitions and third party agreements;
- Stations and system facility design and construction;
- Guideway and trackwork design and construction;
- Communications and signal systems;
- Vehicle procurement and assembly;

- Maintenance and storage facility design and construction; and,
- The System Safety Certification processes.

In addition to the Rail Construction Program oversight, the project will leverage support from City departments and service areas to oversee specific project compliance areas. Additional support will be provided at a minimum by the following teams:

- OC Transpo, Rail Operations: Railway operations and maintenance expertise;
- OC Transpo, Service Planning: Transit operations and maintenance expertise;
- OC Transpo, Safety, Compliance, and Training: Transit safety experience and transit training support;
- City of Ottawa, Traffic Services: Traffic operations and maintenance expertise;
- City of Ottawa, Transportation Planning: Integrated transportation planning expertise including active transportation and multi-use pathway networks;
- City of Ottawa, Office of Emergency Management: Emergency response planning, coordination, and compliance;
- City of Ottawa, Fire Services: Fire system and emergency response compliance;
- City Of Ottawa, Planning, Infrastructure, and Economic Development (PIED): Municipal infrastructure design compliance including for water, sewer, storm water, and other utility areas;
- City of Ottawa, Building Code Services: Code compliance and enforcement;
- City of Ottawa, Corporate Services Public Information and Media Relations: City-wide communications support;
- City of Ottawa, Legal Services: Internal and external legal counsel; and,
- City of Ottawa Financial Services: Budget and financials oversight and expertise.

Finally, the City's funding partners, the Government of Canada and the Province of Ontario, will remain heavily involved in an oversight capacity throughout the course of the Trillium Line Project. Two committees, the Agreement Management Committee (AMC) with the Government of Canada and the Agreement Oversight Committee (AOC) with the Province of Ontario, will meet quarterly with the Rail Construction Program and City representatives to receive project progress reports, review project financials, and ensure that the Project is managed in compliance with the objectives set out in the funding agreements.

The additional support from specific service areas and external funding partners will help ensure that the City's commitments to City Council, third parties, stakeholders and regulators are fulfilled and that the City's obligations under any permits, licenses or approvals are met.

Contract Management

The Rail Construction Program Contract Management Branch will monitor, verify compliance and impose the requirements of the PA, and as required. The PA includes numerous monitoring and compliance tools available to the City in cases of non-conformance, including financial penalties.

Design Management

The Rail Construction Program Design Management Branch will oversee and review all design submittals from Project Co. at each stage of the design process. A team of design engineering professionals and subject matter experts will review each aspect of the design of the Trillium Line Project prior to design finalization and construction. The Design Management Branch will meet regularly with Project Co. and stakeholders at Design Review Committee meetings, as required by the PA, to discuss design review and resolve any disputes as required.

For the Airport Link, an additional level of design oversight and approval is required through the National Capital Commission Federal Land Use Design Approval (FLUDA) process. The FLUDA process ensures the design and construction of infrastructure on Federal Lands reflects the NCC's Capital Interests.

It should be noted that Project Co. is bound by the PA to ensure that all parts of the design are performed or reviewed, and certified by licensed or registered professional engineers and architects registered to practice in the Province of Ontario. All designs must comply with applicable standards, specifications, codes and laws.

Construction Management

The Rail Construction Program Construction Management Branch will monitor, inspect, and audit all of Project Co.'s construction works, including testing and commissioning. A team of construction inspectors will work at Project Co.'s construction sites and will inspect construction works throughout all phases of construction.

Additionally, the Construction Management Branch will also review all construction works submittals from Project Co. for PA compliance. The Construction Management Branch will meet regularly with Project Co. at Construction Coordination Committee, and Testing and Commissioning Coordination Committee meetings, as required by the PA, to discuss works submittal reviews, construction progress, and resolve any disputes as required.

It should be noted that Project Co. is bound by the PA to ensure that the construction works are performed as to minimize disturbances to all properties and operations adjacent to the construction areas and alignment, including with respect to noise, dust control and access. All construction works must comply with the PA, and all applicable laws and municipal by-laws.

Communications and Stakeholder Engagement

The City has conducted a thorough communications and stakeholder engagement process to support the environmental assessments, planning and procurement phases of the Trillium Line Project to date, which has been detailed in Section D: Consultation Activities of this application.

As the Project moves into the construction phase, the City will continue to actively communicate and engage the public throughout the life of the Project. A team of Communications and Stakeholder Relations Engagement community liaisons, who will be readily available to assist residents and public with questions or concerns as they arise, and provide proactive communications for construction related works, will support the Trillium Line Project. The Communications & Stakeholder team includes a dedicated group of 10 professionals who are focused on communications and stakeholder engagement for the City's Transportation Service Department. This team is additionally supported by a team in the City's Corporate Services Public Information and Media Relations Branch, which is responsible for City-wide communications and supplements any department specific activity.

As required by the PA, following contract award, the City's Communications and Stakeholder Relations Engagement team will be directly supported by Project Co.'s respective communications team, who will be responsible for the following consultative responsibilities:

- Providing timely and accurate technical information;
- Providing written and multimedia content for the project website;
- Collaborate with the City to update project stakeholders and participate in community events as required;
- Facilitate reasonable access to project construction sites for the purposes of documentary and archival imagery as well as for technical tours and media events; and,
- Report to the City on communications matters on an agreed upon basis.

The transition from the procurement phase to the construction phase will require a refreshed community outreach approach that can keep pace with a rapidly evolving construction environment as the project advances. This approach includes, but is not limited to communicating with the impacted residents and the public about construction techniques being used and where they are being used day-by-day, potential noise and vibration impacts, impacts to transit service at affected stations, community impacts related to traffic detouring, parking, sidewalk closures, and others impacts related to construction.

To address this changing outreach dynamic, the City's Communications and Stakeholder Relations Engagement team will undertake a community-oriented communications approach for the Trillium Line Project similar to the Confederation Line Project (Stage 1), including the following specific initiatives:

- Project website
- Project-specific email inquiry box
- Public information sessions prior to start of construction
- Open houses and public meetings throughout construction
- Project and station specific newsletters
- Neighbourhood working groups
- Dedicated staff resources to address resident and business concerns about construction impacts
- Media events
- Community signage and decorative hoarding
- Presence at public events
- Advertising in advance of major disruptions

As has been described, the City will play a pivotal role in the execution of the Trillium Line project as the oversight body over all aspects of Project Co.'s works throughout the project.

1.6 Supporting Studies

The City of Ottawa has undertaken the 2016 Trillium Line South Extension Provincial Planning and Environmental Assessment Study and Environment Project Report ("2016 Trillium Line EA"), the ongoing 2018 Provincial Environmental Assessment Environment Project Report Addendum ("2018 EA Addendum"), and the ongoing Federal *Canadian Environmental Assessment Act* Environmental Effects Evaluation (EEE) processes to



support the project. The studies mentioned above will be described in detail in Section B (“Location of the Railway Line”).

1.7 Description of Localities in Direct Proximity

The Bowesville Subdivision will extend the City’s LRT reach and access to the wider O-Train and OC Transpo bus transit network to the south of Ottawa. The Trillium Line will provide a high level of transit service for these communities, aimed at encouraging the use of public transport for both short-haul trips within the communities and for longer trips downtown and beyond.

As noted above, only the new track sections of the Trillium Line alignment apply to this application. As a result, for the purposes of this application, the communities in direct proximity to the Bowesville Subdivision rail alignment are Findlay Creek just east of Leitrim Station and Riverside South just west of Limebank Station. The Airport Link does not affect any communities directly; however, the communities in closest proximity are Sawmill Creek and Blossom Park between Hunt Club Road and Lester Road, and Elizabeth Park north of the OMCIA.



Section B: Location of the Railway Line

2.0 Railway line description

The following section provides a description of the location and the rail infrastructure of the Bowesville Subdivision and Airport Link alignments. Subsequent sections of this application will describe each component in detail as it relates to the operation of the system.

2.1 Location of the Railway Line

As noted above, for the purposes of this application, only the Trillium Line new track construction from the existing end-of-track north of Leitrim Road to Limebank Station and the Airport Link are described below. The section of new track includes:

- The Bowesville Subdivision (Figure 2); and,
- The Airport Link (Figure 3).



Figure 2 - Bowesville Subdivision Alignment

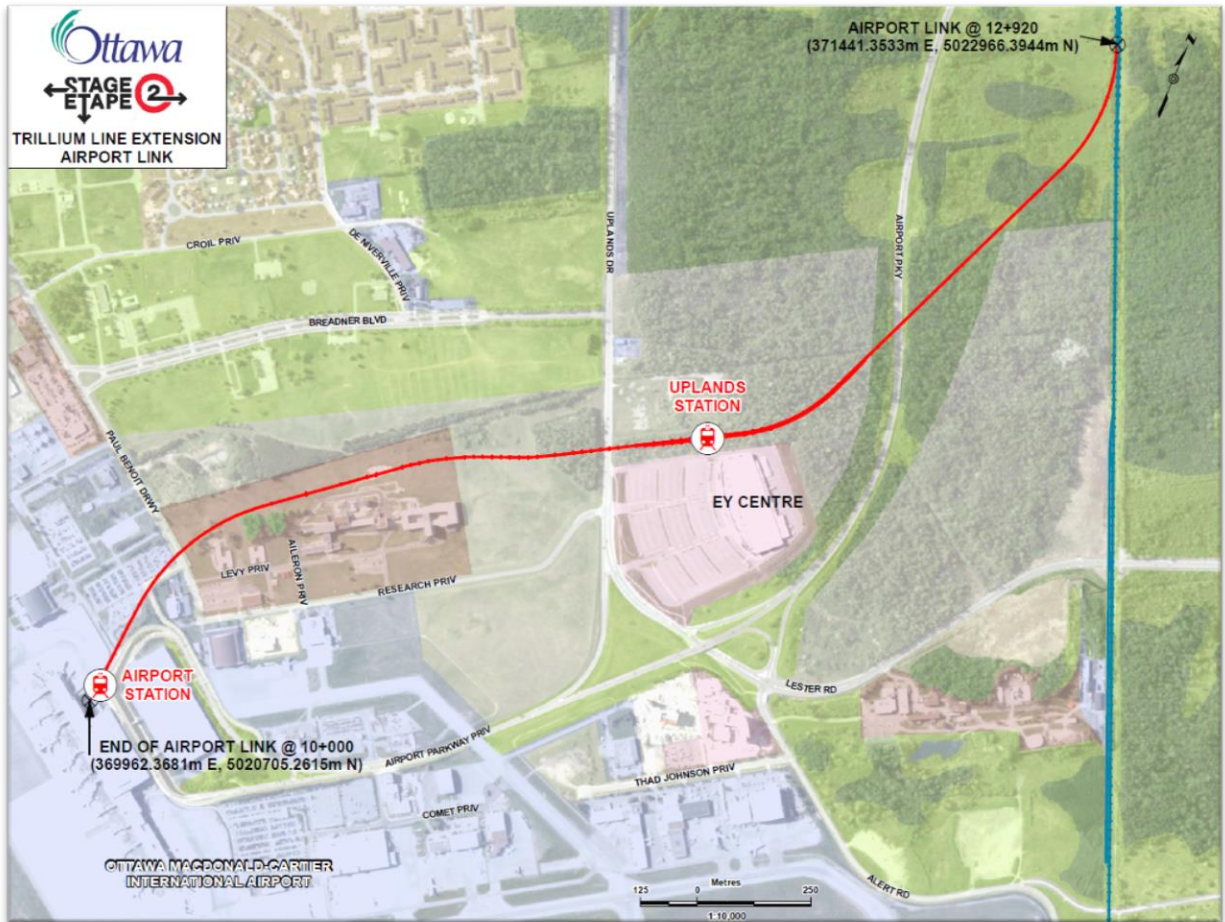


Figure 3 - Airport Link Alignment

2.2 Bowesville Subdivision

The Bowesville Subdivision represents a 6km extension of the Trillium Line from the existing end-of-track just north of Leitrim Road to Limebank Station.

The Bowesville Subdivision alignment follows the existing City-owned former CP Rail Prescott Subdivision rail corridor from the end-of-track just north of Leitrim Road to Earl Armstrong Road. The former Prescott Subdivision corridor was purchased by the City of Ottawa from CP Rail in 2005. The Agreement of Purchase of Sale of Railway Lands as agreed-to between the City and CP Rail is provided in Appendix B. It should be noted that this section of the former Prescott Subdivision underwent a formal discontinuance process in 1998. A copy of the discontinuance letter is provided in Appendix B.

The remaining lands that make up the Bowesville Subdivision alignment outside of the existing City-owned rail corridor south of Earl Armstrong Road and west to Limebank Road will be acquired by the City. Property ownership is described in Section C.

The following rail infrastructure will be constructed on the Bowesville Subdivision:

- i) Bowesville Subdivision from the existing end-of-track to Leitrim Station (Figure 4):



Figure 4 - Bowesville Subdivision at Leitrim Road

The mainline of the Bowesville Subdivision from the existing end of-track north of Leitrim Road to Limebank Station will be a double-track line. A grade separation will be constructed at Leitrim Road to segregate the rail from the roadway, and Leitrim Road will be realigned to accommodate the grade separation, if required.

An Accessibility for Ontarians with Disabilities Act/ American Disabilities Act (AODA/ADA) compliant multi-use pathway will be constructed throughout the alignment to provide connectivity to pedestrians and cyclists, and perimeter fencing will be installed throughout the alignment.

ii) Leitrim Station (Figure 5)

A new Leitrim Station with two platforms will be constructed to accommodate an 80m train. The existing Park and Ride parking lot will be expanded to accommodate 330 parking spots, and protect for a future total 925 spots. The Station will serve the adjacent Findlay Creek and surrounding communities. The mainline of the Bowesville Subdivision from the existing end-of-track north of Leitrim Road to Limebank Station will be a double-track line. A new station plaza will connect to an AODA/ADA compliant multi-use pathway to provide connectivity to pedestrians and cyclists, and perimeter fencing will be installed throughout the alignment.



Figure 5 - Leitrim Station

iii) Bowesville Subdivision from Leitrim Station to Bowesville Station (Figures 6-8)

The mainline of the Bowesville Subdivision from the existing end-of-track north of Leitrim Road to Limebank Station will be a double-track line. A grade separation (Figure 8) will be constructed at Earl Armstrong Road to segregate the rail from the roadway. Earl Armstrong Road will be realigned to accommodate the grade separation, if required. An AODA/ADA compliant multi-use pathway will be constructed to provide connectivity to pedestrians and cyclists, and perimeter fencing will be installed throughout the alignment.

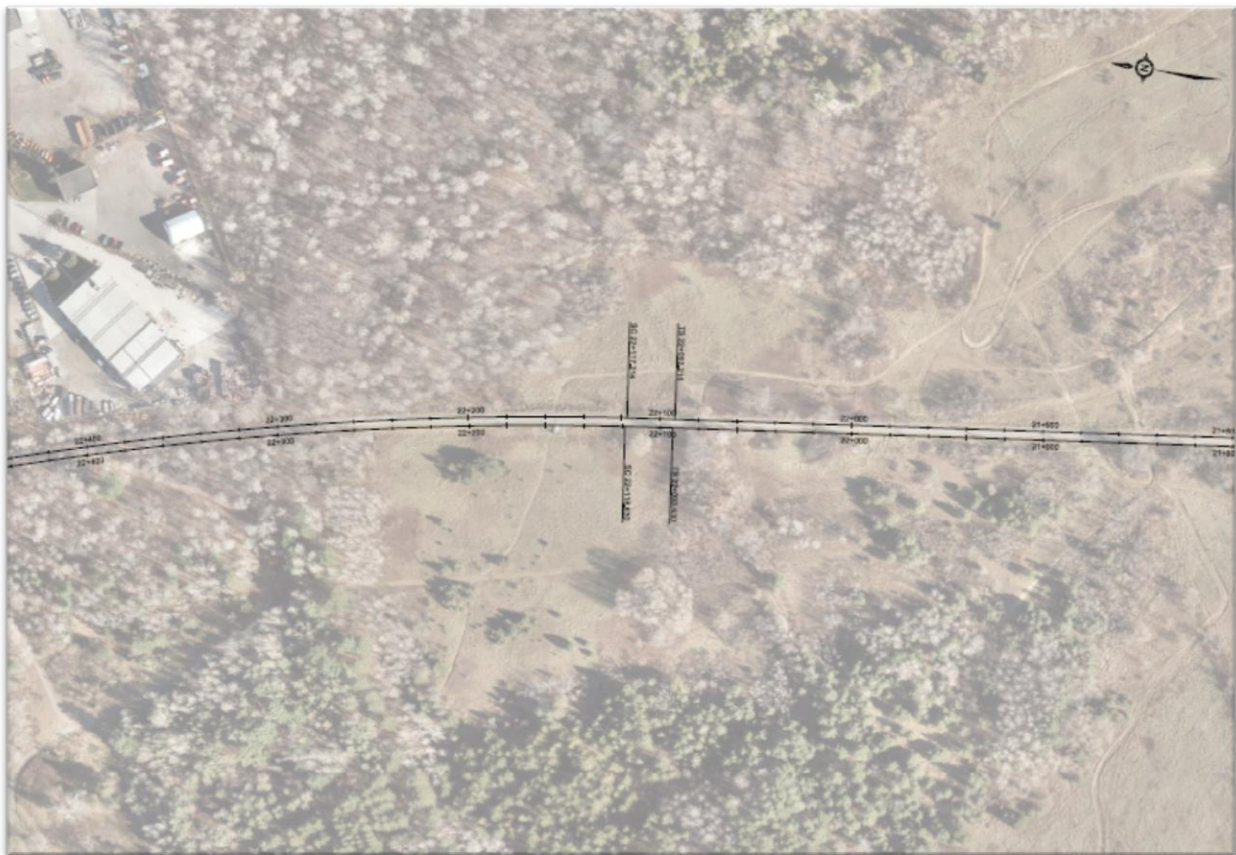


Figure 6 - Bowesville Subdivision from Leitrim Station to Bowesville Station (1)



Figure 7 - Bovesville Subdivision from Leitrim Station to Bovesville Station (2)

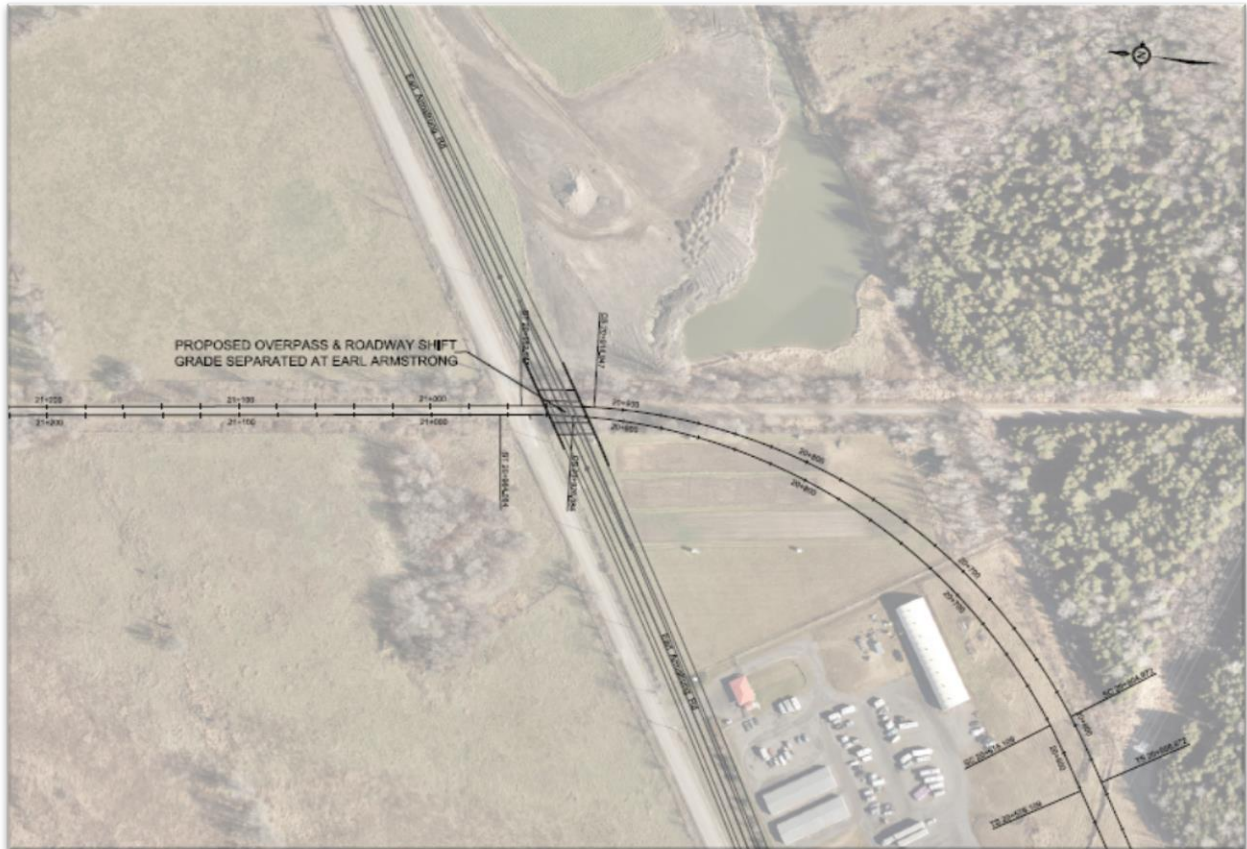


Figure 8 - Bowesville Subdivision from Leitrim Station to Bowesville Station (3)

iv) Bowesville Station (Figure 9)

A new Bowesville Station with two platforms will be constructed to accommodate an 80m train. A Park and Ride parking lot will be constructed to accommodate 800 parking spots, and protect for a future total of approximately 2,000 spots, which will serve the nearby Riverside South and Barrhaven communities, and southern communities of Greely, Manotick, and Osgoode.

A grade separation will be constructed at Bowesville Road to segregate the rail line from the roadway. The mainline of the Bowesville Subdivision from the existing end-of-track north of Leitrim Road to Limebank Station will a double-track line. A single crossover track will be constructed just west of Bowesville Station.

A new station plaza will connect to the AODA/ADA compliant multi-use pathway to provide connectivity to pedestrians and cyclists, and perimeter fencing will be installed throughout the alignment.



Figure 9 - Bovesville Station

v) Bowesville Subdivision from Bowesville Station to Limebank Station (Figure 10-13)

The mainline of the Bowesville Subdivision from the existing end-of-track north of Leitrim Road to Limebank Station will be a double-track line. Two locations for future stations have been protected. Perimeter fencing will be installed throughout the alignment. A rail bridge will be constructed over Mosquito Creek with a wildlife crossing underneath (Figure 13).



Figure 10 - Bovesville Subdivision from Bovesville Station to Limebank Station (1)

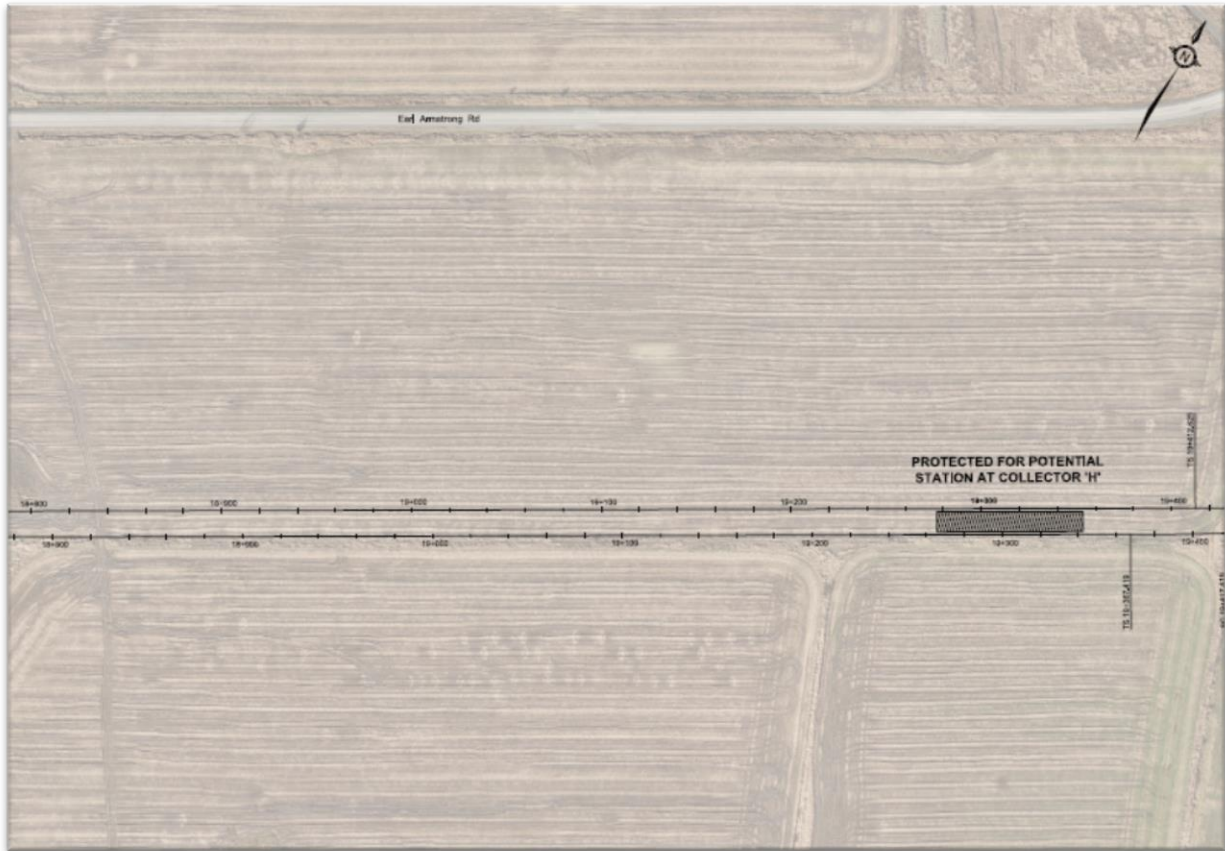


Figure 11 - Bowesville Subdivision from Bowesville Station to Limebank Station (2)



Figure 12 - Bovesville Subdivision from Bovesville Station to Limebank Station (3)



Figure 13 - Bovesville Subdivision from Bovesville Station to Limebank Station (4)

vi) Limebank Station (Figure 14)

A new Limebank Station with two platforms will be constructed to accommodate an 80m train. Passenger pick-up and drop-off parking spots will be provided, which will serve the nearby communities of Riverside South and Barrhaven, and southern communities of Greely, Manotick, and Osgoode. A future station location has been protected.

A grade separation will be constructed at Limebank Road to segregate the rail line from the roadway. The mainline of the Bovesville Subdivision from the existing end-of-track north of Leitrim Road to Limebank Station will be a double-track line. A double crossover and pocket track will be constructed to facilitate the movement of trains into and out of the terminus station.

A new station plaza will connect to an AODA/ADA compliant multi-use pathway will be

constructed to provide connectivity to pedestrians and cyclists, and perimeter fencing will be installed throughout the alignment.

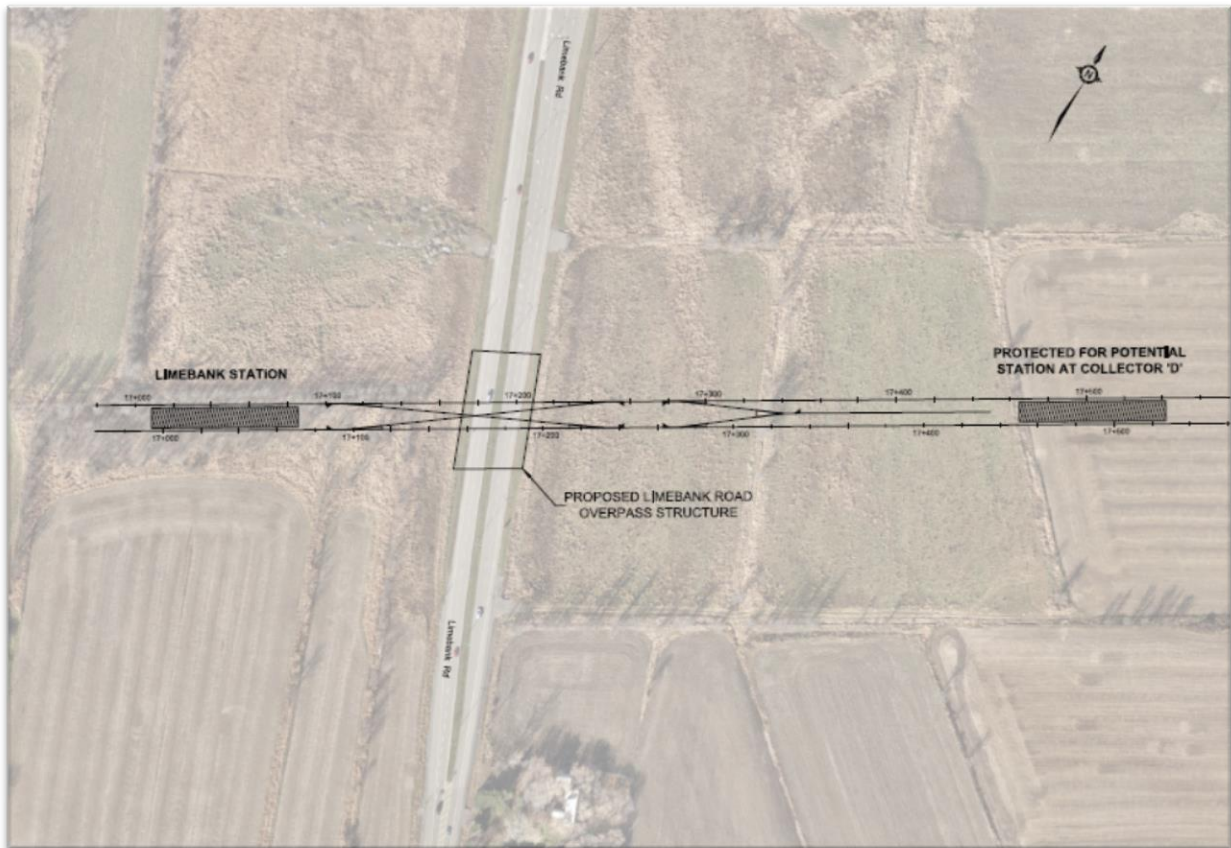


Figure 14 - Limebank Station

2.3 Airport Link

The Airport Link, a 4km line from the main Trillium Line alignment, will provide passenger service from South Keys Station to the OMICA. The lands required for the Airport Link have been acquired from the OMICA Authority and other federal agencies by means of easements. Property ownership is described in detail in Section C.

