



Environmental Project Report

**BARRHAVEN LIGHT RAIL TRANSIT AND RAIL
GRADE-SEPARATIONS PLANNING AND
ENVIRONMENTAL ASSESSMENT STUDY**

October 2024

BARRHAVEN LIGHT RAIL TRANSIT AND RAIL GRADE-SEPARATIONS PLANNING AND ENVIRONMENTAL ASSESSMENT STUDY

ENVIRONMENTAL PROJECT REPORT

Prepared for:



City of Ottawa

110 Laurier Avenue West

Ottawa, Ontario

K1J 1P1

Prepared By:



1223 Michael Street North, Suite 100

Ottawa, Ontario

K1J 7T2

DATE: October 2024

TABLE OF CONTENTS

ACRONYMS	XVI
EXECUTIVE SUMMARY	XVIII
SOMMAIRE	XXV
1 INTRODUCTION	1-1
1.1 Project Background	1-2
1.2 Environmental Assessment Process	1-3
1.3 Impact Assessment Act.....	1-4
1.4 Consultation	1-5
1.4.1 Consultation Groups	1-5
1.4.1.1 Agency Consultation Group	1-5
1.4.1.2 Business Consultation Group	1-6
1.4.1.3 Public Consultation Group	1-7
1.4.2 Public Open Houses.....	1-7
1.4.3 Individual Stakeholder Meetings.....	1-7
1.4.4 Indigenous Consultation	1-8
1.4.5 City of Ottawa Website	1-10
1.5 Report Organization	1-10
2 PROJECT NEED AND OPPORTUNITIES	2-1
2.1 Need for the Project.....	2-1
2.1.1 Meeting Planning Policy.....	2-1
2.1.1.1 Official Plan.....	2-1
2.1.1.2 Transportation Master Plan	2-1
2.2 Rapid Transit Network Overview	2-2
2.2.1 Previous Planning Studies	2-3
2.2.1.1 Southwest Transitway Extension Environmental Assessment (1997).....	2-3
2.2.1.2 Fallowfield Road Environmental Assessment (1997).....	2-6
2.2.1.3 Southwest Transitway Extension and Woodroffe Widening Federal Environmental Assessment (2004).....	2-8
2.2.1.4 Southwest Transitway Extension EA Study (2006).....	2-8
2.2.1.5 Confederation Line West LRT Extension (2016)	2-9
2.2.1.6 Barrhaven and Merivale Road Rail-Grade Separation Study (2017).....	2-10

2.2.2	Addressing Transportation Issues.....	2-11
2.3	LRT Maintenance and Storage Facility.....	2-12
2.4	Opportunities.....	2-12
2.4.1	Meeting Future Ridership Targets.....	2-12
2.4.2	Environmental Gains.....	2-13
2.4.3	Safety.....	2-13
2.4.4	Enhanced Transit Experience.....	2-13
2.4.5	Health Benefits.....	2-14
2.5	Conclusion.....	2-14
3	EXISTING ENVIRONMENTAL CONDITIONS.....	3-1
3.1	Study Area.....	3-1
3.1.1	Physical and Temporal Boundaries.....	3-1
3.2	Methods of Investigation.....	3-1
3.3	Social Environment.....	3-1
3.3.1	Regulatory Planning Policies.....	3-2
3.3.1.1	Federal Policy.....	3-2
3.3.1.1.1	The Plan for Canada’s Capital, 2017 - 2067.....	3-2
3.3.1.1.2	NCC Greenbelt Master Plan (2013).....	3-3
3.3.1.2	Provincial Policy.....	3-5
3.3.1.3	Municipal Policy.....	3-6
3.3.1.3.1	City of Ottawa Official Plan (2013, as amended).....	3-6
3.3.1.3.2	City of Ottawa Secondary Plans.....	3-8
3.3.2	Comprehensive Zoning By-Law.....	3-11
3.3.3	Existing Land Use.....	3-11
3.3.3.1	Agricultural Land Use.....	3-18
3.3.4	Landscape and Urban Design Character.....	3-18
3.3.4.1	Woodroffe Avenue: North edge of the Study Area to Baseline Station.....	3-18
3.3.4.2	Woodroffe Avenue: Baseline Station to Knoxdale Road/Medhurst Drive.....	3-18
3.3.4.3	Woodroffe Avenue: Knoxdale Road/Medhurst Drive to West Hunt Club Road.....	3-20
3.3.4.4	Woodroffe Avenue: West Hunt Club Road to Fallowfield Road.....	3-21
3.3.4.5	Southwest Transitway: Woodroffe Avenue to Fallowfield Road.....	3-23
3.3.4.6	Fallowfield Road: Woodroffe Avenue to Greenbank Road.....	3-23
3.3.4.7	Southwest Transitway: Fallowfield to Barrhaven Town Centre.....	3-24
3.3.5	Land ownership.....	3-26

3.3.6	Climate Change	3-30
3.3.6.1	Temperature	3-30
3.3.6.2	Precipitation	3-30
3.3.6.3	Wind	3-31
3.3.6.4	Extreme Weather Events	3-31
3.3.7	Archaeological Resources	3-31
3.3.8	Built Heritage Resources and Cultural Heritage Landscapes	3-34
3.3.9	Noise, Air Quality and Vibration	3-36
3.3.9.1	Noise	3-36
3.3.9.2	Air Quality	3-36
3.3.9.3	Ground Vibrations and Ground Borne Noise Assessment	3-36
3.3.10	Indigenous Land Claims	3-37
3.4	Natural Environment	3-37
3.4.1	Terrestrial Environment	3-37
3.4.1.1	Wildland Fire Risk	3-37
3.4.2	Aquatic Environment	3-38
3.4.2.1	Hydrology	3-38
3.4.2.2	Surface Water Features	3-43
3.4.2.3	Fish and Fish Habitat	3-43
3.4.3	Wetlands	3-44
3.4.3.1	Provincially Significant Wetlands	3-44
3.4.3.2	Other-Evaluated Wetlands	3-44
3.4.3.3	Unevaluated Wetlands	3-44
3.4.4	Natural Heritage Features	3-45
3.4.4.1	NCC Greenbelt Lands	3-45
3.4.4.2	Areas of Natural and Scientific Interest	3-45
3.4.4.3	Significant Woodlands	3-45
3.4.4.4	Significant Valleylands	3-45
3.4.4.5	Linkage Features	3-45
3.4.4.6	Urban Natural Features	3-45
3.4.4.7	Official Plan Designations	3-46
3.4.4.7.1	Natural Environment Area	3-46
3.4.4.7.2	Agricultural Resource Area	3-46
3.4.4.7.3	Greenbelt Rural	3-47

3.4.4.7.4	Urban Natural Features	3-47
3.4.4.7.5	Major Open Space	3-47
3.4.4.8	Other	3-47
3.4.5	Species at Risk and Species of Conservation Concern	3-47
3.5	Physical Environment	3-48
3.5.1	Soil Series.....	3-48
3.5.2	Subsurface Conditions.....	3-52
3.5.3	Fluvial Geomorphology	3-56
3.5.4	Hydrogeology	3-60
3.5.5	Source Protection Area	3-60
3.5.5.1	Intake Protection Area	3-60
3.5.5.2	Wellhead Protection Area	3-61
3.5.5.3	Groundwater Recharge and Vulnerable Aquifers.....	3-61
3.5.6	Contamination and Hazardous Materials.....	3-61
3.5.7	Infrastructure and Utilities.....	3-67
3.5.7.1	Water Distribution Network	3-67
3.5.7.1.1	Existing Water Distribution Network.....	3-67
3.5.7.1.2	Future Water Distribution Projects	3-67
3.5.7.2	Wastewater Collection System	3-72
3.5.7.2.1	Existing Wastewater Collection System	3-72
3.5.7.2.2	Future Wastewater Collection Projects	3-72
3.5.7.3	Stormwater Collection System	3-76
3.5.7.3.1	Future Stormwater/Drainage Projects	3-76
3.5.7.4	Gas Distribution.....	3-80
3.5.7.5	Electricity Distribution	3-80
3.5.7.5.1	Hydro One Electricity Transmission.....	3-80
3.5.7.6	Telecommunications Distribution Systems	3-81
4	EVALUATION OF ALTERNATIVE SOLUTIONS.....	4-1
4.1	Planning and Design Objectives for the Project.....	4-1
4.2	Description of Alternative Solutions	4-1
4.3	Evaluation of Alternative Solutions.....	4-2
4.4	Preliminary Preferred Solution	4-6
4.5	Stakeholder Consultation	4-6
4.5.1	First Round of Consultation Group Meetings	4-6
4.6	Preferred Solution.....	4-7

5	UPDATE TO EXISTING ENVIRONMENTAL CONDITIONS	5-1
5.1	Natural Environment Focused Field Studies.....	5-1
5.1.1	Ecological Land Classification	5-1
5.1.2	Significant Wildlife Habitat	5-1
5.1.3	Significant Woodlands	5-2
5.1.4	Species at Risk.....	5-2
5.1.5	Canadian Wetland Classification	5-3
5.2	Geotechnical Investigation.....	5-4
5.2.1	North Section - LRT Alternatives.....	5-4
5.2.1.1	Elevated Alternatives	5-4
5.2.1.2	Below-Grade Alternatives.....	5-4
5.2.2	Rail Grade-Separations.....	5-6
5.2.3	South Section - BRT to LRT Conversion	5-6
5.3	Fluvial Geomorphic Assessment.....	5-7
5.4	Headwater Drainage Assessment.....	5-8
6	EVALUATION OF ALTERNATIVE DESIGNS	6-1
6.1	Evaluation Criteria and Methodology.....	6-1
6.1.1	Evaluation Scale.....	6-3
6.2	Focussed Evaluations.....	6-4
6.2.1	Evaluation of Alternative Designs for the Extension of LRT from Baseline Station to the Nepean Sportsplex.....	6-4
6.2.1.1	Description of Alternatives.....	6-8
	Alternative 1: Cut and Cover Tunnel in Woodroffe Avenue Right-of-Way.....	6-8
	Alternative 2: Trench in Woodroffe Avenue Right-of-Way	6-9
	Alternative 3: Elevated in Woodroffe Avenue Right-of-Way (Median)	6-10
	Alternative 4: Elevated in Woodroffe Avenue Right-of-Way (West Side)	6-12
	Alternative 5: Trench West of Woodroffe Avenue Right-of-Way.....	6-13
	Alternative 6: Elevated West of Woodroffe Avenue	6-14
6.2.1.2	Discussion of Evaluation.....	6-17
6.2.2	Evaluation Of Alternative Designs For Rail Grade-Separation Of Woodroffe Avenue And The Southwest Transitway	6-22
6.2.2.1	Discussion of Evaluation.....	6-25
6.2.3	Evaluation Of Alternative Designs For Rail Grade-Separation Of Fallowfield Road.....	6-25
6.2.3.1	Discussion of Evaluation.....	6-28
6.2.4	Evaluation of Alternative Locations for the Train Storage and Servicing Facility	6-28

6.2.4.1	Discussion of Evaluation.....	6-33
6.3	Stakeholder Consultation.....	6-33
6.3.1	Second Round of Consultation Group Meetings.....	6-33
6.3.2	Public Open House #1.....	6-34
6.4	Preliminary Preferred Designs.....	6-36
6.5	Stakeholder Consultation.....	6-36
6.5.1	Third Round of Consultation Group Meetings.....	6-36
6.5.2	Landscaping and Space Programming Strategy Workshop.....	6-37
6.5.3	Public Open House #2.....	6-37
6.6	Transportation Committee and Council Meetings and Directions November 2020.....	6-39
6.7	Modification to the Preferred Design.....	6-40
6.8	New City of Ottawa Official Plan (November 2022).....	6-40
6.8.1	New City of Ottawa Transportation Master Plan.....	6-51
6.8.2	New City of Ottawa Infrastructure Master Plan.....	6-52
6.9	Stakeholder Consultation.....	6-53
6.9.1	Fourth Round of Consultation Group Meetings.....	6-53
6.9.2	Fifth Round of Consultation Group meetings.....	6-53
6.9.3	Public Open House #3.....	6-54
6.10	Transportation Committee and Council Meetings and Direction April/May 2023.....	6-55
7	RECOMMENDED PLAN AND ASSESSMENT.....	7-1
7.1	Recommended Plan Overview.....	7-1
7.2	Recommended Design.....	7-3
7.2.1	LRT Alignment and Stations.....	7-3
7.2.1.1	Baseline (Algonquin) Station to Tallwood Station.....	7-3
7.2.1.2	Tallwood Station.....	7-3
7.2.1.3	Knoxdale Station.....	7-4
7.2.1.4	Nepean Sportsplex Station.....	7-6
7.2.1.5	Fallowfield Station.....	7-6
7.2.1.6	Longfields Station.....	7-7
7.2.1.7	Strandherd Station.....	7-8
7.2.1.8	Barrhaven Centre Station.....	7-9
7.2.2	Special Trackwork.....	7-10
7.2.3	Traction Power Substations.....	7-11
7.2.4	Life Safety.....	7-11

