
APPENDIX F

DRAINAGE AND STORMWATER MANAGEMENT TECHNICAL MEMO

For impact assessment, the proposed stations were reviewed in detail with respect to their potential impacts on existing drainage conditions, with associated stormwater management requirements being identified to mitigate any potential impacts to the drainage system. Much of the alignment of the proposed Trillium Line extension will be located in undeveloped areas. To minimize any impacts on surrounding wetland areas, grassed swales are proposed to address water quality and quantity for stormwater management as part of the treatment train approach. Where the alignment will be located in urban areas, runoff can be directed to existing watercourses or constructed stormwater management facilities via grassed swales. Therefore, stormwater management requirements are divided into the following general categories and are discussed below for each location. Please refer to Table 1 for a summarized version.

- 1) Stations draining to the existing storm sewer system:
 - Gladstone Station: The plan proposes a platform adjacent to a station plaza. The proposed SWM measures will include widening of an existing ditch and quantity control (i.e., rooftop storage) for the station plaza.
 - Confederation Station: The proposed SWM measures will include widening/regrading of an existing ditch, which will outlet to a 600 mm storm sewer.

- 2) Stations draining to existing SWM ponds or other SWM facilities which have already been designed and constructed taking the corridor into account:
 - Walkley Station: The proposed SWM measures will include widening/regrading of an existing ditch, which will outlet to the Sawmill Creek constructed wetland facility.
 - South Keys Station: The Sawmill Creek constructed wetland facility (west of the Trillium Line alignment) is designed to alleviate flooding for the area east of Bank Street. The proposed SWM measure will be directing runoff from the platform area to these wetlands, which will ultimately outlet to Sawmill Creek.
 - Leitrim Station: The proposed SWM measure will be to direct runoff to existing SWM ponds located in the Leitrim development area, which ultimately outlet to Findlay Creek. Measures will include grassed swales to accommodate flow without overtopping.

- 3) Stations draining to existing watercourses:
 - Bowesville Station: The proposed SWM measure will include grassed swales to accommodate flow without overtopping, which will drain to an existing watercourse.

- 4) Grade Separations:
 - Lester Road: The plan proposes a rail overpass carrying the Trillium Line tracks and multi-use pathway over Lester Road, while the freight rail track will cross the road at grade. The resulting embankment area will increase runoff compared with pre-development conditions. To reduce runoff intensity, the embankment shall incorporate pervious materials and a grassed swale system to address water quantity and quality before draining to existing watercourses.
 - Leitrim Road: The plan proposes a road overpass, using a structure supported by embankments. The runoff will be directed to existing stormwater management ponds located in the Leitrim development area and ultimately to Findlay Creek. The proposed

SWM measures will include grassed swales to accommodate flow without overtopping and pervious embankments to reduce post-development impacts.

5) Airport Rail Link Stations:

- EY Centre Station: The plan proposes a two-storey station and platform. This land use change will result in an increase in runoff. The proposed SWM measures will be quantity control for the station (i.e., rooftop storage) to maintain pre-development flow levels. The outflow will be directed to the municipal storm sewer system, which will drain to Rideau River or Sawmill Creek either directly or via existing SWM facilities.
- Airport Terminal Station: The proposed station will be located in sub catchment SC-2b, which drains to an existing on-site pond. The proposed SWM measures will ensure that existing drainage patterns are followed.

6) Parking Lot and Maintenance Yard:

- Walkley Maintenance Yard: The plan proposes to expand an existing maintenance yard facility with the addition of new buildings, storage areas and parking lot areas. A preliminary expansion plan is attached for reference. Runoff from the pervious area in the north portion of the site sheet flows on the site in a southerly direction to an existing onsite storm sewer system. In the southern portion of the site, runoff sheet flows to an existing ditch, which is connected to an existing on-site storm sewer system via ditch inlet. To provide quantity control to pre-development levels in the north area, proposed SWM measures include underground pipe storage with a controlled outlet to an existing storm sewer system. This will ensure that existing storm sewers are not backed up during high intensity rainfall events. For the south area, proposed SWM measures will include grassed swales or re-grading/widening of an existing ditch to provide quantity control. The flow to the existing onsite storm sewer can be controlled by either inlet control catch basins or controlled plate outlets. To address water quality measures, an oil/grit separator can be proposed for 80% TSS removal requirement.
- Bowesville Park and Ride Lot: The proposed station and Park and Ride is not within an area to be developed in the near future. Therefore, onsite SWM controls such as underground storage detention and LIDs (i.e. permeable pavers) can be proposed to address water quantity control. Water quality can be addressed through the use of oil/grit separators with grassed swales. This strategy will ensure that runoff is treated to MOE guidelines before discharging into an existing watercourse.