The following rail infrastructure will be constructed on the Airport Link:

- i) Airport Link to Uplands Station (Figure 15-16)



Figure 17 - Uplands Station

ii) Elevated guideway and Airport Station (Figure 18-19)

The mainline of the Airport Link on the approach to Airport Station will be a single-track line. A single-track elevated guideway will be constructed and a new Airport Station with one platform to accommodate a 40m train. The station will be located adjacent to the Airport terminal building. The OMCIA Authority will construct a connection from the station into the airport terminal building.



Figure 18 - Airport Link on Approach to Airport Station



Figure 19 - Airport Station

3.0 Alternative locations

The following section provides a description of the alternative locations that were considered for the Bowesville Subdivision and Airport Link alignments during the environmental assessment studies.

As noted above, the overall alignment of the Bowesville Subdivision mostly follows the existing City-owned former Prescott Subdivision railway corridor, which was initially envisioned for the North-South Light Rail Transit Project to Bowesville Station. The 2005 North-South Light Rail Provincial Transit Project Environmental Assessment (“N-S LRT EA”) provided the basis for the 2016 Trillium Line South Extension Provincial Planning and Environmental Assessment Study and Environment Project Report (“2016 Trillium Line EA”). A copy of both EAs are provided in Appendix B.

The 2016 EA was initiated by the City in accordance with the Ontario's *Transit Projects and Metrolinx Undertaking Regulation*, O Regulation 231/08. The Transit Projects Assessment Process (“TPAP”) required a consideration of alternative designs, public and agency consultation, an assessment of potential environmental impacts and identification of measures to mitigate impacts. The Trillium Line Project EA was completed and approved by the Minister of Environment and Climate Change on March 21, 2016. The City is currently pursuing a Provincial EA Environmental Protection Report amendment (“2018 EA Addendum”) that reflects a new alignment that extends the line to Limebank Station.

The evaluated alternatives and recommended alignment of the rapid transit corridor, location of new stations and Park and Ride facilities were identified and approved by the province through the N-S LRT EA Study in 2005. As a result, the evaluation of alternatives, as summarized below, were not revisited during the 2016 Trillium Line EA study.

The ongoing 2018 EA Addendum evaluates alternatives for Limebank Station, as the station was not envisioned as part of the original 2005 project. The evaluation is provided below.

3.1 Alternative Evaluation Process

The evaluation of design alternatives was carried out in consultation with City staff, agencies and key stakeholders, and the public. A reasoned argument approach was used to identify a preferred alternative for each design element, which together formed the basis of the Study Recommended Plan as part of the 2016 O-Train Trillium Line South Extension Planning and EA Study.

This evaluation approach involved a four-step process, which was designed to be adaptable, traceable and defensible:

- Step 1: Identify a reasonable range of alternatives for each design element;
- Step 2: Assess impacts of each alternative to inform a discussion of priorities;
- Step 3: Identify key priorities and tradeoffs; identify a preferred alternative for each design element; and,
- Step 4: Document rationale for each preferred alternative.

The number and type of alternatives developed for each design element identified above were guided by the following assumptions, considerations and constraints:

- The Trillium Line will continue to operate as a federally regulated railway;
- The Recommended Plan for the north-south line will be generally consistent with the plan identified in the approved N-S LRT EA;
- Notwithstanding the above, Trillium Line diesel multiple unit (DMU) geometric design criteria (e.g., maximum grades) will govern the planning and design of the required grade-separated rail crossings;
- Stations and grade separations will be located and designed to facilitate future conversion to twin-track electric LRT technology without relocation or major modifications;
- Stations must feature 80-metre platforms to accommodate two-car trains as required;
- Stations should provide a passenger experience compatible with the Confederation Line, including station architecture and fare-paid zones;
- Stations must be fully accessible and AODA-compliant, and provide sufficient space for ramps, stairs, elevators and turnstiles as required;
- Stations should provide good connections to adjacent pedestrian routes and pathways;

- A MUP should be provided parallel to the full length of the extension, in accordance with City policy;
- Passing sidings will be designed and located to permit 12-minute headways and flexibility to adjust the operating model to meet demand at different times of the day and week; and,
- Freight rail access will be maintained between the Walkley Yard and the NRC-CSTT, located immediately west of the Trillium Line corridor south of Lester Road.

The effects of each alternative were then assessed against a series of evaluation criteria. The sections below provides a summary of the alternatives analysis, while the full 2016 EA evaluation of alternatives analysis is provided in Appendix B.

3.2 Alignment

The ultimate southern terminus of the approved North-South Corridor LRT project was located within the future Barrhaven Town Centre. East of the Rideau River, the N-S LRT Corridor EA Study examined three potential corridors (Figure 20) for extending rapid transit services from Greenboro Station to the Strandherd-Armstrong Bridge.

The N-S LRT EA assessed these corridor alternatives for their biophysical, social, economic, and cultural impacts, as well as their implications for transportation, land use, and cost. The Leitrim-Armstrong corridor, which follows the existing railway corridor south to south of Leitrim Road, then curves west to travel parallel to Earl Armstrong Road to the Rideau River, was selected as the preferred corridor.

Principal reasons for this recommendation included:

- Serves the largest potential ridership;
- Little or no impact to existing communities;
- Minimal impact to the existing road network;
- Less complex staging; and
- Lowest construction costs.

The decision not to serve the Airport using the main corridor required the identification of a preferred line alignment to serve this destination. The approved alignment for the Airport Link diverged from the main line south of Lester Road, passed under the Delta Taxiway, and followed the existing Airport Parkway alignment into the terminal.

However, the most recent terminal expansion plans conflict with this alignment and are now compatible with transit access from the north side of the terminal.

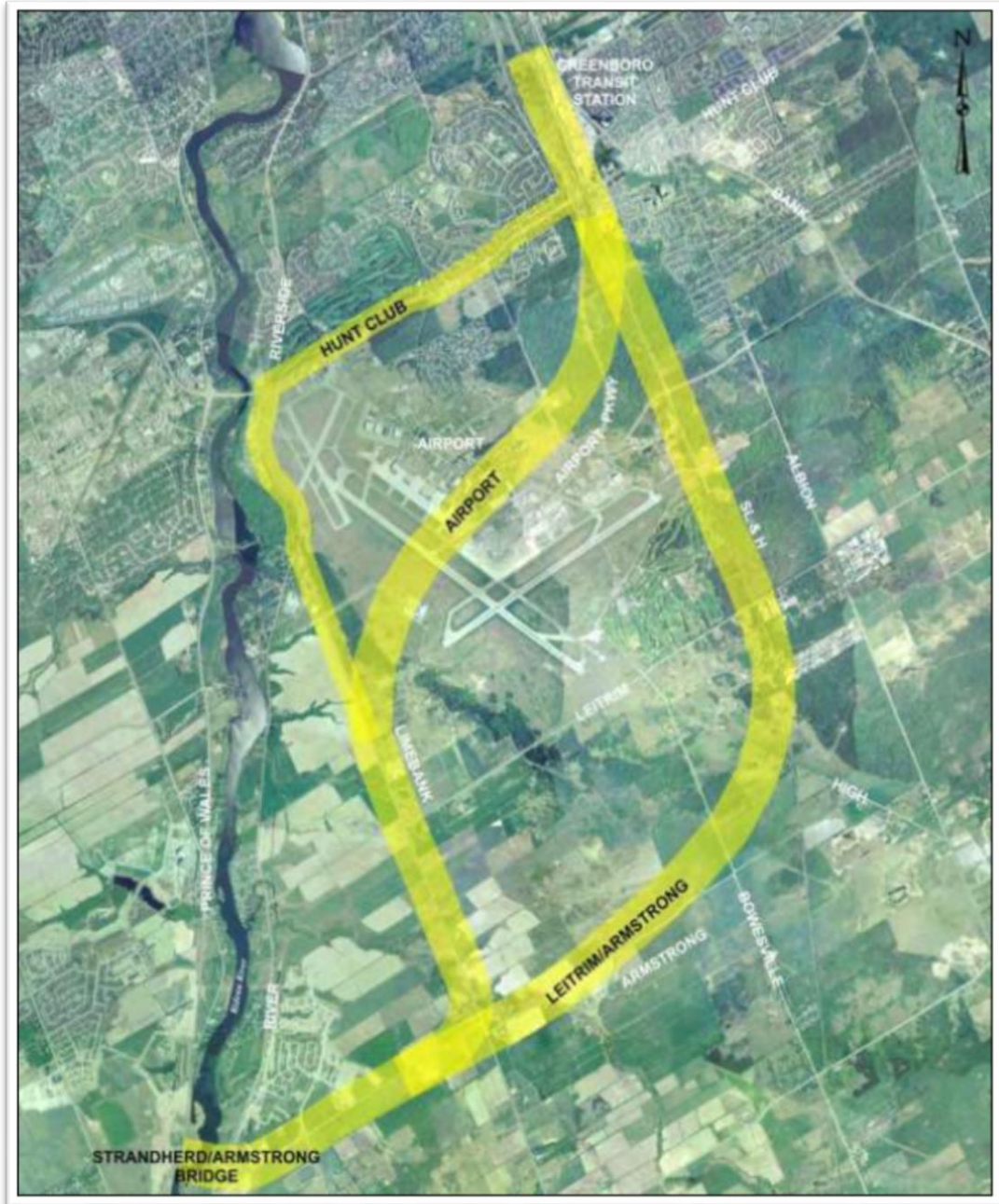


Figure 20 - Alignment Options

A comprehensive evaluation of the many possible corridors (Figure 21) identified a preferred alignment that follows the existing Prescott Subdivision rail corridor south from Greenboro Station. The eastern portion of the alignment follows the existing rail corridor to minimize construction costs and travel delay. The western portion of this alignment serves both residential and employment areas of Riverside South.

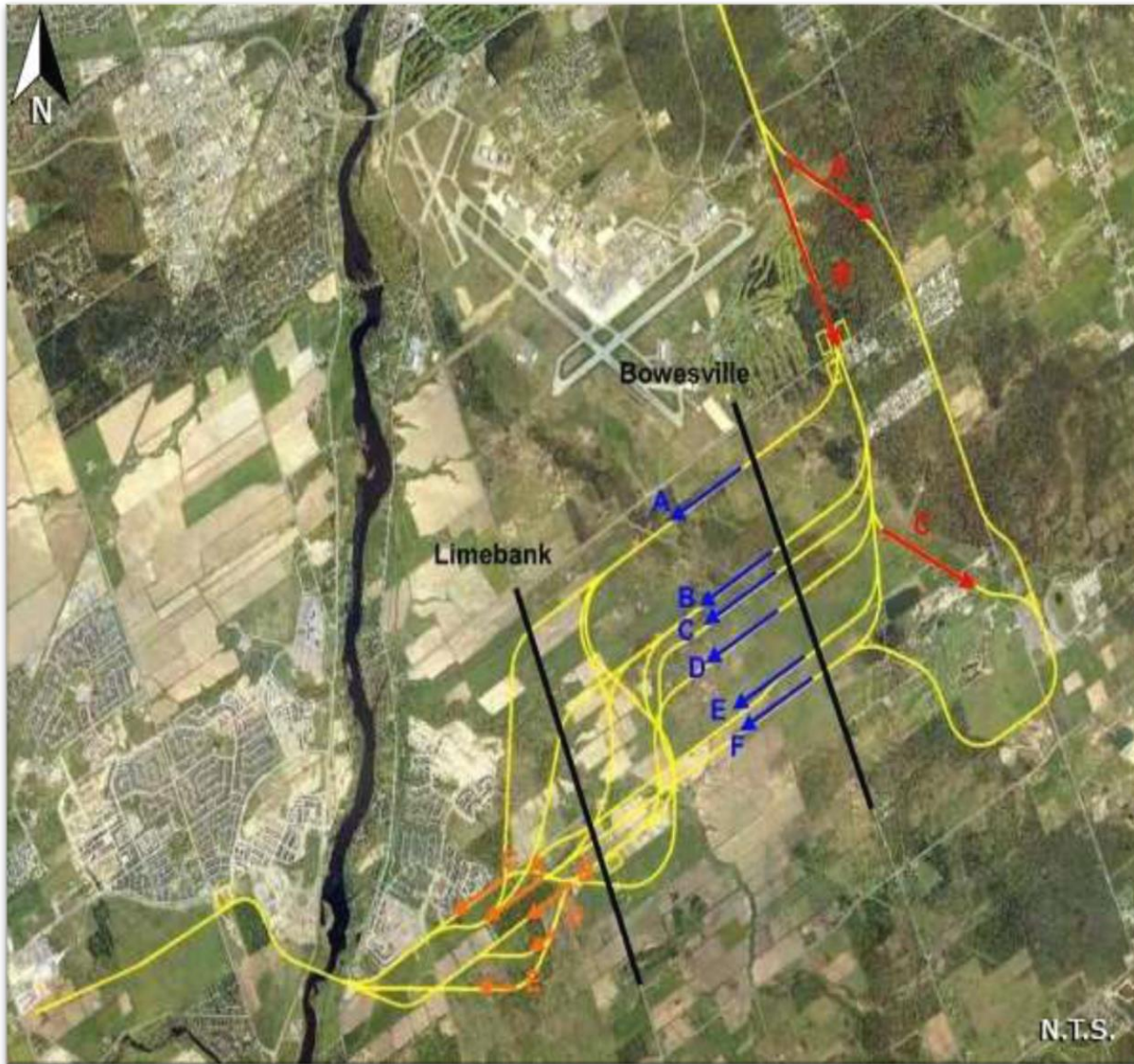


Figure 21 - Alternatives Alignments 2005

3.3 Stations

The N-S LRT EA identified preferred locations, developed functional designs and obtained EA approval for new stations at Leitrim Road and Bowesville Road along the proposed main line extension. Two stations along the identified Airport Link, at the terminal building and Alert Road, also received EA approval.

As part of the 2016 Trillium Line South Extension EA, options for the following stations were evaluated:

Leitrim Station

As no competing planning and design considerations were identified for Leitrim Station, only one option was developed and assessed. It consists of an at-grade platform adjacent to the existing Park and Ride lot and accessible via pathway connections to the east, north and south.

Bowesville Station

The 2016 EA included the extension of the Trillium Line from Greenboro Station to a new terminus station and Park and Ride lot (Figure 22) located on Bowesville Road, several hundred metres north of Earl Armstrong Road.



Figure 22 - Bowesville Station Location

During the original EA process, three alternatives were developed and evaluated for Bowesville Station:

Option 1:

Platform East of Bowesville would terminate the Trillium Line at a Park and Ride facility east of Bowesville Road. A future BRT facility would provide connecting Transitway service to Riverside South with an at-grade crossing of Bowesville Road.

This option is the lowest-cost alternative, as it does not require a rail crossing of Bowesville Road, and uses land already identified for City transit facilities. The pond onsite is not connected to a waterbody, and so its removal would not affect fish habitat.

Option 2:

Platform West of Bowesville, with Bowesville Road Closed would carry the Trillium Line track(s) across the Bowesville Road right-of-way at grade and terminate the Trillium Line at a Park and Ride facility approximately 500 metres to the west, in the location approved in the Barrhaven – Riverside South Rapid Transit Study (BRRT) (2013). Bowesville Road would be closed to traffic, and a future BRT facility would provide connecting Transitway service west to Riverside South.

This option would eliminate the cost of building a grade separation. However, closing Bowesville Road would result in significant impacts to the road network connectivity in the area and is incompatible with the OMCIAA's plans for future land development nearby. It would also result in impacts to a pond that may serve as fish habitat.

Option 3:

Platform West of Bowesville, with Grade Separation would grade-separate the Bowesville/Trillium Line crossing and terminate the Trillium Line at a Park and Ride facility would provide connecting Transitway service west to Riverside South.

This option would maintain connectivity along Bowesville Road but would require a costly grade separation. It would also result in impacts to a pond that may serve as fish habitat.

Recommendation:

The original EA recommendation identified Option 1 as the preferred option, as it does not affect road network connectivity, is compatible with future potential development, and minimizes costs and impacts to natural features. As Option 3 was eliminated from further consideration, the nature of a potential grade separation at Bowesville Road (i.e., rail over road, or road over rail) was not explored.

However, since the 2005 and 2016 EAs, additional preliminary engineering activities were completed, and discussions took place with stakeholders to respond to two key areas of interest:

- The desire from the community to bring LRT closer to Riverside South; and
- Reducing, where possible, environmental affects sensitive Greenbelt lands near the original Bowesville station.

Based on this, the City is moving forward with a new alignment and location for the Trillium Line Bowesville Station and Park and Ride. The new alignment moves the Bowesville Station and Park and Ride to the edge of the urban boundary, just southeast of the Earl Armstrong and Bowesville Road intersection. This alignment follows the former CP rail corridor farther south until it crosses Earl Armstrong Road, at which point it turns westward and terminates just east of Bowesville Road (Figure 23).



Figure 23 - Bovesville Station

Limebank Station (2018 EA Addendum)

Several alternatives were developed and evaluated for the Limebank Station based on integration with the proposed community and transportation network.

Option 1:

Full Trench to terminus west of Limebank Road (Partial trench east of Mosquito Creek)
This option requires the construction of a pump station for the trench segment, and would have significant impact on existing Mosquito Creek tributaries and existing utilities along Limebank Rd. This option allows for at-grade roadway and pedestrian overpasses, and would result in the highest capital costs.

Option 2:

Full Trench to terminus west of Limebank Road (At-grade east of Mosquito Creek)
This option requires the construction of a pump station for the trench segment, and would have significant impact on existing Mosquito Creek tributaries and existing utilities

along Limebank Rd. This option allows for at-grade roadway and pedestrian overpasses, and would be less expensive than full-trench alignment.

Option 3:

Full at-grade alignment terminating west of Limebank Road

This option would have moderate potential impact on existing utilities along Limebank Rd. and minor impacts on the existing Mosquito Creek tributaries. This option requires new elevated roadway overpasses between land uses north and south of the alignment, and would be less expensive than the full or partial trench options.

Option 4:

Full at-grade alignment terminating east of Collector 'D'

This option has no direct impact on existing utilities and minor impacts on existing Mosquito Creek tributaries. This option can serve many, but not all, of the land uses, and is the least expensive option in terms of direct capital costs.

Recommendation:

As a result of the alternative evaluated above, the EA identified the preferred alignment extension to Limebank to be completely double-tracked and will shift at Mosquito Creek to a narrower crossing location. The extension will be predominately at grade with a bridge crossing over Mosquito Creek. The alignment will continue underneath grade-separated overpasses at both Bowesville and Limebank Road. Collector crossings for future development in the area are being “future proofed” by providing a constant offset between Earl Armstrong Road and the Trillium extension from Bowesville Road to Mosquito Creek.

Uplands Station

Two alternatives were developed and evaluated for Uplands Station:

Option 1:

At-Grade Station would locate the station at ground level. Station construction costs and

complexity would be lower than those for an elevated station. However, it would require rapid grade changes at both sides of the station due to the preferred rail over road options for the Airport Parkway and Uplands grade separations.

Option 2:

Elevated Station would locate the station above ground. A two-level station would have higher construction costs and complexity, but acceptable grade changes.

Recommendation: Option 2 was identified as the preferred option as it is compatible with the preferred options for the Airport Parkway and Uplands grade separations. Option 1 would result in undesirable rapid grade changes adjacent to the station in both directions.

Airport Terminal

Two alternatives were developed and evaluated for the Airport Terminal Station.

Option 1:

Elevated Platform between Parking Garage and Terminal would locate the platform at the top level of the existing parking garage, at the end of an elevated segment of the rail line that would pass over existing terminal access roads. Passenger access to the terminal would be provided via the existing parking garage ramps, elevators and elevated walkways on the second level.

This option would have high construction and operating costs and would not provide a direct link for passengers from the Station to the Passenger Terminal Building, as passengers would have to travel through the parking garage.

Option 2:

At-Grade Platform North of Parking Garage would locate the platform north of the parking garage, in the location of an existing surface parking lot. Passenger access to the terminal would be provided by a weather-protected walkway to the first-floor arrivals level, over a distance of approximately 200 metres

This option would have lower construction and operating costs than Option 1. However, it would provide less convenient passenger access to the terminal and less enhancement to the Capital Arrival Experience. It would also require reconfiguring internal Airport roadways and parking lots.

Option 3:

Elevated Station adjacent the Passenger Terminal Building at the Departures Level. Passenger access from the Station to the Passenger Terminal Building would be the most direct of the options considered. Further, this Option allows for a more integrated station where the OMCIAA will extend the Passenger Terminal Building to meet the Station.

Recommendation:

Option 3 has been identified as the preferred alternative, as the improved passenger experience and Airport terminal compatibility outweigh the added construction and operation costs of Option 2.

3.4 Park and Rides

The N-S LRT Corridor EA also examined the impacts of potential Park and Ride facilities at the Bowesville, Leitrim, Lester and Greenboro LRT stations (Figure 24).

The EA recommended that permanent facilities be constructed at Bowesville and Leitrim to serve ridership demand from the Riverside South and Leitrim communities, as well as from the large rural commuter shed in the southeast area of Ottawa and adjacent counties. A Lester Park and Ride facility was proposed only if Lester was to be the southern terminus of the rail line; as the line will extend beyond Lester, a Park and Ride at that location was not recommended.

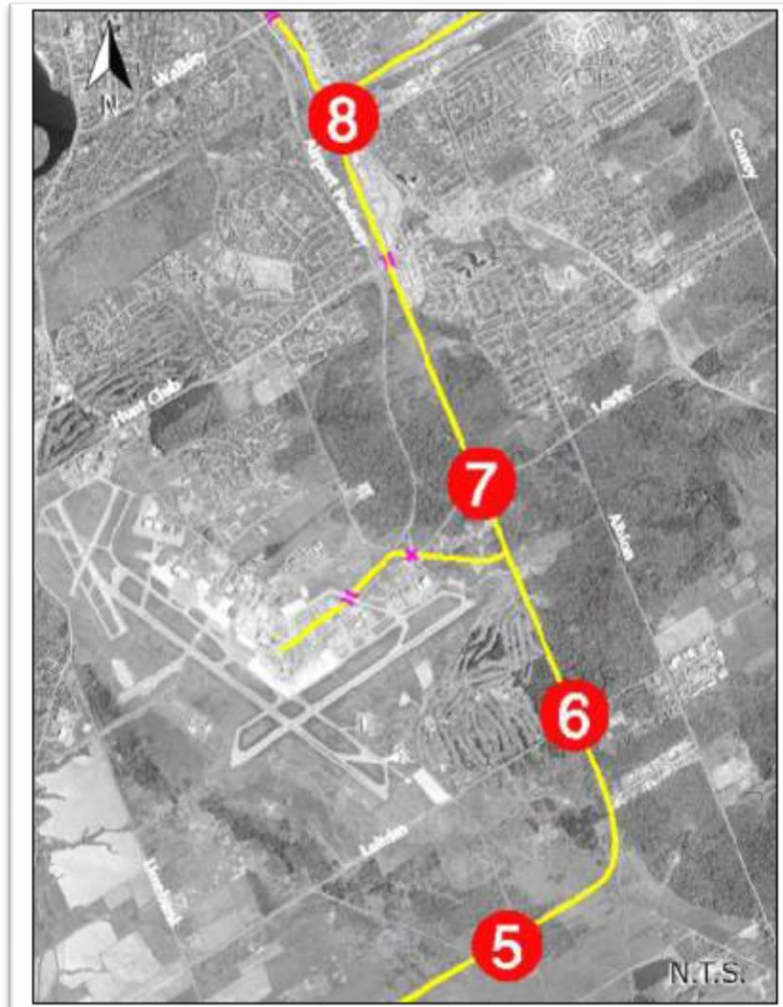


Figure 24 - Park and Ride Options

3.5 Grade Separations

Grade separations were identified as a requirement at all road/rail crossings at the 2016 EA study outset, as they are included in the Trillium Line's current operating agreement with Transport Canada. During the study, it was confirmed that Transport Canada requires all road/rail crossings to be either grade-separated or demonstrated through a formal risk assessment process to be as safe as a grade-separated crossing. This study therefore developed and evaluated alternatives for grade separations at all road crossings for inclusion in the recommended plan.

Four options were initially identified for all grade-separated crossings:

- Rail at grade, road crossing on an elevated structure (“road over rail”);
- Road at grade, rail crossing on an elevated structure (“rail over road”);
- Rail at grade, road crossing through a below-grade tunnel (“road under rail”); and
- Road at grade, rail crossing through a below-grade tunnel (“rail under road”).

A high water table is present throughout the southern portion of the study area where grade separations are proposed, which would involve complex designs and pumping requirements for below-grade transportation infrastructure. The “road under rail” and “rail under road” options were therefore eliminated from consideration, and the remaining two options (“road over rail” and “rail over road”) were evaluated in detail at each location.

Lester Road

Three alternatives were developed for the grade separation at Lester Road. The identified footprint of all three options could be reduced by retaining walls at an additional cost.

Option 1:

All Tracks and MUP over Road would carry the Trillium Line and freight tracks, as well as the MUP, over Lester Road. As the bridge would be designed to freight standards (a substantial structure with large embankments), it would have a significant visual impact and 1.1 ha of footprint impact to the adjacent Lester PSW.

Option 2:

Trillium Line Tracks and MUP over Road, Freight at Grade would carry the Trillium Line track(s) and MUP over Lester Road, while the freight rail track would cross the road at grade. A retaining wall would be required on the west side of the structure to eliminate the embankment on that side and allow the freight line to remain at grade within the existing right-of-way.

Occasional, brief road closures would be required to permit freight passage to the NRC facility south of Lester Road. The overpass structure would be smaller than in Option 1,

as it would not need to accommodate freight, with an estimated 0.8 ha of footprint within the Lester PSW; however, the overall cost of the structure is approximately 15% higher than Option 1 due to the cost of the retaining wall.

Option 3:

Road over Rail would carry Lester Road over the Trillium Line track(s), freight rail track and MUP.

This option would require a taller structure than Options 1 or 2, as clearance requirements over freight rail are higher than clearance requirements over roads. This option would have an estimated 3 ha of footprint impact within the Lester PSW, and would require a road detour during construction.

Recommendation:

Option 2 was identified as the preferred alternative as it has the least impact on the wetland, imposes minimal freight-related delays for road users, and minimizes detours during construction.

Leitrim Road

Two alternatives were developed for the grade separation at Leitrim Road.

As with the Lester Road alternatives, retaining walls could be employed to reduce embankment footprints and minimize property impacts, at an increased cost.

Option 1:

Rail over Road would carry the Trillium Line track and MUP over Leitrim Road. This option would maintain access to Leitrim Road homes and businesses east of the crossing. However, it has footprint impacts on the businesses immediately southeast of the crossing and will be more complex to rebuild if Leitrim Road is realigned to accommodate a potential Airport runway (~2040). The structure is also inconsistent with the Airport Zoning Regulations (AZR) (see Section 8.1.3.2).

Option 2:

Road over Rail would carry Leitrim Road over the Trillium Line track and MUP. Although this option is also inconsistent with the AZR in the short term, the overpass can be removed when Leitrim Road is realigned to accommodate a future runway and will be compliant with the AZR in that case.

However, this option would have footprint impacts and eliminate direct access from Leitrim Road for 5 businesses southeast of the overpass, requiring that alternate access be provided or that the properties be removed.

Recommendation:

Option 2 was identified as the preferred alternative as it has the lowest throwaway costs associated with the planned Leitrim Road realignment, however, the PSOS offers flexibility to proponents to choose either option in their final design.

Airport Parkway

Two alternatives were considered for the grade separation at the Airport Parkway. As with other grade separation alternatives, retaining walls could be employed to reduce embankment footprints and minimize property impacts, at an increased cost.

Option 1:

Rail over Road would carry the Trillium Line track and MUP over the Airport Parkway. This option would result in slightly higher costs for rail infrastructure. However, it would provide greater flexibility for the configuration of a future Airport Parkway widening and a new roadway connection to Uplands Drive north of EY Centre, as well as lower overall transportation infrastructure costs.

Option 2:

Road over Rail would carry the Airport Parkway over the Trillium Line track and MUP. This option involves lower rail infrastructure costs. However, it also provides less road network flexibility and greater overall transportation infrastructure costs due to the

impact of an at-grade alignment on the future Airport Parkway configuration and roadway connection to Uplands Drive.

Recommendation:

Option 1 was identified as the preferred alternative as it is associated with the greatest road network flexibility and the lowest overall transportation infrastructure costs.

Uplands Drive

Two alternatives were considered for the grade separation at Uplands Drive. As with other grade separation alternatives, retaining walls could be employed to reduce embankment footprints and minimize property impacts, at an increased cost.

Option 1:

Rail over Road would carry the Trillium Line track and MUP over Uplands Drive. Like the Airport Parkway grade separation Option 1, this option would result in slightly higher costs for rail infrastructure, greater flexibility for the configuration of the future road network, and lower overall transportation infrastructure costs.

Option 2:

Road over Rail would carry the Airport Parkway over the Trillium Line track and MUP. Like the Airport Parkway grade separation Option 2, this option involves lower rail infrastructure costs, but also less road network flexibility and greater overall transportation infrastructure costs.

Recommendation:

Option 1 was identified as the preferred alternative as it is associated with the greatest road network flexibility and the lowest overall transportation infrastructure costs.