7.2.4.1	Emergency Access and Egress	7-11
7.2.4.2	Communications	7-12
7.2.5	Station Elements	7-12
7.2.5.1	Location and Spacing	7-12
7.2.5.2	Entrances	7-12
7.2.5.3	Accessibility	7-12
7.2.5.4	LRT Platform	7-12
7.2.5.5	Multi-modal Connections	7-13
7.2.6	Running way elements	7-14
7.2.6.1	Track	7-14
7.2.6.2	Service/Emergency Access	7-14
7.2.6.3	Overhead Power Supply	7-14
7.2.7	Transit Operations	7-14
7.2.8	Train Storage and Servicing Facility	7-15
7.2.9	Watermain Protection Strategy	7-15
7.2.9.1	Under LRT Elevated Median Guideway	7-15
7.2.9.2	Rail Grade-Separations Location	7-15
7.2.10	Rail Grade-Separations	7-17
7.2.10.1	Woodroffe Avenue Rail Grade-Separation	7-17
7.2.10.2	Southwest Transitway Rail Grade-Separation	7-17
7.2.10.3	Fallowfield Road Rail Grade-Separation	7-19
7.3	Corridor Drainage and Stormwater Management Approach	7-20
7.3.1	Baseline station	7-20
7.3.2	Baseline Station to Nepean Sportsplex Station	7-20
7.3.3	Nepean Sportsplex Station to VIA Rail	7-21
7.3.4	Woodroffe Avenue and Southwest Transitway/LRT Overpasses	7-21
7.3.5	Fallowfield Station	7-21
7.3.6	Realigned Fallowfield Road Overpass	7-22
7.3.7	Construction Detour	7-22
7.3.8	Fallowfield to Highbury Park	7-23
7.3.9	Train Storage and Servicing Facility	7-23
7.3.10	Highbury Park to Barrhaven Centre Station	7-23
7.3.11	Barrhaven Centre Station	7-23
7.4	Corridor Landscaping and Space Programming Strategy	7-23

7.4.1	Parallel to the corridor adjacent to existing land uses.....	7-24
7.4.2	Tallwood Woods Edge Treatment.....	7-24
7.4.3	Station Locations	7-24
7.4.4	NCC Greenbelt including around the grade separations	7-25
7.4.5	Space Programming Underneath the Elevated Guideway.....	7-25
7.5	Description of Project Activities	7-25
7.5.1	Preconstruction Phase.....	7-25
7.5.2	Construction Phase.....	7-26
7.5.3	Operational Phase.....	7-28
7.5.4	Project Phasing and Prioritization	7-29
7.5.5	Construction Staging.....	7-29
7.6	Built-in Mitigation Measures	7-29
7.6.1	Erosion and Sediment Control Plan	7-30
7.6.2	Environmental Protection Plan.....	7-30
7.6.3	Air Quality, Noise and Vibration.....	7-30
7.6.4	Emergency Response Plan	7-31
7.6.5	Spills Response and Reporting Plan.....	7-31
7.6.6	Lighting Treatment Plan.....	7-32
7.6.7	Construction Waste Management Plan	7-32
7.6.8	Archaeological Resources	7-32
7.7	Site Specific Mitigation Measures	7-32
7.7.1	Property Assessment and Acquisition Process	7-32
7.7.2	Public Communications Plan.....	7-32
7.7.3	Archaeological Assessment.....	7-33
7.7.4	Construction and Traffic Management Plan.....	7-33
7.7.4.1	Traffic and Transit Diversions during Construction	7-33
7.7.4.2	Confederation Line Operations during Construction.....	7-33
7.7.4.3	Railway Operation During Construction	7-33
7.7.5	Corridor Drainage and Stormwater Management Plan	7-33
7.7.6	Hydro One INFRASTRUCTURE Conflict Resolution	7-34
7.7.7	Geotechnical Investigations	7-35
7.7.8	Phase Two Environmental Site Assessment.....	7-35
7.7.9	Excess Soil Management Plan	7-35
7.7.10	Landscape Plan.....	7-35

7.7.11	Agriculture Management Plan	7-36
7.7.12	Ecological Site Assessment	7-37
7.7.13	Tree Conservation Report	7-37
7.7.14	Construction Timing Considerations	7-38
7.7.14.1	Breeding Birds	7-38
7.7.14.2	Fisheries Resources	7-38
7.7.14.3	Turtles	7-39
7.7.14.4	Bats	7-39
7.7.15	Air Quality Dispersion Study	7-39
7.7.16	Detailed Stationary Noise Analysis	7-39
7.8	Assessment of the Recommended Plan	7-39
7.8.1	Assessment Methodology	7-39
7.8.2	Assessment Results	7-41
8	RECOMMENDED PLAN	8-1
9	IMPLEMENTATION AND APPROVALS	9-1
9.1	Project Costs	9-1
9.2	Property Acquisition	9-1
9.3	Future Considerations	9-1
9.3.1	Consultation	9-2
9.3.1.1	Royale Equestrian Centre	9-2
9.3.1.2	Algonquins of Pikwàkanagàn First Nation	9-2
9.4	Design Details	9-3
9.5	Future Permits, Approvals and Other Requirements	9-3
9.5.1	Federal	9-3
9.5.1.1	Federal Land Use, Design and Transaction Approval (FLUDTA)	9-3
9.5.1.2	Impact Assessment Act	9-4
9.5.1.3	Fisheries Act	9-4
9.5.1.4	Species at Risk Act	9-4
9.5.2	Provincial	9-4
9.5.2.1	Environmental Compliance Approval	9-4
9.5.2.2	Permit to Take Water	9-5
9.5.2.3	Ontario Endangered Species Act	9-5
9.5.2.4	Ontario Heritage Act	9-5
9.5.2.5	Public Lands Act	9-5

9.5.2.6	Conservation Authorities Act	9-5
9.5.2.7	Hydro One Class EA.....	9-6
9.5.3	Municipal	9-6
9.5.3.1	Road Modification Approval.....	9-6
9.5.3.2	Road Cut Permits	9-7
9.5.3.3	Temporary Encroachment Permits.....	9-7
9.5.3.4	Noise By-Law Exemption.....	9-7
9.5.3.5	Tree Protection By-Law	9-7
9.6	Monitoring	9-7
9.7	Statement of Completion	9-9
9.8	Modifying the Recommended Plan.....	9-9
9.9	Lapse of Time.....	9-10
10	CONCLUSION REGARDING THE PROJECT	10-1
11	REFERENCES	11-2

LIST OF FIGURES

Figure 1-1 Study Area	1-2
Figure 1-2 The Project as Identified in the 2013 TMP	1-3
Figure 1-3 Illustration of the Transit and Rail Project Assessment Process as per the Environmental Assessment Act.....	1-4
Figure 2-1 TMP Ultimate Rapid Transit Network	2-2
Figure 2-2 The 1997 Southwest Transitway EA alignment	2-4
Figure 2-3 1997 Southwest Transitway EA, exhibit 6-22, grade-separations of CN Rail, Woodroffe Ave and proposed Transitway	2-5
Figure 2-4 Southwest Transitway EA, exhibit 6-22, grade-separations of CN Rail, proposed Transitway and Fallowfield Road	2-6
Figure 2-5 1997 Fallowfield Road (Cedarview Road to Woodroffe Avenue) EA, Study Area.....	2-7
Figure 2-6 Recommended Alignments for the Southwest Transitway Extension and the Greenbank Road Widening Studies.....	2-9
Figure 2-7 Confederation Line West LRT Extension Alignment.....	2-10
Figure 3-1 Plan for Canada's Capital Transit Context.....	3-2
Figure 3-2 Greenbelt Sector Plan applicable within the Study Area.....	3-4
Figure 3-3 City of Ottawa Official Plan	3-8
Figure 3-4 Baseline and Woodroffe Secondary Plan	3-9
Figure 3-5 South Nepean Urban Plan for Areas 1, 2 and 3	3-10
Figure 3-6 Barrhaven Downtown Secondary Plan, 2019.....	3-11
Figure 3-7 Zoning within the Study Area-North	3-12
Figure 3-8 Zoning within the Study Area-Central	3-13
Figure 3-9 Zoning within the Study Area-South	3-14
Figure 3-10 Existing Land Use in the Study Area-North	3-15
Figure 3-11 Existing Land Use in the Study Area-Central.....	3-16
Figure 3-12 Existing Land Use in the Study Area-South.....	3-17
Figure 3-13 Pedestrian bridge across Woodroffe Avenue looking south	3-18
Figure 3-14 Transit priority corridor along Woodroffe Avenue entering the Baseline Southwest Transitway Station and Park-and-Ride looking southwest.....	3-19
Figure 3-15 Woodroffe Avenue looking south. Southwest Transitway Park-and-Ride (west) with the Peter D. Clark Centre behind, noise walls for residences (east).....	3-19
Figure 3-16 Woodroffe Avenue north of Norice Street looking south. Tallwood Woods (west) Commercial uses (east)	3-19
Figure 3-17 CN Rail line overpass of Woodroffe Avenue looking south.....	3-20
Figure 3-18 CN Rail line overpass of Woodroffe Avenue	3-20
Figure 3-19 Woodroffe Avenue south of the CN Rail line overpass looking south. Open space to the west with residences on Beechcliffe Street behind (west) and Brockington Court residences backing onto Woodroffe Avenue (east)	3-20
Figure 3-20 Noise walls located along the residential area on the west side of Woodroffe Avenue (Cheryl Gardens)	3-21
Figure 3-21 Hydro One transmission lines crossing Woodroffe Avenue south of the intersection of Knoxdale Road/Medhurst Drive looking south	3-21
Figure 3-22 Hydro One transmission line crossing Woodroffe Avenue north of the intersection of West Hunt Club Road looking southwest	3-21
Figure 3-23 Woodroffe Avenue looking south. Greenbelt Agriculture lands and the Southwest Transitway to the west. The Nepean Sportsplex and Pinhey Forest to the east	3-22

Figure 3-24 The Southwest Transitway exiting Woodroffe Avenue to the west 3-22

Figure 3-25 Woodroffe Avenue looking south with Pinhey Forest to the east..... 3-22

Figure 3-26 Woodroffe Avenue VIA Rail line at-grade crossing looking south. Southwest Transitway crossing (west) and MUP crossing (east) 3-23

Figure 3-27 Fallowfield Transit Station on the Southwest Transitway looking west. VIA Rail Station (west).... 3-23

Figure 3-28 Fallowfield Road at-grade crossing of the Southwest Transitway and VIA Rail line looking west . 3-24

Figure 3-29 Fallowfield Road Greenbelt vistas (north) looking west..... 3-24

Figure 3-30 Strandherd Transit Station and Park & Ride 3-25

Figure 3-31 MUP located to the east of the Southwest Transitway underpass at Highbury Park looking south.. 3-25

Figure 3-32 Southwest Transitway at Marketplace Avenue Intersection looking south 3-25

Figure 3-33 Southwest Transitway seen from Strandherd Drive overpass..... 3-25

Figure 3-34 Terminus of the Southwest Transitway at Jockvale Road looking south 3-26

Figure 3-35 Land Ownership in the Study Area-North..... 3-27

Figure 3-36 Land Ownership in the Study Area-Central 3-28

Figure 3-37 Land Ownership in the Study Area-South 3-29

Figure 3-38 Average Temperatures (City of Ottawa, 2013) 3-30

Figure 3-39 Archaeological Potential in the Study Area - North..... 3-32

Figure 3-40 Archaeological Potential in the Study Area - South 3-33

Figure 3-41 Known and Potential Cultural Heritage Resources 3-35

Figure 3-42 Natural environment features present in the Study Area – North 3-39

Figure 3-43 Natural environment features present in the Study Area – Central..... 3-40

Figure 3-44 Natural environment features present in the Study Area – South..... 3-41

Figure 3-45 Subwatershed Catchment Areas related to the Study Area 3-42

Figure 3-46 Soil Series Mapping in the Study Area 3-50

Figure 3-47 Soil Series CLI Mapping in the Study Area..... 3-51

Figure 3-48 Surficial Geology in the Study Area 3-53

Figure 3-49 Bedrock Geology in the Study Area 3-54

Figure 3-50 Drift Thickness in the Study Area 3-55

Figure 3-51 Overview of Watercourse and Drainage Feature Crossings 3-56

Figure 3-52 Watercourse and Drainage Feature Crossings Near the Intersection of Fallowfield Road and Woodroffe Avenue 3-57

Figure 3-53 IPZ-2 Area for Ottawa (*From Mississippi-Rideau Source Protection Plan, 2020*) 3-61

Figure 3-54 Locations of Issues of Potential Environmental Concern in the Study Area 3-63

Figure 3-55 Locations of Issues of Potential Environmental Concern in the Study Area 3-64

Figure 3-56 Locations of Issues of Potential Environmental Concern in the Study Area 3-65

Figure 3-57 Locations of Issues of Potential Environmental Concern in the Study Area 3-66