The proposed Trillium Line extension includes small footprints for stations and platform areas. Grade separations will follow the treatment train approach, which will ensure that impacts on surrounding areas are minimized. Stormwater management at the proposed maintenance yard will consist of individual SWM controls, which will not result in a significant impact on existing drainage conditions. Overall, the proposed Trillium Line extension can be developed with a negligible impact on existing surface water or groundwater conditions.

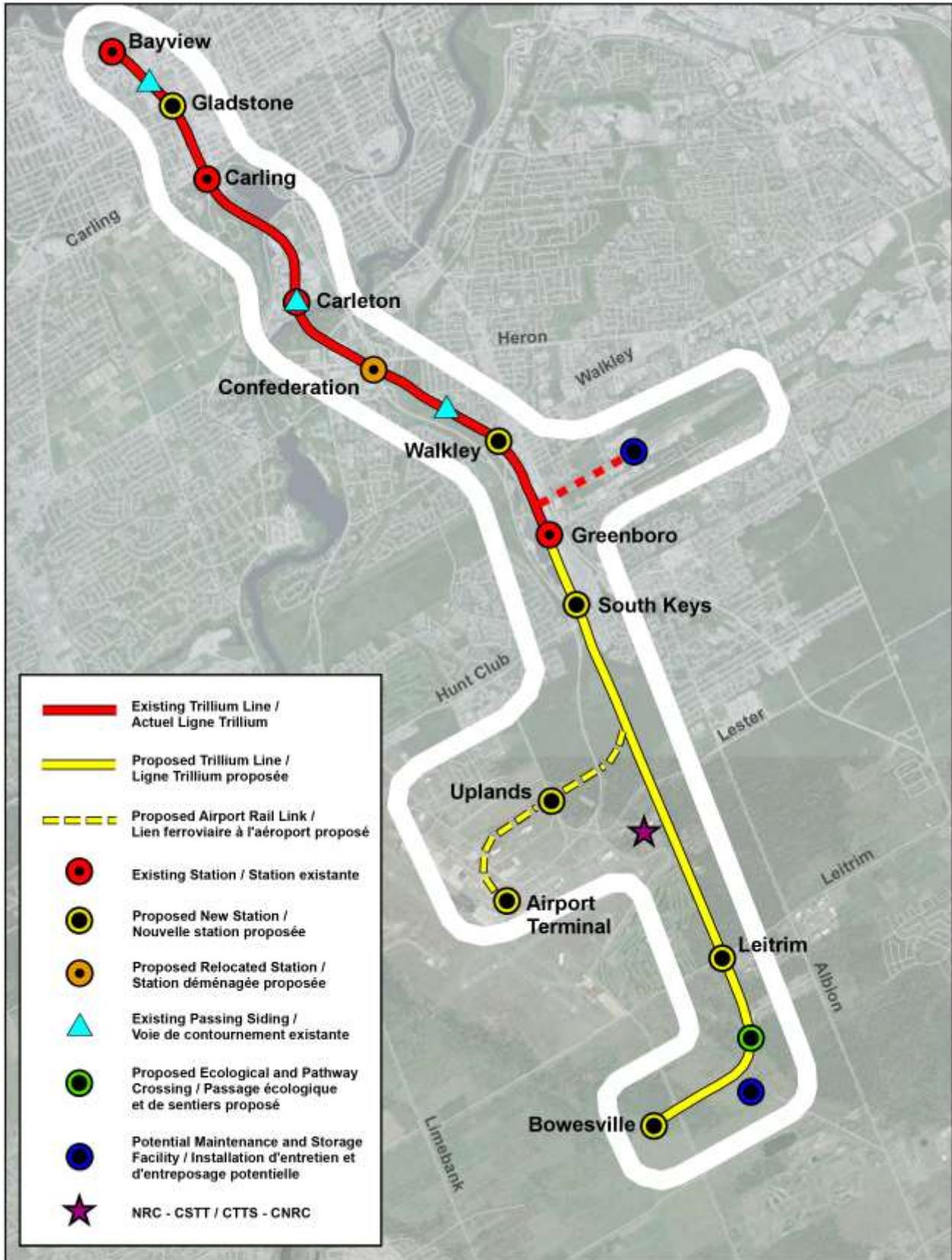


Figure 1: Trillium Line Extension Study Area

Table 1: Summary of Stormwater Management Requirements for Trillium Line Extension