3.6 Airport Link Alignment

Five alternatives were identified for the Airport Link alignment. These were

initially developed as part of the Airport Access and Transit Study associated with the 2013 TMP update.

Option 1:

Adjacent to Airport Parkway would run parallel to the Airport Parkway, cross the Parkway and Uplands Drive north of the EY Centre, and approach the north end of the Airport terminal. This option would serve major destinations on Airport lands and is consistent with future Airport development plans. However, it would result in a long stretch of duplicate track south of Hunt Club Road. The poor track geometry where the alignment crosses the Airport Parkway would also result in low rider comfort and more complex construction.

Option 2:

Sweeping Curve would curve through forested Airport lands east of the Airport Parkway, cross the Parkway and Uplands Drive north of the EY Centre, and approach the north end of the Airport terminal. This option would serve major destinations on Airport lands and is consistent with future Airport development plans, but would require a large amount of currently forested land to be cleared.

Option 3:

Former Rail Siding would travel along an existing rail siding between the main line and Uplands Drive, cross the Parkway and Uplands north of the EY Centre, and approach the north end of the Airport terminal. This option would serve major destinations and is consistent with future Airport development plans, and would re-use a portion of an existing rail bed. However, it would require an additional curve in the track to provide effective service to the EY Centre and may not integrate effectively with the realigned Airport Parkway.

Option 4:

Tight to EY Centre would travel along a more southerly alignment, immediately north of an existing drainage channel, between the main line and Uplands Drive. It would cross Uplands immediately north of the EY Centre and approach the north end of the Airport terminal. This option minimizes track duplication by branching from the main line as far

south as possible, minimizes impacts on adjacent wooded areas, serves major destinations, and is consistent with future Airport development plans. However, mitigation measures will be required to avoid impacts to the drainage channel.

Option 5:

Airport Loop with Optional Direct Connection would enter Airport lands north of the EY Centre, loop through the terminal area, and exit via Airport Parkway Private and the NRC lands. A direct main-line Trillium Line connection to Bowesville could be maintained, and a direct freight connection to NRC would continue to be required. This option would permit an additional station at Lester Road and direct access between the Airport terminal and Riverside South. However, it would also result in longer travel times from downtown to Riverside South and greater potential for delays, and would conflict with Airport terminal expansion plans. Additionally, it would have higher costs due to the longer track length and the required reconstruction of the Delta taxiway.

Recommendation:

Option 4 was identified as the preferred alternative, as it is cost-effective and has the best potential for integration with the EY Centre and the realigned Airport Parkway.

3.7 Operating Model

Finally, although EA approval is not required for operating models, they were evaluated as part of the study to ensure the design of the Recommended Plan does not preclude potential operating models. Four alternatives were identified for the Trillium Line operating model.

Option 1:

Dual Service Overlay would see alternating trains operating between Bayview and Bowesville and between Bayview and the Airport. This option would offer direct service to both Bowesville and the Airport at all times, but would double the headways to and from destinations south of South Keys.

Option 2:

Airport Branch would see main-line trains operating between Bayview and Bowesville, with a branch line to the Airport operating from a transfer station at South Keys. This option would offer frequent, direct service to Bowesville and frequent branch service at all times, but would require all Airport passengers (who are likely to be carrying luggage) to transfer.

Option 3:

Bowesville Branch would see main-line trains operating between Bayview and the Airport, with a branch line to Bowesville operating from a transfer station at South Keys. This option would offer frequent, direct service to the Airport and frequent branch service at all times, but would require all Bowesville passengers (a higher overall number of users) to transfer.

Option 4:

Mixed Model would use a combination of the first three models, depending on the time of day. The dual service overlay would likely be used in late evenings and on weekends, the Airport branch model during morning and evening peak periods, and the Bowesville branch model at other times of day.

Recommendation:

Option 2 was identified as the preferred option and is anticipated to be the standard operational model for the Airport Link; however, track infrastructure will be built to allow the Option 4 model to be used on occasion.

4.0 Maps and Plans

A comprehensive set of maps and plans are provided in Appendix B depicting the location of the proposed railway line and associated infrastructure in relation to their geographic surroundings, as per the guideline requirements, including:

1. O-Train Trillium Line Alignment Map
2. Property Index Map
3. Property Parcel Plans (PRP)
4. Zoning Map
5. Land-use Map
6. Species at Risk, Cultural, and Environmental Impacts Map
7. Civil Grading Reference Concept Design Plans:
 - Bowesville Road to Hunt Club
 - Mosquito Creek
 - Limebank Extension (7 plans)
 - Airport Link (2 plans)
8. Roadway Reference Concept Design Plans:
 - Limebank Road
 - Bowesville Road
 - Earl Armstrong Road
 - Leitrim Road
 - Uplands Drive
 - Airport Parkway
9. Structures Reference Concept Design Plans:
 - Limebank Road
 - Bowesville Road
 - Earl Armstrong Road
 - Leitrim Road
 - Uplands Drive
 - Airport Parkway
10. Utilities Plans:
 - Airport Link
 - Bowesville Subdivision
11. Station Reference Concept Design Plans:
 - Airport Station
 - Uplands Station



- Limebank Station
- Bowesville Station
- Leitrim Station

12. Trackwork Reference Concept Design Plans:

- Airport Link
- Mainline Bowesville to Greenboro stations
- Limebank Extension

Alternative alignment maps are provided throughout section 3.0.



Section C: Railway Operations and Services

5.0 Infrastructure and Ground Alterations

The section below describes in detail the proposed infrastructure and ground alterations necessary to support the operation of the Bowesville Subdivision and the Airport Link.

As noted in Section 1.2, the information set out in the operations sections below is based on the PSOS requirements of the PA, which will inform the system provided by the successful consortium through the procurement process (“Project Co”). The procurement method permits Project Co. some flexibility within the parameters set out in the PSOS.

5.1 Communications Systems

The current Trillium Line operates on an “Indusi” Automatic Train Protection System. The Indusi system is an intermittent train control system using carborne and wayside equipment that enforces signal approach speeds, signal overrun stops, startup speeds, and maximum speeds under specified conditions.

Due to technical limitations with the Indusi system, including the lack of continuous speed supervision across the alignment, the City of Ottawa is transitioning to a cab signaling solution. As per the requirements outlined in the PSOS documents, Project Co. must deliver a modern and advanced Signaling & Train Control System (S&TCS), which will provide continuous positive train protection and speed enforcement throughout the alignment. The new S&TCS will provide continuous speed supervision and speed enforcement throughout the alignment to prevent derailments due to over speeds and to prevent signals passed at danger.

Other communications systems for Trillium Line will include the following:

- Fibre communications transmission system;
- Telephone and intercom system;
- Public Address / Passenger Information Display System;
- Voice and Data Radio System;
- Fare Collection System;
- CCTV System;
- SCADA System; and,

- Intrusion Access Control System.

Additionally, the current Trillium Line's Rail Traffic Control function is subcontracted to Rail Term and is operated from their Dorval facility. With the Trillium Line Project, the train dispatch function will be assumed by and moved to the City's multimodal Transit Operations Control Centre (TOCC) in 2021. A backup control centre, equipped to support full dispatching functionality will also be provided. The TOCC is the command and control centre for the City's bus, Para Transpo, Confederation Line LRT, and Special Constables Unit (SCU) operations.

As per the requirements of the PSOS, Project Co. will provide an integrated train control solution in the TOCC for the Trillium Line alongside all of the existing supporting technology, including Supervisory Control and Data Acquisition (SCADA) systems, CCTV cameras, emergency telephones, public address systems, electronic signage, radio, and other features.

Output specifications for the S&TC and Communications systems are provided in Appendix C.

5.2 Structures

As part of the Trillium Line Bowesville Subdivision and the Airport Link, several structures will be constructed. No tunnels are envisioned on the Trillium Line Bowesville Subdivision and the Airport Link.

As per the requirements outlined in the PSOS documents, Project Co. must deliver the following:

- Limebank Road Bridge: Design and construct a new grade separation at Limebank Road to accommodate either the rail alignment over the roadway or the roadway over the rail alignment.
- Mosquito Creek Rail Bridge and wildlife path: A new guideway structure to carry the alignment over Mosquito Creek and wildlife path under the structure.

- Bowesville Road Bridge: A new grade separation at Bowesville Road to either accommodate the alignment over the roadway or the roadway over the alignment.
- Earl Armstrong Bridge: A new grade separation at Earl Armstrong Road to either accommodate the alignment over the Roadway or the Roadway over the alignment.
- High Road Bridge: A new overhead structure to carry a MUP and ecological corridor over the alignment.
- Leitrim Road Bridge: A new grade separation at Leitrim Road to either accommodate the alignment over the structure or the roadway over the alignment.
- Rail Bridge over Lester Road: A new elevated guideway structure to carry the alignment over the Lester Road.
- Elevated Guideway to OMCIA Terminal: A new elevated guideway structure to carry the alignment over various roadway and parking areas.
- Railway Bridge over Uplands Drive: A new elevated guideway structure to carry the alignment over Uplands Drive.
- Railway Bridge over Airport Parkway: A new elevated guideway structure to carry the alignment over Airport Parkway.

The description of the structures above are based on PSOS and reference concept design drawings, copies of which are provided in Appendix B.

Roadway modifications

- Leitrim Road: New approach embankments and all necessary improvements to the roadway to support the new Leitrim Road bridge or rail bridge over Leitrim Road.
- Leitrim Park And Ride Facility: A bus station facility with dedicated space for public parking.

- Lester Road: All necessary improvements to the roadway support the new rail bridge over Lester Road.
- Airport Parkway: All necessary improvements to the roadway support the new rail bridge over the Airport Parkway.
- Uplands Drive: All necessary improvements to the roadway support the new rail bridge over Uplands Drive.
- Earl Armstrong Road: New approach embankments and all necessary improvements to support the new Earl Armstrong Bridge.
- Bowesville Road: New approach embankments and all necessary improvements to the roadway to support the new Bowesville Road Bridge.
- Bowesville Park and Ride Facility: Construction of a bus station facility with dedicated space for public parking.
- Limebank Road: New approach embankments and all necessary improvements to the roadway to support the new Limebank Road Bridge or rail bridge over Limebank Road.
- Connector Road: A new 2-lane urban collector between Main Street, Collector D and Limebank Road.
- Main Street: A new 7.5m wide 2-lane urban collector undivided roadway to connect the west limit of Connector Road to Earl Armstrong Road.
- Collector D: Project Co. to provide any widening or pavement improvements required for the existing roadway to accommodate the appropriate transition and connection from Connector Road to Collector D.

The description of the roadway modifications above are based on PSOS and reference concept design drawings, copies of which are provided in Appendix B.

Pathways and Connections

All of the stations on the Trillium Line, both new and existing, will include pedestrian connections to nearby roadways and pathways. The project will provide a parallel multi-use pathway along the majority of the extension, connecting to adjacent communities and destinations, the NCC's Greenbelt pathway network, and the City's pathway network at Sawmill Creek.

A description of the proposed multi-use pathway network is provided in the 2017 Connectivity Report for the Stage 2 Project. A copy of the report is provided in Appendix C.

5.3 Stormwater Management

As per the requirements outlined in the PSOS documents of the PA, Project Co. will design and construct a drainage and storm water management system (SWM) to ensure that operations can safely commence and continue, and such that surface ponding remains below the top of rail during the 100-Year Storm event.

The following documents are provided in Appendix C to inform the specification described in the PA for stormwater management, grading and drainage:

- Trillium Line Extension Stormwater Management Report;
- Project Specific Output Specifications (Article 5) Drainage and Stormwater Management;
- Project Specific Output Specifications (Article 6) Grading; and,
- Reference Concept drawings for Stormwater, Civil Grading and Drainage.

5.4 Trackwork

As noted previously, the construction of the new track section north of Leitrim Road to Limebank Station will be a double-track line to increase service efficiency. The Airport Link line track will provide a mixture of single-track and passing sidings to optimize service efficiency. As noted above, Uplands Station will be located along a passing siding, whereas a single-track will provide service to the Airport Station along an elevated structure into the airport terminal building.

The following documents are provided in Appendix B and C to inform the specifications required for track configuration and special track work:

- Project Specific Output Specifications (Article 2 and 3); and,
- Reference concept drawings for track configuration and special trackwork for the south extension to Limebank Station and the Airport Link.

5.5 Noise and Vibration

The study of and proposal of mitigations to noise and vibration impacts have played a key role in the EAs processes. The following section summarizes the study of and mitigations proposed that have been included in the design of the project.

2016 EA

The 2016 Trillium Line EA reviewed the existing and potential noise and vibration impacts of current and future operations respectively and contemplated mitigations where necessary. A summary of the review is provided below:

Existing Conditions: Noise

The major noise sources along the alignment include vehicle traffic on arterial roads and highways, rail traffic along existing rail corridors and at the Walkley Yard, and air traffic taking off and landing at the Ottawa International Airport.

Road and rail noise is measured in decibels (dBA) and expressed as the equivalent sound level (LEQ), the continuous sound level that has the same energy as variable noise over a particular period of time. Aircraft-related noise levels are described in terms of Effective Perceived Noise Levels and expressed as the Noise Exposure Forecast or Noise Exposure Projection (NEF/NEP).

The Ottawa Airport Vicinity Development Zone (OAVDZ) has an NEF/NEP of 25, corresponding to an approximate LEQ of 55 dBA. The Ottawa Airport Operations Influence Zone (OAOIZ), within which noise-sensitive development is generally not permitted, has an NEF/NEP of 30, or an approximate LEQ of 60 dBA.

The City of Ottawa's Environmental Noise Control Guidelines (ENCG) stipulate that daytime LEQ levels of 55 dBA or lower are acceptable for noise-sensitive uses such as outdoor living areas, schools, hospitals and parks which occur frequently along the study corridor. LEQ levels exceeding 60dBA generally require mitigation.

Within the alignment area, areas with elevated noise levels (daytime LEQ of greater than 60 dBA) include areas within approximately 60 metres of arterial roadways and approximately 100 metres of Highway 417. Due to Airport operations, the portion of the study area bounded approximately by Lester Road in the north and del Zotto Avenue in the south also has elevated existing noise levels.

Areas with moderate noise levels (daytime LEQ of 55 to 60 dBA) include areas within approximately 50 metres of the Trillium Line, approximately 100 metres of arterial roadways, and approximately 200 metres of Highway 417 and the Walkley Yards. Due to Airport operations, background noise levels are also considered moderate in most of the study area south of the Walkley Yards.

The remaining portions of the study area, generally north of Walkley Yard and more than 120 metres from an arterial roadway, are considered to have low existing noise levels, or a daytime LEQ below 55 dBA.

Future Conditions: Noise

Localized, controlled and intermittent noise impacts are anticipated as part of construction due to vehicle and equipment operations.

The increase in noise due to Trillium Line operations is projected to be at a level not considered noticeable by the majority of human observers.

The additional jacking bay, train wash building, inspection pit, office space and storage tracks proposed at Walkley Yard will remain within the existing yard and are not expected to result in increased noise impacts, as the nearest noise-sensitive land use is 320 m away.

Mitigations

The construction manager will be required to develop a strategy for mitigating noise impacts. Mitigation measures may include:

- Limiting speeds of heavy vehicles within and around the site;

- Installing movable noise barriers or temporary enclosures around locations such as blast sites;
- Ensuring equipment is properly maintained and functioning as intended by the manufacturer;
- Implementing a blast design program prepared by a blast design engineer; and
- Undertaking construction activities during daytime hours.

Existing Conditions: Vibrations

- Rail cars and heavy vehicles passing over uneven surfaces can produce perceptible ground vibrations and ground-borne noise. Human response to these vibrations is indicated by the root mean squared (RMS) of particle movement, usually measured in millimetres per second (mm/s);
- Vibrations become perceptible at approximately 0.10 mm/s RMS and may cause annoyance at levels above 1.0 mm/s RMS; and,
- Background levels of ground vibration were measured or estimated to be below 0.10 mm/s, and likely unnoticeable, in the majority of the study area. At one measurement location near the Brookfield passing siding, vibration levels were recorded at levels between 0.10 mm/s and 1.0 mm/s, which may be noticeable but not disruptive to a small percentage of the population.

Future Conditions: Vibrations

Construction activities are expected to result in localized and intermittent vibration impacts due to installation or replacement of the rail bed, installation of station foundations and grade separation abutments, and upgrades to underground utilities.

Future vibration levels are not expected to increase in amplitude; however, with increased Trillium Line service headways, the frequency of vibration events may increase.

Mitigations

The construction manager will be required to develop a strategy for mitigating vibration impacts. Mitigation measures may include:

- Limiting speeds of heavy vehicles within and around the site;

- Providing compacted smooth surfaces, avoiding abrupt steps and ditches;
- Installing movable noise barriers or temporary enclosures around locations such as blast sites;
- Ensuring equipment is properly maintained and functioning as intended by the manufacturer;
- Implementing a blast design program prepared by a blast design engineer; and
- Undertaking construction activities during daytime hours.

2018 Trillium Line EA Addendum

Furthermore, the 2018 Trillium Line EA Addendum reviewed the existing and potential noise and vibration impacts of current and future operations respectively for the extension to Limebank Station. The EA also reviewed potential noises and vibration mitigations, summarized below:

Existing Conditions: Noise

Under the City of Ottawa's Environmental Noise Control Guidelines, noise control measures is to be investigated if the future sound level is greater than 55 dB and 5 dB above ambient; or greater than 60 dBA regardless of the increase. Predicted noise levels are assessed at outdoor living areas (OLA), usually 3 m from the dwelling façade at a height of 1.5 m above ground level based on a 16-hour equivalent average sound level ($L_{eq, 16hr}$) between 07:00 and 23:00. The closest sensitive receptor is located approximately 195 m south of the proposed track alignment, on a land parcel just north of #4705 Limebank Road.

In accordance with the City's Environmental Noise Control Guideline, traffic noise levels were calculated using the ORNAMENT method, implemented in the STAMSON (version 5.04) software.

To assess the noise impact, the predicted "No Project" noise levels were compared to those of the future predicted "With Project" noise levels. Noise levels in the OLA of a noise sensitive land use were calculated to determine if a noise mitigation investigation would be required.

Existing road traffic data and future volume prediction were received the City of Ottawa. O train information was received from GWE Appendix B Noise, Vibration and Air Quality



Report. Traffic information is summarized in table below:

Traffic Data

| Source | Year | AADT | Daytime Auto | Daytime Heavy Truck | Daytime Medium Truck | Speed Limit (km/h) | Day/Night Split |
|---|------|-------|--------------|---------------------|----------------------|--------------------|-----------------|
| Limebank Road | 2016 | 7333 | 6746 | 261 | 187 | 80 | 92/8 |
| Earl Armstrong Road (west of Limebank Road) | 2016 | 13591 | 12504 | 382 | 273 | 80 | 92/8 |
| Earl Armstrong Road (east of Limebank Road) | 2016 | 4583 | 4216 | 82 | 58 | 80 | 92/8 |
| Limebank Road | 2031 | 8513 | 7832 | 303 | 217 | 80 | 92/8 |
| Earl Armstrong Road (west of Limebank Road) | 2031 | 15779 | 14516 | 443 | 316 | 80 | 92/8 |
| Earl Armstrong Road (east of Limebank Road) | 2031 | 5321 | 4895 | 95 | 68 | 80 | 92/8 |
| O Train | 2031 | 216 | 192 | - | - | 70 | 92/8 |

Predicted operational noise levels and impacts are summarized in the table below:

Operational Noise Prediction Results

| ID | Assessed Point of Reception | Existing Noise Level (dBA)-2016 | Future Noise Level (dBA)-2031 | Noise Impact (dBA) | Mitigation Investigation Requirement (Yes/No) |
|----------------|--|--|--------------------------------------|---------------------------|--|
| R01_OLA | House on land parcel north of # 4705 Limebank Road, Ottawa | 59.3 | 59.7 | 0.4 | No |

As indicated above, only a marginal increase in operational noise levels are predicted at the assessed point of reception, the noise impacts are generally anticipated to be insignificant.

Mitigation

As a result of the data above, no noise mitigation requirement will be needed due to the insignificant impacts.

Existing Conditions: Vibration

The US Federal Transit Administration recommends a vibration assessment screening distance of 150 feet (45.7 m) between LRT and residential buildings. There are no sensitive receivers within that screening distance, so vibration impacts are anticipated to be negligible.

Future Operations: Vibration

Vibration impacts are anticipated to be insignificant with no mitigation required, and as a result, no vibration mitigations will be needed due to the insignificant impacts.

Additional Mitigations

As per the requirements outlined in the PSOS documents, Project Co. will:

- Develop a noise and vibration control to identify and document the processes, required analyses and surveys, and any other supporting effort necessary to ensure that the Project Construction and Operations are carried out in compliance during the Project Term and Maintenance Period;
- Prepare, and keep up to date, on a monthly basis, a list of Representative Sensitive Receivers and shall submit the list to the City of Ottawa;
- For the first 5 years, will carry out a monthly survey of ground-borne and air-borne noise and vibration to confirm that the operation of the system and vehicles are in compliance with Applicable Noise and Vibration Requirements or Additional Sensitive Receiver Performance Requirements;
- Address and respond to each complaint regarding noise or vibration received during the Maintenance Period;
- Upon receipt of a request by the City to investigate a complaint regarding noise or vibration, Project Co shall conduct ground-borne and air-borne noise and vibration measurements; and,
- Take steps toward defining and undertaking the mitigation measures, and be responsible for all costs and expenses related to any noise and vibration.

The following documents are also provided in Appendix C to provide additional information on noise and vibration assessments undertaken to support the Project:

- Trillium Line Noise and Vibration Assessment Report;
- Trillium Line Construction Noise and Vibration Review;
- Trillium Line Noise and Vibration at NRC Uplands Campus Memorandum;
- Trillium Line Preliminary Engineering Environmental Noise Compliance Memorandum; and,
- Stage 2 Station Acoustics Guidelines Report.

5.6 Utility Crossings and Relocations

As per the requirements of the PSOS in the PA, Project Co. will be solely responsible for identifying the actual locations and condition of all existing utility infrastructure to

complete the utility work, identifying all utility infrastructure relocation requirements, developing and preparing a Utility Infrastructure Relocation Plan. A full description, including matrices and drawings for all rail utility crossings as identified by the City of Ottawa on the Trillium Line Bowesville Subdivision and the Airport Link are provided in Appendix B and C.

5.7 Permanent Property Acquisitions

To support the infrastructure and ground alternations identified above, and the overall construction and operation of the Bowesville Subdivision and Airport Link, the following property parcels have been acquired permanently by the City of Ottawa.

An indexed map of property parcels, property request plans (PRPs) identified below are provided in Appendix B.

| Property Request Plan | Parcel | Date Lands given to Project Co. | Ownership | Rights to Property |
|------------------------------|---------------|--|------------------|---------------------------|
| 18692-PRP_019b | 1 | Friday, March 01, 2019 | City | Current Owners |
| 18692-PRP_020a | 1 | Friday, March 01, 2019 | City | Current Owners |
| 18692-PRP_020a | 2 | Friday, March 01, 2019 | City | Current Owners |
| 18692-PRP_022b | 1 | Friday, March 01, 2019 | City | Current Owners |
| 18692-PRP_022b | 2 | Friday, March 01, 2019 | City | Current Owners |
| 18692-PRP_022b | 3 | Friday, March 01, 2019 | City | Current Owners |
| 18692-PRP_022b | 4 | Friday, March 01, 2019 | City | Current Owners |
| 18692-PRP_022b | 5 | Friday, March 01, 2019 | City | Current Owners |
| 18692-PRP_023c | 1 | Friday, March 01, 2019 | City | Current Owners |
| 18692-PRP_089b | 1 | Friday, March 01, 2019 | City | Current Owners |

| Property Request Plan | Parcel | Date Lands given to Project Co. | Ownership | Rights to Property |
|------------------------------|---------------|--|------------------|--|
| 18692-PRP_099 | 2 | Friday, March 01, 2019 | City | Current Owners |
| 18692-PRP_024c | 1 | Friday, March 01, 2019 | City | Current Owners |
| 18692-PRP_32b | 1 | Friday, March 01, 2019 | City | Current Owners |
| 18692-PRP_099 | 1 | Friday, March 01, 2019 | City | Current Owners |
| 18692-PRP_114 | 1 | Friday, November 01, 2019 | City | Current Owners |
| 18692-PRP_115 | 1 | Friday, November 01, 2019 | City | Current Owners |
| 18692-PRP_116 | 1 | Friday, November 01, 2019 | City | Current Owners |
| 18692-PRP_116 | 2 | Friday, November 01, 2019 | City | Current Owners |
| 18692-PRP_116 | 3 | Friday, November 01, 2019 | City | Current Owners |
| 18692-PRP_116 | 4 | Friday, November 01, 2019 | City | Current Owners |
| 18692-PRP_116 | 5 | Friday, November 01, 2019 | City | Current Owners |
| 18692-PRP_34b | 1 | Sunday, March 31, 2019 | NCC | Transfer Agreement |
| 18692-PRP_34b | 7 | Sunday, March 31, 2019 | NCC | Transfer Agreement |
| 18692-PRP_64a | 1 | Sunday, March 31, 2019 | NCC | Transfer Agreement |
| 18692-PRP_64a | 2 | Sunday, March 31, 2019 | NCC | Transfer Agreement |
| 18692-PRP_015f | 1 | Friday, March 01, 2019 | OMCIIA | MOU/ Sub-license/ Property Acquisition Agreement |

| Property Request Plan | Parcel | Date Lands given to Project Co. | Ownership | Rights to Property |
|------------------------------|---------------|--|------------------|--|
| 18692-PRP_015f | 22 | Friday, March 01, 2019 | OMCIAA | MOU/ Sub-license/ Property Acquisition Agreement |
| 18692-PRP_015f | 23 | Friday, March 01, 2019 | OMCIAA | MOU/ Sub-license/ Property Acquisition Agreement |
| 18692-PRP_015f | 24 | Friday, March 01, 2019 | OMCIAA | MOU/ Sub-license/ Property Acquisition Agreement |
| 18692-PRP_015f | 28 | Friday, March 01, 2019 | OMCIAA | MOU/ Sub-license/ Property Acquisition Agreement |
| 18692-PRP_015f | 29 | Friday, March 01, 2019 | OMCIAA | MOU/ Sub-license/ Property Acquisition Agreement |
| 18692-PRP_015f | 39 | Friday, March 01, 2019 | OMCIAA | MOU/ Sub-license/ Property Acquisition Agreement |
| 18692-PRP_015f | 40 | Friday, March 01, 2019 | OMCIAA | MOU/ Sub-license/ Property Acquisition Agreement |
| 18692-PRP_016e | 1 | Friday, March 01, 2019 | OMCIAA | MOU/ Sub-license/ Property Acquisition Agreement |
| 18692-PRP_33e | 1 | Friday, March 01, 2019 | OMCIAA | MOU/ Sub-license/ Property |

| Property Request Plan | Parcel | Date Lands given to Project Co. | Ownership | Rights to Property |
|------------------------------|---------------|--|---------------------------|--|
| | | | | Acquisition Agreement |
| 18692-PRP_33e | 2 | Friday, March 01, 2019 | OMCIAA | MOU/ Sub-license/ Property Acquisition Agreement |
| 18692-PRP_33e | 3 | Friday, March 01, 2019 | OMCIAA | MOU/ Sub-license/ Property Acquisition Agreement |
| 18692-PRP_33e | 5 | Friday, March 01, 2019 | OMCIAA | MOU/ Sub-license/ Property Acquisition Agreement |
| 18692-PRP_35a | 2 | Monday, April 01, 2019 | OMCIAA | MOU/ Sub-license/ Property Acquisition Agreement |
| 18692-PRP_36b | 1 | Friday, March 01, 2019 | OMCIAA | MOU/ Sub-license/ Property Acquisition Agreement |
| 18692-PRP_37c | 1 | Friday, March 01, 2019 | OMCIAA | MOU/ Sub-license/ Property Acquisition Agreement |
| 18692-PRP_65 | 1 | Friday, March 01, 2019 | OMCIAA | MOU/ Sub-license/ Property Acquisition Agreement |
| 18692-PRP_94b | 3 | Friday, November 01, 2019 | Private - Riverside South | Property Acquisition Agreement |

| Property Request Plan | Parcel | Date Lands given to Project Co. | Ownership | Rights to Property |
|------------------------------|---------------|--|--|--------------------------------|
| | | | Development Corp | |
| 18692-PRP_94b | 5 | Friday, November 01, 2019 | Private - Riverside South Development Corp | Property Acquisition Agreement |
| 18692-PRP_94b | 6 | Friday, November 01, 2019 | Private - Riverside South Development Corp | Property Acquisition Agreement |
| 18692-PRP_94b | 7 | Friday, November 01, 2019 | Private - Riverside South Development Corp | Property Acquisition Agreement |
| 18692-PRP_94b | 8 | Friday, November 01, 2019 | Private - Riverside South Development Corp | Property Acquisition Agreement |
| 18692-PRP-96c | 2 | Friday, November 01, 2019 | Private - Carl Quinn | Initiate Expropriation in June |
| 18692-PRP-96c | 7 | Friday, November 01, 2019 | Private - Carl Quinn | Initiate Expropriation in June |
| 18692-PRP_97c | 2 | Friday, November 01, 2019 | Private - Daniel Quinn | Initiate Expropriation in June |
| 18692-PRP_98a | 2 | Friday, November 01, 2019 | Private - Carl Quinn | Initiate Expropriation in June |

| Property Request Plan | Parcel | Date Lands given to Project Co. | Ownership | Rights to Property |
|------------------------------|---------------|--|--|--------------------------------|
| 18692-PRP_117 | 1 | Friday, November 01, 2019 | Private - Riverside South Development Corp | Property Acquisition Agreement |
| 18692-PRP_117 | 2 | Friday, November 01, 2019 | Private - Riverside South Development Corp | Property Acquisition Agreement |
| 18692-PRP_117 | 3 | Friday, November 01, 2019 | Private - Riverside South Development Corp | Property Acquisition Agreement |
| 18692-PRP_117 | 4 | Friday, November 01, 2019 | Private - Riverside South Development Corp | Property Acquisition Agreement |

It should be noted that certain transfer agreements outlined in the table above may not result in City ownership until the completion of construction. During the period of construction, the City will hold licenses of occupation.