Figure 3-58 Water Distribution Network within the Study Area-North..... 3-69

Figure 3-59 Water Distribution Network within the Study Area-Central..... 3-70

Figure 3-60 Water Distribution Network within the Study Area-South 3-71

Figure 3-61 Wastewater Collection System within the Study Area-North 3-73

Figure 3-62 Wastewater Collection System within the Study Area-Central..... 3-74

Figure 3-63 Wastewater Collection System within the Study Area-South 3-75

Figure 3-64 Stormwater Collection System within the Study Area-North 3-77

Figure 3-65 Stormwater Collection System within the Study Area-Central 3-78

Figure 3-66 Stormwater Collection System within the Study Area-South 3-79

Figure 5-1 Significant Woodland Assessment Results..... 5-2

Figure 5-2 Location of Watercourse Crossings within the Study Area..... 5-8

Figure 5-3 Headwater Drainage Feature Assessment Locations and Management Recommendation 5-9

Figure 6-1 Location of the Pinch Point in the Study Area.....	6-5
Figure 6-2 LRT Profile Considerations	6-6
Figure 6-3 Hydro Lines on the East side of Woodroffe Avenue at Majestic Drive	6-7
Figure 6-4 Alternative LRT Alignments through the Pinch Point	6-7
Figure 6-5 Alignment of Alternatives 1 and 2 in the Woodroffe Avenue Right-of-Way	6-8
Figure 6-6 Alternative 1: Cut and Cover Tunnel in Woodroffe Avenue Right-of-Way	6-8
Figure 6-7 Alternative 2: Trench in Woodroffe Avenue Right-of-Way.....	6-9
Figure 6-8 Alignment of Alternatives 3 and 4 in the Woodroffe Avenue Right-of-Way	6-10
Figure 6-9 Alternative 3: Elevated in Woodroffe Avenue Right-of-Way (Median).....	6-11
Figure 6-10 Alternative 4: Elevated in Woodroffe Avenue Right-of-Way (West Side)	6-12
Figure 6-11 Alignment of Alternatives 5 and 6 outside of the Woodroffe Avenue Right-of-Way	6-13
Figure 6-12 Alternative 5: Trench West of Woodroffe Avenue Right-of-Way	6-13
Figure 6-13 Alternative 6: Elevated West of Woodroffe Avenue Right-of-Way.....	6-14
Figure 6-14 Subsurface Geotechnical Challenges with a Below-Grade Facility	6-18
Figure 6-15 Underground Infrastructure Conflicts with Alternative 5	6-18
Figure 6-16 Preferred Alternative for Baseline Station to Nepean Sportsplex section: Alternative 6 Elevated, outside of the Woodroffe Avenue Right-of-Way	6-20
Figure 6-17 Affected Properties - Manor Village.....	6-21
Figure 6-18 Affected Properties - Cheryl Gardens	6-21
Figure 6-19 General Arrangement for the TSSF	6-28
Figure 6-20 Potential TSSF Sites for Evaluation	6-30
Figure 6-21 Excerpt from the 2022 Official Plan, Schedule B6 - Suburban (Southwest) Transect.....	6-43
Figure 6-22 Excerpt from the 2022 Official Plan, Schedule B3 - Outer Urban Transect.....	6-44
Figure 6-23 Excerpt from the 2022 Official Plan, Schedule B4 - Greenbelt Transect.....	6-45
Figure 6-24 Excerpt from 2022 Official Plan, Schedule C1 - Protected Major Transit Stations (PMTSA).....	6-47
Figure 6-25 Excerpt from the 2022 Official Plan, Schedule C3 - Active Transportation Network, Urban Major Pathways	6-48
Figure 6-26 Excerpt from the 2022 Official Plan, Schedule C7-A Design Priority Areas - Urban.....	6-48
Figure 6-27 Excerpt from the 2022 Official Plan, Schedule C-11-A Natural Heritage System West.....	6-49
Figure 6-28 Excerpt from the 2022 Official Plan, Schedule C12 - Urban Greenspace	6-50
Figure 6-29 Excerpt from the 2022 Official Plan, Schedule C15 - Environmental Constraints	6-50
Figure 7-1 Recommended Plan Overview	7-2
Figure 7-2 Artistic Rendering of Proposed Tallwood Station Looking Southwest.....	7-4
Figure 7-3 Artistic Rendering of Proposed Knoxdale Station Looking Southeast.....	7-5
Figure 7-4 Artistic rendering of proposed Nepean Sportsplex Station Looking Southwest	7-6
Figure 7-5 Plan View of the Proposed Fallowfield Station.....	7-7
Figure 7-6 Plan View of the Proposed Longfields Station	7-8
Figure 7-7 Plan View of Proposed Strandherd Station	7-9
Figure 7-8 Plan View of Proposed Barrhaven Centre Station	7-9
Figure 7-9 Artistic Renderings of the Woodroffe Avenue and Southwest Transitway/LRT Overpasses.....	7-18
Figure 7-10 Artistic Rendering of the Fallowfield Road Overpass	7-19
Figure 7-11 Enhanced Grass Swale with Check Dams (TRCA, 2016).....	7-20
Figure 7-12 OMCIA Primary Bird Hazard Zone.....	7-22
Figure 9-1 Potentially Affected Hydro One Infrastructure	9-6

LIST OF TABLES

Table 1-1 Agency Consultation Group Meetings.....	1-6
Table 1-2 Business Consultation Group Meetings	1-7
Table 1-3 Public Consultation Group Meetings	1-7
Table 1-4 Public Open Houses.....	1-7
Table 1-5 Individual Stakeholder Meetings	1-8
Table 1-6 Indigenous Consultation Meetings	1-9
Table 2-1 Crossing Exposure Index analysis and recommended solution.....	2-11
Table 3-1 Greenbelt Master Plan Land Use Designations	3-3
Table 3-2 Land Use Designations applicable to the Study Area.....	3-6
Table 3-3 Summary of Known and Potential Cultural Heritage Resources	3-34
Table 3-4 Hazardous Forest Types Characteristic and Risk Level (MNRF, 2017).....	3-38
Table 3-5 Rideau River Subwatersheds and Catchment Areas related to the Study Area	3-38
Table 3-6 Fish Species observed in Black Rapids Creek	3-43
Table 3-7 SAR and Species of Conservation Concern Wildlife Records for the Study Area.....	3-47
Table 3-8 CLI Capability Ratings for the Study Area	3-49
Table 3-9 Summary of Existing Fluvial Geomorphic and Hydrologic Conditions at Watercourse Crossings.....	3-58
Table 3-10 Backbone Watermains in the Study Area	3-67
Table 3-11 Sanitary Collectors and Forcemain in the Study Area	3-72
Table 3-12 Stormwater Collectors in the Study Area	3-76
Table 3-13 Hydro Duct Banks in the Study Area	3-80
Table 4-1 Planning and Design Objectives for the Project.....	4-1
Table 4-2 Description of Alternative Solutions - LRT Extension	4-2
Table 4-3 Description of Alternative Solutions -Rail Grade-Separation.....	4-2
Table 4-4 Evaluation of Alternative Solutions Results - LRT Extension.....	4-3
Table 4-5 Evaluation of Alternative Solutions Results – Rail Grade-Separation: Woodroffe Avenue and Southwest Transitway.....	4-4
Table 4-6 Evaluation of Alternative Solutions Results – Rail Grade-Separation: Fallowfield Road.....	4-5
Table 5-1 Summary of Candidate and Confirmed SWH for the Study Area	5-2
Table 5-2 Canadian Wetland Classification for the Study Area	5-3
Table 6-1 Evaluation Criteria and Indicators.....	6-2
Table 6-2 Evaluation Scale	6-3
Table 6-3 Results of Focused Evaluation for LRT Extension (Baseline Station to West Hunt Club).....	6-15
Table 6-4 Results of Focused Evaluation for Rail Grade-Separation of Woodroffe Avenue and Southwest Transitway.....	6-23
Table 6-5 Results of Focused Evaluation for Rail Grade-Separation of Fallowfield Road.....	6-26
Table 6-6 Results of Focused Evaluation for the Location of the TSSF	6-31
Table 6-7 Second Round of Consultation Group Meetings.....	6-34
Table 6-8 Third Round of Consultation Group Meetings.....	6-36
Table 6-9 Issues and Objectives of the New OP 2022.....	6-41
Table 6-10 City of Ottawa Official Plan Land Use Designations (new 2022 Official Plan).....	6-42
Table 6-11 Additional Official Plan Designations	6-46
Table 6-12 Fourth Round of Consultation Group Meetings.....	6-53
Table 6-13 Fifth Round of Consultation Group Meetings.....	6-54
Table 7-1 Impact Assessment Approach.....	7-40
Table 7-2 Impact Assessment Results.....	7-42
Table 9-1 Barrhaven LRT and Rail Grade-Separations Estimated Capital Cost.....	9-1

APPENDICES

Appendix A: Consultation Record

Appendix B: Supporting Reports

Acronyms

AAQC	Ambient Air Quality Criteria
AAC	Accessibility Advisory Committee
ACG	Agency Consultation Group
ANSI	Area of Natural and Scientific Interest
BCG	Business Consultation Group
BHR	Built Heritage Resource
BIA	Business Improvement Area
BMP	Best Management Practices
BMRRGSS	Barrhaven and Merivale Road Rail-Grade Separation Study
BRC	Black Rapids Creek
BRT	Bus Rapid Transit
CCDP	Climate Change Data Portal
CHER	Cultural Heritage Evaluation Report
CHL	Cultural Heritage Landscape
CHR	Cultural Heritage Resource
CLI	Canada Land Inventory
CPTED	Crime Prevention Through Environmental Design
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
CWS	Canadian Wildlife Service
DFO	Department of Fisheries and Oceans
EA	Environmental Assessment
EB	East Bound
ECA	Environmental Compliance Approval
ECCC	Environment and Climate Change Canada
ELC	Ecological Land Classification
ENCG	Environmental Noise Control Guideline
END	Endangered
EPR	Environmental Project Report
ESA	Environmental Site Assessment
GHG	Greenhouse Gas
HFR	High Frequency Rail
IAA	Impact Assessment Act
IPZ	Intake Protection Zone
LID	Low Impact Development
LoS	Level of Service
LRT	Light Rail Transit
MCM	Ministry of Multiculturalism and Citizenship
MMAH	Ministry of Municipal Affairs and Housing
MNRF	Ministry of Natural Resources and Forestry
MECP	Ministry of the Environment, Conservation and Parks
MTO	Ontario Ministry of Transportation
MUP	Multi-Use Pathway
NCC	National Capital Commission
NHIC	Natural Heritage Information Centre
ESA	Ontario Endangered Species Act
OCS	Overhead Catenary System
OHA	Ontario Heritage Act
OP	Official Plan
OPA	Official Plan Amendment

OPH	Ottawa Public Health
OPP	Ontario Provincial Police
OWES	Ontario Wetland Evaluation System
OWRA	Ontario Water Resources Act
PCG	Public Consultation Group
pphpd	Person per hour per direction
PPS	Provincial Policy Statement
POH	Public Open House
PSPC	Public Service Procurement Canada
PSW	Provincially Significant Wetland
PTTW	Permit to take Water
REC	Royale Equestrian Centre
RMA	Roadway Modification Approval
RTTP	Rapid Transit and Transit Priority
RVCA	Rideau Valley Conservation Authority
SAR	Species at Risk
SARA	Species at Risk Act
SC	Special Concern
SWH	Significant Wildlife Habitat
SWM	Stormwater Management
TBM	Tunnel Boring Machine
TDM	Transportation Demand Management
THR	Threatened
TMP	Transportation Master Plan
TOD	Transit-Oriented Development
TPAP	Transit Project Assessment Process (renamed Transit and Rail Project Assessment Process February TRPAP 2024)
TPSS	Traction power substation locations
TSB	Transportation Safety Board
TSSF	Train Storage and Servicing Facility
UNA	Urban Natural Area

Executive Summary

Introduction/Overview

Extending Light Rail Transit (LRT) to Barrhaven is contemplated in the City of Ottawa's current Transportation Master Plan (TMP, 2013) as part of the Ultimate Rapid Transit and Transit Priority Network, with implementation anticipated beyond the 2031 horizon year. In June 2018, City Council approved a motion directing staff to undertake the Barrhaven Light Rail Transit (LRT) Environmental Assessment (EA) Study for conversion of existing Southwest Transitway between Baseline Station and Barrhaven Town Centre from Bus Rapid Transit (BRT) to LRT facility. Completion of this study will bring the Barrhaven area to the same level as other suburban communities in Ottawa with regards to LRT planning, as part of the Stage 3 LRT program. This is the last LRT segment identified in the City's 2013 TMP requiring EA approval.

This study focused on implementing LRT within the rapid transit corridor previously identified and protected through the 1997 Southwest Transitway EA study (Baseline Station to Strandherd Drive) (McCormick Rankin) and the 2006 Southwest Transitway Extension EA study (Strandherd Drive to Cambrian Road) (TSH). This study also examined options for implementation of a Train Storage and Servicing Facility (TSSF), a new Park and Ride lot, and pedestrian and cycling facilities to support rapid transit service.

It should be noted that through the course of this study Baseline Station was renamed to Algonquin Station. To avoid confusion, Baseline Station remains the name used for the Station as it was shown on public consultation documents throughout the project lifecycle.