Design Element	Existing Conditions	Future Conditions	Proposed Drainage Requirements/ Strategy	Source/Reference Documents	
<i>(Station / Grade Separation)</i>	<i>(Brief description of existing land use, SWM, drainage conditions, where applicable)</i>	<i>(Brief description of proposed land use, future (ponds, bioswales, infiltration trenches, etc.) or drainage features (ditches, sewers, etc.) conditions proposed in other studies, Master Plans or MESP's that will accommodate the alignment.)</i>	<i>(Brief description of Proposed SWM measures (ponds, bioswales, infiltration trenches, etc.) or drainage features (ditches, sewers, etc.) to be included in Functional Design, if required)</i>	<i>(List/identify reference documents/ drawings/reports for SWM/drainage information - title, date, & name of consultant)</i>	
Gladstone	Land use : Pervious open space Drainage: Drains to existing city storm sewer via ditches	Land use: Impervious station plaza and platform Drainage: Outflow to existing storm sewer via widening/ re-grading of existing ditches	Widening or re-grading of existing ditches (Platform) Quantity control calculations for station plaza	North south Corridor Project – Stormwater Management and Drainage – Robinson Consultants – August 2005	
Confederation	Land use : Pervious open space Drainage: Drains to water course via ditches	Land use: Impervious platform area Drainage: Widening or re-grading of existing ditch	Confirm existing ditch capacity. If necessary, provide calculations for proposed ditch design		
Walkley	Land use : Pervious open space Drainage: Drains to water course via ditches	Land use: Impervious platform area Drainage: Widening or re-grading of existing ditch	Confirm existing ditch capacity. If necessary, provide calculations for proposed ditch design		
South Keys	Land use : Pervious open space Drainage: Outflow to Sawmill Creek	Land use: Impervious platform area Drainage: Direct runoff from platform area to Sawmill Creek constructed wetlands (West of Trillium Line Alignment) to alleviate flooding on East side of Bank Street	Review of a site servicing and grading plan to ensure that runoff is directed to Sawmill Creek constructed wetlands		
Lester Grade Separation	Land use : Pervious open space Drainage: Drains to an existing water course via ditches	Land use: Impervious platform and embankment area Drainage: Direct runoff via grassed swale to watercourse. Design embankment with semi-pervious surface to reduce runoff and intensity. Design ditch to accommodate flow without overtopping	Design swale to accommodate flow without overtopping to minimize impacts on surrounding wetlands		
Leitrim Grade Separation	Land use : Pervious open space Drainage: Drains to Findley Creek via SWM ponds located in Leitrim development area	Land use: Impervious platform and embankment area Drainage: Direct runoff via grassed swale to existing SWM ponds. Design embankment with semipervious surface to reduce runoff and intensity	Design swale to accommodate flow without overtopping to minimize impacts on wetlands		
Leitrim Station	Land use : Pervious open space Drainage: Drains to Findley Creek via SWM ponds located in Leitrim development area	Land use: Impervious platform and embankment area Drainage: Direct runoff via grassed swale to existing SWM ponds. Design embankment with semipervious surface to reduce runoff and intensity	Design swale to accommodate flow without overtopping to minimize impacts on wetlands		
Bowesville Station and Park and Ride	Land use : Pervious open space Drainage: Drains to an existing water course	Land use: Impervious platform and parking lot Drainage: Direct runoff via grassed swale to existing water course without overtopping	Design swale to accommodate flow without overtopping to minimize impacts on wetlands SWM measures will be required to address water quality and quantity for parking lot area		
Airport Terminal Station	Land use : Impervious area Drainage: Drains to existing on-site pond (Sub catchment SC-2b)	Land use : Impervious platform Drainage: No change	Pond provides water quantity and quality control for the area. No further studies related to design available on the pond. May require further input from Airport Authority.		Master Servicing and Transportation Strategy Final Report – Delcan – June 2011
Walkley Yard	Land use : Pervious open space	Land use: Impervious yard area Drainage : Direct runoff to Sawmill Creek constructed wetlands (West of Trillium Line Alignment) to alleviate flooding on east side of Bank Street	Review of a site servicing and grading plan to ensure that runoff is directed to Sawmill Creek constructed wetlands		North south Corridor Project – Stormwater Management and Drainage – Robinson Consultants – August 2005