6.0 Operational Activities

The section below describes in detail the proposed railway activities for the Bowesville Subdivision and Airport Link.

As noted in Section 1.2, the information set out in the operations sections below is based on the PSOS requirements of the PA, which will inform the system provided by the successful consortium (“Project Co”). The procurement method permits Project Co. some flexibility within the parameters set out by the PSOS.

6.1 Passenger Rail Service – Bowesville Subdivision

As noted earlier, the Bowesville Subdivision represents a 6km double track extension of the Trillium Line in the existing City-owned rail corridor from the end-of-track just north of Leitrim Road to Limebank Station. The Bowesville Subdivision will provide passenger rail service from the southern terminus at Limebank Station to the northern terminus at Bayview Station. Passengers will be able to connect to the wider transit network on the Confederation Line at Bayview Station and the bus networking throughout the alignment.

Stations

As noted previously, the Bowesville Subdivision will provide passenger rail service of from the end-of-track just north of Leitrim Road to Limebank Station. This section of the alignment will have three stations, Leitrim, Bowesville, and Limebank, which will be described in detail below:

Leitrim Station

Located adjacent to the existing Leitrim OC Transpo transit Park & Ride parking lot, Leitrim Station (Figure 25) will include a small station house and a covered walkway across the bus lanes to the rail platform. The one (1) fare-paid zone in the station will include three (3) bus and two (2) rail platforms. A loop in the Park & Ride lot will provide vehicle drop off and turnaround and lay-by spaces, four (4) passenger drop-off spaces, and the Park & Ride lot will be expanded to 330 spaces for opening day, with 925 spaces planned for the ultimate configuration.

The station will include numerous facilities, including, but not limited to, sidewalks and multi-use pathway connections, security lighting, CCTV and emergency phones, elevators, wayfinding, bicycle parking, and will be constructed to be expandable to permit future increased capacity. Leitrim Station will not have public washroom facilities.

Leitrim Station will have two (2) minimum 80m long platforms. All Stations platforms with the exception of Limebank, Bowesville, Uplands and Airport are required to be equipped with slip-resistant retractable Platform edge extenders along the entire length of the platform, and providing the required clearance for the passage of freight Trains through the Station Platform area, in the retracted position.

A reference concept design for Leitrim Station is provided in Appendix B.

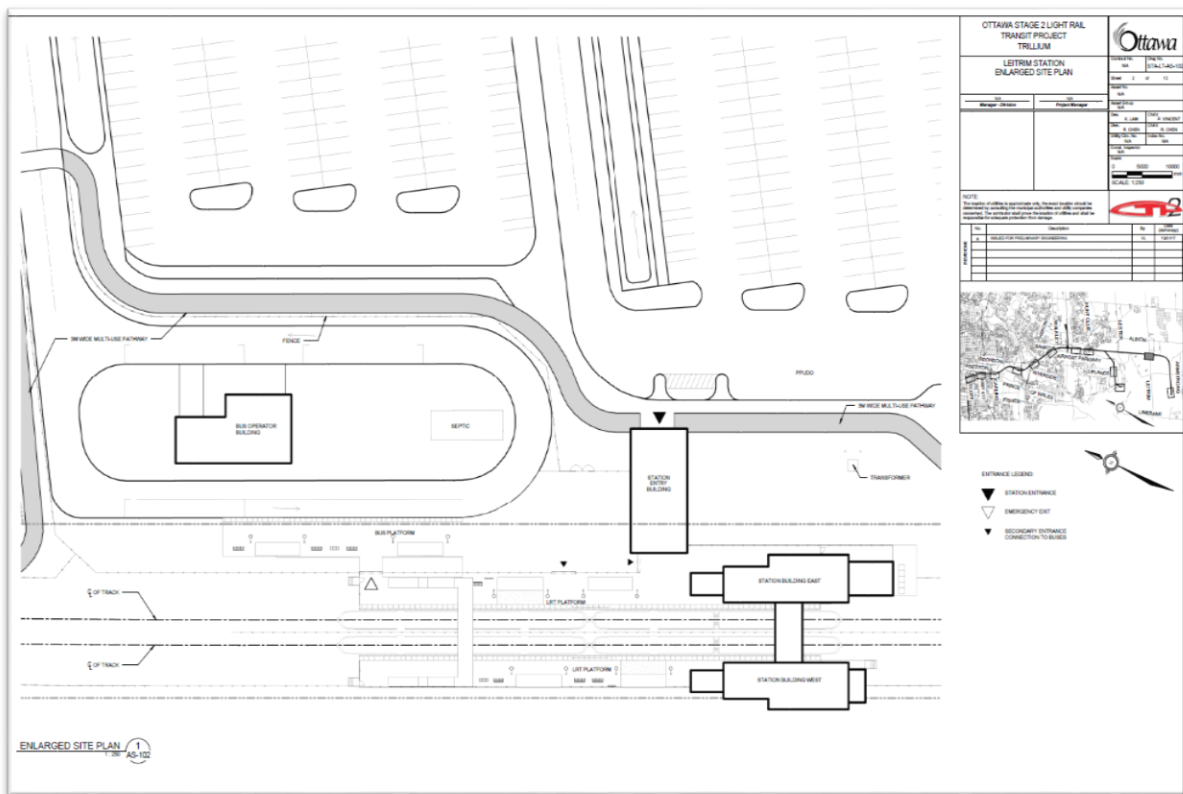


Figure 25 - Leitrim Station

Bowesville Station

Located adjacent to the intersection of Earl Armstrong Road and Bowesville Road, Bowesville Station (Figure 26) will include a covered walkway across the bus lanes to the rail platform, and glazed shelters on all platforms. The fare-paid zone at this station also includes both bus and rail platforms. A loop and bus layup area will be located at the east end of the station, and the station will have six (6) passenger drop-off spaces. The Park & Ride lot will accommodate 800 spaces on opening day with the potential to accommodate 2,000 spaces.

The station will include numerous facilities, including, but not limited to, sidewalks and multi-use pathway connections, security lighting, CCTV and emergency phones, elevators, wayfinding, bicycle parking and facilities, and will be constructed to be expandable to permit future increased capacity. Bowesville Station will not have public washroom facilities. Bowesville Station will have two (2) minimum 80m long platforms.

A reference concept design for Bowesville Station is provided in Appendix B.

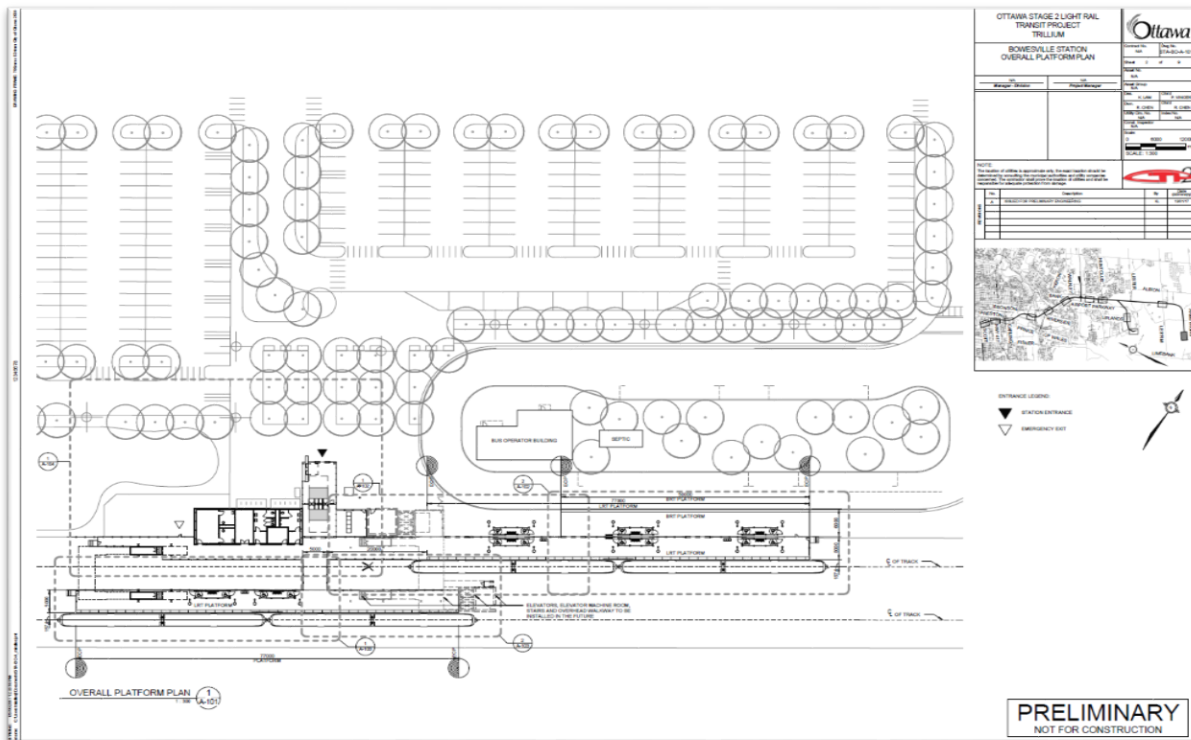


Figure 26 - Bowesville Station

Limebank Station

Located adjacent to the intersection of Earl Armstrong Road and Limebank Road near Riverside South, Limebank Station (Figure 27) will be the southern terminus of the Trillium Line. The design will be designed as an urban Station with direct access to the on street bus transit facility located to the north of the alignment. Limebank Station will not have a Park and Ride facility, but will have six (6) passenger drop-off spaces.

The station will include numerous facilities, including, but not limited to, sidewalks and multi-use pathway connections, security lighting, CCTV and emergency phones, elevators, wayfinding, bicycle parking and facilities, and will be constructed to be expandable to permit future increased capacity. Limebank Station will have public washroom facilities.

Limebank Station will have a minimum 80m long platform.

A reference concept design for Limebank Station is provided in Appendix B.

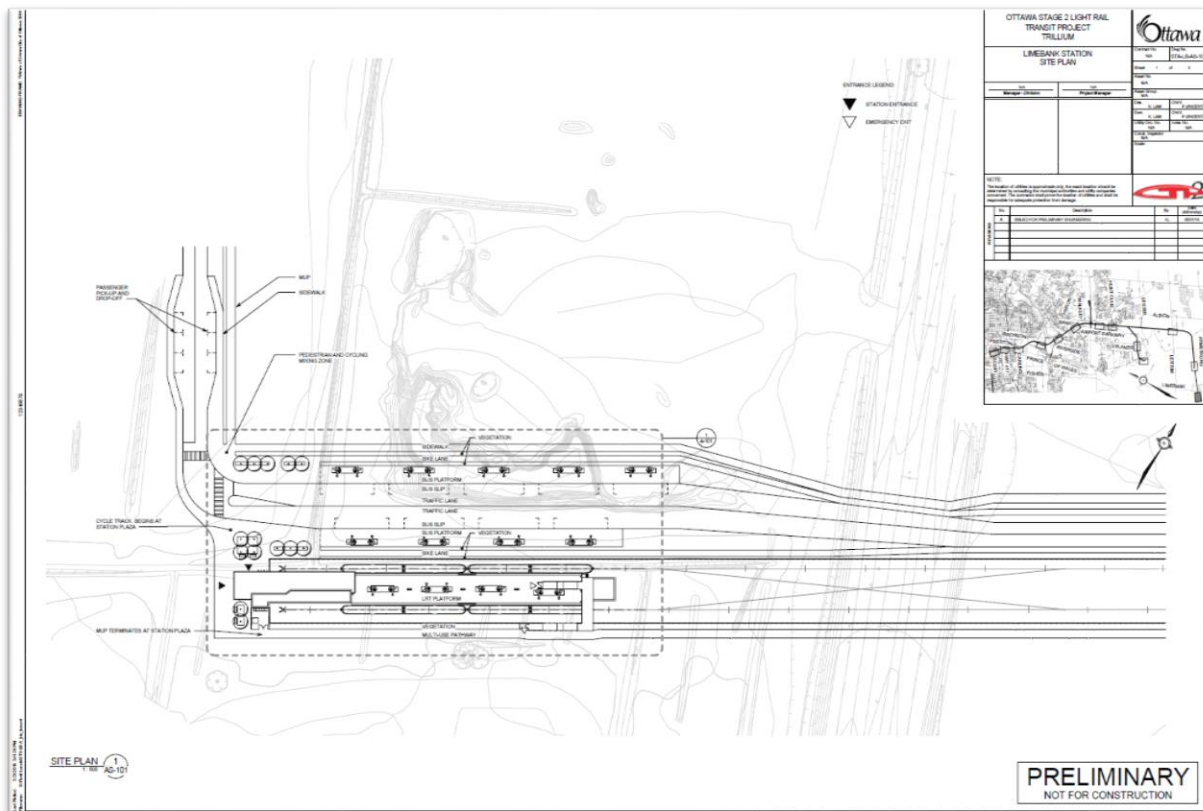


Figure 27 - Limebank Station

Crossings

As noted in Section 5.0, on the Bowesville Subdivision, grade separations will be constructed at Leitrim, Earl Armstrong, Bowesville and Limebank Roads to provide separation of the rail operations from the road crossings in these areas.

Additionally, an at-grade crossing will remain along the alignment at the Lester Road crossing (National Research Council spur track). The Lester Road grade crossing will only be used for occasional freight movements to and from the NRC facility and during non-revenue hours.

Train Volume

As per the requirements outlined in the PSOS documents, Project Co. must provide a system capable of accommodating the City's Base Service Plan (Figure 29) operating requirements.

As noted above, Project Co. is required to design the system to support the reliable operation of 12-minute headways. The Trillium Line will operate on different hours of operation depending on the day of the week, but train volumes will not exceed five (5) trains per hour per direction.

Train lengths

The Bowesville Subdivision will operate the equivalent of seven (7) 80m trains, which will be taken from a pool of seven (7) 80m Stadler vehicles and six (6) 40m Alstom vehicles.

Train speed

As per the requirements outlined in the PSOS set out in the PA, Project Co. will provide a system based on the nominal station-to-station travel times of a maximum permissible speed of 80 km/hr and civil speed restrictions imposed by track/alignment curvature and platforms.

Operating Configuration

The entire mainline Trillium Line will operate on following configuration (Figure 28):

1. Northbound trains from Limebank Station to Bayview Station will have mainline priority, while southbound trains from Bayview Station to Limebank Station will be required to move into passing sidings to provide right-of-way to northbound trains.
2. Southbound trains from Bayview Station will permit the northbound trains to pass by using the passing siding between Bayview Station and Gladstone Station.
3. After servicing Carling Station, southbound trains will continue through the Dow's Lake Tunnel and will use the Carleton passing siding to allow northbound trains to pass.
4. After servicing Carleton Station, southbound trains will continue through Confederation Station and the Ellwood Diamond grade separation and will move into the Brookfield Siding to permit northbound trains to pass.
5. Southbound trains will continue through Walkley, Greenboro and South Keys stations.
6. South Keys station is a two-track station and hence, northbound and southbound trains pass each other at the station.
7. Southbound trains enter the double-track siding at Leitrim Road to permit northbound trains to pass, and continues south towards Limebank Station in the double track.



Figure 28 -Trillium Line Operations Schematic



Headways

As per the requirements outlined in the PSOS documents, Project Co. must provide a system capable of accommodating the following train headways and operating configuration:

- *Weekdays*: Trains with a minimum capacity of 420 passengers will operate on 12-minute headways on the mainline between Bayview Station and Limebank Station; and,
- *Weekends*: Trains with a minimum capacity of 420 passengers will operate on 12-minute headways on the mainline between Bayview Station and Limebank Station.

The 12-minute headways will provide an overall trip from Limebank Station to Bayview Station of approximately 31 minutes, which is comparable to passenger vehicle trip time today without traffic or delay.



| | | | | Limebank to Bayview | | Min Terminal | Track KM | Dropback Operator | | | | | | |
|--------------|--------|----------------|----------|---------------------|-------------|--------------------|----------------|-------------------|---------------------|--------------|------------------|-------------------|----------------------|------------------------|
| | | | | | | 5 | 18.5 | 1 | | | | | | |
| | Period | | Duration | Headway | Round Trips | Roundtrip Run Time | Total Terminal | Cycle Time | Revenue Train Hours | Route Length | Revenue Train KM | Trains in Service | Operators in Service | Revenue Operator Hours |
| Mon-Thurs | AM | 6am-9am | 3 | 12 | 15 | 64 | 20 | 84 | 21 | 18.5 | 555.0 | 7 | 8 | 24.0 |
| | Mid | 9am-3pm | 6 | 12 | 30 | 64 | 20 | 84 | 42 | 18.5 | 1,110.0 | 7 | 8 | 48.0 |
| | PM | 3pm-6pm | 3 | 12 | 15 | 64 | 20 | 84 | 21 | 18.5 | 555.0 | 7 | 8 | 24.0 |
| | Late | 6pm-12am | 6 | 12 | 30 | 64 | 20 | 84 | 42 | 18.5 | 1,110.0 | 7 | 8 | 48.0 |
| | | | | | | | | | 126 | | 3,330.0 | | | 144.0 |
| Friday | AM | 6am-9am | 3 | 12 | 15 | 64 | 20 | 84 | 21 | 18.5 | 555.0 | 7 | 8 | 24.0 |
| | Mid | 9am-3pm | 6 | 12 | 30 | 64 | 20 | 84 | 42 | 18.5 | 1,110.0 | 7 | 8 | 48.0 |
| | PM | 3pm-6pm | 3 | 12 | 15 | 64 | 20 | 84 | 21 | 18.5 | 555.0 | 7 | 8 | 24.0 |
| | Late | 6pm-12am | 6 | 12 | 30 | 64 | 20 | 84 | 42 | 18.5 | 1,110.0 | 7 | 8 | 48.0 |
| | | | | | | | | | 126 | | 3,330.0 | | | 144.0 |
| Saturday | AM | 6:30am-9am | 2.5 | 12 | 12.5 | 64 | 20 | 84 | 18 | 18.5 | 462.5 | 7 | 8 | 20.0 |
| | Mid | 9am-3pm | 6 | 12 | 30 | 64 | 20 | 84 | 42 | 18.5 | 1,110.0 | 7 | 8 | 48.0 |
| | PM | 3pm-6pm | 3 | 12 | 15 | 64 | 20 | 84 | 21 | 18.5 | 555.0 | 7 | 8 | 24.0 |
| | Late | 6pm-12am | 6 | 12 | 30 | 64 | 20 | 84 | 42 | 18.5 | 1,110.0 | 7 | 8 | 48.0 |
| | | | | | | | | | 123 | | 3,237.5 | | | 140.0 |
| Sunday / Hol | AM | 7:30am-9am | 1.5 | 12 | 7.5 | 64 | 20 | 84 | 11 | 18.5 | 277.5 | 7 | 8 | 12.0 |
| | Mid | 9am-3pm | 6 | 12 | 30 | 64 | 20 | 84 | 42 | 18.5 | 1,110.0 | 7 | 8 | 48.0 |
| | PM | 3pm-5:30pm | 2.5 | 12 | 12.5 | 64 | 20 | 84 | 18 | 18.5 | 462.5 | 7 | 8 | 20.0 |
| | Late | 5:30pm-11:30pm | 6 | 12 | 30 | 64 | 20 | 84 | 42 | 18.5 | 1,110.0 | 7 | 8 | 48.0 |
| | | | | | | | | | 112 | | 2,960.0 | | | 128.0 |

| Annual Quantities | | | | | | |
|-------------------|------------|---------------|--|------------------|--|---------------|
| Mon-Thurs | 203 | 25,578 | | 675,990 | | 29,232 |
| Fri | 52 | 6,552 | | 173,160 | | 7,488 |
| Sat | 50 | 6,125 | | 161,875 | | 7,000 |
| Sun/Hol | 60 | 6,720 | | 177,600 | | 7,680 |
| | 365 | 44,975 | | 1,188,625 | | 51,400 |

Figure 29 - Bowesville Subdivision Base Service Plan

6.2 Passenger Rail Service – Airport Link

The Airport Link will provide a 4km passenger service rail line from South Keys Station to the OMCIA. The Airport Link will provide two stations at Uplands, adjacent to the EY Centre, and the Airport, adjacent to and with a direct connection to the passenger terminal building. Connections to the mainline service (Bayview to Limebank) will occur at the South Keys Station. Airport Link trains will be timed to arrive and depart South keys Station in such a manner that minimizes transfer times for connecting passengers.

Stations

The Airport Link includes two stations at Uplands, adjacent to the Ernst and Young (“EY Centre”) Centre, and the Airport within the OMCIA passenger terminal building:

Uplands Station

Uplands Station (Figure 30) will be located along a passing siding, and will be designed as a grade-separated station with two side platforms to reduce property impacts. A station house, designed to accommodate Ernst & Young (EY) Centre event traffic, will incorporate street-level doors on the south side providing access to a bus transfer platform within the fare-paid zone, with staircases and switchback ramps (or redundant elevators, if required) providing access to each rail platform. A street-level connection will be provided from the south entrance of the station to the EY Centre, and a MUP connection will be provided to Uplands Drive.

The station design will include numerous facilities, including, but not limited to, sidewalks and multi-use pathway connections, security lighting, CCTV and emergency phones, elevators, wayfinding, bicycle parking and facilities, and will be constructed to be expandable to permit future increased capacity.

Uplands Stations will be constructed with an initial minimum platform length of 40m with design allowances and provisions to allow extension of the platform to a minimum of 80m.

A reference concept design for Uplands Station is provided in Appendix B.

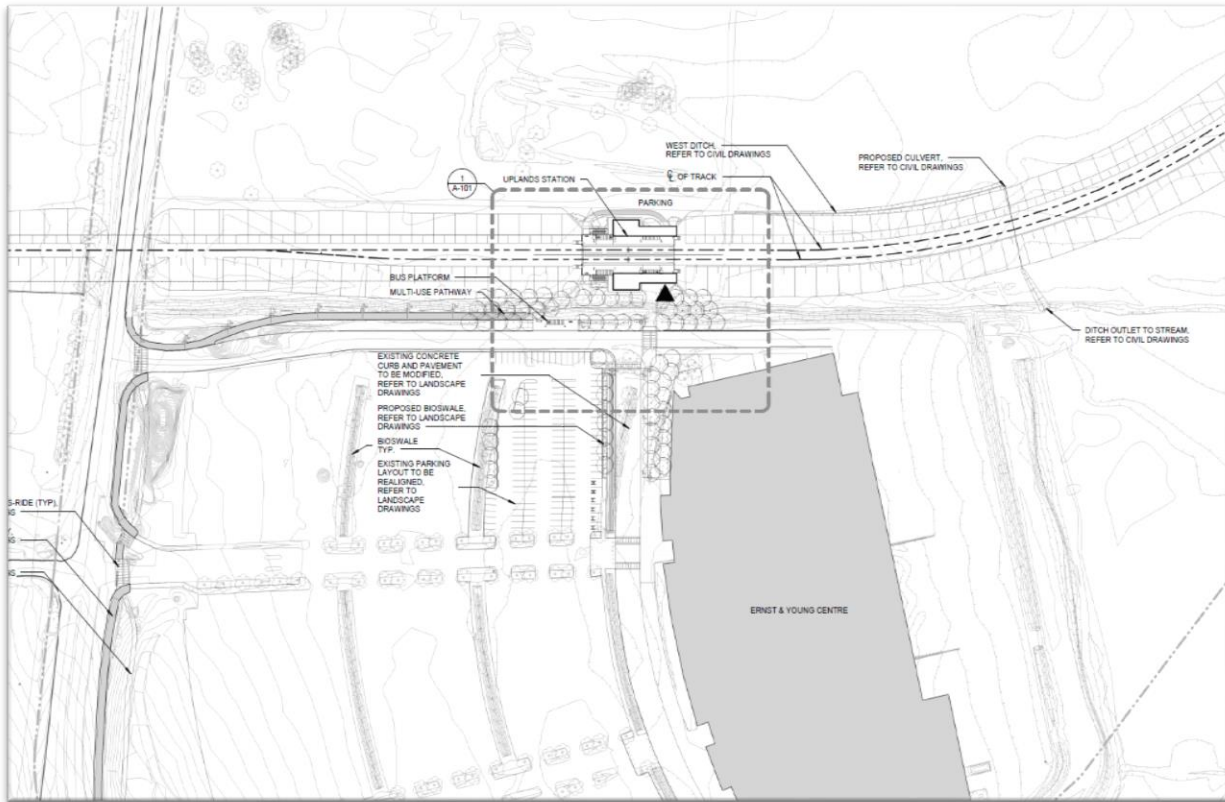


Figure 30 - Uplands Station

Airport Station

The Trillium Line South Extension also includes a 4km passenger service line connecting to the Ottawa Macdonald-Cartier International Airport (OMCIA). Passengers seeking access to and from the OMCIA will be provided with fast, frequent and efficient connections from South Keys Station.

The new elevated Airport Station (Figure 31) will be conveniently located adjacent to the airport departure roadway and the airport terminal building. The Station entrance and lounge will be an extension of the airport terminal building and shall be constructed by the OMCIA. Washrooms will be provided in the terminal building.

A reference concept design for Airport Station is provided in Appendix B.

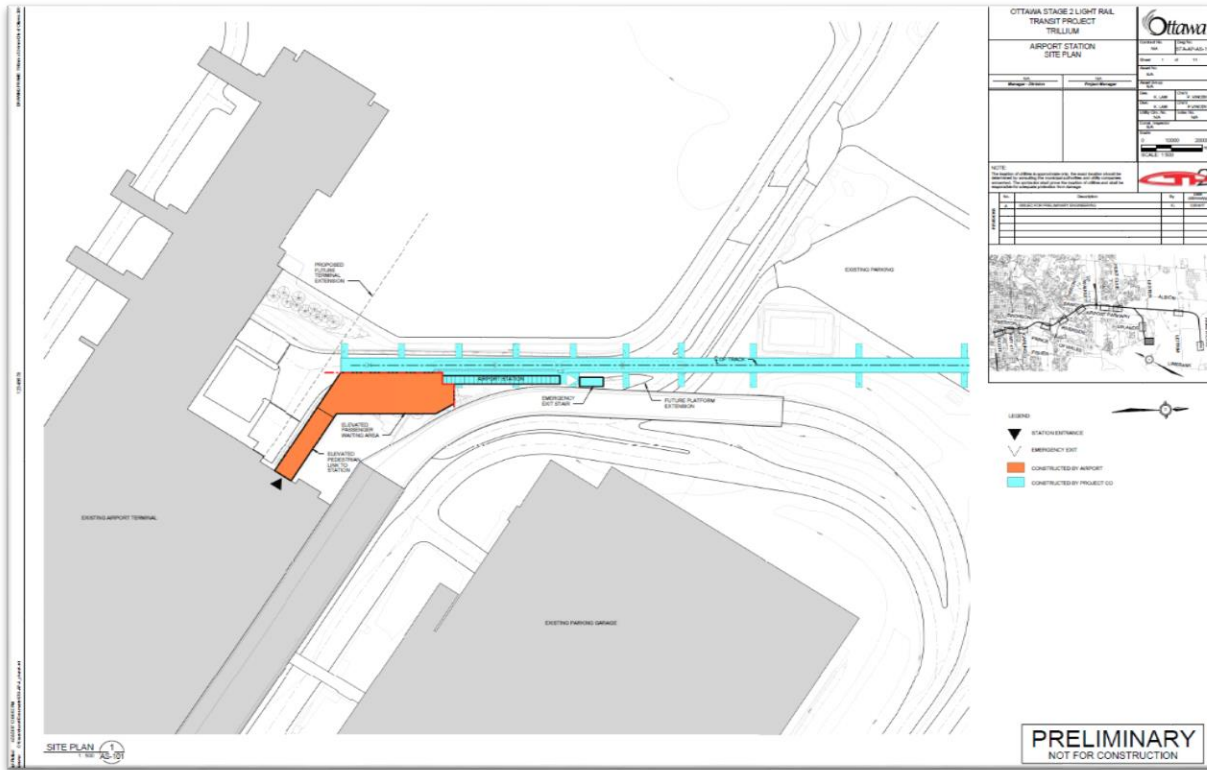


Figure 31 - Airport Station

Crossings

As noted in Section 5.0, on the Airport Link, grade separations will be constructed at Uplands Drive and Airport Parkway to provide separation of the rail operations from the road crossings in these areas.

Additionally, an at-grade crossing will remain along the alignment at the OMCIA emergency access roadway. Authorized personnel can only access the OMCIA emergency access roadway crossing by locked gates on both sides of the alignment. The gates will be interlocked with the S&TCS to prevent train movements across the emergency access roadway when the gates are opened.

Train volume

As per the requirements outlined in the PSOS documents, Project Co. must design a System capable of accommodating the City's Base Service Plan (Figure 32) operating

requirements. As noted above, Project Co. is required to design the system to support the reliable operation of a headway of 12 minutes. The Trillium Line Airport Link will operate to coincide with the Trillium Line mainline operations, and may vary depending on the day of the week, however on average, train volumes will not exceed five (5) trains per hour per direction.

Train lengths

The Airport Link will operate two (2) Alstom vehicles. Trains of approximately 40m in length will operate on the Airport Link.

Train speed

As per the requirements outlined in the PSOS set out in the PA, Project Co. will provide a system based on the nominal station-to-station travel times of a maximum permissible speed of 80 km/hour and civil speed restrictions imposed by track/alignment curvature and platforms.

Operating Configuration

The Airport Link will operate on following configuration:

1. Southbound trains from South Keys Station will have right-of-way priority through the Link track. Northbound trains will move into the passing siding at Uplands to allow southbound trains to pass.
2. Southbound and northbound trains will service Uplands Station.
3. Southbound trains will depart Uplands Station towards Airport Station, while northbound trains will continue to South Keys Station.