Environmental Assessment Process

The project planning phase for the Barrhaven LRT commenced in accordance with Ottawa City Council's direction of June 27, 2018 (Motion No. 72/8) and the EA Scope of Work subsequently approved by Ottawa Transportation Committee on October 3, 2018 (Motion No. 35/1).

This study was carried out in accordance with the Province of Ontario's Transit Project Assessment Process (TPAP) which has since been renamed to the Transit and Rail Project Assessment Process (February 2024) as prescribed in Ontario Regulation 231/08 of the Ontario *Environmental Assessment Act*. The regulation prescribes an EA process facilitating public consultation, documentation, and provincial approval. The process is documented in an Environmental Assessment Report (EPR) which is submitted to the Minister of the Environment, Conservation and Parks (MECP) for approval following a mandatory 30-day public review. The Minister has 35 days to render a decision whether the project can proceed. If the Minister does not render a decision by the end of the 35th day, the project is considered approved. Should there be requests to elevate the scale of the EA, the scope of those requests is limited to matters of provincial importance, related to the natural environment or cultural heritage values or interests, or the project may have negative impact on constitutionally protected Aboriginal and treaty rights.

In accordance with the regulation, this EPR will be placed on public record for comment and review prior to MECP approval. If there are concerns of provincial interest that cannot be resolved, a written objection may be made and sent to the Minister for consideration.

Study Process

The Study process reconfirmed the project needs and opportunities, documented existing conditions, evaluated alternative solutions and alternative designs to arrive at a Preferred design, with public and stakeholder consultation undertaken throughout. On November 25, 2020, Ottawa City Council approved the Preferred Design for the Barrhaven Light Rail Transit (LRT) extension from Baseline Station to Barrhaven Town Centre that incorporated an elevated LRT guideway located immediately west of the Woodroffe Avenue Right-of-Way between Algonquin College and the Nepean Sportsplex. One of the impacts of this plan was the removal of 100 low-cost

residential housing units situated within a required 20 metre wide strip of land between Knoxdale and West Hunt Club Roads – a section of Right-of-Way referred to throughout the Study as the ‘Pinch Point’.

An outcome to Committee and Council’s approval of the Preferred Design included direction to establish a task force and working group on affordable housing to address the displacement of 100 privately owned rental units for the properties located with municipal mailing addresses of: 1, 3, 5, 19 and 23 Cheryl Road, 1668 Woodroffe Avenue and 5 Majestic Drive (Recommendation #5). The task force and working group on affordable housing was initiated prior to the issuing of the Notice of Commencement of the TPAP on October 23, 2021.

The task force explored numerous options to mitigate the housing loss, including modifying the LRT alignment to eliminate the loss of housing altogether. Accordingly, the Study Team prepared a functional design plan shifting the LRT alignment to the median of Woodroffe Avenue between north of Knoxdale Road and the Nepean Sportsplex Station (the “Pinch Point”). The new median LRT alignment requires reconstruction of Woodroffe Avenue through the Pinch Point to accommodate the elevated guideway and support piers. It is important to note that the functional design for the remainder of the corridor remains unchanged.

On June 8, 2022 the median LRT alignment and was subsequently approved by Transportation Committee and Council and directed staff to finalize the functional design for the revised alignment and conduct public consultation on the design change and report back to Committee and Council with the outcome prior to re-initiating the TPAP.

Following consultation and refinement of the median elevated LRT alignment the Recommended Plan was presented and approved by the City of Ottawa Transportation Committee on April 27, 2023 and full Council on May 10, 2023. The modification to the design has been captured and described beginning in **Section 6.7** of this EPR. Sections preceding **Section 6.7** have not been edited so as to maintain the transparency and accuracy of the process followed over a number of years to finalize the EA study’s Recommended Plan. As part of the revised design, the existing conditions have been revisited and are documented in **Annex 18, Appendix B**. The remainder of the EPR remains unchanged, consistent with the majority of the Recommended Plan remaining unchanged from what was presented and approved by Committee and Council in 2021.

New City of Ottawa Official Plan

During the process of revising the design, the City adopted a new Official Plan (2022). Subsequently, the Infrastructure Master Plan and Transportation Master Plan have also undergone process of updating and have significantly completed drafts since the documentation of the existing conditions written at the outset of the EA study in 2018. The Recommended Plan has been reviewed to ensure consistency with these new planning documents and is described in **Section 6.8**.

Existing Conditions

The Study Area extends from Baseline Station in the north to Barrhaven Town Centre in the south.

The Official Plan designations from both the 2013 and new 2022 versions were considered through the EA study. Areas around Baseline Station (renamed to Algonquin) and Barrhaven Town Centre are recognized as areas for high density developments, a range of mixed use functions within easy access to transit. Station locations are identified as areas for future focused development and intensification. The Study Area north of Hunt Club Road recognizes Woodroffe Avenue as a Mainstreet Corridor. The Study Area south of West Hunt Club Road to Fallowfield Road recognizes the Greenbelt area and support for Agricultural Resource Area, and Greenbelt Facility. Greenspaces cross the Study Area throughout.

The VIA Rail Smiths Falls Subdivision also crosses the Greenbelt whereby the Southwest Transitway, Woodroffe Avenue and Fallowfield Road all cross at-grade.

Existing environmental conditions for the Study Area were established through a combination of document review and field investigation. Major issues identified which guided planning and design of the project included:

- Geotechnical conditions –a large part of the Study Area includes sensitive soils and groundwater conditions which influence alternative designs, constructability, and project cost.
- Land use and development constraints –part of the Study Area includes established residential communities. New infrastructure must be compatible and address potential impacts such as noise, vibration, the visual environment, community access and property requirements.
- National Capital Commission Greenbelt –new infrastructure needs to address the visual environment, property (including farm infrastructure) and access impacts and enable pathway/eco-passageway connectivity.
- Transportation conditions –The Southwest Transitway and Woodroffe Avenue carry large volumes of transit and automobile traffic and there are key pedestrian/cycling linkages in the Study area. New infrastructure will need to support future travel demand for all modes and address safety, capacity and accessibility requirements.

Pre-planning Activities

The following activities were undertaken during the pre-planning phase:

- Data collection to establish the existing conditions for the Study Area and inform subsequent evaluations;
- Re-confirm the project need and opportunity;
- Re-confirm the Preferred Solution identifying the transit project;
- Develop and complete a comprehensive evaluation of alternative designs and Train Storage and Servicing Facility (TSSF) locations;
- Consultation and engagement including three (3) public open houses, 16 consultation group meetings and several individual stakeholder meetings;
- Presentation and approval of the Recommended Plan at City of Ottawa Transportation Committee and Council; and
- Preparation of the draft Environmental Project Report.

Recommended Plan (Project Description)

The Recommended Plan incorporates:

- 10 kilometres of twin-track, fully segregated electric LRT including;
 - 2.4 kilometres on an elevated structure within the Woodroffe Avenue corridor.
 - 7.6 kilometres converted from bus to rail within the existing Southwest Transitway corridor between Nepean Sportsplex and Barrhaven Town Centre, including 1.7 kilometres of an open-cut trench at the southern end of LRT line.
- 7 LRT stations;
 - Three new LRT stations: Tallwood, Knoxdale and Nepean Sportsplex.
 - Converting four existing Bus Rapid Transit (BRT) stations to LRT stations: Fallowfield, Longfields, Strandherd and Barrhaven Centre.
- Improved and new facilities for pedestrian and cyclists along the corridor, including a pedestrian bridge connecting to the Nepean Sportsplex over Woodroffe Avenue;
- Reconstruction of Woodroffe Avenue from north of Knoxdale to the southern Nepean Sportsplex intersection including modification to five intersections (Knoxdale, Majestic, West Hunt Club, Sportsplex North, Sportsplex South) conforming to the City's Protected Intersections Design Guidelines;
 - Inclusion of uni-directional cycle tracks on both sides of Woodroffe Avenue between Knoxdale Avenue and West Hunt Club Road; and
 - Corridor Landscaping.
- Three new bridges over the VIA Rail line at Woodroffe Avenue, the Southwest Transitway (LRT) and Fallowfield Road;
- Three new below-grade separating structures at Berrigan Drive, Marketplace Avenue and Chapman Mills Drive;

- A light rail TSSF near the VIA Rail overpass at Greenbank Road (1005 and 1045 Greenbank Road);
- A bus-to-rail transfer terminal and 250 space park-and-ride facility at the Barrhaven Town Centre; and
- Signalization at Woodroffe Avenue and the entrance to Baseline Station, and the relocation of a northbound bus stop to far-side at Norice Street as interim transit priority measures.

From approximately 200m north of the Knoxdale/Medhurst intersection to the Nepean Sportsplex south entrance, Woodroffe Avenue will require reconstruction to accommodate the elevated LRT alignment within the median. The functional design for roadway reconstruction reflects a reduction in total traffic lanes (from six to four) through this segment by reallocating the existing transit-only lanes to a wider median needed to support the elevated LRT. The roadway functional design also reflects current best practices and City design standards for Complete Streets, with wider sidewalks and separated cycling facilities (cycle tracks). It also includes five protected signalized intersections (Knoxdale, Majestic, West Hunt Club, Sportsplex North, Sportsplex South) with Smart-channels for right-turns at some locations to meet traffic operations requirements and a wide median to provide road safety barriers around piers.

South of Nepean Sportsplex to Barrhaven Town Centre, the LRT would follow the existing Southwest Transitway corridor, with grade separations over the VIA Rail line. A new signalized intersection at Woodroffe Avenue will provide access to the integrated Fallowfield Station. The Park and Ride at the Barrhaven Centre Station could be integrated with the future development plans for the Barrhaven Town Centre area.

The TSSF will be located on City-owned land in the north-east corner of the Greenbank-Highbury Park intersection. The location is near the end of the LRT line, which will reduce deadhead train mileage, operating cost and non-revenue service time.

Impact Assessment Mitigation and Monitoring

A comprehensive analysis/assessment was undertaken to identify the impacts on the social, natural and physical environments based on implementation of the Recommended Plan. Where potential effects were predicted, mitigation measures are recommended including monitoring, where applicable.

Environmental implications and mitigation measures include:

Noise and Vibration

A noise and vibration assessment and subsequent addendum to capture any changes resulting from the modification to the preferred design were completed to evaluate the potential impacts of the project on the surrounding noise sensitive land uses. Operational noise impacts due to the LRT project are not expected to be significant as noise levels along the alignment are dominated by area road traffic. At-source noise control measures in the form of a noise screen along elevated portions of the guideway is not warranted based on current guidelines. Should there be changes to the guidelines and best management practices in the future or changes in LRT design, it is recommended that noise control measures be reviewed at detailed design. The proposed Fallowfield Road re-alignment to the north will move the road away from nearby receptors, thus reducing road noise levels for residents on the southside. The activity and traffic patterns around existing bus stations and proposed LRT stations are expected to remain similar to the current stations, with the exception of Barrhaven Centre Station which will be reconstructed to include a new bus terminal and Park and Ride lot.

The TSSF is located 100 metres from the nearest sensitive receiver. Inspections and servicing activities will be undertaken indoors, thereby reducing the impact of noise on the adjacent community. Nevertheless, it is recommended that a detailed stationary noise analysis be undertaken during detailed design to confirm mitigation needs. Measures could include equipment silencers, noise walls or berms around the perimeter of the property. Walls and/or landscaped berms could also be built as needed to reduce visual and noise impacts.

Vibration impacts due to the project are not expected to be significant although, if required, appropriate mitigation such as ballast mats/track isolation and resilient track fasteners can be implemented. This can be

confirmed during design and continued discussion with the LRT office of lessons learned through Stage 1 and 2 implementation.

The expected impacts from construction of the project will be limited to isolated and local surface construction generating an increase in occasional minor ground vibrations, emissions and dust, as well as intermittent noise. In all cases, air quality, noise and ground vibrations are not expected to be overly disruptive to commonly occurring regular activities and can be mitigated through standard best practices during construction.

Visual Impacts and Privacy

The project will change the existing views within the corridor and offer new views and vistas across the NCC Greenbelt from the facility and rail grade-separations. The rail grade-separations have been designed to minimize embankment heights and use long open spans to allow for light penetration and views underneath the structures.

The elevated section from Baseline Station to the Nepean Sportsplex will become a new view from the surrounding land uses. Detailed landscape plans will be required throughout the corridor and will include preserving, to the extent possible, existing vegetation and provide new opportunities to mitigate views of the elevated facility to the surrounding community. Where the project includes elevated sections, opportunities to program the space under the guideway for community benefiting uses including parks and recreational pathways or greening will be explored.

The elevated facility is located 40 metres to 60 metres from existing residences along Beechcliffe Street. Opportunities to include landscape buffering, public space and/or more transit-oriented land uses will be explored to minimize impacts to privacy.

Natural Environment

The LRT alignment, while largely within an urban context, does cross the NCC Greenbelt between West Hunt Club Road and Fallowfield Road.

The project includes three existing water crossings: one at the north end of the Greenbelt that provides drainage from the agricultural fields to storm systems under and along Woodroffe Avenue and West Hunt Club Road; and two crossings of Black Rapids Creek closer to Fallowfield Station. Impacts to fisheries and aquatic habitat, as well as water quality, can be avoided using standard design and construction practices such as adhering to in-water timing restrictions and by implementing erosion and sediment control measures.