At South Keys, Airport Link and Mainline trains will coordinate as follows:

4. Northbound Link trains from the Airport Station will arrive at South Keys Station ahead of northbound mainline service from Limebank Station to Bayview Station.
5. Airport Link trains drops-off passengers and proceeds into the South Keys pocket track.
6. Northbound Bayview Station train arrives at South Keys Station, services the South Keys Station and departs, and Southbound Limebank Station train arrives at South Keys, services South Keys Station and departs.



7. Airport Link Train pulls out of the pocket track southbound, services South Keys Station and proceeds toward the Airport Station.

Headways

As per the requirements outlined in the PSOS documents, Project Co. must design a System capable of accommodating the following operating configuration:

- Weekdays: Trains with a minimum capacity of 240 passengers will operate on 12-minute headways on the Airport Link between Airport Station and South Keys Station.
- Weekends: Trains with a minimum capacity of 240 passengers, operating on 12-minute headways on the Airport Link between Airport Station and South Keys Station.

The 12-minute headways will provide an overall trip from South Keys Station to Airport Station of approximately 7.5 minutes.

| South Keys to Airport | | | Min Terminal 2 | Track KM 3.0 | | | | Dropback Operator 1 | | |
|-----------------------|-------------|--------------------|-------------------|-----------------|---------------------|--------------|------------------|------------------------|----------------------|------------------------|
| Headway | Round Trips | Roundtrip Run Time | Total Terminal | Cycle Time | Revenue Train Hours | Route Length | Revenue Train KM | Trains in Service | Operators in Service | Revenue Operator Hours |
| 12 | 15 | 15 | 9 | 24 | 6 | 4.2 | 126.0 | 2 | 3 | 9.0 |
| 12 | 30 | 15 | 9 | 24 | 12 | 4.2 | 252.0 | 2 | 3 | 18.0 |
| 12 | 15 | 15 | 9 | 24 | 6 | 4.2 | 126.0 | 2 | 3 | 9.0 |
| 12 | 30 | 15 | 9 | 24 | 12 | 4.2 | 252.0 | 2 | 3 | 18.0 |
| | | | | | 36 | | 756.0 | | | 54.0 |
| 12 | 15 | 15 | 9 | 24 | 6 | 4.2 | 126.0 | 2 | 3 | 9.0 |
| 12 | 30 | 15 | 9 | 24 | 12 | 4.2 | 252.0 | 2 | 3 | 18.0 |
| 12 | 15 | 15 | 9 | 24 | 6 | 4.2 | 126.0 | 2 | 3 | 9.0 |
| 12 | 30 | 15 | 9 | 24 | 12 | 4.2 | 252.0 | 2 | 3 | 18.0 |
| | | | | | 36 | | 756.0 | | | 54.0 |
| 12 | 12.5 | 15 | 9 | 24 | 5 | 4.2 | 105.0 | 2 | 3 | 7.5 |
| 12 | 30 | 15 | 9 | 24 | 12 | 4.2 | 252.0 | 2 | 3 | 18.0 |
| 12 | 15 | 15 | 9 | 24 | 6 | 4.2 | 126.0 | 2 | 3 | 9.0 |
| 12 | 30 | 15 | 9 | 24 | 12 | 4.2 | 252.0 | 2 | 3 | 18.0 |
| | | | | | 35 | | 735.0 | | | 52.5 |
| 12 | 7.5 | 15 | 9 | 24 | 3 | 4.2 | 63.0 | 2 | 3 | 4.5 |
| 12 | 30 | 15 | 9 | 24 | 12 | 4.2 | 252.0 | 2 | 3 | 18.0 |
| 12 | 12.5 | 15 | 9 | 24 | 5 | 4.2 | 105.0 | 2 | 3 | 7.5 |
| 12 | 30 | 15 | 9 | 24 | 12 | 4.2 | 252.0 | 2 | 3 | 18.0 |
| | | | | | 32 | | 672.0 | | | 48.0 |

| Annual Quantities | | | | | | |
|-------------------|------------|---------------|--|----------------|--|---------------|
| Mon-Thurs | 203 | 7,308 | | 153,468 | | 10,962 |
| Fri | 52 | 1,872 | | 39,312 | | 2,808 |
| Sat | 50 | 1,750 | | 36,750 | | 2,625 |
| Sun/Hol | 60 | 1,920 | | 40,320 | | 2,880 |
| | 365 | 12,850 | | 269,850 | | 19,275 |

Figure 32 - Airport Link Base Service Plan

6.3 Trains

The Trillium Line currently operates a fleet of six (6) Alstom LINT diesel multiple unit (DMU) vehicles, which are 40 metres long and can accommodate 240 customers. The Alstom vehicles were approved by Transport Canada in 2015.

In order to provide greater capacity, the Trillium Line Project is moving to a longer train strategy and will operate 80 metre consists on the mainline and Bowesville Subdivision and 40 metre consists on the Airport Link.

Following an open procurement, Stadler was chosen as the successful proponent for the provision of seven (7) 80-metre DMU vehicles. The Stadler vehicle can accommodate 420 customers. The Alstom vehicles will remain in service with the Stadler vehicles, to provide a full vehicle fleet of 13 DMUs.

The vehicles will be designed and constructed to satisfy, but not limited, to the following requirements:

- Transport Canada Rules and Regulations, and vehicle acceptance;
- Americans with Disabilities Act (ADA);
- Accessibility for Ontarians with Disabilities Act (AODA);
- Canadian Transportation Agency (CTA) Code of Practice, Passenger Rail Car Accessibility and Terms, and Conditions of Carriage by Rail of Persons with Disabilities;
- Capital Railway Inspection and Safety Rules, including requirements for wrecking tools, first aid supplies and trauma kits;
- IEC 61373 shock and vibration limits;
- City of Ottawa Noise By-Law limits, including interior noise levels no greater than 70 dba in the seated area and cab area, and exterior levels no greater than 79dBA, when measured 25m from a Train traveling at 85 km/h and braking;
- NFPA 130, 49 CFR part 238 and BSS 7239 compliance for all non-metallic components;
- Crash energy management as per EN 15227 and/or FRA Tier I Alternative Compliance consistent with the DOT report (Technical Criteria and Procedures for Evaluating the Crashworthiness and Occupant Protection Performance of Alternatively Designed Passenger Rail Equipment for Use in Tier I Service – dated October 2011)
- Carbody structural integrity compliant to EN 12663, P-II; and,

- APTA Standards, including windows compliant to APTA-SS-PS-003-98, and roof emergency access compliant to APTA-RP-C&S-001-98.

The City has created a robust set of requirements for the vehicle compliance. A copy of the PSOS Schedule 15-2, Part 8 pertaining to Vehicles is provided in Appendix C.

6.4 Safety and Security

The Trillium Line will significantly increase the safety of passengers, adjacent residents and members of the public. As part of the PA requirements, Project Co. must provide a System Safety and Assurance Plan (SSAP) that applies to all phases of the work including design, construction, testing, commissioning, trial running, in-service support, operations, warranty, retrofits and field modifications.

The objective of the SSAP is to deliver the Project by meeting or exceeding related governmental rules, regulations, standards and industry best practices, and applicable requirements. The SSAP will be developed in accordance with the following guidelines and documents:

- Handbook for Transit Safety and Security Certification, Final Report, November 2002; DOT, FTA-MA-90-5006-02-01.
- Hazard Analysis Guidelines for Transit Projects, U.S. DOT, January 2000, Final Report # DOT-VNTSC-FTA-00-01.
- NFPA 101 Life Safety Code and other relevant NFPA codes and standards.
- NFPA 130, Fixed Guideway Transit and Passenger Rail Systems.
- MIL-STD-882E, Standard Practice System Safety.
- MIL-HDBK-470A, Designing and Developing Maintainable Products and Systems (Volume II), December 1997.
- MIL-HDBK-781A, Handbook for Reliability Test Methods, Plans and Environments for Engineering, Development Qualification and Production, April 1996.
- MIL STD-785B, Reliability Program for Systems and Equipment Development and Production.
- MIL HDBK-217F, Reliability Prediction of Electronic Equipment.
- MIL STD 756B, Reliability Modeling and Prediction.
- MIL STD-781D, Reliability Testing for Engineering Development, Qualification and Production - Exponential Distribution.

- MIL STD-470A, Maintainability Program Requirements (for Systems and Equipment).
- Procedures for Performing a Failure Mode Effects and Criticality Analysis, MIL- STD-1629A.
- Public Transportation System Security and Emergency Preparedness Planning Guide, January 2003, Final Report, U.S. DOT, FTA, DOT-VNTSC-FTA-03-01.
- Transit Security Design Considerations, Final Report, November 2004, US DOT, FTA, DOT-VNTSC-FTA-05-02.
- CPTED principles, City of Ottawa, Urban Design, A Reference Guide to Creating Great Places and Great Spaces, Planning, Transit and the Environment, Publication #2103, Summer 2007

Project Co. will undertake the delivery of the Trillium Line Project in accordance with the SSAP, by providing a safe and secure system, but will also include provisions in the case of emergency, including, but not limited to:

- Provisions to enable safe and timely evacuation of passengers and personnel from all fixed structures, disabled vehicles and facilities;
- Necessary safeguards to protect passengers, personnel and emergency service providers during evacuation;
- Provisions to minimize exposure to all hazards, including those due to moving vehicles and potential falls; and,
- Facilitating emergency response training drills, and implementing contractual training for the safe and efficient handling of both normal and emergency conditions.

In advance of revenue service, Project Co. will be required to undergo a Safety and Security Certification process of all aspects of the new system, which will involve the validation, testing, inspection, and review of all system safety requirement conformance throughout all phases of work.

It should be noted that once in operation, the expended Trillium Line will provide a significant safety improvement above the current system because of, but not limited to, the following system features:

- New infrastructure to create a fully grade separated system from the public right-of-way, as noted above;

- Secured perimeter fencing enclosing of the entire alignment, and all stations and bus platforms, with the lockable gates; and,
- CCTV cameras, emergency telephones and security lighting at each station.

Additionally, as per the Capital Railway Operating Rules, which will also apply once the Trillium Line Bowesville Subdivision and Airport Link are in service revenue operations in 2021, require that the bell must be rung when an engine or diesel multiple unit:

- Is about to move except when switching requires frequent stopping and starting after the initial move;
- Passing any movement standing on an adjacent track;
- Approaching, passing or moving about station facilities or shop track areas; and
- One-quarter of a mile (402 metres) from every public crossing at grade (except within limits as may be prescribed in special instructions) until the crossing is fully occupied by the engine, diesel multiple unit or cars. At crossings where engine or diesel multiple unit whistle signal 14 (I) is applicable, the engine or diesel multiple unit bell need not be rung.

Furthermore, the Capital Railway Operating Rules require that the whistle signals must be sounded as prescribed by this rule, and should be distinct, with intensity and duration proportionate to the distance the signal is to be conveyed. Unnecessary use of the whistle is prohibited. Whistle signal must be prolonged or repeated until the crossing is fully occupied.

A copy of the Capital Railway Operating Rules is provided in Appendix C. It should be noted that the Capital Railway Operating Rules will be updated to reflect the change in operations for the Bowesville Subdivision and Airport Link, and the addition of Stadler vehicle fleet prior to service revenue.

6.5 Railway Yard Operations

Although not located within the extents of this application, a new Walkley Yard will support the operations of the Bowesville Subdivision and Airport Link. A new Walkley Yard facility will be constructed on City-owned lands as part of the Trillium Line Project directly west of the current Walkley Yard location at 3101 Albion Road North. The current Walkley Yard location will be vacated prior to service revenue operations. A site plan of the new Walkley Yard is provided in Appendix C.

The new Walkley Yard will be constructed as per the specifications outlined in the PSOS requirements in Schedule 15-2, Part 5 pertaining to the New Walkley Yard. The specifications outline the types of Yard facilities, design and civil requirements, track work, traffic movement and service roads, and other requirement Yard equipment. A copy of Schedule 15-2, Part 5 New Walkley Yard is provided in Appendix C.

The New Walkley Yard will provide the efficient movement of system vehicles from the mainline track to storage tracks capable of accommodating the full vehicle fleet of 13 DMUs, maintenance and rehabilitation facilities for both the vehicles and system infrastructure, and facilities for the City for system operations. Project Co will determine which equipment, accessories, materials, and others that are needed to meet the maintenance requirements of the Project Agreement and in what quantities. At a minimum, the City expects that the following equipment will be provided within the New Walkley Yard:

- Sand dispenser system;
- Diesel fuel storage and dispensing system;
- Oil and water separator;
- Loading and unloading facilities;
- Pressure washing equipment for both vehicle cleaning and as required for parts cleaning in the shop;
- Mobile column lifts in sufficient number and configuration to service all vehicle types;
- DMU exhaust extraction;
- Fall protection (overhead and pit);
- Battery charger system;
- Cranes;
- Hoists;
- Forklift trucks;
- Fluids distribution system;
- Compressed air system; and,
- Parts storage.

The New Walkley Yard will operate as a non-Cab signal territory with a separate S&TCS controlled by the Yard Control Centre (YCC). All vehicle moves and routes within the New Walkley Yard limits will be restricted to limited speed and governed by

radio control authorization from the YCC. The YCC will not control the wayside signals and powered switches that allow all vehicles to enter or exit the mainline alignment. The entering and exiting of all Vehicles on to the mainline will be controlled by the TOCC under the mainline S&TCS.

Project Co. will ensure that the new Walkley Yard is safe and secure by establishing and monitoring security measures to protect the new Walkley Yard from unauthorized entry, criminal activity and vandalism including, but not limited to the following:

- Fencing along the perimeter of the New Walkley Yard;
- Security alarm systems;
- Maintenance staff competently trained in the provision of security working 24 hours per day from Monday to Sunday;
- Standard Safety Procedures;
- Card access entry systems;
- Closed circuit television systems (CCTV); and,
- Secure public zones.

6.6 Railway Yard Maintenance Operations

Project Co. will develop and provide to the City facility and vehicle Maintenance Plans, Corrective Maintenance Plans, and Preventive Maintenance Plans based on the requirements identified in the PA PSOS Schedule 15-3. A copy of PSOS Schedule 15-3 Maintenance and Rehabilitation Requirements is provided in Appendix C. The specifications include, but are not limited to, the following:

- Maintain the maintenance building, associated vehicle maintenance equipment, and storage yard in a state of good repair and working order;
- Provide all necessary trade fixtures, shop tools, heavy lifts, washers, equipment, vehicles and furniture as may be necessary maintenance building to undertake the maintenance activities;
- Ensure that each vehicle is maintained and inspected daily to a condition that is physically clean, functional, safe, in a good state of operation and repair suitable to be placed into revenue service; and,
- Twice a year, at the end of the winter and summer seasons, Project Co. will take each vehicle off-line for a thorough cleaning. Project Co will undertake major repairs at this time and the vehicle will be pressure washed and sanitized.

Failure to meet any of the vehicle requirements stipulated in the PSOS requirements will result in the vehicle being removed from revenue service.

7.0 Railway Services

The following section will outline the Trillium Line Project requirements, benefits, and partners. The Trillium Line Project, including the Bowesville Subdivision and Airport Link, as part of the larger Stage 2 Project, will increase volume capacity to the transit network to meet expected growth in demand and population as identified by the City of Ottawa's 2013 Transportation Master Plan and will provide significant benefits to the city.

7.1 Railway Service Requirements

City of Ottawa 2013 Transportation Master Plan

The Trillium Line Project, including the Bowesville Subdivision and Airport Link, form a section of the overall Stage 2 LRT Project. The Stage 2 LRT Project is the pillar of the City of Ottawa's 2013 Transportation Master Plan (TMP), which sets out the City's priorities for transit and transportation infrastructure until 2031. The 2013 TMP projected significant population growth, resulting in transportation and transit demand. These projection increases necessitate that the City provide services to accommodate the impacts of growing population on the municipal transit network.

Population growth and Transit demand

TMP contemplates population growth and proposes transit facilities to meet the needs of residents and businesses. The City expects a 23% increase in population of Ottawa from 922,000 to 1.14 million people, and a 24% increase in employment from 565,000 to 703,000 jobs¹.

As discussed in the 2013 TMP, the City of Ottawa enjoys a higher level of transit ridership than any other Canadian city of a similar size. The TMP notes that Ottawa's

¹ City of Ottawa, Transportation Master Plan, 2013:
http://documents.ottawa.ca/sites/documents.ottawa.ca/files/documents/tmp_en.pdf Page 21

transit modal share in the morning peak period in 2011 was approximately 22%². The 2013 TMP proposes a target transit modal share increase to 26% by 2031.

With the objective to meet the projected increase in transit demand resulting from population growth, and to increase the 26% transit modal share target set for 2031, the 2013 TMP proposed a rapid transit and transit priority (RTTP) network, including light rail transit (LRT). The RTTP reflects the City's strategic approach to expanding its transit network in response to future transportation needs and towards the goal of achieving an ultimate RTTP network³.

The 2013 TMP identifies an Affordability Plan of prioritized RTTP projects to meet the goals identified above. The larger Stage 2 project, including the Trillium Line Project, are identified as cornerstones of the priority RTTP projects within the within the TMP's affordability plan below.

The 2013 TMP was unanimously approved by City of Ottawa Council on November 26, 2013, and staff was given the approval to proceed with the planning of the RTTP projects. Following the approval for the 2013 TMP, the City undertook an Environmental Assessment (EA) study for the functional design of the Trillium Line Bowesville Extension and Airport Link. The EA study and design was approved by City Council on July 8, 2015. Council later approved Stage 2 project and procurement updates in the spring and fall 2017 respectively. A copy of the three (3) reports to Ottawa City Council are provided in Appendix C.

² City of Ottawa, Transportation Master Plan, 2013:
http://documents.ottawa.ca/sites/documents.ottawa.ca/files/documents/tmp_en.pdf Page 24

³ Page 54

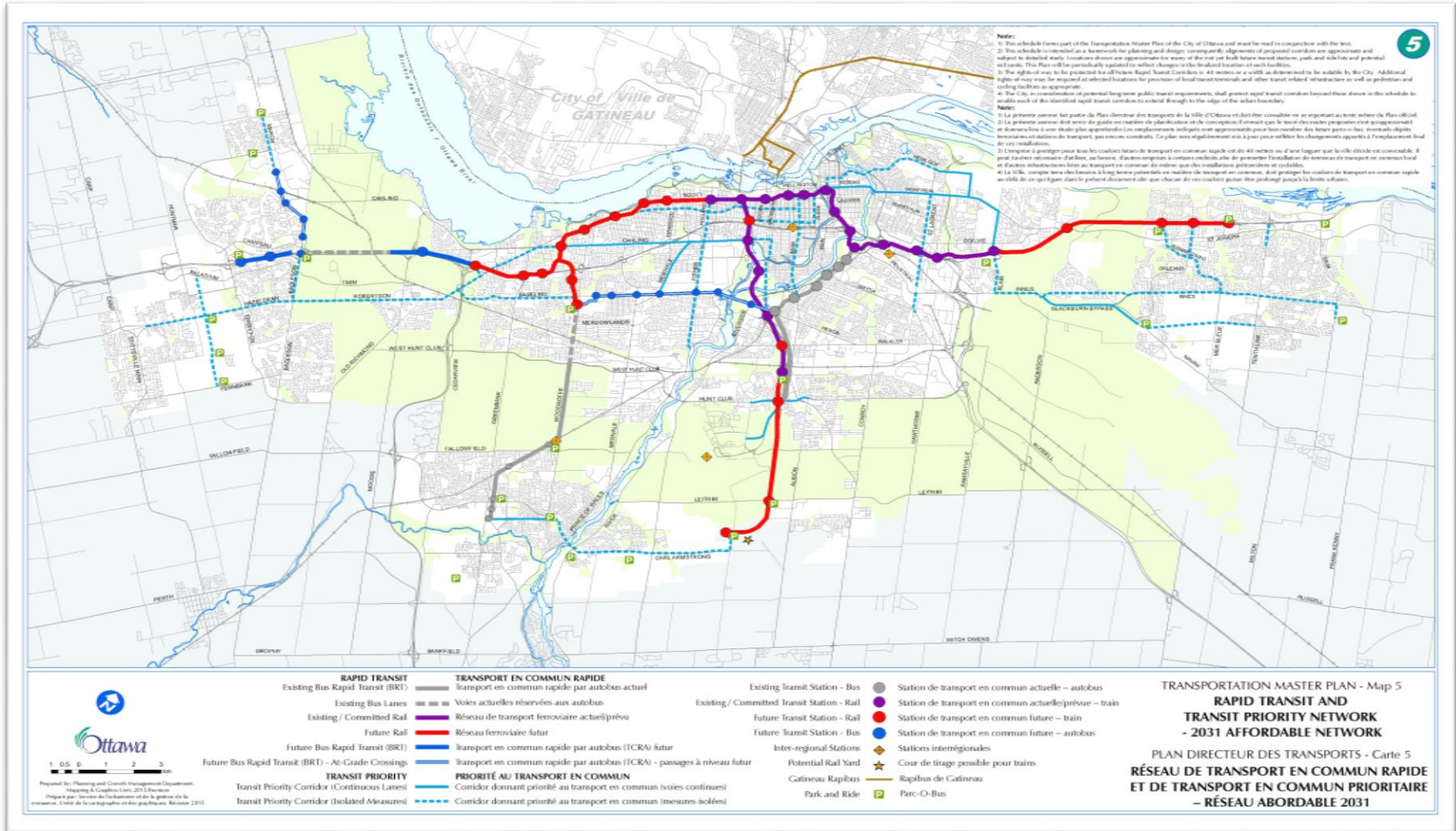


Figure 33 - 2013 Transportation Master Plan 2031 Affordable Transit Network

7.2 Project Benefits

The Trillium Line Bowesville Extension and Airport Link will provide significant benefits to city of Ottawa, both as a standalone project, and within the wider Stage 2 LRT Project framework.

The Stage 2 LRT Project builds on the currently under construction O-Train Confederation Line project by expanding the service with three separate rail extensions:

- Confederation Line East to Trim Station;
- Confederation Line West to Bayshore and Baseline stations; and,
- Trillium Line south to Limebank Station and the Ottawa MacDonald-Cartier International Airport.

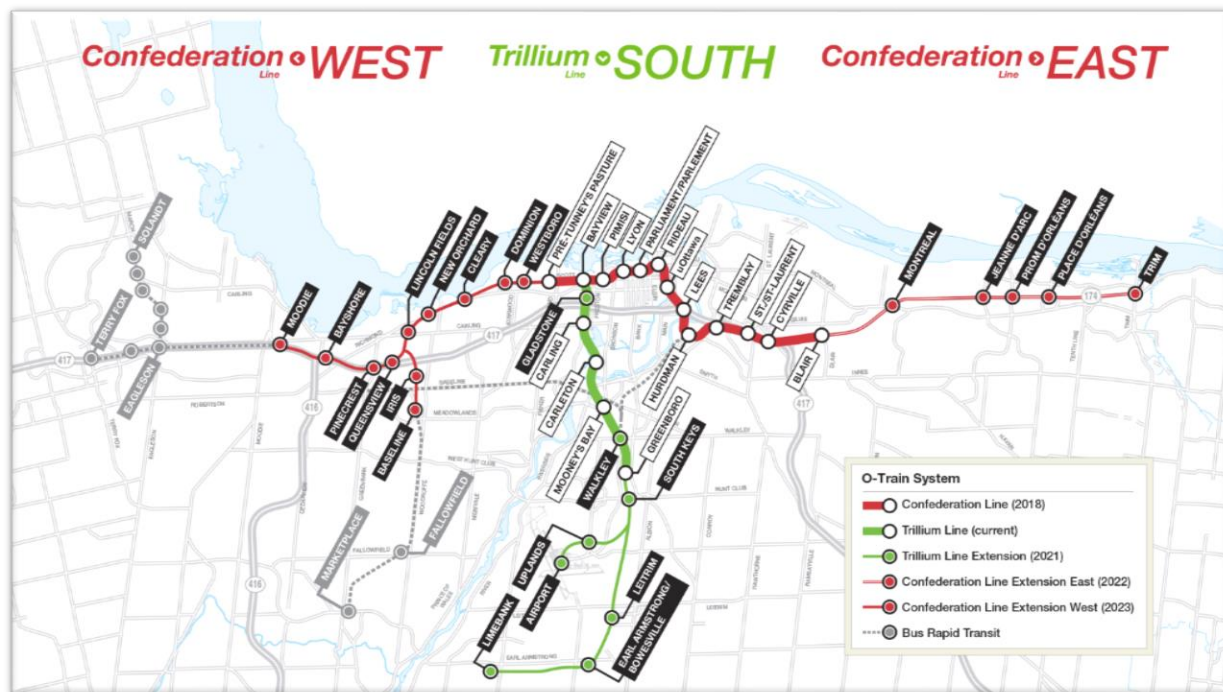


Figure 34 - Stage 2 Project

Together the three extensions will add over 40kms of track and 24 new stations to Ottawa’s O-Train transit system. When completed in 2023, approximately 70% of Ottawa’s population will live within 5km of a reliable clean, quiet, comfortable and convenient light rail transit system.

With these extensions in place, the O-Train network will link Ottawa’s major post-secondary institutions, retail centres, major employment nodes, the Ottawa MacDonald-Cartier International Airport, city parks, Parliament Hill, the Rideau Canal, museums and other cultural institutions with a rapid, high quality rapid transit rail service. The rail network will be fully integrated with the communities it serves with cycling and pedestrian pathways to encourage sustainable transportation. More families will be able to manage without the expense of a second car and more people will have the transit options to choose not to purchase a car at all.

The benefits of expanded LRT in Ottawa are substantial, as noted in the Stage 2 LRT Business Case, and summarized below. A copy of the Stage 2 LRT Business Case is provided in Appendix C:

- *Decreased Congestion:* Ottawa will see a reduction of almost one quarter of its total vehicle kilometres travelled (VKT) by 2048⁴ with the implementation of Stage 2:

| | Base Case | Affordable | Δ Change |
|------------------|---------------|---------------|--------------|
| 2031 | | | |
| AM peak hour VKT | 2,409,010 | 2,002,709 | -406,301 |
| Annual VKT | 3,772,510,270 | 3,136,242,904 | -636,267,366 |
| 2048 | | | |
| AM peak hour VKT | 2,409,010 | 2,002,709 | -630,735 |
| Annual VKT | 3,772,510,270 | 3,136,242,904 | -987,730,611 |

Figure 35 - Vehicle Kilometre Savings 2031 and 2048

- *Improved Mobility – Travel Time Savings:* Stage 2 will reduce travel time by improving speed and reliability of service for transit riders, and providing congestion relief for auto users. Based on the modeled forecasts, it is estimated that auto users will experience an annual savings of over 23 million person-hours by 2048, and transit passengers will experience a savings of almost 13 million person-hours.

⁴ Stage 2, Ottawa LRT, Business Case. June 22, 2015, http://www.stage2lrt.ca/wp-content/uploads/2015/09/Doc_7_Business_Case.pdf p. iii

- *Improved Mobility – Improved Access:* Stage 2 will improve travel from extended areas of the city to the core, resulting in quicker journey times and providing greater transportation choice and freedom for a greater portion of the population.
- *Vehicle Operating Cost Savings:* As a result of lower VKT across the City, there will be a substantial savings in the costs of operating vehicles (e.g. fuel, maintenance, etc.). Given an annual reduction of VKT of approximately one billion kilometres in 2048, the total discounted VOC savings resulting from the extension over the 25-year period of analysis is approximately \$2.630 billion.
- *Environmental Benefits:* Perhaps one of the most recognizable benefits of transit investment is the reduction in greenhouse gases (GHGs) and critical air contaminants (CACs), which have direct implications for the overall sustainability of urban growth and direct consequences on the health of residents. It is estimated that Stage 2 will result in over 67 million litres of savings in fuel consumption, and reduce GHG emissions by 155,500 tonnes and CACs by 4,363 tonnes by 2048. The economic value of these reductions will total \$635 million between 2023 and 2048.
- *Public Health Benefits:* The health benefits associated with reductions in harmful emissions are numerous, including a reduction of air pollution exposure from road traffic and the long-term effects of reducing contributors to climate change can help prevent health issues associated with extreme weather events, heat waves, etc. Transit use is also tied to active modes of transportation; on average, those who take public transit will walk a significant portion of their recommended daily activity in a round trip. Increased transit use also reduces the number collisions. The savings in collision costs resulting from Stage 2 are estimated to be approximately \$903 million. Finally, transit provides connectivity and mobility relief to those who are unable to drive (e.g. the elderly, residents with disabilities), including providing access to healthcare.
- *Land Use Benefits:* A number of land-use benefits can be derived from improved transit. It supports land use intensification and more compact urban form, making infrastructure and service provision more cost effective. Transit creates an “amenity premium” due to the catering of businesses and development towards pedestrian activity, as well spin-off economic activity and agglomeration economies (from increased clustering and accessibility of land use). Finally, LRT can create land-

value uplift near the stations.

- *Economic Development:* With a project cost of \$2.5 billion (2013\$) and an annual savings of \$5 million per year (2013\$) starting in 2023, the project will result in the creation of nearly 24,000 person-years of employment, or nearly 1,000 full-time jobs; a GDP contribution of \$3.8 billion; and a tax contribution of \$170 million.
- *Benefit-Cost Analysis:* Given the quantified benefits outlined above and the capital and operating costs, Stage 2 has a Benefit-Cost Ratio (BCR) of 3.56. Should only half of the benefits manifest themselves, the BCR remains positive at 1.78. Further, a second scenario was also examined – Stage 2, with an extension to the Airport from South Keys as well as an eastern extension from Place d’Orléans to Trim Road. In this scenario, the BCR remains well above 3, suggesting that this project remains highly viable from an economic perspective.

| Account | Stage 2 (2023\$, million) | Stage 2 + Airport Spur + Trim Ext (million) |
|--------------------------------|------------------------------|---|
| Project Capital Cost | \$3,302 ⁵ | \$3,644 |
| Project Operating Savings | \$103 | \$103 ⁷ |
| Vehicle Operating Cost Savings | \$2,630 | \$2,658 |
| Travel Time Savings | \$7,234 | \$7,615 |
| Collision Cost Savings | \$903 | \$912 |
| Environmental Benefits | \$635 | \$642 |
| BCR | 3.56 | 3.34 |

Figure 36 - Benefit-Cost Ratio for Stage 2

- *Increased Ridership:* Stage 2 is expected to increase City-wide ridership by nearly 13.5 million trips per year by 2031, or ten percent higher than a scenario in which Stage 2 is not materialized.

Trillium Line Ridership

Specific to the Trillium Line, ridership is projected to increase with the new service extensions, including the Bowesville Subdivision and Airport Link. The existing 8-km Trillium Line provides service between Bayview and Greenboro stations, and, as of

2015, carries approximately 15,100 persons per day⁵. In February 2018, the average total passenger activity on the Trillium Line in the morning peak period (6:00am to 9:00am) was 2,406 boardings and 2,175 alightings, or a combined total of 4,581 boardings and alightings⁶.

In 2016, AECOM, on behalf of the City of Ottawa, undertook a projected ridership modelling exercise to forecast both 2023 and 2031 travel demand on the Trillium Line service. The ridership forecasts are provided below, and a copy of the AECOM ridership forecast is included in Appendix C.

The study found that the average total boardings and alightings on the Trillium Line are forecasted to be approximately 5,564 during the AM peak hour in 2023. This represents an approximately 20% increase to current 2018 ridership levels.

| Stations | Northbound | | Southbound | | Total | | Total |
|---------------|------------|------------|------------|------------|-----------------|------------------|-------|
| | Boardings | Alightings | Boardings | Alightings | Boardings | Alightings | |
| Bowesville | 812 | 0 | 0 | 13 | 812 | 13 | 825 |
| Leitrim | 236 | 0 | 0 | 35 | 236 | 35 | 271 |
| South Keys | 148 | 46 | 13 | 51 | 161 | 97 | 258 |
| Greenboro | 363 | 36 | 4 | 17 | 367 | 53 | 420 |
| Walkley | 37 | 9 | 3 | 15 | 40 | 24 | 64 |
| Confederation | 49 | 39 | 6 | 83 | 54 | 121 | 176 |
| Carleton | 52 | 1,140 | 25 | 821 | 78 | 1,961 | 2,039 |
| Carling | 33 | 194 | 77 | 15 | 110 | 209 | 319 |
| Gladstone | 2 | 78 | 93 | 0 | 95 | 78 | 172 |
| Bayview | 0 | 190 | 830 | 0 | 830 | 190 | 1,020 |
| TOTAL | | | | | | | |
| | Eastbound | | Westbound | | Total Boardings | Total Alightings | Total |
| | 1,731 | 1,731 | 1,051 | 1,051 | 2,782 | 2,782 | 5,564 |

Figure 37 - Boardings and Alightings at Trillium Line Stations (2023 AM Peak)

⁵ OC Transpo Reports and Stats: http://www.octranspo.com/about-octranspo/reports_and_stats. Retrieved on April 18, 2018.

⁶ Passenger volumes provided by OC Transpo Systems and Planning on May 11, 2018.

Furthermore, the study also found that the total boardings and alightings on the Trillium Line are forecasted to increase to approximately 6,496 during the AM peak hour in 2031. This represents an approximately 40% increase to current 2018 ridership levels.

| Stations | Northbound | | Southbound | | Total | | Total |
|---------------|------------|------------|------------|------------|-----------------|------------------|-------|
| | Boardings | Alightings | Boardings | Alightings | Boardings | Alightings | |
| Bowesville | 944 | 0 | 0 | 19 | 944 | 19 | 963 |
| Leitrim | 400 | 0 | 0 | 33 | 400 | 33 | 433 |
| South Keys | 142 | 59 | 17 | 54 | 159 | 113 | 272 |
| Greenboro | 343 | 40 | 5 | 16 | 348 | 56 | 404 |
| Walkley | 36 | 14 | 2 | 17 | 38 | 32 | 70 |
| Confederation | 49 | 60 | 6 | 85 | 54 | 144 | 199 |
| Carleton | 57 | 1,281 | 21 | 975 | 78 | 2,256 | 2,333 |
| Carling | 52 | 201 | 113 | 24 | 165 | 224 | 389 |
| Gladstone | 2 | 79 | 94 | 0 | 96 | 79 | 175 |
| Bayview | 0 | 291 | 966 | 0 | 966 | 291 | 1,257 |
| TOTAL | | | | | | | |
| | Eastbound | | Westbound | | Total Boardings | Total Alightings | Total |
| | 2,024 | 2,025 | 1,223 | 1,223 | 3,248 | 3,248 | 6,496 |

Figure 38 - Boardings and Alightings at Trillium Line Stations (2031 AM Peak)

Safety

The Trillium Line Project is being designed and constructed to maximize public safety. As subsequent sections will detail, and in addition to safety features expected along the alignment including perimeter fencing, security fencing and lighting, the extended Trillium Line alignment will benefit from numerous grade separations that cross public road and rail crossing in an effort to increase safety and transit efficiency.

As a result, the City of Ottawa will see significant benefits from the Stage 2 Project and specifically the Trillium Line Project, and will enable the City to work towards the transit

modal share goals identified in the 2013 TMP.

7.3 Project Partners

The benefits of the Stage 2 LRT Project, including the Trillium Line Project, highlighted above have resulted in the City of Ottawa collaborating with numerous interested and benefitted parties and stakeholders. The following section seeks to summarize these partnerships, as to demonstrate the wide support of the Stage 2 LRT Project, and specifically the Trillium Line Project:

Federal and Provincial Governments

The Federal and Ontario Provincial governments have demonstrated their support and commitment to the Trillium Line Project, by entering into a 1/3 funding agreement with the City, as follows:

- On June 16, 2017, the federal government pledged to contribute up to approximately \$200 million for the Trillium Line extension project. The funding commitment letter is provided in Appendix C;
- On June 3, 2016, the Province of Ontario committed to invest more \$200 million for the Trillium Line extension project, and 50 per cent of the cost associated with extending the O-Train system to the Ottawa Airport. The funding commitment letter is provided in Appendix C;
- On May 3, 2018, the Province of Ontario committed to invest an additional \$50 million for the Limebank Extension. The funding commitment letter is provided in Appendix C; and,
- The remainder of the LRT costs, approximately \$200 million, will be covered by the City of Ottawa.

As part of the Project governance, the City will regularly meet with the Federal and Provincial funding partners to provide project and budgetary updates throughout the course of construction.

Additional Project Partners

The Stage 2 Project has also created strong supportive partnerships with numerous partners to execute a variety of Agreements, Memorandums of Understanding (MOUs), and interface and funding agreements to ensure the successful delivery of the Project.

These key project partnerships include:

- VIA Rail has partnered with the City to share the cost of the grade separation at the Ellwood interlocking/diamond. VIA Rail has provided a letter of support, which is provided in Appendix C;
- The National Capital Commission (NCC) has demonstrated their support of the Stage 2 Project by providing lands throughout the alignment. The NCC has provided a letter of support, which is provided in Appendix C;
- The National Research Council (NRC) will benefit directly from the upgrades that will be made to the track in the lead up-to and the NRC spur. The NRC has provided a letter of support, which is provided in Appendix C;
- Ottawa MacDonald-Cartier International Airport (Authority), a major supporter of the Stage II project, will benefit directly from the Airport Link as a new connection option for airport passengers into and out of Ottawa. The OMCIAA has provided a letter of support, which is provided in Appendix C;
- South Keys Shopping Centre will benefit from the new South Keys Station, which will provide a new convenient access option to shoppers; and,
- Trinity Development, Ottawa Community Housing, and Urbandale will be developing the lands adjacent to various Trillium Line stations and their residents will benefit directly from their close and convenient access and proximity to the system.

The City of Ottawa has also undertaken significant outreach to inform the general public and impacted communities of the project and benefits of the Trillium Line Project, which will be described in detail in Section D. Over the course of these consultations, key supporters of the Trillium Line Project have been identified and summarized below:

- Riverside South Community Association, which represents the community of Riverside South adjacent to the Bowesville and Limebank stations provided a letter

of support in Appendix C;

- Manotick Community Association, which represents the community of Manotick in Ottawa South provided a letter of support in Appendix C; and,
- Osgoode Community Association, which represents the community of Osgoode in Ottawa South provided a letter of support in Appendix C.

Finally, a wider network of Stage 2 Project “champions” were identified during the early planning stages of the project in 2015. The champions are made up of major Ottawa employers, cultural centres, educational institutions, hospitals, business improvement areas and others, and are provided on the Stage 2 website (<http://www.stage2lrt.ca/champions/>).

In summary, the Stage 2 LRT Project, including the Trillium Line Project Bowesville Subdivision and Airport Link will provide significant benefits not only to the communities adjacent to the alignment, but also the city of Ottawa as a whole and major Project supporters and partners. The Stage 2 Project will have a profoundly transformative effect on the development of the city and will contribute to the wider economic and growth objectives of the Ottawa region.

The following sections will discuss the Bowesville Extension and Airport Link operations and construction.

8.0 Construction Activities

The section below describes in detail the proposed construction activities of the Bowesville Subdivision and the Airport Link.

8.1 Overview

As noted in Section 1.2, the information set out in the section below is based on the PSOS requirements set out in the PA, which will inform the construction methodologies undertaken by the successful consortium through the procurement process (“Project Co”). The procurement method permits Project Co. some flexibility within the parameters set out by the PSOS; however, once the successful proponent is chosen, Project Co. will provide specific details related to:

- Construction methodologies;
- Safety and security;
- Environmental awareness;
- On-site staging and laydown zones;
- Construction materials to be incorporated into the work;
- Temporary facilities;
- Site access and egress;
- Temporary controls (which would include shoring, dewatering facilities, berms and site drainage); and,
- Means and methods to construct the new systems as identified in the PA.

As noted in the previous section, the new systems and infrastructure as identified in this application will include the following:

- Approximately 6km of guideway and track from the current end-of-track just north of Leitrim Road to Limebank Station on the Bowesville Subdivision;
- Approximately 4km of guideway and track on the Airport Link to the OMCIA (Airport Link);
- Passing sidings at Uplands Station (Airport Link);
- Three Stations along the Bowesville Subdivision:
 - Leitrim Station;
 - Bowesville Station; and,
 - Limebank Station.

- Two Stations on the Airport Link:
 - Airport Station; and,
 - Uplands Station.
- New rail, road and pedestrian facilities and structures;
- New Signaling and Train Control System;
- New communications systems and infrastructure;
- Perimeter fencing and landscaping; and,
- Drainage infrastructures, including ditches, storm sewers, berms and culverts in support of track, sidings and stations.

Project Co. is responsible to provide to the City prior to the start of construction (pre-construction/design phase) the following construction related plans and procedures that identify specific measures to control the work as identified in the PSOS set out in the PA. In addition, the plans and procedures will provide specific mitigation responsibilities to be established, in case of unexpected and or changed site conditions:

- Construction Phasing Plans identifying the sequence of work, and Detailed Contract Schedules and Look-ahead Schedules;
- Site Specific Staging, Mobilization and Laydown Plans identifying laydown zones for bulk construction materials, track materials, ballast stockpiling zones, containment zones, field office and staging locations, including parking areas as required;
- Traffic Management Control Plans and Truck Route plans identifying traffic impacts and mitigations, and truck routes within the City's Official Truck route requirements;
- Temporary Works Plans identifying dewatering plans, temporary shoring and monitoring plans;
- Construction Waste Management Plan, Contaminated Materials Plan, and Excavated and Imported Materials Management Plan (EIMMP); and,
- Archaeology Risk Management Plan, including a protocol for dealing with archaeological resources or human remains discovered;
- Noise and Vibration Control Plan, as noted in the previous section;
- Communications and Stakeholder Engagement Plan, and Crisis Communication Plan in consultation with the City to ensure the successful communication of the project to stakeholders;
- Dust Control Plan identifying how Project Co. plans to to limit the generation and dispersion of, and mitigate potential effects of, air-borne particulate matter associated with the works;

- Erosion and Sediment Control Plan to document the degree of erosion and sedimentation that would occur under normally anticipated weather conditions during the life of the project, and to develop and describe mitigation strategies to control foreseen areas determined to be predisposed to the problem;
- Environmental Protection Plan and Sustainability Plan to identify preventative measures to ensure that no contamination, waste or other substances, which may be detrimental to terrestrial/aquatic life or water quality, will enter a watercourse or natural terrestrial habitat as either a direct or indirect result of construction; and,
- Site Security and Safety Plans.

The PSOS requirements are written to place constraints on Project Co., in an effort to guide the development of the plans and procedures outline above. For the purposes of this application, the following sections will outline the perceived approach that Project Co. will take to construct the Bowesville Subdivision and the Airport Link within the parameters set out by the PSOS.

8.2 Construction Phasing

With procurement completed by the City in Q1 2019, construction is anticipated to begin in Q2 or Q3 2019. Design and pre-construction tasks should commence Q2 2019 by Project Co.

There are defined segment/zone deliverables in the PSOS that Project Co. must complete within the PA timelines. Since the PSOS currently identifies specific timelines for the Bowesville Subdivision and Airport Link, as such, it is anticipated construction phasing will be based as follows:

| Segment | Start | End | Constraint |
|---|---------|---|---|
| Trillium Line: Bowesville Subdivision (Greenboro to Leitrim station) | Q2 2019 | Q2 2022 (Revenue Service Availability) | Trillium Line operations between Bayview and Greenboro stations will remain in service. |
| Trillium Line: Bayview to Greenboro stations | Q1 2020 | Q2 2022 (Revenue Service Availability) | Trillium Line operations shut down period. |

| Segment | Start | End | Constraint |
|---------------------|-----------|---|--|
| Airport Link | Q2/3 2019 | Q4 2020 Full link, with Airport Station, to be completed by Q2 2022 (Revenue Service Availability) | All works must be complete prior to November 30, 2020 to allow uninhibited access to the OMCIAA for construction of the Airport Station Concourse. |

As noted above, Project Co. will be required to submit a detailed phasing plan during the pre-construction phase. The phasing plan will provide sequential construction operations in order to ensure that right-of-way (ROW) work is controlled throughout the Airport Link and Trillium railroad line construction period.

Based on a preliminary schedule, the City expects the following sequence of work to occur along the Airport Link and Bowesville Subdivision:

- A. Mobilization within the right-of-way and available lands as identified in the PSOS, including site office and construction field office set-up, construction crew facility establishment, and others;
- B. Preliminary Works to mark-out, survey, undertake environmental controls and clearing and grubbing, define access and egress routes, and set up of staging and hoarding locations;
- C. Infrastructure and foundation work commences at multiple sites concurrently. Additionally, horizontal operations will commence including utilities, track and roadway drainage systems, cut and fill works, rail systems related underground operations, foundation support systems (H piles and concrete caissons), and others;

- D. Foundation operation to begin at bridges, abutments and guideway (including viaduct piers);
- E. Station Works to commence in conjunction with general infrastructure work;
- F. Bridge superstructure erections;
- G. Track works, including grading, sub ballast works, ballast, ties and rail installation, dressing, and systems support structures installation;
- H. Station superstructures and architectural activities; and,
- I. Testing and commissioning activities.

The City anticipates that several construction activities within and along the right-of-way will actively be advancing concurrently rather than just sequentially. As a result, the City will require a detailed sequence work plan from Project Co. at the initial start of the project following financial close.

8.3 Preliminary Works

As previously notes, preliminary works are anticipated to be undertaken early in the construction phasing by Project Co. The City expects the following preliminary works to be performed:

- Mark-out tasks, associated with utility call-outs, utility relocations where required, and utility abandonments where identified;
- Rail corridor survey tasks;
- Establishment and installation of environmental controls as identified in the PSOS, including temporary site drainage structures;
- Clearing and grubbing within the rail corridor and staging areas;
- Preparing access and egress equipment and haul routes;
- Install temporary fencing and visual signage; and,
- Establish maintenance of traffic devices at roadways impacted by proposed construction operations.

The works as presented above are general preliminary operations and further detail of specifics will be defined by Project Co. following contract award and financial close.

8.4 Facilities for Construction

The staging and mobilization plan to be provided by Project Co. will describe the facilities that will be provided for construction crews. The flexibility of the PSOS permits Project Co. to make a determination of location, but must be limited to the property parcels and restrictions identified for each in the table above. The City expects that Project Co. will, at a minimum, establish staging and laydown/hoarding zones at each of the three (3) stations on the Bowesville Subdivision, two (2) sites along the Airport Link stations.

Due the type of building materials and equipment needed for station construction, Project Co. will require laydown areas near the erection/building limits of work. Further, the City expects equipment storage, laydown and stockpiling of construction materials, specifically track related material (rail, ties, securing hardware, sub ballast and ballast) along the secured/proposed rail corridor.

It should be noted that the bridge construction over the Airport Parkway, Upland Drive, and Mosquito Creek, and the grade separation structures bridgework at Limebank, Bowesville, and Leitrim Roads may also necessitate laydown and staging areas at these locations. Bridge foundations will be supported by either piles and or caissons, therefore the installation equipment will be mobilized and remain on site until foundation work is complete. The work anticipated within these areas will be limited to the lands provided in the table above.

On Site Storage

Based on the construction tasks presented in the PSOS the City expects laydown stockpile materials to include:

- Clean structural fill;
- Sub ballast and ballast (initial layer of ballast as a minimum);
- Concrete ties hardware;
- Rail along rail corridor (after welding);
- Temporary roadway materials including mud matt rock;

- Riprap rock (temporary drainage structures);
- Maintenance of Traffic devices;
- H Piles (generally at proposed bridge sites);
- Caisson pipes (Airport Link corridor);
- Sand and other related aggregate;
- Environmental control devices and materials;
- Reinforcing and structural steel (bridges and stations);
- Concrete forms and excavation shoring (trench boxes, sheeting, whaler); and,
- Reusable excavated materials.

Site Offices

As per the requirements of the PSOS, Project Co. will provide site offices at Leitrim and Uplands stations for the City's use. Additionally, the City anticipates that Project Co. will establish their own site offices within the same locations. The PSOS does require parking spaces to be provided in support of the site offices. As a result, the City anticipates that Project Co. contractor vehicles may be stored within the parcels identified for construction mobilization in the table above.

It should be noted that site offices must be compliant with City of Ottawa Accessibility Design Standards (COADS), have entrance/exit signs and lighting and meet the requirements of the Ontario Codes and Guides for Buildings (Fire, Sewage, Plumbing and Electrical) and the Ministry of Labour and Workplace Safety and Insurance Board (WSIB).

8.5 Construction Staging

To support the construction of the Bowesville Subdivisions and Airport Link, the following property parcels have been acquired temporarily by the City of Ottawa for construction staging and mobilization.

The PSOS set out in the PA provides flexibility to Project Co. in determining which of the parcels below will be utilized for staging and mobilization. The parcels identified below represent the approved lands available to Project Co. to deliver the construction, and entering lands outside of those identified is not permitted as part of the PA.

The specific Property Request Plans (PRPs) and an indexed map of property parcels are provided in Appendix B for cross-reference and reflects the list provided below.

| Property Request Plan | Parcel | Commencement date | Duration (months) | Restrictions & Requirements |
|------------------------------|---------------|--------------------------|--------------------------|--|
| 18692-PRP_015f | 2 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions |
| 18692-PRP_015f | 3 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions |
| 18692-PRP_015f | 4 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions NMI limited to a multi-use pathway |
| 18692-PRP_015f | 5 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions NMI limited to a multi-use pathway |
| 18692-PRP_015f | 6 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions |
| 18692-PRP_015f | 7 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions |
| 18692-PRP_015f | 8 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions Pedestrian and vehicular access over parcel to be |

| Property Request Plan | Parcel | Commencement date | Duration (months) | Restrictions & Requirements |
|-----------------------|--------|-------------------|-------------------|--|
| | | | | maintained between parking area and terminal building at all times for the benefit of users, employees, and invitees of the Airport |
| 18692-PRP_015f | 9 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions |
| 18692-PRP_015f | 10 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions |
| 18692-PRP_015f | 11 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions |
| 18692-PRP_015f | 12 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions Pedestrian and vehicular access over parcel to be maintained between parking area and terminal building at all times for the benefit of users, employees, and invitees of the Airport |
| 18692-PRP_015f | 13 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions Stratified Parcel commencing at the underside of the elevated road providing access to the departures area. |

| Property Request Plan | Parcel | Commencement date | Duration (months) | Restrictions & Requirements |
|-----------------------|--------|--|-------------------|---|
| | | | | Pedestrian and vehicular access over parcel to be maintained between parking area and terminal building at all times for the benefit of users, employees, and invitees of the Airport |
| 18692-PRP_015f | 25 | Financial Close | 48 | Report Card Parcel, OMCI AA Terms & Conditions |
| 18692-PRP_015f | 26 | On two months' notice in accordance with OMCI A Terms & Conditions | 6 | Report Card Parcel, OMCI AA Terms & Conditions Refer to OMCI AA Terms & Conditions for additional conditions relating to the use of and access to area adjacent to airport loading dock |
| 18692-PRP_015f | 27 | Financial Close | 48 | Report Card Parcel, OMCI AA Terms & Conditions This parcel contains a portion of the High Velocity Canon berm. Refer to Schedule 15 – 2 for additional conditions of use and reinstatement requirements. |
| 18692-PRP_015f | 30 | Financial Close | 48 | This parcel contains a portion of the High Velocity Canon berm. Refer to |

| Property Request Plan | Parcel | Commencement date | Duration (months) | Restrictions & Requirements |
|------------------------------|---------------|--------------------------|--------------------------|--|
| | | | | Schedule 15 – 2 for additional conditions of use and reinstatement requirements. Report Card Parcel, OMCIAA Terms & Conditions |
| 18692-PRP_015f | 31 | Financial Close | 48 | This parcel contains a portion of the High Velocity Canon berm. Refer to Schedule 15 – 2 for additional conditions of use and reinstatement requirements. Report Card Parcel, OMCIAA Terms & Conditions |
| 18692-PRP_015f | 32 | Financial Close | 48 | This parcel contains a portion of the High Velocity Canon berm. Refer to Schedule 15 – 2 for additional conditions of use and reinstatement requirements. Report Card Parcel, OMCIAA Terms & Conditions |
| 18692-PRP_015f | 33 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions |
| 18692-PRP_015f | 35 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions |

| Property Request Plan | Parcel | Commencement date | Duration (months) | Restrictions & Requirements |
|------------------------------|---------------|--|--------------------------|--|
| 18692-PRP_015f | 36 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions Area incorporating the E1 Parking Building excluded from Temporary Construction area. |
| 18692-PRP_015f | 41 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions |
| 18692-PRP_016e | 2 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions |
| 18692-PRP_016e | 3 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions A vehicular access route to be maintained through Parcel at all times for use of visitors to the EY Centre, for contractors and employees of the EY Centre and for deliveries to the EY Centre. |
| 18692-PRP_016e | 4 | Financial Close | 48 | Report Card Parcel, OMCIAA Terms & Conditions |
| 18692-PRP_016e | 5 | On two months' notice subject to OMCIAA Terms and Conditions | 12 | Report Card Parcel, OMCIAA Terms & Conditions To be used for construction of bus facilities only. A vehicular access route to be maintained through Parcel at all times for use of |

| Property Request Plan | Parcel | Commencement date | Duration (months) | Restrictions & Requirements |
|-----------------------|--------|--|---------------------|--|
| | | | | visitors to the EY Centre, for contractors and employees of the EY Centre and for deliveries to the EY Centre. |
| 18692-PRP_33e | 4 | November 1, 2019 | 4 | Report Card Parcel, OMCIAA Terms & Conditions NMI is limited to a watermain. |
| 18692-PRP_36b | 2 | On two months' notice subject to OMCIAA Terms and Conditions | 12 | Report Card Parcel, OMCIAA Terms & Conditions NMI limited to a multi-use pathway. |
| 18692-PRP_36b | 3 | April 1, 2019 | 22 | Report Card Parcel, OMCIAA Terms & Conditions. |
| 18692-PRP_93a | 1 | On two months' notice subject to OMCIAA Terms and Conditions | 12 | Report Card Parcel, OMCIAA Terms & Conditions NMI limited to a multi-use pathway. |
| 18692-PRP_93a | 2 | April 1, 2019 | 22 | Report Card Parcel, OMCIAA Terms & Conditions |
| 18692-PRP_93a | 3 | April 1, 2019 | 22 | Report Card Parcel, OMCIAA Terms & Conditions |
| 18692-PRP_023c | 2 | Financial Close | Construction Period | ROW (where Parcel 2 crosses Airport Parkway) Report Card Parcel |

| Property Request Plan | Parcel | Commencement date | Duration (months) | Restrictions & Requirements |
|------------------------------|---------------|--------------------------|--------------------------|---|
| 18692-PRP_023c | 3 | Financial Close | Construction Period | ROW (where Parcel 3 crosses Airport Parkway) |
| 18692-PRP_023c | 4 | Financial Close | Construction Period | |
| 18692-PRP_023c | 5 | Financial Close | Construction Period | |
| 18692-PRP_023c | 6 | Financial Close | Construction Period | ROW (where Parcel 6 crosses Airport Parkway) |
| 18692-PRP_089b | 2 | Financial Close | Construction Period | |
| 18692-PRP_089b | 3 | Financial Close | Construction Period | |
| 18692-PRP_099 | 5 | Financial Close | Construction Period | |
| 18692-PRP_099 | 6 | Financial Close | Construction Period | Telecom License Parcel, Utility Coordination |
| 18692-PRP_020a | 3 | - | - | ROW |
| 18692-PRP_020a | 4 | - | - | ROW |
| 18692-PRP_020a | 5 | - | - | ROW |
| 18692-PRP_32b | 2 | - | Construction Period | ROW Refer to Schedule 15 – Output Specifications with respect to traffic management during Construction Period. Maintain vehicular and pedestrian access at all times to private homes and |

| Property Request Plan | Parcel | Commencement date | Duration (months) | Restrictions & Requirements |
|-----------------------|--------|-------------------|---------------------|--|
| | | | | businesses having frontage on this Parcel. |
| 18692-PRP_32b | 3 | - | Construction Period | ROW Refer to Schedule 15 – Output Specifications with respect to traffic management during Construction Period. Maintain access at all times to private homes and business having frontage on this Parcel |
| 18692-PRP_099 | 3 | Financial Close | Construction Period | ROW |
| 18692-PRP_099 | 4 | Financial Close | Construction Period | ROW |
| 18692-PRP_94b | 1 | November 1, 2019 | 36 | |
| 18692-PRP_94b | 2 | November 1, 2019 | 36 | |
| 18692-PRP_94b | 3 | November 1, 2019 | 36 | Stratified Parcel for NSI to be determined – rail over road or road over rail to be determined with further detail design |
| 18692-PRP_94b | 4 | November 1, 2019 | 36 | |
| 18692-PRP_94b | 9 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP_94b | 10 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP_94b | 11 | November 1, 2019 | 36 | Report Card Parcel |

| Property Request Plan | Parcel | Commencement date | Duration (months) | Restrictions & Requirements |
|------------------------------|---------------|--------------------------|--------------------------|---|
| 18692-PRP-96c | 1 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP-96c | 3 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP-96c | 4 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP-96c | 5 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP-96c | 6 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP-96c | 7 | November 1, 2019 | 36 | Stratified Parcel for NSI to be determined – rail over road or road over rail to be determined with further detail design |
| 18692-PRP-96c | 8 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP-112 | 1 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP-96a | 6 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP_97c | 1 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP_97c | 3 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP_97c | 4 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP_97c | 5 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP_97c | 6 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP_97c | 7 | November 1, 2019 | 36 | Report Card Parcel |

| Property Request Plan | Parcel | Commencement date | Duration (months) | Restrictions & Requirements |
|------------------------------|---------------|--------------------------|--------------------------|---|
| 18692-PRP_110 | 1 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP_110 | 2 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP_98a | 1 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP_98a | 3 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP_98a | 4 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP_98a | 5 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP_111 | 1 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP_111 | 2 | November 1, 2019 | 36 | Report Card Parcel |
| 18692-PRP_114 | 1 | November 1, 2019 | 36 | Stratified Parcel for NSI to be determined – rail over road or road over rail to be determined with further detail design |
| 18692-PRP_116 | 1 | November 1, 2019 | 36 | Stratified Parcel for NSI to be determined – rail over road or road over rail to be determined with further detail design |
| 18692-PRP_116 | 2 | November 1, 2019 | 36 | Stratified Parcel for NSI to be determined – rail over road or road over rail to be determined with further detail design |
| 18692-PRP_116 | 3 | November 1, 2019 | 36 | Stratified Parcel for NSI to be determined – rail over |

| Property Request Plan | Parcel | Commencement date | Duration (months) | Restrictions & Requirements |
|------------------------------|---------------|-----------------------------------|--------------------------|---|
| | | | | road or road over rail to be determined with further detail design |
| 18692-PRP_116 | 4 | November 1, 2019 | 36 | Stratified Parcel for NSI to be determined – rail over road or road over rail to be determined with further detail design |
| 18692-PRP_117 | 2 | November 1, 2019 | 36 | Stratified Parcel for NSI to be determined – rail over road or road over rail to be determined with further detail design |
| 18692-PRP_117 | 4 | November 1, 2019 | 36 | Stratified Parcel for NSI to be determined – rail over road or road over rail to be determined with further detail design |
| 18692-PRP_34b | 4 | 30 days following Financial Close | 34 | NCC Terms & Conditions, Report Card Parcel NMI limited to a multiuse pathway. |
| 18692-PRP_64a | 3 | 30 days following Financial Close | 19 | NCC Terms & Conditions, Report Card Parcel Both TC and NMI limited to construction of a multi-use pathway only. |

Project Co. will be responsible for restoring and rehabilitating any disturbed areas within or extending beyond the limits of works. The restored/rehabilitated work may include track work and redressing, landscaping, which could include plantings and sod, slop

and ditch restoration, and others. Furthermore, Project Co. will be required to protect all City and third party Facilities adjacent to their works, as detailed in PSOS documents.