The project will require the removal of some vegetation along the edge of the Tallwood Woods, an urban woodlot. A detailed tree conservation report and landscape plan will be required prior to project implementation to minimize the impact to trees and identify areas where new trees could be provided.

There is potential for the project to interact with urban and rural species, as well as Species at Risk. The need for more targeted species/inventories is documented in future requirements and with the application of mitigation measures, potential impacts can be reduced or eliminated following all federal and provincial permitting requirements. In addition, the project will need to adhere to the City of Ottawa Protocol for Wildlife Protection during construction. Stations will be designed following the City of Ottawa's guidelines for bird-safe design.

Climate Change

Electric LRT will have a positive effect on climate change when compared to the effects of the current diesel bus service that operates in the corridor today. The reliability and convenience of LRT will also encourage residents to switch from single-occupancy vehicle trips to transit. In addition to electric propulsion, which reduces greenhouse gases, particularly sulphur and nitrogen oxides and other contaminants, LRT also reduces the number of vehicles required to carry large volumes of passengers. The rail grade separations will also eliminate

vehicle idling and congestion associated with the existing at-grade crossings while waiting for trains to pass, thus contributing to a cleaner local environment in the community.

There are also activities that can be done during construction to minimize the project's negative impacts on the environment such as: waste reduction/re-use/diversion measures; sourcing local materials where possible; minimizing tree removals; and other best management practices to reduce temporary noise and air quality impacts. The LRT design includes measures to increase its resiliency to the effects of climate change: stormwater management strategies that consider extreme weather events; landscaping plans that include additional shelter and rest elements to shield facility users from extreme heat; and developing maintenance plans throughout the lifecycle of the facility, including snow and ice management strategies.

Approvals, Monitoring and Commitments to Future Work

The following future commitments will be undertaken as part of the next phases of the project:

- Additional consultation with the Royale Equestrian Centre and NCC regarding the new entrance to the centre at 2191 Woodroffe Avenue resulting from the grade-separation of Woodroffe Avenue and LRT.
- Section 82 determination under the *Impact Assessment Act* based on requirement for federal lands.
- Federal Land Use, Design and Transaction Approval (FLUDTA) from NCC due to the requirement for federal lands.
- Other Federal Approvals to be confirmed including those required under the *Species at Risk Act* and *Fisheries Act* and O.Reg. 406/19 On-site and excess soil management.
- Provincial Approvals to be confirmed including: Environmental Compliance Approval, Permit to take Water, those under the *Endangered Species Act*, *Heritage Act*, *Public Lands Act*, *Conservation Authorities Act*,
- Possible EA under Hydro One Class EA process
- Municipal Approvals to be confirmed including: Road modification Approval, Road Cut Permit, Temporary Encroachment Permit, Noise By-Law Exemption and Tree Protection By-Law.

Monitoring plans from **Section 7** will be developed and reviewed by the appropriate agencies prior to implementation. Construction and post construction monitoring will be required (**Section 9.6**).

In addition, monitoring may be required as part of the permit and approval process detailed above.

Under the Environmental Assessment Act, the proponent is required to monitor compliance of the implementation of mitigation measures as identified in the EPR. The City of Ottawa will prepare a monitoring plan in accordance with subsection 9.2.8 of Ontario Regulation 231/08 to verify the effectiveness of the mitigation measures. The monitoring plan will be designed prior to the start of construction and will outline roles and responsibilities related to agency reviews and implementation of the monitoring report.

Financial Implications

The Class C estimate (2023 dollars) to design and implement the Barrhaven LRT and three rail grade-separations is \$4.019 billion.

The project can be constructed in phases:

- Phase 1: Baseline Station to Fallowfield Station (\$2.717 billion). It includes rail grade-separations (at Woodroffe Avenue, Southwest Transitway and Fallowfield Drive) and the expansion of the maintenance facility at Moodie Drive to initially support Phase 1 extension.
- Phase 2: Fallowfield Station to Barrhaven Town Centre (\$1.302 billion). It includes the new TSSF.

Rail grade-separations of Woodroffe Avenue, Southwest Transitway and Fallowfield Drive may be undertaken in advance of the LRT extension at an estimated cost of \$535 million. This cost is included in the estimate for Phase 1.

The Class C estimate (2020 dollars) to design and implement a new signalized protected intersection at the entrance to the Baseline Station, and the relocation of an existing bus stop at Norice Street, is \$2 million.

This near-term improvement measure can be funded through the City's transit priority program.

Public Consultation / Input

Consultation with stakeholders occurred through the Agency Consultation Group (ACG), Business Consultation Group (BCG), and Public Consultation Group (PCG). Stakeholders include Indigenous Communities, government agencies, Ottawa Housing, National Capital Commission (NCC), VIA Rail, CN Rail, Rideau Valley Conservation Authority (RVCA), City's Accessibility Advisory Committee (AAC), Barrhaven Business Improvement Area (BIA), developers, landowners, business groups, school boards, community associations and special interest groups. Consultation with the general public occurred primarily through three open houses and through the project website, e-mail, and additional meetings as required, such as with affected property owners. A project website (www.ottawa.ca/barrhavenlrt) was established to share information on the study's progress.

Major feedback included: support for advancing the project; concerns about the impact on rental housing units, noise and visual impacts from the elevated facility, and avoiding traffic impacts to Woodroffe Avenue during and post construction; support for pedestrian and cycling facilities, making use of the space under the guideway, providing more parking, and the grade separations at the VIA rail crossings; and a desire to limit impacts on the NCC Greenbelt and green spaces; and, impact on water quality.

These issues were assessed during the development of Recommended Plan and are described as part of the description of the Recommended Plan.

Sommaire

Introduction/Aperçu

Le Plan directeur des transports (PDT, 2013) actuel de la Ville d'Ottawa examine le prolongement du train léger sur rail (TLR) à Barrhaven dans le cadre du réseau de transport en commun rapide et de transport en commun prioritaire final, dont le déploiement est projeté au-delà de l'horizon de 2031. En juin 2018, le Conseil municipal a approuvé une motion mandatant le personnel d'entreprendre une étude d'évaluation environnementale (EE) pour le train léger sur rail (TLR) à Barrhaven en prévision de la conversion du Transitway Sud-Est existant entre la station Baseline et le centre-ville de Barrhaven depuis un réseau de transport en commun rapide par autobus (TCRA) en un réseau de TLR. La réalisation de cette étude permettra au secteur de Barrhaven d'atteindre le même niveau que les autres communautés suburbaines d'Ottawa en ce qui concerne la planification du TLR dans le cadre du programme de l'Étape 3 du TLR. Il s'agit du dernier segment du TLR identifié dans le PDT 2013 de la Ville nécessitant l'approbation de l'EE.

L'étude portait sur la mise en œuvre du TLR dans le couloir de transport en commun rapide précédemment identifié et protégé par l'étude d'EE du Transitway Sud-Ouest entre la station Baseline et la promenade Strandherd (1997) et l'étude d'EE du prolongement du Transitway Sud-Ouest entre la promenade Strandherd et le chemin Cambrian (2006) (TSH). Différentes options de mise en œuvre ont également été examinées, de même que l'aménagement d'une installation d'entreposage et d'entretien des trains (IEET), d'un nouveau parc relais et d'installations piétonnières et cyclables pour soutenir le service de transport en commun rapide.

Il est à noter que dans le cadre de cette étude, la station Baseline a été renommée station Algonquin. Pour éviter toute confusion, on continuera ici de l'appeler la station Baseline, telle qu'elle était identifiée dans les documents de consultation publique tout au long du cycle de vie du projet.

Évaluation environnementale du projet

La phase de planification du projet du TLR de Barrhaven a débuté conformément à la directive du Conseil municipal d'Ottawa du 27 juin 2018 (motion n° 72/8) et à la portée des travaux de l'EE approuvée par la suite par le Comité des transports d'Ottawa le 3 octobre 2018 (Motion n° 35/1).

Cette étude a été réalisée conformément au Processus d'évaluation des projets de transport en commun (PEPTC) du gouvernement de l'Ontario, qui a depuis été renommé Processus d'évaluation des projets de transport en commun et ferroviaire (février 2024), comme le prévoit le Règlement de l'Ontario 231/08 de la *Loi sur l'évaluation environnementale de l'Ontario*. Ce règlement prescrit un processus d'EE qui facilite la consultation publique, la documentation et l'approbation provinciale. Le processus est documenté dans un rapport d'évaluation environnementale (REE) qui est soumis au ministre de l'Environnement, de la Protection de la nature et des Parcs (MEPNP) aux fins d'approbation à la suite d'un examen public obligatoire de 30 jours. Le ministre dispose de 35 jours pour décider si le projet peut se poursuivre. Si le ministre ne rend pas de décision à la fin de la 35^e journée, le projet est considéré comme approuvé. S'il y a des demandes d'augmentation du niveau de l'EE, la portée de ces demandes se limite aux questions d'intérêt provincial, notamment l'environnement naturel ou culturel, les valeurs ou les intérêts du patrimoine culturel ou si le projet entraîne des répercussions négatives sur les droits ancestraux autochtones protégés par la Constitution.

Conformément au PEPTC, ce REE sera versé au dossier public aux fins de commentaires et d'examen avant l'approbation par le MEPNP. S'il y a des préoccupations d'intérêt provincial qui ne peuvent être résolues, une objection écrite peut être envoyée au ministre pour examen.

Processus de l'étude

Le processus d'étude a reconfirmé les besoins et les possibilités du projet, documenté les conditions existantes, évalué les solutions et les conceptions de rechange pour arriver à une conception privilégiée, en ayant consulté

le public et les intervenants tout au long du processus. Le 25 novembre 2020, le Conseil municipal d'Ottawa a approuvé la conception privilégiée pour le prolongement du train léger sur rail (TLR) de Barrhaven, depuis la station Baseline jusqu'au centre-ville de Barrhaven, qui comprenait une voie de guidage du TLR surélevée située immédiatement à l'ouest de l'emprise de l'avenue Woodroffe, entre le Collège Algonquin et le Sportsplex de Nepean. Ce plan avait entre autres pour effet d'éliminer 100 logements résidentiels à loyer modique dans une parcelle de terrain de 20 mètres de largeur requise entre le chemin Knoxdale et le chemin West Hunt Club – une section d'emprise appelée le « point de rétrécissement » tout au long de l'étude.

Le Comité et le Conseil ont approuvé la conception privilégiée et demandé notamment la création d'un groupe de travail sur le logement abordable afin de traiter le déplacement de 100 logements locatifs privés pour les propriétés ayant les adresses postales municipales suivantes : 1, 3, 5, 19 et 23, chemin Cheryl, 1668, avenue Woodroffe et 5, promenade Majestic (recommandation n° 5). Le groupe de travail sur le logement abordable a été mis sur pied avant l'émission de l'avis de début de l'étude du PEPTC, le 23 octobre 2021.

Le groupe de travail a examiné de nombreuses options afin d'atténuer la perte de logement, notamment la modification du tracé du TLR pour éliminer complètement la perte de logement. Par conséquent, l'équipe de l'étude a préparé un plan de conception fonctionnel déplaçant le tracé du TLR sur le terre-plein central de l'avenue Woodroffe entre le nord du chemin Knoxdale et la station du Sportsplex de Nepean (le « point de rétrécissement »). Le nouveau tracé du TLR passant par le terre-plein central exige la réfection de l'avenue Woodroffe en passant par le point de rétrécissement afin d'accommoder la voie de guidage surélevée et les piliers de soutènement. Il est important de noter que la conception fonctionnelle pour le reste du couloir demeure inchangée.

Le 8 juin 2022, le Comité des transports et le Conseil ont approuvé le tracé du TLR passant par le terre-plein central et ont demandé au personnel de finaliser la conception fonctionnelle pour le tracé révisé et de mener une consultation publique sur la modification de la conception puis de rendre compte au Comité et au Conseil des résultats avant de relancer le PEPTC.

Après la consultation et le peaufinage du tracé surélevé du TLR dans le terre-plein central, le plan recommandé a été présenté et approuvé par le Comité des transports de la Ville d'Ottawa le 27 avril 2023 et par le Conseil le 10 mai 2023. La modification de la conception a été saisie et décrite à la **Section 6.7** du présent REE. Les sections précédant la **Section 6.7** n'ont pas été modifiées afin de préserver la transparence et l'exactitude du processus suivi depuis de nombreuses années pour finaliser le plan recommandé de l'étude d'EE. Dans le cadre de la conception révisée, les conditions existantes ont été revues et sont documentées à l'**annexe 18, appendice B**. Le reste du REE demeure inchangé, comme la majorité du plan recommandé qui demeure également inchangé par rapport à ce qui a été présenté et approuvé par le Comité et le Conseil en 2020.

Nouveau Plan officiel de la Ville d'Ottawa

Au cours du processus de révision de la conception, la Ville a adopté un nouveau Plan officiel (2022). Par la suite, le Plan directeur des infrastructures et le Plan directeur des transports ont également été mis à jour, et des versions préliminaires sont en grande partie terminées depuis la documentation des conditions existantes écrite au début de l'étude de l'EE en 2018. Le plan recommandé a été revu pour assurer la cohérence avec ces nouveaux documents de planification et est décrit à la **Section 6.8**.

Conditions existantes

Le secteur à l'étude s'étend de la station Baseline, au nord, au centre-ville de Barrhaven, au sud.

Les désignations du Plan officiel de la version 2013 et de la nouvelle version 2022 ont été examinées dans le cadre de l'étude sur l'EE. Les secteurs autour de la station Baseline (renommée Algonquin) et du centre-ville de Barrhaven sont reconnus comme étant des zones d'aménagement de grande densité, offrant une gamme d'utilisations polyvalentes et un accès facile au transport en commun. Les emplacements des stations sont identifiés comme des zones futures d'aménagement et de densification. La zone à l'étude au nord du chemin

Hunt Club identifie l'avenue Woodroffe comme un couloir de rue principale. La zone à l'étude au sud du chemin West Hunt Club jusqu'au chemin Fallowfield reconnaît la zone de la Ceinture de verdure et soutient l'aménagement d'un secteur de ressources agricole et l'installation de la Ceinture de verdure. La zone à l'étude comporte de nombreux espaces verts.

La subdivision de Smiths Falls de VIA Rail traverse également la Ceinture de verdure alors que le Transitway Sud-Ouest, l'avenue Woodroffe et le chemin Fallowfield traversent tous à niveau.

Les conditions environnementales existantes pour le secteur à l'étude ont été établies en analysant des documents et en effectuant des études de terrain. Voici les problèmes majeurs qui ont été relevés et qui ont orienté la planification et la conception du projet :

- Conditions géotechniques – Une vaste partie du secteur à l'étude comprend des sols fragiles et des eaux souterraines qui influent sur les conceptions de rechange, sur la constructibilité et sur les coûts du projet.
- Utilisation du sol et contraintes sur les aménagements – Une partie du secteur à l'étude comprend des communautés résidentielles établies. Les nouvelles infrastructures doivent être compatibles avec celles-ci et il est important d'examiner les répercussions possibles comme le bruit, les vibrations, l'environnement visuel, l'accès à la communauté et les exigences en matière de propriété.
- Ceinture de verdure de la Commission de la capitale nationale – En raison de ces nouvelles infrastructures, il est important d'examiner les répercussions sur l'environnement visuel, sur les propriétés (y compris les infrastructures agricoles) et sur l'accès. Il importe également d'aménager des sentiers ou des passages écologiques.
- Conditions de transport – Le Transitway Sud-Ouest et l'avenue Woodroffe accueillent un grand volume de circulation automobile et de transports en commun. Le secteur à l'étude comprend aussi des points de liaison importants pour les piétons et les cyclistes. Les nouvelles infrastructures devront répondre aux besoins futurs en matière de déplacement, pour tous les modes de transport, et il sera important de traiter les exigences de sécurité, de capacité et d'accessibilité.

Activités préalables à la planification

Les activités suivantes ont été entreprises au cours de la phase préalable à la planification :

- Collecte de données pour établir les conditions existantes pour le secteur à l'étude et orienter les évaluations subséquentes;
- Reconfirmation de la nécessité et l'opportunité du projet;
- Reconfirmation de la solution privilégiée identifiant le projet de transport en commun;
- Élaboration et évaluation complète des conceptions de rechange et des emplacements de l'installation d'entreposage et d'entretien des trains (IEET);
- Consultation et engagement, notamment trois (3) journées portes ouvertes publiques, 16 réunions de groupe de consultation et plusieurs réunions individuelles avec les intervenants;
- Présentation et approbation du plan recommandé au Conseil et au Comité des transports de la Ville d'Ottawa; et
- Préparation du rapport de projet environnemental.

Plan recommandé (description du projet)

Le plan recommandé comprend :

- Une ligne de 10 kilomètres de TLR électrique à deux voies entièrement séparées, y compris :
 - 2,4 kilomètres de voies sur une structure surélevée dans le couloir de l'avenue Woodroffe.
 - 7,6 kilomètres convertis de l'autobus au train dans le couloir actuel du Transitway Sud-Ouest, entre le Sportsplex de Nepean et le centre-ville de Barrhaven, y compris une tranchée à ciel ouvert de 1,7 kilomètre à l'extrémité sud de la ligne du TLR.
- Sept stations de TLR :

- Trois nouvelles stations de TLR : Tallwood, Knoxdale et Sportsplex de Nepean
- Conversion de quatre stations de transport en commun rapide par autobus (TCRA) existantes en stations de TLR : Fallowfield, Longfields, Strandherd et Barrhaven Centre.
- Des installations nouvelles et améliorées pour les piétons et les cyclistes le long du couloir, y compris une passerelle piétonnière reliant ces installations au Sportsplex de Nepean au-dessus de l'avenue Woodroffe;
- Réfection de l'avenue Woodroffe du nord du chemin Knoxdale jusqu'à l'intersection sud du Sportsplex de Nepean, comprenant la modification de cinq intersections (Knoxdale, Majestic, West Hunt Club, entrée nord du Sportsplex, entrée sud du Sportsplex) conformément au Guide de conception des intersections protégées de la Ville;
 - Inclusion de pistes cyclables unidirectionnelles des deux côtés de l'avenue Woodroffe, entre l'avenue Knoxdale et le chemin West Hunt Club; et
 - Aménagement paysager du couloir.
- Trois nouveaux ponts enjambant la ligne ferroviaire de VIA Rail à la hauteur de l'avenue Woodroffe, du Transitway Sud-Ouest (TLR) et du chemin Fallowfield;
- Trois nouvelles structures souterraines à la hauteur de la promenade Berrigan, de l'avenue Marketplace et de la promenade Chapman Mills;
- Une installation d'entreposage et d'entretien des trains (IEET) près du passage supérieur de VIA Rail à la hauteur du chemin Greenbank (1005 et 1045, chemin Greenbank);
- Un terminus pour les correspondances autobus/train et un parc relais de 250 places au centre-ville de Barrhaven
- Installation de feux de signalisation à l'avenue Woodroffe et à l'entrée de la station Baseline et le déplacement de l'arrêt d'autobus direction nord de l'autre côté du couloir, à la hauteur de la rue Norice, à titre de mesures provisoires de priorité au transport en commun.

À partir d'environ 200 m au nord de l'intersection Knoxdale/Medhurst jusqu'à l'entrée sud du Sportsplex de Nepean, l'avenue Woodroffe nécessitera une réfection pour accommoder le tracé surélevé du TLR sur le terre-plein central. La conception fonctionnelle de la réfection de la chaussée prévoit une réduction du nombre total de voies (de six à quatre) dans ce segment en réaffectant les voies existantes réservées au transport en commun à un terre-plein central plus large nécessaire pour soutenir le TLR surélevé. La conception fonctionnelle de la chaussée respecte les pratiques exemplaires actuelles et les normes de conception de la Ville pour les rues complètes, prévoyant des trottoirs plus larges et des installations cyclables séparées (pistes cyclables). Elle comprend également cinq intersections protégées avec feux de signalisation (Knoxdale, Majestic, West Hunt Club, entrée nord du Sportsplex, entrée sud du Sportsplex) avec des bretelles de virage à droite sécuritaires à certains endroits afin de répondre aux impératifs opérationnels de la circulation automobile et un large terre-plein central pour permettre d'aménager des barrières de sécurité routière autour des piliers.

Au sud du Sportsplex de Nepean jusqu'au centre-ville de Barrhaven, il est prévu que le tracé du TLR emprunte le couloir actuel du Transitway Sud-Ouest et que des sauts-de-mouton soient construits aux passages ferroviaires de VIA Rail. Une nouvelle intersection avec signalisation à la hauteur de l'avenue Woodroffe permettra d'accéder à la station intégrée de Fallowfield. Il sera possible d'intégrer le parc relais de la station de Barrhaven-Centre aux plans d'aménagement futur du centre-ville de Barrhaven.

L'IEET sera située sur un terrain appartenant à la Ville, à l'angle nord-est de l'intersection Greenbank-Highbury Park. Cet emplacement est situé près de la fin de la ligne du TLR, réduisant ainsi le nombre de kilomètres parcourus à vide par les trains, les frais d'exploitation et le temps de service non commercial.

Évaluation, atténuation et surveillance des répercussions

Une analyse et une évaluation approfondies ont été entreprises pour déterminer les répercussions sur les environnements sociaux, naturels et physiques de la mise en œuvre du plan recommandé. Lorsque des effets potentiels étaient prévus, des mesures d'atténuation sont recommandées, notamment la surveillance, le cas échéant.

Voici les répercussions environnementales et les mesures d'atténuation prévues :

Bruit et vibration

Une évaluation du bruit et des vibrations visant à saisir tout changement découlant de la modification de la conception privilégiée a été réalisée pour déterminer les répercussions possibles du projet sur les aménagements avoisinants sensibles au bruit, le tout ayant ensuite été consigné dans un addenda. On ne s'attend pas à ce que les opérations du TLR aient un impact sonore considérable étant donné que le niveau prédominant de bruit le long du tracé est celui de la circulation routière dans le secteur. Une mesure de contrôle du bruit à la source, comme l'installation d'un mur antibruit longeant les parties surélevées de la voie de guidage, n'est pas nécessaire en fonction des actuelles lignes directrices. Si on modifiait ces lignes directrices et les pratiques de gestion exemplaires ou si on modifiait la conception du TLR, il est recommandé de réviser les mesures de contrôle du bruit à l'étape de la conception détaillée. Le nouveau tracé proposé du chemin Fallowfield vers le nord éloignera la route des récepteurs à proximité de celle-ci, ce qui aura pour effet de réduire le niveau du bruit de la circulation pour les résidents du côté sud. Les activités et la circulation autour des stations d'autobus actuelles et des stations du TLR proposées devraient demeurer assez semblables à ce qu'elles sont présentement, sauf dans le cas de la station Barrhaven Centre, qui sera reconstruite pour inclure un nouveau terminus d'autobus et un parc relais.

L'IEET est située à 100 m du récepteur sensible au bruit le plus près. Les inspections et les activités d'entretien se dérouleront à l'intérieur, réduisant ainsi les effets du bruit sur la communauté adjacente. Néanmoins, il est recommandé d'effectuer une analyse détaillée des sources de bruit fixes à l'étape de la conception détaillée afin de déterminer les mesures d'atténuation requises. Ces mesures pourraient inclure des silencieux placés sur des équipements et des murs ou des bermes antibruit installés autour de la propriété. Des murs ou des bermes aménagées pourraient également être construits au besoin pour réduire l'impact visuel ou sonore.

Les vibrations causées par le TLR ne devraient pas être importantes quoique, au besoin, des mesures d'atténuation, comme des plaques isolantes et des dispositifs de fixation résistants pour les rails, pourront être mises en œuvre. Cela pourra être confirmé pendant la conception et lors des discussions continues avec le Bureau du TLR portant sur les leçons apprises lors de la mise en œuvre des Étapes 1 et 2.

Les répercussions en ce qui concerne la construction devraient se limiter à des activités locales isolées et à des travaux en surface générant occasionnellement de légères vibrations, des émissions et de la poussière, ainsi que des bruits intermittents. Dans tous les cas, la qualité de l'air, le bruit et les vibrations du sol ne devraient pas perturber excessivement les activités normales, et leur impact pourra être atténué à l'aide de pratiques exemplaires durant la construction.

Impact visuel et vie privée

Le projet modifiera les vues à l'intérieur du couloir et offrira d'autres vues et perspectives dans la Ceinture de verdure de CCN depuis l'installation et les sauts-de-mouton. Les sauts-de-mouton ferroviaires ont été conçus de manière à réduire la hauteur des remblais et ils s'appuient sur de longs arcs ouverts afin de permettre à la lumière de pénétrer et de pouvoir voir sous les structures.

La section surélevée depuis la station Baseline jusqu'au Sportsplex de Nepean offrira une nouvelle vue aux aménagements environnants. Des plans d'aménagement paysager devront être produits pour l'ensemble du couloir. Ils prévoient la préservation, dans la mesure du possible, de la végétation existante et ils offriront de nouvelles possibilités de cacher à la vue de la collectivité environnante la structure surélevée. Lorsque le projet comprend des sections surélevées, on examinera les possibilités d'aménager l'espace sous la voie de guidage pour des utilisations qui bénéficieront à la communauté, comme des parcs et des sentiers récréatifs ou l'écologisation.

La structure surélevée se trouve de 40 m à 60 m de distance des maisons longeant la rue Beechcliffe. On étudiera les possibilités d'inclure des zones tampons paysagères, des espaces publics ou des utilisations du sol plus axées sur le transport en commun afin de minimiser les répercussions sur la vie privée.

Environnement naturel

Le tracé du TLR, bien qu'il se trouve en grande partie en zone urbaine, traverse la Ceinture de verdure de la CCN, entre les chemins West Hunt Club et Fallowfield.