8.6 Off-site Disposal Facilities

Project Co. will be responsible for providing off-site disposal locations for materials removed as required for construction. As required by the PSOS, materials and refuse removed will be the property of Project Co., and will be disposed of in accordance with the Applicable Laws as identified in the PA and PSOS. The materials expected to be removed from site will include:

- Excavated materials not suitable for reuse;
- Clearing and grubbing materials;
- Abandoned structures, utilities, concrete, roadway and pavement materials;
- Selective demolition materials;
- Railroad material not suitable for salvage; and,
- Contaminated material.

Project Co. is encouraged to recycle to the fullest extent all materials designated for offsite disposal. Reuse and recycled materials will be reflected in Project Co. Sustainability Plan. The plan provides a measurable report card that will be presented in an Annual Report, as identified in the PA.

Project Co. is required to prepare an Excavated and Imported Materials Management Plan (EIMMP) to the City as a component to their Environmental Management Plan. The plan will describe how specific materials will be handled, disposed of off-site and stocked pile on site for use. Materials to be disposed of off-site will be separated and stockpiled separately from recyclable materials and reuse materials. The plan will also detail their procedures for removal of hazardous and contaminated materials.

8.7 Temporary Works

The City anticipates that temporary controls will be constructed during the early works stage of the project and continue through construction completion, specifically related to environmental control devices installed along the rail corridor. Such temporary devices will include silt curtains, screens and fencing, check dams and temporary drainage ditches, temporary detention basins, drainage berms, and dewatering basins and

diversions. Project Co., will be required to design, install, maintain and remove the devices when no longer required. The devices and plans of erection and locations are a requirement of the PA and all Applicable Laws and standards.

In addition, due the types of construction expected along the new rail corridor, other notable temporary work items are also expected and specific plans and procedures to support the temporary work items are required of the Project Co. Such temporary works include:

- Access and egress roadways, staging and laydown areas, crew and construction oversight facilities; and,
- Temporary Shoring and falsework, excavation shoring, slope and embankment protection, elevated structure falsework and rigging falsework.

Project Co. will incorporate temporary works into their means and methods of construction. As a result, the City expects details accompanied by Site Specific Work Plans (SSWP) to be provided as required in the PSOS. All temporary works will be removed and areas/lands restored as required in the PSOS requirements.

8.8 Security Facilities

As per the requirements of the PSOS, Project Co. will be responsible for ensuring that the boundaries of each of the construction sites be fenced, and the boundaries of each mobilization site be hoarded. Project Co. will provide hoarding/fencing plans to the City that will identify the location, height, materials and expected timing of installation and removal during the design phase and prior to the start of construction.

For lands owned by the NCC, hoarding plans will be created in accordance with the NCC hoarding specifications. Project Co. is also responsible for maintaining the construction hoarding and fencing in a good condition of repair at all times.

As per the requirements of the PSOS, the City will provide a camera system to be installed by Project Co at each construction Site, in addition to other locations if selected by the City. The intended use is for site observation and security purposes during non-working periods.

In addition Project Co., is required to maintain and Site Specific Safety Plan (SSSP), the aforementioned will include an emergency contact matrix and security specific procedures to be implemented throughout the contract duration.

8.9 Construction Methodology

All construction methodology, including the means and methods, monitoring requirements, manner of procedures, and systematic means of constructing each component of the project, will be provided by Project Co. during the design phase.

Considering the multiple types of construction operations anticipated within the rail corridor, the City does expect several different types of construction equipment in operation along the construction limits of work. As noted previously, due the horizontal distance of the project and the likelihood of concurrent works at multiple sites, the City expects several of each type of major equipment vehicles to be onsite and in use concurrently, including:

- Cranes, both long boom and hydraulic;
- Wood chippers and grinders;
- Pile hammers including crane leads with swing stops;
- Excavators;
- Hoe-Rams;
- Back-hoes;
- Dump trucks;
- Concrete Pump trucks;
- Bulldozers;
- Truck Mounted and Hydraulic Augers;
- Rollers;
- Track ballast dumps;
- Track installation equipment;
- Ballast regulators;
- Peddie bones;
- Tampers, both roadbed and hi-rail mounted; and,
- Track sweepers.

8.10 Excavation Methods

The City anticipates that Project Co. will utilize conventional or established excavation methods for the construction of the Bowesville Subdivision and Airport Link, including open cut, either sloped and/or protection sheeting installed, either driven or pile and lagging, when depths warrants.

For utility relocation and trench work, trench boxes will be utilized and should be identified on to be submitted SSWP. The City does not anticipate tunneling and/or blasting operations, but Project Co., may request further consideration if unanticipated conditions are exposed.

8.11 Truck Routes

Project Co. will be required to comply with the City of Ottawa's Traffic and Parking bylaws concerning truck routes, including truck haul routes. Project Co. will be responsible for identifying to the City in advance all roadways being utilized for haul routes. In addition, they are responsible for ensuring haul routes are kept clean and free of construction debris and dust.

The PSOS requires that Project Co. submit a Plan for cleaning truck haul routes in addition to providing a Traffic and Transit Management Plan (TTMP) that describes in detail the proposed vehicular traffic and hauling routes along with specific truck route details that will be needed during the construction phase. The City expects that as construction progresses that changes to the Plan will be necessary and for that reason have required that the TTMP be updated regularly to address the conditions encountered. The City of Ottawa Official Urban and Rural Truck Route maps are provided in Appendix C.

8.12 Traffic and Mobility during Construction

As per the requirements of the PA and PSOS, Project Co. will be required to manage the traffic and transit impacts construction throughout all phases of the Project by developing a Traffic and Transit Management Plan (TTMP). The TTMP will guide Project Co. throughout the Project and will ensure that the impact on the mobility of all modes of traffic is minimized.

The City has created a robust set of requirements for Project Co.'s TTMP. A copy of the PSOS Schedule 15-2, Part 7 pertaining to Traffic and Transit Management is provided in Appendix C.

8.13 Audible Warning Devices

Due the type of construction operations expected in support of the Airport Link and Trillium Line extension, several different types of safety related warning devices will be

utilized during the construction phases.

The warning devices will be determined by Project Co., but may include:

- Horn type;
- Visual signage;
- Lit beacons;
- Strobe lights;
- Signal type devices; and,
- Back-up alarms.

As the Airport Link and Station are within the OMCIA flight paths, it is expected that beacon type lighting devices on crane booms will be required. All vehicles including hi-rail will be required to have back up type warning devices as well as strobe lighting if in areas where noise levels must be reduced. When Project Co., is working along the rail corridor, specific devices will be as identified within the SSWP.

In summary, Project Co. will provide detailed plans that will detail the means and methods for the construction of the Bowesville Subdivision and Airport Link during the construction design phase following contract award. However, as provided, the PA PSOS requirements provide set parameters that permit the City to anticipate the methods that will be used to construct the Trillium Line Project. Although flexibility is provided to Project Co., the Project constructors must abide by PA requirements and City by-laws and standards in executing the construction.



Section D: Consultation Activities

9.0 Introduction

The following section describes in detail the consultation activities that have been undertaken by the City to inform the public about the Trillium Line Project, within the overall context of the Stage 2 LRT Project. Consultation was an integral component of the Trillium Line 2016 Environmental Assessment (EA), Stage 2 LRT project planning following the 2016 Provincial EA process, 2018 Provincial EA Addendum, and Federal Environmental Effects Evaluation (EEE) processes.

For the purposes of this application, as noted in section 2.0 Railway Line Description, only the new track construction section of the proposed Bowesville Subdivision and the Airport Link requires approval under Section 98 of *Act*.

Neither the Bowesville Subdivision nor the Airport Link alignments have direct residential impacts, rather, as demonstrated in the property tables and maps provided for sections 8.7 and 9.3, the lands impacted by the alignment are found within the jurisdictions of the Federal Government and OMCIAA, City of Ottawa, National Capital Commission (NCC), and the Riverside South Development Corporation. Any lands that had direct residential impact have been acquired by the City of Ottawa either on a permanent or temporary basis from the lands owner through executed agreements.

This section will outline the consultation activities that have taken place in the context of the Trillium Line Project discussions since 2014. The consultations activities have occurred throughout the entire Trillium Line Project alignment, as stakeholder impacts are generally not limited to the space or area in which they occur.

The consultation activities outlined below with internal and external project stakeholders and the public have been undertaken with several objectives in mind: to inform, garner interest and excitement, and obtain input and feedback into the study and fulfill provincial and federal EA requirements. In keeping with City of Ottawa best practices and stakeholder outreach guidelines, these consultations activities and outreach tools to support outreach were designed to be inclusive, timely, and clear. This consistent outreach has promoted effective two-way communication, provided multiple opportunities for stakeholders to identify issues and concerns related to the project, and fostered a better awareness and the development of solutions to key issues related to the O-Train Trillium Line South extension project.

9.1 Stakeholder Identification

At the outset of the O-Train Trillium Line South Extension EA, and the ongoing outreach associated with the Stage 2 LRT planning, EA Addendum and EEE processes, the City communicated and undertook outreach activities to targeted key stakeholder groups, including:

- Political stakeholders (Federal, Provincial, and Municipal);
- Agency (Federal and Provincial Departments);
- Indigenous communities;
- Members of the public, businesses and community associations adjacent to the alignment; and,
- General public, including transit riders and non-transit riders.

To support these consultation activities, the project used a variety of activities and platforms to engage with stakeholders, including design and technical workshops, public open houses, committees, meetings, presentations, mail-outs, email newsletters, and web based interactions on the project website (www.stage2lrt.ca).

Additionally, as part of the Stage 1 and Stage 2 LRT Projects, the City of Ottawa has had an ongoing consultation with local Indigenous groups and communities. These groups were contacted as part of the requirements of both Environmental Assessments (EAs) and the Federal Environmental Effects Evaluation (EEE) undertaken in accordance with Section 67 of the *Canadian Environmental Assessment Act (2012)*. A Section 67 evaluation was deemed appropriate as the Canadian Environmental Assessment Agency confirmed the project did not meet the definition of a designated Project.

A more detailed overview of consultation with local Indigenous groups, and all stakeholders, is provided below.

10.0 Consultation Approach

10.1 Consultation Phases

The consultation process for the O-Train Trillium Line South extension, as part of the Stage 2 LRT project, followed four phases:

- Consultation for the 2016 Environmental Assessment (EA);
- Consultation following the Environmental Assessment (EA);
- Consultation related to the 2018 Provincial EA Addendum; and,
- Consultation related to the 2018 Environment Effects Evaluation (EEE) Report.

10.2 Consultation Plans

EA Processes

Consultation was an integral component of all phases of the project consultations. A Consultation Strategy was defined and implemented as part of the EA:

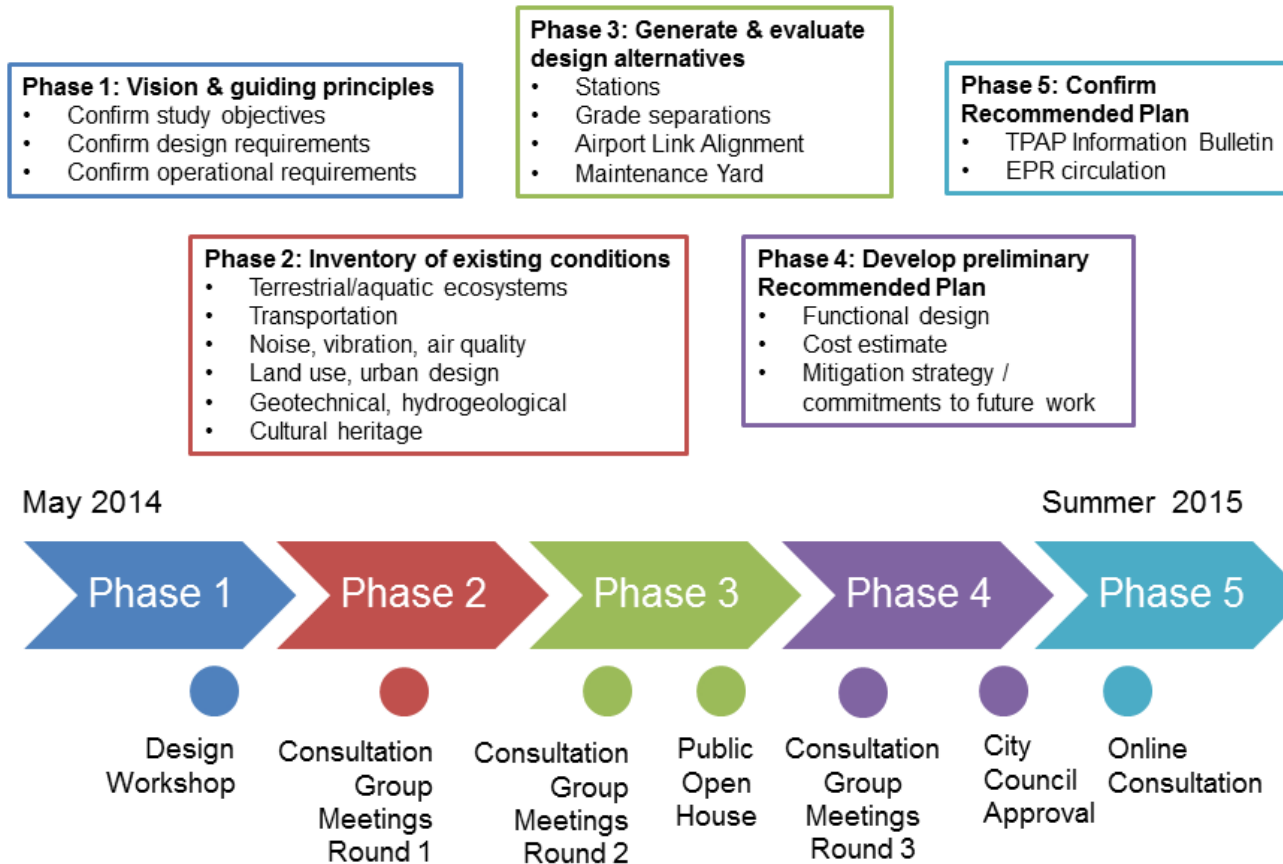


Figure 39 - 2016 Trillium Line EA Consultation Strategy

The Consultation Strategy for 2016 EA included the following activities, which will be discussed in detail below:

- Transit Design and Operations Workshop;
- Three rounds of Agency, Business, and Public Consultation Group meetings;
- Public Open Houses (POHs);
- Consultation with Aboriginal communities;
- Review by federal and provincial government agencies;
- A project website; and
- An online information bulletin.

Indigenous Consultations Plan

The Aboriginal Community Engagement Strategy (ACES) was developed to outline an approach to ongoing and effective consultation with Indigenous communities to address the obligations of the crown and the proponent for the project (Appendix D). The ACES has been developed based on two key obligations:

- The Crowns Duty to Consult; and
- Proponent commitments made within the Environmental Assessment processes.

The Ontario Ministry of Indigenous Relations and Reconciliation (formerly Ontario Ministry of Aboriginal Affairs) was contacted through the TPAP process to confirm the local Indigenous groups to be contacted. The NCC also contacted local Indigenous groups through the federal EEE.

Post-EA Consultations Plan

Concurrent to, and following the completion of the EA process in March 2016, the City of Ottawa undertook stakeholder outreach and consultation activities to support the project planning processes in the lead up to and throughout the project procurement phase.

The consultation strategy for the post-EA period focused on supporting the project activities, building an understanding of the project among key stakeholders, continuing to validate the approach and identify any ongoing and/or emerging issues, and continuing to generate interest and excitement for the project.

Specific Stage 2 communication and outreach objectives include:

- Build understanding of Stage 2 among Federal and Provincial partners (political and bureaucratic levels), including benefits and business case;
- Generate excitement among the general public and interested stakeholders;
- Build a community of champions to support and sustain momentum for funding request;
- Ensure consistent Stage 2 messaging in the Environmental Assessment processes
- Create a visible and recognizable Stage 2 brand;
- Ensure that the investments are bundled in the minds of Councillors, funding partners the general public;
- Support 100 Day Working Group activities, including the development of consistent messaging and materials; and,
- Ensure Stage 2 messaging and branding is consistent with OC Transpo and O-Train Construction marketing, branding and outreach efforts.

The Stage 2 Project Communications Plan is included in Appendix D.

11.0 Trillium Line 2016 Environmental Assessment (EA)

A comprehensive consultation program took place as part of the Trillium Line South Extension EA study in 2014-2016, as part of the Transit Project Assessment Process (TRAP). It consisted of a rail planning and design workshop; three rounds of Agency, Business, and Public Consultation Group meetings; and two Public Open Houses delivered in conjunction with the second round of Consultation Group (CG) meetings. The consultation events are summarized below:

11.1 Transit Design and Operations Workshop

To introduce the key opportunities and constraints driving the study and to initiate communication and knowledge sharing, a half-day Transit Design and Operations Workshop was held on June 26, 2014.

Workshop participants included planning and technical staff from the City of Ottawa, OC Transpo, Capital Rail, and the NCC, as well as members of the Study Team including the Ottawa Macdonald-Cartier International Airport Authority (OMCIAA). The workshop included an introduction to the study and discussions of the following major topics:

- The needs and opportunities to be addressed by Trillium Line extensions to Bowesville;
- Station and the Airport;
- Existing and potential Trillium Line operations;
- Ridership considerations along the main line and Airport branch;
- Comparable rail service to other airports worldwide; and,
- Priorities and potential evaluation criteria for use in the current study.

The workshop provided participants with a common understanding of the objectives and framework of the study and identified several design and service considerations for the Trillium Line extension. All attendees were also invited to sit on the Agency Consultation Group for the study.

Minutes of the workshop are provided in Appendix D.

11.2 Consultation Group (CG) Meetings

Consultation Group (CG) meetings were held at key decision-making milestones. Each included a presentation by the Study Team, with the opportunity throughout for participants to ask questions and raise issues for discussion. As a co-proponent in the study, the Ottawa Macdonald-Cartier International Airport Authority (OMCIAA) participated in the meetings of all three Consultation Groups.

11.2.1 Agency Consultation Group (ACG)

The Agency Consultation Group (ACG) included representatives from:

- City of Ottawa:
- Economic Development,
- Emergency and Protective Services;
- Infrastructure Services,
- Planning and Growth Management,
- Public Works,
- Rail Implementation,
- Real Estate, and
- Transit Services,
- Ministry of Natural Resources;
- National Capital Commission;
- National Research Council;
- Public Works and Government Services Canada (PWGSC);
- Rideau Valley Conservation Authority;
- South Nation Conservation;
- Transport Action Canada; and
- Transport Canada.

Three (3) ACG meetings took place, coinciding with key milestones in the study process. The meeting dates were as follows:

| Date | Meeting Attendees | Purpose/Overview |
|-------------------------|---|--|
| July 10, 2014 | O Train Extension EA - Agency Consultation Group Meeting #1 | Study introduction and discussion of operational and design considerations. |
| December 9, 2014 | O Train Extension EA - Agency Consultation Group Meeting #2 | Presentation of evaluation criteria, station and grade separation alternatives, and preliminary recommendations. |
| May 5, 2015 | Trillium Line Extension EA - Agency Consultation Group Meeting #3 | Overview of Recommended Plan, costs, environmental impacts and proposed mitigation measures. |

Input from the ACG was reviewed after each meeting and, where appropriate, adjustments were made to the study findings.

Concerns Raised and Responses

Key discussion points from the ACG are summarized below:

| ACG #1 | |
|--|---|
| Issue | How it was addressed |
| Will the study contemplate changes to existing Trillium Line stations, particularly at Confederation, where PWGSC has long-term intensification plans? | With participation from PWGSC, Confederation Station was included in the study and approval is being sought for a station location that is compatible with higher-density land uses. This station will not be implemented in advance of redevelopment at Confederation Heights. |

| | |
|--|--|
| <p>What will happen to the existing heavy rail connection to NRC after the line is converted to LRT?</p> | <p>The ultimate Recommended Plan includes an additional reserved freight track between Walkley Yard and the NRC facility.</p> |
| <p>There is currently an inconsistency in the vicinity of Bowesville Station between the City's OP, which designates the area as General Rural, and the Airport's plans for urban development.</p> | <p>Comment noted.</p> |
| <p>The study must consider how well the Trillium Line extension connects to people, rather than cars, particularly at Bowesville Road. It must consider sustainability and Smart Growth.</p> | <p>The Bowesville Park and Ride is consistent with the City's practice of providing Park and Ride facilities at the end of major transit lines, and located in a way that does not preclude repurposing into transit-oriented development in the future. The Park and Ride will also be served by cycling facilities and local transit routes.</p> |

| ACG #2 | |
|---|---|
| Issue | How it was addressed |
| <p>The evaluation of station location alternatives must include the full ridership catchment area. This is particularly important for residents and businesses at the edges of the catchment areas.</p> | <p>A 600-metre catchment area was assumed for all stations and included in the evaluation of alternatives.</p> |
| <p>Options for minimizing the wetland footprint of the Lester Road grade separation could include a multiple-span bridge.</p> | <p>The study team evaluated various structural options, with consideration for the study's affordability envelope. The Recommended Plan includes a structure that minimizes the footprint in a cost-effective manner.</p> |

| | |
|---|---|
| How will the proposed Airport Link alignments interact with an additional passing track? | Passing track locations have been designed to accommodate the required service frequency on the main line and Airport Link. |
| The footprints of the Airport Parkway and Uplands Drive grade separations appear to overlap, potentially requiring elevation of the whole line in this area | The Recommended Plan includes a two-storey Uplands Station to accommodate an elevated line and maximize passenger comfort. |
| A model with service flexibility is preferred, notably to accommodate additional frequency for special events at the EY Centre. | The Recommended Plan does not preclude a mixed / flexible service model. |

| ACG #3 | |
|--|--|
| Issue | How it was addressed |
| Even though it is anticipated that the Lester Road cross-section under the Trillium Line will be undivided, the EA should incorporate a grade separation design that includes a pier. It will be easy to remove the pier and pursue a design with a smaller footprint, but adding a pier later may require additional EA approval. | The EA includes a design incorporating a pier as an optional form of the Lester Road crossing. |
| The EA should address any impacts to servicing, such as the water and natural gas mains under Leitrim Road. | The EPR notes that impacts to servicing are anticipated and includes a commitment to identify specific impacts and develop mitigation measures in future design phases of the project. |
| The EA should address stormwater management (SWM) for the Bowesville Station site. | Potential SWM measures have been identified in the EPR and will be refined in future design phases of the project. |

Minutes of the meetings are provided in Appendix D.

11.2.2 Business Consultation Group (BCG)

As significant portions of the study area along the full length of the corridor are identified for future intensification and development, direct input and advice from local developers and business representatives was essential. Business Consultation Group (BCG) members were invited to comment on the alternatives and recommendations, and to advise on local issues and concerns.

Representatives of the following organizations participated in the BCG:

- Claridge Homes;
- Days Inn Ottawa;
- EY Centre;
- KS on the Keys Restaurant;
- Manor Park Developments;
- Moncion’s Independent Grocer;
- Ottawa Chamber of Commerce;
- Ottawa-Gatineau Hotel Association;
- Regional Group;
- The Richcraft Group of Companies;
- Tamarack; and
- Tartan Land Corporation.

The BCG consultations provided an overview of design alternatives considered for various stations, grade separations and other design elements along the line, and identified potential impacts of each alternative and a preliminary preferred alternative for each location.

Three (3) BCG meetings took place at key study milestones, on the following dates:

| Date | Meeting Attendees | Purpose/Overview |
|---------------|---|--|
| July 10, 2014 | O-Train Extension EA - Business Consultation Group Meeting #1 | Study introduction and discussion of operational and design considerations |

| | | |
|--------------------------|---|---|
| December 10, 2014 | O-Train Extension EA - Business Consultation Group Meeting #2 | Presentation of evaluation criteria, station and grade separation alternatives, and preliminary recommendations |
| May 7, 2015 | O-Train Extension EA - Business Consultation Group Meeting #3 | Overview of Recommended Plan, costs, environmental impacts and proposed mitigation measures |

Key discussion points from the BCG meetings are summarized below:

| BCG #1 | |
|---|---|
| Issue | How it was addressed |
| The analysis of grade separation options at the Airport should account for impacts on land use, as these could create an opportunity cost for landowners. | The study team consulted adjacent landowners and worked with the Airport Parkway and Lester Road widening EA to develop a plan that minimized impacts on existing and planned land uses. |
| Park and Ride facilities at Bowesville will be important for residents of fast-growing southern communities. 1,200 spaces does not seem like enough. | The Park and Ride at Bowesville was sized based on City growth and travel demand projections. Additional Park and Ride space is available at Leitrim Station. |
| The link between Transitway and Trillium Line stations at Walkley Road is an important design consideration at that location. | The Study Team considered station connectivity as part of the evaluation. The Recommended Plan at this location balances connectivity with other factors. It is noted that South Keys and Greenboro are more likely locations for transfers between the Transitway and the Trillium Line. |

| BCG #2 | |
|--|---|
| Issue | How it was addressed |
| The requirement for costly grade-separated crossings appears to be a policy issue, rather than a safety issue. The City should pursue discussions with Transport Canada on this issue to ensure taxpayers are well served. | The Recommended Plan includes functional designs and cost estimates for grade-separated crossings, however the City has flexibility to continue discussions with Transport Canada in future design phases. Construction of level crossings may require significant changes to the Trillium Line operating rules |
| The City's affordability envelope should not be used to rule out otherwise good options. | Comment noted. The Study Team considers the ultimate Recommended Plan to be the best overall plan, with interim implementation scenarios that provide the best opportunity to achieve the City's objectives within the affordability envelope |
| Overall economic benefit should be considered as part of the evaluation criteria. | A business case was prepared as part of the study that evaluates the potential benefit and forms part of the City's Stage 2 funding application. |
| A gauntlet track should be considered to provide freight access through South Keys, eliminating the need for an additional rail bed and track. | Comment noted. Overhead power supply clearance must be considered for this option and can be examined at a later stage of the project. |
| There does not appear to be a need to extend the Trillium Line beyond Leitrim Road. | Analysis performed for the City's 2013 TMP update found that operational savings could be realized by eliminating buses and replacing them with rail in this area. Additionally, as Riverside South was designed as a transit-dependent community, it is |

| | |
|--|---|
| | important to provide rail service in close proximity. The Recommended Plan is consistent with these objectives |
| It is important that the ultimate operating model be easy for users to understand and provide appropriate service to the Airport and to Riverside South. The mixed model may be confusing, and branch models may require too many transfers. | Comment noted. The current study is not seeking approval for an operating model. However, the Recommended Plan has been designed not to preclude any of the operating models identified |

| BCG #3 | |
|--|--|
| Issue | How it was addressed |
| There is some concern regarding noise levels associated with stopping and starting trains for residents of new buildings near Gladstone Station. | A noise assessment undertaken as part of this study did not project noise levels in this area to exceed City of Ottawa guidelines. |
| Pathways currently being constructed beside the hotel development adjacent to Walkley Station could be integrated with future access to the station. However, other landowners between this property and Bank Street must be involved if pathways are to connect this station to Bank Street. | A City of Ottawa Stage 2 LRT pathway study is being undertaken concurrently with this EA to identify the most appropriate pedestrian and pathway connections. Further consultation will be undertaken at future stages of project implementation |
| A turntable is too costly a solution for Walkley Yard. The study team should consider rebuilding the previous wye on the site, or acquiring a short section of track linking Walkley Yard to Greenboro Station that would allow trains to turn by entering the yard from either north or south. | The available land does not provide a sufficient turning radius for a wye. Following direction from the City, the Recommended Plan does not include a turntable and trains will continue to turn on CN tracks. |

| | |
|--|--|
| <p>Construction-related service shutdowns should be planned more tightly than they were during the recent Trillium Line expansion, which left the public very dissatisfied. There are numerous examples of other, similar projects completed with minimal or no shutdowns.</p> | <p>The implementation schedule and associated service shutdowns will be determined at later design and tendering stages of this project.</p> |
|--|--|

Minutes of the meetings are provided in Appendix D.

11.2.3 Public Consultation Group (PCG)

A Public Consultation Group (PCG) was formed to provide an opportunity for community associations, advisory committees, City Councillors or representatives, and special interest groups to advise on local issues and provide input at key milestones.

A broad base of stakeholders took part in the PCG, including:

- Accessibility Advisory Committee;
- Dalhousie Community Association;
- Emerald Woods Community Association;
- Environmental Stewardship Advisory Committee;
- Fairlea Community Association;
- Findlay Creek Community Association;
- Hintonburg Community Association;
- Hunt Club Community Organization;
- Hunt Club Park Community Association;
- Kempark Homeowners' Association;
- Manotick Village and Community Association;
- Riverside Park Community Association;
- Riverside South Community Association;
- South Keys Landing Homeowners Association;
- Ward 10 (Gloucester – Southgate) representatives-at-large;
- Ward 15 (Kitchissippi) representatives-at-large;
- Ward 16 (River) representatives-at-large; and

- Ward 22 (Gloucester – South Nepean) representatives-at-large.