Il compte trois franchissements de cours d'eau : un à l'extrémité nord de la Ceinture de verdure qui draine l'eau des champs agricoles et la dirige vers les réseaux d'eaux pluviales sous l'avenue Woodroffe et le chemin West Hunt Club et en bordure de ces routes et deux au ruisseau Black Rapids, plus près de la station Fallowfield. L'impact sur les poissons et l'habitat aquatique et sur la qualité de l'air peut être évité par des pratiques normalisées de conception et de construction, comme des restrictions quant au moment d'effectuer des travaux dans l'eau, et par des mesures pour contrôler l'érosion et la sédimentation.

Pour réaliser le projet, il faudra enlever une partie de la végétation en bordure du boisé Tallwood, une forêt urbaine. Un rapport détaillé sur la conservation des arbres et un plan d'aménagement paysager devront être produits avant la mise en œuvre du projet afin de réduire l'impact sur les arbres et de déterminer des endroits où de nouveaux arbres pourront être plantés.

Il est possible que le projet interagisse avec des espèces urbaines et rurales, ainsi qu'avec des espèces en péril. La nécessité de répertorier les espèces ciblées est documentée dans les exigences futures et, en appliquant des mesures d'atténuation et en respectant toutes les exigences des permis fédéraux et provinciaux, l'impact potentiel peut être réduit, voire éliminer. De plus, il faudra que le projet, durant la phase de construction, soit conforme au protocole de la Ville d'Ottawa en matière de protection de la faune. Les stations seront conçues conformément aux directives de la Ville d'Ottawa en matière de conception sécuritaire pour les oiseaux.

Changements climatiques

Le TLR électrique aura des effets positifs au chapitre des changements climatiques en comparaison à l'impact des autobus au diesel qui circulent présentement dans ce couloir. La fiabilité et le côté pratique du TLR inciteront aussi les résidents à délaissier leurs véhicules à un seul occupant au profit du transport en commun. Outre sa propulsion à l'électricité, qui réduit les émissions de gaz à effet de serre, notamment les oxydes de soufre et d'azote et d'autres contaminants, le TLR réduit aussi le nombre de véhicules requis pour transporter un grand volume de passagers. Les sauts-de-mouton ferroviaires élimineront également les véhicules tournant au ralenti et la congestion associée aux passages à niveau actuels où il est nécessaire d'attendre le passage des trains. Cela contribuera à un environnement local plus propre au sein de la collectivité.

Certaines mesures peuvent être prises durant la construction pour réduire les effets négatifs du projet sur l'environnement, notamment : réduire, recycler et réacheminer les déchets; se procurer localement des matériaux lorsque possible; réduire l'abattage d'arbres et appliquer d'autres pratiques de gestion exemplaires pour réduire le bruit temporaire et les répercussions temporaires sur la qualité de l'air. La conception du TLR comprendra des mesures pour accroître sa résistance face aux effets des changements climatiques : des stratégies de gestion des eaux pluviales qui tiennent compte des phénomènes météorologiques extrêmes; des plans d'aménagement paysager qui incluent des abris additionnels et des aires de repos pour protéger les usagers de la chaleur extrême et des plans d'entretien pour l'ensemble du cycle de vie de l'installation, y compris des stratégies de gestion de la neige et de la glace.

Approbations, surveillance et engagements pour les travaux futurs

Les engagements futurs suivants seront pris dans les prochaines phases du projet :

- Consultation supplémentaire avec le Centre équestre Royale et la CCN au sujet de la nouvelle entrée du centre au 2191, avenue Woodroffe, en raison de l'aménagement du saut-de-mouton du TLR pour l'avenue Woodroffe.
- Détermination de l'article 82 en vertu de la *Loi sur l'évaluation d'impact* concernant le besoin d'acquisition de terres fédérales.
- Obtention de l'approbation fédérale de l'utilisation du sol, du design et des transactions immobilières de la CCN en raison de la nécessité d'acquérir des terres fédérales.
- Autres approbations fédérales à confirmer, notamment celles qui sont requises en vertu de la *Loi sur les espèces en péril*, de la *Loi sur les pêches* et du Règl. de l'Ont. 406/19 : *Gestion des sols sur les lieux et des sols de déblai*.
- Approbations provinciales restant à confirmer, notamment : Autorisation environnementale, permis de prélèvement d'eau, approbations en vertu de la *Loi sur les espèces en voie de disparition*, de la *Loi sur le patrimoine*, de la *Loi sur les terres publiques* et de la *Loi sur les offices de protection de la nature*.
- Possibilité d'une évaluation environnementale en vertu du processus d'évaluation environnementale de portée générale d'Hydro One.
- Approbations municipales restant à confirmer, notamment : Approbation de modification à la chaussée, permis de terrassement, permis d'empiètement temporaire, exemption au *Règlement sur le bruit* et au *Règlement sur la protection des arbres*.

Des plans de surveillance (**Section 7**) seront élaborés et examinés par les organismes appropriés avant leur mise en œuvre. Une surveillance pendant et après la construction sera requise (**Section 9.6**).

De plus, une surveillance pourrait être nécessaire dans le cadre du processus de permis et d'approbation décrit ci-dessus.

En vertu de la *Loi sur l'évaluation environnementale*, le promoteur est tenu de surveiller la conformité de la mise en œuvre des mesures d'atténuation, comme indiqué dans le REE. La Ville d'Ottawa préparera un plan de surveillance conformément au paragraphe 9.2.8 du Règlement de l'Ontario 231/08 afin de vérifier l'efficacité des mesures d'atténuation. Le plan de surveillance sera élaboré avant le début de la construction et il décrira les rôles et les responsabilités reliés aux examens des organismes et à la mise en œuvre du rapport de surveillance.

Répercussions financières

Selon l'estimation de catégorie C (en dollars de 2023), la conception et la mise en œuvre du TLR de Barrhaven et des trois sauts-de-mouton coûteront 4,019 milliards de dollars.

Le projet peut se réaliser en trois phases :

- Phase 1 : de la station Baseline à la station Fallowfield (2,717 milliards de dollars). Cela comprend les sauts-de-mouton ferroviaires (à l'avenue Woodroffe, au Transitway Sud-Ouest et à la promenade Fallowfield) et l'agrandissement de l'installation d'entretien de la promenade Moodie pour soutenir initialement la phase 1 du prolongement.
- Phase 2 : de la station Fallowfield jusqu'au centre-ville de Barrhaven (1,302 milliard de dollars). Cette phase comprend la nouvelle installation d'entreposage et d'entretien des trains.

Les travaux de construction des sauts-de-mouton ferroviaires de l'avenue Woodroffe, du Transitway Sud-Ouest et de la promenade Fallowfield peuvent commencer avant le début des travaux de prolongement du TLR, à un coût estimé de 535 millions de dollars. Ce montant est compris dans l'estimation des coûts de la phase 1.

Selon l'estimation de catégorie C (en dollars de 2023), la conception et la mise en œuvre d'une nouvelle intersection protégée avec feux de signalisation à l'entrée de la station Baseline ainsi que le déplacement d'un arrêt d'autobus existant sur la rue Norice s'élèvent à 2 millions de dollars.

Cette mesure d'amélioration à court terme peut être financée à même le budget du programme de priorité au transport en commun de la Ville.

Consultation et commentaires du public

Les consultations se sont déroulées par l'entremise du Groupe de consultation des organismes (GCO), du Groupe de consultation des entreprises (GCE) et du Groupe de consultation publique (GCP). Les intervenants consultés comprennent des communautés autochtones, des ministères, Logement Ottawa, la Commission de la capitale nationale (CCN), VIA Rail, le Canadien National (CN), l'Office de protection de la nature de la vallée Rideau (OPNVR), le Comité consultatif sur l'accessibilité (CCA) de la Ville, la Zone d'amélioration commerciale de Barrhaven (ZAC), des promoteurs, des propriétaires, des groupes de gens d'affaires, des conseils scolaires, des associations communautaires et des groupes d'intérêts spéciaux. La consultation du grand public a surtout pris la forme de deux séances portes ouvertes, de commentaires recueillis sur le site Web du projet, de courriels et de rencontres additionnelles au besoin, notamment avec les propriétaires touchés. Un site Web (www.ottawa.ca/barrhaventlr) a été créé pour le projet afin de diffuser de l'information sur le déroulement de l'étude.

Les principaux commentaires portaient sur les aspects suivants : soutien pour l'avancement du projet; répercussions sur les logements locatifs; bruit et effets visuels de la structure surélevée; éviter de perturber la circulation sur l'avenue Woodroffe durant et après la construction; soutien pour les installations piétonnières et cyclables; utilisation de l'espace sous la voie de guidage; fournir plus de places de stationnement; sauts-de-mouton aux passages à niveau de VIA Rail; désir de limiter les répercussions sur la Ceinture de verdure et les espaces verts de la CCN et impact sur la qualité de l'eau.

Ces problèmes ont été évalués au cours de l'élaboration du plan recommandé et sont détaillés dans la description du plan recommandé.

1 Introduction

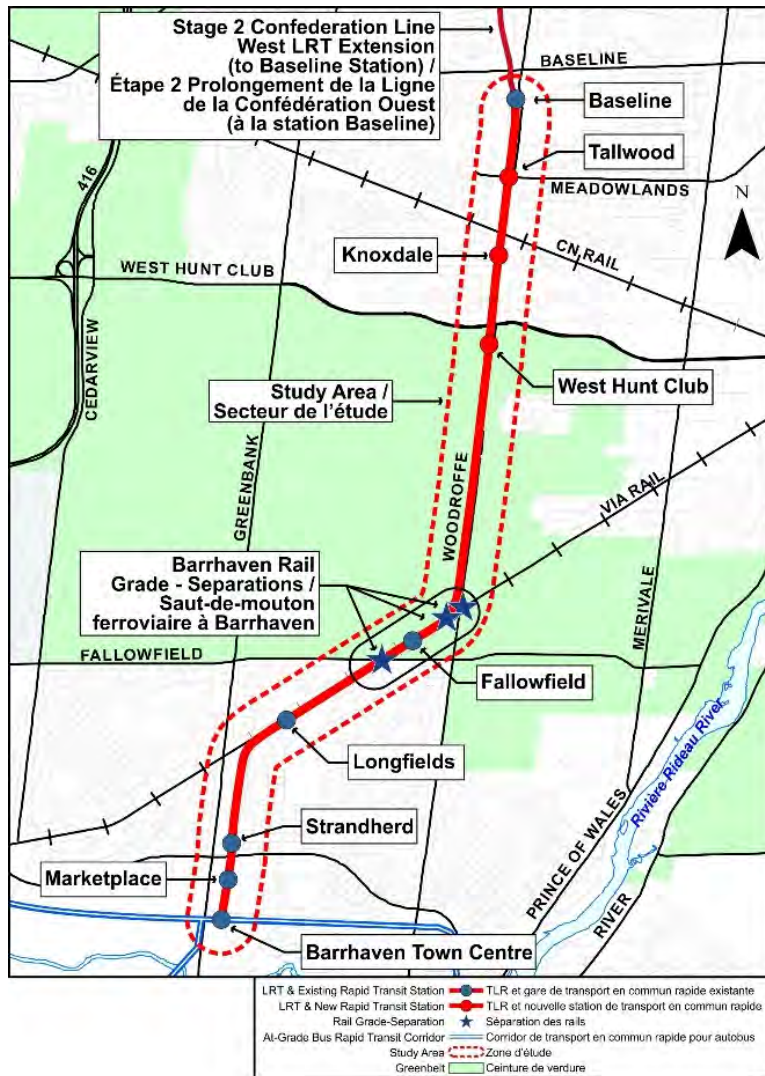
The City of Ottawa is the proponent of the Barrhaven Light Rail Transit (Baseline Station to Barrhaven Town Centre) and Rail Grade-Separations Planning and Environmental Assessment (EA) Study. The Study was completed in accordance with the Transit Project Assessment Process (TPAP) (since renamed to the Transit and Rail Project Assessment Process TRPAP) Ontario Regulation 231/08 under Ontario's *Environmental Assessment Act*. This EA study has developed a Recommended Plan for a 10 kilometre (km) long twin-track electrically powered Light Rail Transit (LRT) facility extending from Baseline Station to Barrhaven Town Centre, as well as the grade-separations of Woodroffe Avenue, the Southwest Transitway and Fallowfield Road where these corridors currently cross the VIA Rail Smiths Falls Subdivision rail line at-grade in Barrhaven. The Study Area for this EA is illustrated on **Figure 1-1**. The City of Ottawa will have charge of this project, following the responsibilities and obligations identified in Regulation 231/08 during the planning stages, Transit and Rail Project Assessment Process, implementation and operation of the preferred undertaking described herein.

The need and opportunity for extending LRT to Barrhaven Town Centre and implementing the associated rail grade-separations is well established in a number of the City's key strategic directions and objectives as well as within the previously completed EA studies dating from 1997. There are numerous benefits associated with extending LRT to Barrhaven Town Centre, including providing opportunities for modal shift from private vehicles to public transit and via enhanced pedestrian and cycling facilities with improved connections to and from rapid transit stations as well as along the LRT corridor.