Three (3) Public Consultation Group meetings took place, coinciding with key milestones in the study process. The meeting dates were as follows:

| Date | Meeting Attendees | Purpose/Overview |
|--------------------------|---|---|
| July 10, 2014 | O-Train Extension EA - Public Consultation Group Meeting #1 | Study introduction and discussion of operational and design considerations |
| December 10, 2014 | O-Train Extension EA - Public Consultation Group Meeting #2 | Presentation of evaluation criteria, station and grade separation alternatives, and preliminary recommendations |
| May 7, 2015 | O-Train Extension EA - Public Consultation Group Meeting #3 | Overview of Recommended Plan, costs, environmental impacts and proposed mitigation measures |

Concerns Raised and Responses

Key discussion points from the PCG meetings are summarized below:

| PCG #1 | |
|---|--|
| Issue | How it was addressed |
| The Trillium Line must account for future Airport runway expansion plans. | The Recommended Plan was developed in close consultation with the OMCIAA and accommodated Airport expansion plans based on the information currently available. In particular, the grade separation configuration at Leitrim Road was chosen with consideration for these plans. |

| | |
|---|---|
| <p>Will the extensions to Bowesville and/or the Airport be extended to serve employment sites across the Rideau River?</p> | <p>The extension to Bowesville is planned to be compatible with the City's long-term plan to extend rail transit into Riverside South and BRT into Barrhaven. An extension of the rail link passing under the Airport is cost-prohibitive for construction and security reasons.</p> |
| <p>How long will passengers sit on the tracks at passing sidings?</p> | <p>The Recommended Plan is intended to allow trains to keep moving slowly along passing sidings between stations, rather than coming to a stop.</p> |
| <p>How will the Trillium Line extension affect the Osgoode Link pathway?</p> | <p>The Recommended Plan relocates the pathway to run parallel to the tracks south of Leitrim Road. Consistent with City policy, it also connects the pathway to additional MUPs extending west along the rail corridor to Bowesville Station and north to South Keys.</p> |
| <p>The Walkley Transitway and Trillium Line stations should be better integrated than they were shown in the 2012 Bank Street CDP.</p> | <p>The Recommended Plan locates the Trillium Line station adjacent to Walkley Road, reducing the transfer distance to local bus routes and the Transitway</p> |
| <p>The study must allow adequate time for review and comment from an accessibility perspective, and include key accessible design considerations.</p> | <p>Accessibility was included in the evaluation criteria and as a functional design consideration at stations. In accordance with City policy, public washrooms will be included at the Bowesville terminal station. Accessibility criteria will continue to be incorporated, and review opportunities provided, in later design phases of the project.</p> |
| <p>Each Trillium Line station should be surrounded by a community. At Bowesville, where the station abuts the Greenbelt, this may be difficult.</p> | <p>Comment noted. Bowesville Station is intended to serve nearby Riverside South and potential future Airport development, but further consultation with the City, NCC</p> |

| | |
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| | and Airport could improve the integration of the Greenbelt with the station as a community amenity. |
|--|---|

| PCG #2 | |
|--|---|
| Issue | How it was addressed |
| At Gladstone Station, the plan must consider integration with nearby development and appropriate pedestrian and cycling connections. | The Gladstone Station District CDP has identified a preferred location for the station, and the City will have the opportunity to more closely examine integration with surrounding developments closer to construction. The Recommended Plan identifies crossing locations that promote passenger safety and the continuity of the existing MUP network. |
| To encourage use, it is important that new Trillium Line stations be as appealing as Confederation Line and Transitway stations, which have permanent buildings. | The functional design of the Recommended Plan includes enclosed stations with partially covered platforms, to balance appeal, affordability and operating requirements. |
| At Confederation Station, the study should seek approval for an area that also includes the existing train tunnel and service road underneath Heron Road, to keep a variety of options open for station location and pathway access. | Comment noted |
| The recommended station location at Walkley Road facilitates potential future northbound road access from Walkley to the Airport Parkway, and may reduce noise impacts on north-side homes with no direct access to Walkley. | Comment noted |
| Locating the South Keys Trillium Line station platform north of the existing pedestrian underpass could allow | As the Recommended Plan uses a centre train platform for operational reasons, this |

| | |
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| <p>transfers to the Transitway directly across the platform.</p> | <p>consideration was not a factor in the choice of platform location</p> |
| <p>Wildlife crossings should be incorporated into the grade separations at Lester and Leitrim roads, to promote motorist and wildlife safety.</p> | <p>In consultation with the NCC, the Recommended Plan incorporates a dedicated ecological crossing underneath the corridor south of Leitrim Station. No additional crossings are proposed at Leitrim Road, although some green verge underneath the grade separation may provide a crossing point. Crossings of Lester Road are within the scope of the concurrent Airport Parkway and Lester Road Widening EA Study.</p> |
| <p>Grade-separated road crossings are a good thing, as they seem to be safer than level crossings.</p> | <p>Comment noted. Current As Trillium Line operating requirements and Transport Canada regulations require grade-separated crossings, they have been included in the Recommended Plan.</p> |
| <p>An elevated Airport Terminal Station is likely to be expensive, and the piles required may make the ground-level area seem claustrophobic. The Study Team should consider placing the station on the far side of the parking garage, with an improved walkway through the garage.</p> | <p>Comment noted. The Recommended Plan locates the station closer to the terminal to increase the prominence of transit. Additionally, the location of the Transportation Safety Board facility on the far side of the garage is a constraint on the placement of a rail line on that side.</p> |
| <p>The Study Team should consider low-floor shuttle bus service from a station at Lester Road to the Airport.</p> | <p>Comment noted. The Recommended Plan does not incorporate a Lester Road station due to wetland and footprint considerations. The mixed operating model may be confusing for passengers. Additionally, service to the Airport should not come at the expense of service to residents of Riverside South.</p> |

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| | <p>The current study is not seeking approval for an operating model, but the Recommended Plan has been designed not to preclude any of the proposed operating models. The ultimate operating model will be determined in later design stages of this project.</p> |
|--|---|

| PCG #3 | |
|--|---|
| Issue | How it was addressed |
| <p>Transit should not be planned in isolation, but should include businesses and services and be integrated with the community.</p> | <p>The Recommended Plan is designed to promote integration of transit with the community. The City will discuss integration opportunities and funding arrangements with adjacent developers closer to implementation</p> |
| <p>The full build-out of South Keys Station may affect the space available for the existing MUP over the Sawmill Creek culvert west of the tracks. Pedestrian safety must be a consideration, and a culvert extension should be avoided if possible.</p> | <p>The Recommended Plan has been designed to leave sufficient space for the existing MUP. The design will be refined at later stages of implementation as required to maintain safe pedestrian and cycling facilities</p> |
| <p>The study team should consider providing passenger pick-up and drop-off facilities at all stations.</p> | <p>As OC Transpo did not identify pick-up and drop-off zones as requirements for Gladstone, Confederation and Walkley stations, the Recommended Plan has not included them. Such facilities will be provided at Leitrim, and Bowesville and Uplands stations and maintained at South Keys Station</p> |

| | |
|--|---|
| <p>The study team should consider placing the Hunt Club MUP crossing in its ultimate location from the start, and designing it to be wider than 3m.</p> | <p>The interim site was selected as it avoids modifications to Transitway ramps in the near term. The width of the structure was increased to 3.6 m to provide a wider pathway without constraining future bridge construction and relocation.</p> |
| <p>The bridge abutments at Lester Road should be built to maximum size in the near term, to avoid costly service disruptions during conversion to electric LRT.</p> | <p>The Recommended Plan includes the full build-out of this crossing. The City will develop performance standards for construction and potential conversion at later stages of implementation, which will seek to minimize overall cost and disruption.</p> |
| <p>The MUP through the Bowesville Park and Ride should be routed to cross the fewest traffic lanes possible.</p> | <p>The route of the MUP was revised to follow the edge of the Park and Ride lot.</p> |
| <p>The study team should consider closing Leitrim Road, eliminating the need for a costly grade separation, and providing offsetting traffic capacity by extending Earl Armstrong Road as a four-lane facility to Albion Road.</p> | <p>Traffic analysis of this scenario undertaken by the City found that it does not provide sufficient capacity, and Leitrim Road must remain open. The Recommended Plan therefore includes a grade separation at Leitrim Road.</p> |

Minutes of the meetings are provided in Appendix D.

11.3 Public Open Houses (POHs)

Public Open Houses (POHs) were held on January 13 and 15, 2015. The content and format of the two POHs were identical. The purpose of the POHs was to give members of the general public an opportunity to learn about the study process and progress, as well as to provide comments and feedback on the preliminary preferred plan.

The dates and locations of these POHs were as follows:

| Date | Meeting Attendees | Purpose/Overview |
|------------------|-------------------|-----------------------------|
| January 13, 2015 | Public Meeting | Presentation of preliminary |

| | | Recommended Plan for public review and comment |
|-------------------------|----------------|--|
| January 15, 2015 | Public Meeting | Presentation of preliminary Recommended Plan for public review and comment |

Notification of the POHs was provided via English and French notices placed in le Droit and local EMC newspapers before the events.

The POHs were organized as bilingual, drop-in style sessions with a set of graphic display boards and numerous City and Study Team staff present to answer questions one-on-one. The POH boards are provided in Appendix D.

Each POH also included a formal PowerPoint presentation and brief question and answer session. The presentation is provided in Appendix D.

Comment forms were provided at the POHs to collect comments and information to assist with the identification and refinement of the Recommended Plan. Seventy comments were received from the public, either on comment forms or via e-mail to the City project manager. A full list of the comments provided by attendees and responses are provided in Appendix D.

11.4 Indigenous Consultation

As part of the Stage 1 and Stage 2 LRT Projects, the City of Ottawa has an ongoing consultation with local Indigenous groups including:

- Algonquins of Ontario Consultation Office;
- Algonquins of Pikwàkanagàn;
- Kitigan Zibi Anishinabeg First Nation;
- Quebec Métis; and
- Métis Nation of Ontario.

Indigenous consultation was specifically undertaken within the context of the federal and provincial environmental assessments with the local Indigenous groups.

The project area is located within Algonquin Traditional Territory. The Algonquins of Ontario (AOO) and the Governments of Canada and Ontario are working together to resolve the historic Algonquin Aboriginal rights claim through a negotiated settlement. If successful the agreement reached will take the form of a modern-day Treaty with Aboriginal and Treaty Rights protected under Section 35 of the *Constitution Act, 1982*.

A review of traditional land uses and resources within the study area took place as part of the North-South Light Rail Transit EA (project cancelled in 2006). This review supplemented the City's existing knowledge of the study area with information from other sources and identified any potential effects on specific resources. This review concluded that Aboriginal persons were not currently using any of the lands and resources within the study boundaries for traditional purposes such as hunting, fishing or harvesting. The study area's urban and suburban character likely presents a limit to many of these traditional uses.

The Study Team contacted the Ministry of the Environment and Climate Change (MOECC) and the Ontario Ministry of Aboriginal Affairs (MAA) for assistance in identifying First Nations and Métis organizations that should be consulted as part of the study.

In a letter dated October 6, 2014, the MAA identified two organizations with a potential interest in the project: the Algonquin Consultation Office and the Ottawa Region Métis Council (with a copy of all correspondence to the Métis Nation of Ontario Head Office).

The study team contacted these organizations at all key project milestones. These organizations were contacted via email on January 5, 2015, during the pre-consultation phase of the study, to provide an overview of the study and an invitation to the Public Open Houses. Each was also contacted on June 23, 2015 to provide information regarding the upcoming Committee and Council meetings where the Stage 2 project was to be considered.

Each was also contacted on June 23, 2015 to provide information regarding the upcoming Committee and Council meetings where the Stage 2 project was to be

considered.

On September 24, 2015, each organization was sent a copy of the TPAP Notice of Commencement and the draft EPR as part of the formal TPAP agency circulation. Follow-up emails were sent on December 7, 2015. Follow-up emails were sent to both organizations on December 7, 2015 as part of a general study reminder to all agencies, and to an additional email address for the ORMC on December 18. A response from the Ottawa Region Métis Council (ORMC) on December 20, 2015 did not indicate an interest in the Trillium Line study. Through follow-up phone and email correspondence in December 2015 and January 2016, the AOO provided updated information concerning the ongoing settlement negotiations. The AOO also requested a presentation regarding the project during the TPAP public review period and expressed an interest in continued involvement.

All anticipated effects on traditional uses or cultural heritage resources will be identified and described as part of the EA process and subsequent detail design, and will be communicated to any potentially affected Aboriginal peoples and communities as they are identified.

Concerns Raised

Key areas of interest identified by First Nations included:

- Algonquins of Ontario
 - Thorough archaeological work. Study team committed to providing all archaeological reports done as part of the study.
 - Interest in exploring opportunities to incorporate linkages to their history such as interpretive pathways, identifying trees and importance of access to water.
 - All anticipated effects on traditional uses or cultural heritage resources will be identified and described as part of the EA process and subsequent detail design, and will be communicated to any potentially affected Aboriginal peoples and communities as they are identified.

- Kitigan Zibi Anishinabeg
 - Proximity to natural waterways.
 - Potential impacts on the health of waterways during the course of the light rail transit extensions.

- Belief that water is sacred and essential for all life.
- Quebec Métis
 - No further interest in the study(ies).

Commitments and Responses

As a result of the consultation undertaken, the following commitments were made in regards to the Environmental Assessments and resultant projects:

- Ongoing consultation with the Algonquins of Ontario regarding the scope and results of Archaeological Assessments.
- All anticipated effects on traditional uses or cultural heritage resources will be identified and described as part of the EA process and subsequent detail design, and will be communicated to any potentially affected Aboriginal peoples and communities as they are identified.
- Public Art Program: There is going to be a general call for artists for the art projects. To reach out to indigenous communities as part of this program, Stage 2 will coordinate an Indigenous Liaison Officer art consultant to hold workshops aimed at helping to build the capacity of local artists and artisans. This would benefit them in submissions for the calls for art, as well as beyond the Stage 2 LRT call for art. Also, Stage 2 has agreed to build upon the previous work done in the Stage 1 LRT work, by including the wayfinding symbol developed in Stage 1 for Pimisi station, and including it in all of the stations for the 3 extensions of the rail system. This Liaison Officer will also undertake general outreach.
- Identifying additional economic opportunities for continued capacity building and engagement in consultation with the Aboriginal Communities and businesses/workers.

11.5 Review by federal and provincial government agencies

A draft of the EA was circulated to federal and provincial agencies on September 24, 2015 as part of the Review Stage (Stage 3).

These agencies included:

- Transport Canada;

- Ottawa Macdonald-Cartier International Airport Authority;
- National Capital Commission; the Ministry of the Environment;
- Ministry of Natural Resources and Forestry;
- Ministry of Tourism, Culture, and Sport;
- South Nation Conservation, and,
- Rideau Valley Conservation Authority.

The EA was revised in response to comments received from these review agencies before its publication for public review. A full list of the comments received during the review period is provided in Appendix D.

11.6 Project Website

A web page (ottawa.ca/trilliumline) was maintained throughout the project on the City of Ottawa's website, and remains active to provide public access to information about the progress of the study.

The information available included:

- An overview of the study, including the main line extension and the Airport branch;
- POH notification and display materials;
- A summary of public comments received;
- TPAP notices and information bulletin; and
- Contact information for the City of Ottawa's Project Manager.

All website materials were provided in both official languages, using plain language wherever possible.

The City's Public Information and Media Relations (PIMR) department also assisted in promoting consultation activities where appropriate through their media and news channels online.

11.7 Online information bulletin

Following publication of the TPAP Notice of Commencement on September 24, 2015, an information bulletin was posted on the project website and the website address was

circulated to the study's mailing list, including First Nations representatives and the owners of all properties within 30 metres of the transit corridor.

This bulletin included the following information to satisfy TPAP consultation requirements:

- Information about why the proposed design was selected, including the assessment and evaluation of the impacts of the transit project and any other methods considered, the criteria for the assessment and evaluation of those impacts, and any studies completed with respect to those impacts; and
- Information about the proposed measures for mitigating any potential negative impacts of the transit project and how the proponent will monitor the effectiveness of the proposed mitigation measures.

A copy of this information bulletin is included in Appendix D.

11.8 Notice of Completion of Transit Project Assessment Process

A Notice of Completion of the TRAP was posted to the project website (www.stage2lrt.ca) on January 21, 2016. The Notice offered the public the opportunity to object to the project, by submitting a written letter to Minister of the Environment within 30 days, or February 21, 2016. A copy of the Notice is included in Appendix D.

All submissions must have clearly indicated that an objection was being submitted and described any negative impacts to matters of provincial importance (natural/cultural environment) or Indigenous rights. A full list of the comments received during the 30-day review is provided in Appendix D.

12.0 Consultation Summary: Post-Environmental Assessment (EA)

As noted previously, concurrent to, and following the completion of the 2016 EA process, the City continued stakeholder outreach and consultation activities to support the Stage 2 LRT project planning processes in the lead up to and through the project procurement phase. The sections below outline the activities that have taken place since mid-2015 to present related to the Trillium Line Project.

12.1 Project Website

An overall project website – www.stage2lrt.ca – was introduced in Q2 2015.

This project website continues to be the primary means utilized to promote and publish all documents related to the consultation process, including information bulletins, invitations to public open houses, City Council reports, and power points and boards presented to the public.

The Project website received the following visits from June 23, 2015 to April 11, 2018:

- Page views: 511,397
- Unique Page views: 391,029
- Users: 165,388
- Sessions: 216,895

The City's Public Information and Media Relations (PIMR) department also assisted in promoting consultation activities where appropriate through their media and news channels online on the City of Ottawa website (www.ottawa.ca).

12.2 Outreach Activities (General Public and Agency)

To support planning activities, and to build momentum for the Stage 2 project, the City of Ottawa undertook the following consultation activities with the public, various government agencies and businesses, which included:

- National Capital Commission;
- City of Ottawa staff from various departments;



- City of Ottawa Councillors;
- OC Transpo;
- Conservation Authorities;
- OMCIAA;
- Ontario Ministry of Natural Resources and Forestry;
- Community associations; and,
- Business owners.

The table below provides a list of all the outreach activities that took place following the completion of the EA process:

| Date | Attendees/Audience | Purpose/Overview |
|---------------------------|---------------------------|--|
| July 27, 2016 | AOC/AMC Meeting | Project overview PowerPoint presentations being given by Rail Implementation Office & Stage 2 office |
| August 17, 2016 | Public Meeting | Stage 2 Connectivity South Public Open House: Jim Durrell Centre |
| August 30, 2016 | Public Meeting | Stage 2 Connectivity South Public Open House: Rideauview Centre |
| August 23, 2016 | Agency Meeting | Species at Risk Workshop |
| September 28, 2016 | Public | Hunt Club Borehole Drilling Public Notice |
| November 29, 2016 | Cycling Advocacy Groups | Stage 2 Connectivity: Cycling Advocacy Working Group-All Day <i>(no formal presentation. Comments included a part of Connectivity Report)</i> |
| November 30, 2016 | Cycling Advocacy Groups | Stage 2 Connectivity: O-Train Planning Cycling Advocacy Working Group |

| Date | Attendees/Audience | Purpose/Overview |
|---------------------------|-----------------------------|--|
| | | <i>(no formal presentation. Comments included a part of Connectivity Report)</i> |
| December 1, 2016 | National Capital Commission | Advisory Committee on Planning, Design and Realty |
| December 15, 2016 | Public Meeting | O-Train Construction and O-Train Planning Project Presentation RE/MAX Info Session |
| April 7, 2017 | AOC/AMC | Project and Procurement Update Presentation |
| September 26, 2017 | Public Meeting | Royal LePage Project PowerPoint Presentation |

All outreach presentations for the events identified above are included in Appendix D.

Over the course of the outreach activities listed above, a number of frequent high-level concerns emerged. A full list of these most frequent comments provided by attendees of outreach events, and mitigations provided by staff are outlined below:

| Issue | How it was addressed |
|--|--|
| Loss of greenspace as a result of project implementation | As part of the environmental assessment (EA) process, the project team identified potential adverse environmental effects, proposed mitigation measures, assessed adverse environmental effects of mitigation efforts, and established criteria to determine the effectiveness of the mitigation measures. When possible, the project team has proposed alternative alignments to reduce impact on greenspace or environmentally sensitive |

| Issue | How it was addressed |
|--|--|
| | <p>lands. In addition, tree inventories will be required as part of the project with replacement planting ratios of minimum of 2:1.</p> <p>The City will also institute a early transplanting program for trees prior to major construction works to relocate trees where possible in heavily disturbed corridors to suitable locations.</p> |
| <p>Impact of construction on local community (dust, detours, noise, and vibration)</p> | <p>As part of the environmental assessment (EA) process, the project team identified potential adverse environmental effects, proposed mitigation measures, assessed adverse environmental effects of mitigation efforts, and established criteria to determine the effectiveness of the mitigation measures.</p> |
| <p>Noise and vibration as a result of revenue service</p> | <p>Stakeholders were debriefed on mitigation measures for both noise and vibration as a result of revenue service. Noise attenuation measures include but are not limited to, berms, noise walls, and landscaping. Vibration mitigation measures include but are not limited to, resilient fasteners and floating slabs. Confirmation was provided that noise and vibration will be performance based on the legislative standards and will be confirmed during commissioning period prior to revenue service.</p> |
| <p>Impact on local wildlife as a result of project construction and implementation</p> | <p>As part of the environmental assessment (EA) process, the project team identified potential adverse environmental effects,</p> |

| Issue | How it was addressed |
|--|---|
| | <p>proposed mitigation measures, assessed adverse environmental effects of mitigation efforts, and established criteria to determine the effectiveness of the mitigation measures for wildlife, including reviews for sensitive and endangered species. An ecopassage for wildlife is being provided to link environmentally sensitive lands to facilitate the migration of wildlife across the alignment.</p> |
| <p>Increased vehicular traffic to LRT stations after project implementation</p> | <p>As part of the environmental assessment (EA) process, an analysis of existing traffic conditions occurred including a review of existing infrastructure, travel demand, and roadway operations. As well, station requirements accommodating all forms of transportation have been defined through the Stage 2 LRT Connectivity Study, which include, but not limited to, having Passenger Pick-Up and Drop-Off (PPUDO) facilities to integrate vehicular traffic with each LRT station. In addition, the City of Ottawa Transportation Master Plan was referenced, which predicts an increase in modal share of transportation because of implementation of the LRT, which will help reduce traffic impacts.</p> |
| <p>Pedestrian and cyclist community connections to and through all stations, and along the LRT alignment</p> | <p>As part of the Stage 2 LRT Project, a connectivity study was conducted with a series of connectivity workshops/consultations to ensure that community connections to and through all stations, and along the LRT alignment, are preserved or enhanced. These</p> |

| Issue | How it was addressed |
|-------|---|
| | <p>consultations were designed to incorporate strong community connections for pedestrians and cyclists through multi-use pathways (MUP) and sidewalks that are fully accessible to each Stage 2 LRT station. The communities adjacent to the stations were studied to identify opportunities to enhance connections, facilitate formal pedestrian and cycling connections to the station, and to the City wide Multi Use Pathway system. The study provided input into the station reference designs and was include within the submissions for the RFP for bidders.</p> |

12.3 Consultation with Indigenous communities

In addition, the City of Ottawa Light Rail Train Stage 2 Office also undertook the following additional consultation activities with the Algonquins of Ontario (AOO) since April 2016:

| Date | Meeting Attendees | Purpose/Overview |
|--------------------------------|---|--|
| <p>April 13th, 2016</p> | <p>Planning and Environmental Working Group</p> | <p>Overview of the 3 extensions of the Stage 2 LRT Trillium Line Extensions and status of the Environmental Assessments</p> |
| <p>July 9th, 2016</p> | <p>Nation Gathering at Mattawa</p> | <p>Stage 1 and 2 LRT Project staff attended the Algonquin Nation Gathering. Staff brought display boards showing the 3 extensions of the Stage</p> |

| Date | Meeting Attendees | Purpose/Overview |
|---------------------------------------|--|---|
| | | <p>2 LRT and answered questions</p> <p>(no formal presentation)</p> |
| September 8th, 2016 | Heritage and Culture Working Group | presented an overview of the 3 extensions of the Stage 2 LRT Trillium Line Extensions and status of the Environmental Assessments |
| June 1, 2017 and July 10, 2017 | Archaeological Outreach | <p>the Stage 2 Office, working with the AOO Office, reached out to area Algonquins for an Archaeological Liaison Officer regarding further investigations along the Stage 2 LRT Confederation and Trillium Line corridors. The AOO send a request to a group trained and identified by their resources to assist. Unfortunately, no uptake came from the requests. (via email correspondence)</p> <p>(no formal presentation)</p> |
| June 14, 2017 | Planning and Environmental Working Group re: Ottawa LRT Projects presentation and update | Representatives from the City of Ottawa, Stage 1, 2 and 3 (future) LRT Projects attended and presented the status and updates to current projects |

| Date | Meeting Attendees | Purpose/Overview |
|---------------------------|-----------------------------|---|
| July 8 2017 | Nation Gathering at Mattawa | Stage 1 and 2 LRT Project staff attended the Algonquin Nation Gathering in Pembroke to continue to build on our relationship and display the updates and answer questions regarding the Stage 1 and 2 LRT projects including display of the Pimisi station and wayfinding symbol <i>(no formal presentation)</i> |
| September 11, 2017 | AOO Staff Meeting | Staff from the Stage 2 LRT Office met with AOO staff to discuss ongoing consultation and involvement and opportunities for continued engagement and capacity building (no formal presentation) |

All outreach presentations for the events identified above are included in Appendix D.

13.0 Consultation Summary: 2018 EA Addendum

Following the approval of the Trillium Line Extension Environmental Assessment in March 2016, and the release of the Trillium Line Request for Proposal (RFP) in July 2017, the City announced Trillium Line alignment improvements in July 2017 and confirmed in report to Council in September 2017, including the following features:

- New southern terminus at Earl Armstrong/Bowesville; and,

- Potential extension to Limebank.

The changes to the Trillium Line alignment required staff to initiate an Environmental Project Report (EPR) Addendum to the approved 2016 Trillium Line EA. The addendum provides a description and reasons for the change in alignment, assesses and evaluates any environmental impacts and offers a description of any proposed mitigation measures.

In support of the Addendum work, consultations were held with the public in 2017:

Public delegations were present at the City of Ottawa February 24, 2017 Finance and Economic Development Committee (FEDCO) meeting at which the Stage 2 Light Rail Transit Implementation – Project Definition and Procurement Plan report was tabled. Further to this, a public information session occurred on March 1, 2017 discussing various Stage 2 topics related to the changes to the EA. The public information session was broadcasted live on Facebook and held in person at Ottawa City Hall and the Hunt Club-Riverside Park Community Centre. The Stage 2 report was approved by FEDCO and subsequently by Council on March 8, 2017.

Bowesville Station and Limebank Extension

A public information session specific to Bowesville Station and the Limebank Extension occurred on October 25, 2017 at St. Jerome School to provide an overview of the updated Trillium Line alignment and potential extension to Limebank Road. Additional input was gathered regarding desired pedestrian and cyclist access to the future Bowesville LRT Station. Major Land Owners in the vicinity of the Limebank Extension were also consulted.

The event was advertised on the project and City of Ottawa websites. The event invitation, presentation, and “*As We Heard It*” Report, including comments provided by attendees and mitigations provided is included in Appendix D.

Future consultations for the integration of LRT and planning in the southern community of Riverside South will take place as part of the Community Design Plan (CDP) process. As part of these consultations, the CDP team will present and request input on land use changes and adjustments in the area, residential densities, as well as road network and connectivity opportunities.

Indigenous Consultation

As part of the 2018 EA Addendum, notification was sent to inform local Indigenous communities about the proposed changes on February 16, 2018. A copy of the correspondence is provided in Appendix D.

Notice of Completion of the Transit Project Assessment Process

The 2018 EA Addendum is ongoing. A Notice of Completion of the TRAP will be posted to the project website (www.stage2lrt.ca) in September 2018. The Notice will provide the public with the opportunity to object to the project, by submitting a written letter to Minister of the Environment within 30 days. A full list of the comments received during the 30-day review can be provided following the submission of this application at the request of the CTA when available.

14.0 Consultation Summary: Federal Environmental Effects Evaluation (EEE) Process

Finally, as per the requirements of the *Canadian Environmental Assessment Act, 2012* (CEAA), the City of Ottawa undertook an Environmental Effects Evaluation (EEE) Process to evaluate and document the anticipated environmental effects of the Trillium Line south extension project and identified mitigations to eliminate or minimize the adverse environmental effects.

A comprehensive EEE report has been prepared, circulated and approved by the following federal agencies:

- National Capital Commission (NCC);
- Public Services and Procurement Canada (PSPC);
- Transport Canada (TC);
- Ottawa MacDonal-Cartier International Airport Authority (OMCIAA);
- Canadian Transportation Agency (CTA);
- Parks Canada;
- VIA Rail (VIA);
- National Research Council (NRC);
- Canada Post; and,



- Agriculture and Agri-Foods Canada (AAFC).

Other commenting agencies included:

- Environment and Climate Change Canada (ECCC); and,
- Infrastructure Canada (IC).

A copy of the final EEE report and full list of the comments provided by agencies and mitigations during the EEE circulation are provided in Appendix D. Final approval of the EEE report is ongoing.

Therefore, as detailed above, the City of Ottawa has endeavored to undertake significant outreach and consultation with impacted stakeholders, agency partners, indigenous communities, and the public in an effort to inform, engage, and build excitement for the Stage Trillium Line Project. Consultation has been undertaken throughout all phases of the project, through the environmental assessments to planning, and will continue through procurement and construction.

Section E: Application Summary

As detailed above, the O-Train Trillium Line Project, including the Bowesville Subdivision and Airport Link, will provide significant transformative benefits to not only the residents adjacent to the new alignment and stations, but also for residents, employers, governmental agencies, and other key stakeholders throughout the entire city of Ottawa and beyond.

In the preceding application sections, the City of Ottawa has contemplated in detail the project alignment, the proposed railway operations and services, construction methodologies, infrastructure improvements and changes that will support the new system, and the consultation activities that have been undertaken to ensure the success of the Trillium Line project.

In contemplating the various sections provided above, the City of Ottawa has identified perceived technical risks and impacts that stakeholders may face from both construction and operations of the system, and detailed the precautions that will be implemented to mitigate these concerns. The wider risk analysis has laid the basis of the technical requirements within the PA, which will guide Project Co. through the successful execution of the Trillium Line Project.

As a result, the City of Ottawa is confident that this application satisfies the requirements of the Canadian Transportation Agency's guidelines for applying for approval to construct a railway line under *Section 98* of the *Canada Transportation Act*.