The proposed rail grade-separations will address Transportation Safety Board of Canada (TSB) Recommendation R15-05 provided by the TSB in its Railway Investigation Report R13T0192 on the September 2013 VIA Rail/OC Transpo train and bus collision at the VIA Rail line/Southwest Transitway level crossing. The need for the rail grade-separations is further established and confirmed by the recently completed study: Barrhaven and Merivale Road Rail-Grade Separation Study ((BMRRGSS,) 2017).

As part of the study process, this Environmental Project Report (EPR) has been prepared to document activities and findings during the planning and functional design phase and to present the Recommended Plan for the project. The EPR provides the background and an overview of the study including the location and rationale for the proposed project; EA requirements; the public consultation process; the existing and future social, transportation, infrastructure and utilities, economic, natural and physical conditions; development and evaluation of alternative designs; the selection of a preferred alternative; the Recommended Plan; and an assessment of the effects of the project.

Figure 1-1 Study Area



1.1 Project Background

The Barrhaven LRT project is a component of the City’s planned rapid transit network. It is identified in the City’s 2013 Transportation Master Plan (TMP) as part of the Ultimate Rapid Transit Network, with implementation currently anticipated beyond the TMP’s 2031 horizon year (Figure 1-2).

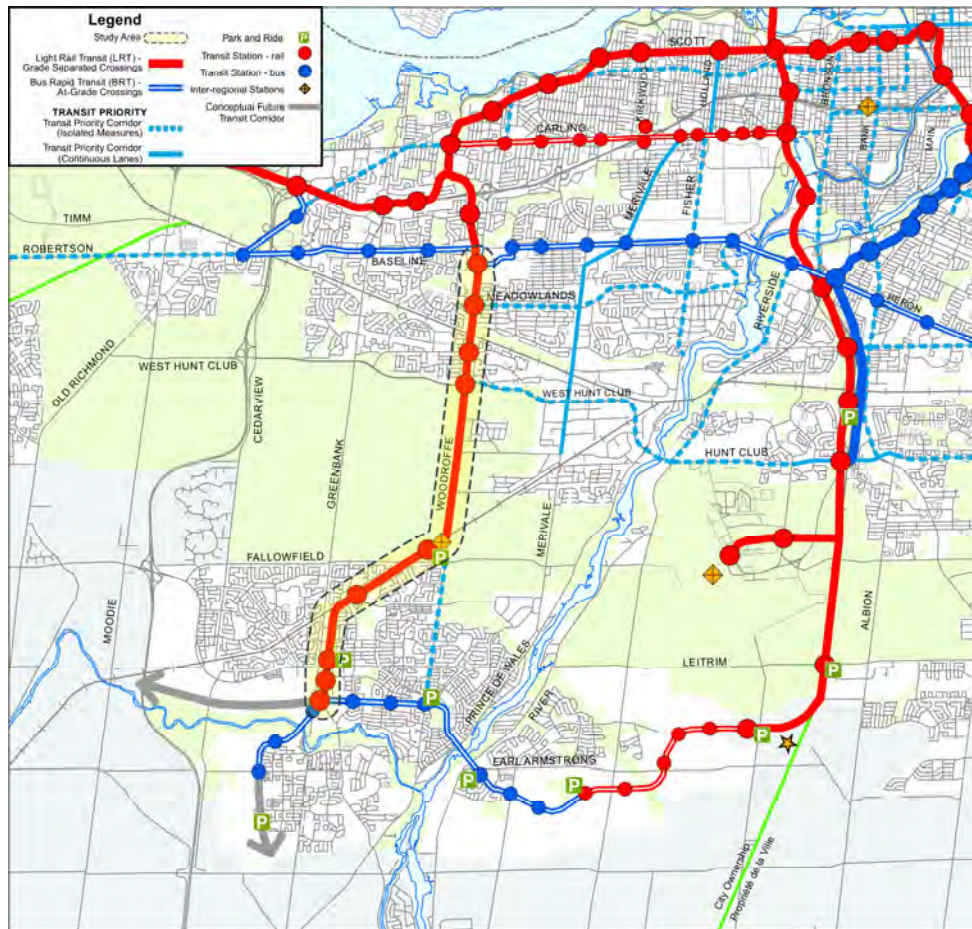
In May 2018, the City initiated the Barrhaven Rail Grade-Separation Environmental Assessment study to complete the EA requirements for rail grade-separation of the Southwest Transitway, Woodroffe Ave and Fallowfield Road at VIA Rail crossing.

In June 2018, Council directed staff to undertake the EA study for conversion of the BRT corridor to LRT facility to serve Barrhaven, such that interim results can be part of the upcoming TMP review to be assessed for consideration with respect to the City’s next phase of transit investments.

The Barrhaven LRT EA study area partially overlaps with the then ongoing Barrhaven Rail Grade-Separation EA study. Due to the overlapping study areas and design issues, EA process requirements, study durations and consultation activities, the two EA studies were integrated and restructured into one study. The integrated EA study was titled as the Barrhaven Light Rail Transit (Baseline Station to Barrhaven Town Centre) and Rail Grade-Separations EA study. Combining the two studies was deemed appropriate to bring efficiencies to the EA processes, streamline consultation and project management activities and cost savings to the City.

On October 3, 2018, as per Committee approval, the scope of the ongoing Barrhaven Rail Grade-Separation EA Study was expanded to include extending the Confederation Line LRT to Barrhaven by converting the Southwest Transitway from bus to rail technology due to overlapping study areas, cost saving and efficiency in the EA process (Motion No. 35/1).

Figure 1-2 The Project as Identified in the 2013 TMP



1.2 Environmental Assessment Process

The purpose of the *Ontario Environmental Assessment Act RSO 1990 (EA Act)* is to help protect and conserve Ontario's environment by ensuring that projects subject to the Act follow a planning process leading to environmentally sound decision-making. An EA involves identifying and planning for environmental issues and effects prior to implementing a project. The process allows for opportunities for the involvement of public and other stakeholders in the decision-making process of the project.

In June of 2008, the *Transit Projects Regulation (Ontario Regulation 231/08)* was created under the EA Act to guide public transit projects through approval. The process requires public sector proponents to assess the impacts of their project, identify mitigation measures, undertake consultation, and make available information or documentation completed for the pre-planning work which led to the selection of the Recommended Plan for the transit project.

The process outlined in *Ontario Regulation 231/08* provides a framework for an accelerated consultation and review process regarding the assessment of the potential environmental effects of a transit project, to enable decision-making within six months from the time an EA Study is launched. As per Section 6 (1) of the regulation prior to the project commencement date, the proponent shall complete the following steps:

1. Prepare and distribute a notice of commencement of the transit project assessment process under section 7.
2. Conduct consultations under section 8.
3. Prepare an environmental project report under section 9.

4. Prepare and distribute a notice of completion of the environmental project report under section 11.
5. Submit statements of completion of the transit project assessment process to the Director of the Environmental Assessment Branch and the appropriate regional director of the Ministry under section 14. O. Reg. 231/08, s. 6 (1); O. Reg. 354/12, s. 3 (1); O. Reg. 342/20, s. 4 (1).

The project planning phase for the Barrhaven LRT commenced as per the Ottawa City Council direction of June 27, 2018 (Motion No. 72/8) and the Scope of Work subsequently developed and approved by Ottawa Transportation Committee on October 3, 2018 (Motion No. 35/1).

The planning and assessment phase of the project was designed to meet the Province of Ontario’s Transit and Rail Project Assessment Process requirements as prescribed in Ontario Regulation 231/08 (**Figure 1-3**). The six-month EA process is primarily for public consultation, documentation, and provincial approval of the EPR. Once the EPR is submitted to the Minister of the Environment, Conservation and Parks (MECP), the approval period is 35 days (this is within the six-month timeline). If the Minister does not render a decision by the end of the 35th day, the project is considered approved. Should there be requests to elevate the scale of the EA, the scope of those requests is limited to matters of provincial importance, related to the natural environment or cultural heritage values or interests or the project may have negative impacts on constitutionally protected Aboriginal and treaty rights.

In accordance with Ontario Regulation 231/08 this EPR has been completed and made publicly available. As part of the assessment process, the EPR will be placed on public record for comment and review prior to MECP approval. If there are outstanding concerns regarding potential impact to constitutionally protected Aboriginal and treaty rights or provincial importance that cannot be resolved, a written objection may be made and sent to the Minister for consideration.

Figure 1-3 Illustration of the Transit and Rail Project Assessment Process as per the Environmental Assessment Act



1.3 Impact Assessment Act

The purpose of the *Impact Assessment Act (IAA) (2019)* is to protect the components of the environment that are within the legislative authority of the federal government from significant adverse environmental effects caused by a designated project. Additionally, the Act serves to promote cooperation and coordinated action between federal and provincial governments with respect to EAs.

Under Section 82 of the IAA: “An authority must not carry out a project on federal lands, exercise any power or perform any duty or function conferred on it under any Act of Parliament other than this Act that could permit a project to be carried out, in whole or in part, on federal lands or provide financial assistance to any person for the purpose of enabling that project to be carried out, in whole or in part, on federal lands, unless (a) the authority determines that carrying out of the project is not likely to cause significant adverse environmental effects; or (b) the authority determines that the carrying out of the project is likely to cause significant adverse environmental effects and the Governor in Council decides, under subsection 90(3), that those effects are justified in the circumstances”.

As federal lands are required for various phases of project completion, an Environmental Effects Analysis of all the physical activities proposed on federal lands is required, under Section 82 of the IAA. No approvals from the National Capital Commission under the *National Capital Act* can be issued before these obligations are fulfilled. An Environmental Effects Analysis of a proposed project will determine the need to eliminate or mitigate adverse effects, or to recommend monitoring based on detailed design. **Section 7.8.2** details the impact assessment based on the Recommended Plan described herein. Many of the potential impacts that will also be analyzed through the federal Environmental Effects Analysis are included.

The proposed project will also require approval through the Federal Land Use, Design and Transaction Approvals (FLUDTA) process under the *National Capital Act*. Other federal authorities that may have an interest in the project include Public Services and Procurement Canada, Fisheries and Oceans Canada, the Canadian Transportation Agency, and Transport Canada. This Report was prepared in consultation with the NCC and is intended to form the basis for evaluation of environmental effects when the Federal EA requirements are met.

1.4 Consultation

1.4.1 CONSULTATION GROUPS

The study proceeded under the direction of the City of Ottawa and benefitted from the direct involvement and guidance of three invited Study Consultation Groups. These included an Agency Consultation Group (ACG) consisting of City staff, consultants in a variety of disciplines and representatives from government agencies and approval bodies that may have an interest in the project; a Business Consultation Group (BCG) including business associations, institutions and large commercial establishments/developers; and a Public Consultation Group (PCG) consisting of representatives from Community Associations and interested community groups relevant to the Study Area.

1.4.1.1 Agency Consultation Group

The ACG was formed to address the full range of technical issues and to comment on special studies as well as applicable procedures, legislation, and policies. ACG members included agencies and government department representatives from Municipal, Provincial and Federal levels, as well as Indigenous communities. The following were invited to participate either by attending ACG meetings or providing comments during the EA process:

Internal ACG (City of Ottawa) Representation

- Transportation Services Department
- Transportation Planning
 - Transportation Environmental Assessments
 - Transportation Policy and Networks
- Traffic Services
 - Traffic Operations
 - Road Safety and Traffic Investigations
- Rail Construction Program Services
- Transit Customer Systems and Planning
- Planning, Infrastructure and Economic Development Department
 - Planning Services
 - Development Review
 - Infrastructure Services
 - Asset management
 - Economic Development Services
 - Resiliency, Planning and Policy
 - Natural Systems and Rural Affairs
 - Right of Way, Heritage and Urban Design Services
- Corporate Real Estate Office
 - Realty Initiatives and Development
 - Environmental Remediation Unit
 - Realty Services
- Emergency and Protective Services Department
- Public Works and Environmental Services Department
- Recreation, Cultural and Facility Services Department
- Ottawa Public Health (OPH)

External ACG Representation

Federal

- National Capital Commission (NCC)
- VIA Rail
- CN Rail
- Public Services and Procurement Canada (PCPC)
- Transport Canada
- Environment and Climate Change Canada (ECCC)

Provincial

- Ministry of the Environment, Conservation and Parks (MECP)
- Ministry of Agriculture, Food and Rural Affairs
- Ministry of Natural Resources and Forestry (MNRF)
- Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) now, Ministry of Multiculturalism and Citizenship (MCM)

Regional

- Rideau Valley Conservation Authority (RVCA)
- Hydro Ottawa Limited
- Transport Action Canada
- Rogers
- Hydro One Networks Inc. "Hydro One"
- Bell Canada
- Enbridge

Indigenous Groups

- Algonquins of Ontario
- Algonquins of Pikwàkanagàn First Nation (AOPFN)
- Kitigan Zibi Anishinabeg
- Ottawa Métis Council
- Metis Nation of Ontario

Meeting agendas and notes are contained in **Appendix A. Table 1-1** outlines the meeting dates and main agenda topics.

Table 1-1 Agency Consultation Group Meetings

Meeting #	Date	Main Agenda Topics
1	November 27, 2018	Study Overview, Study Background, Needs and Opportunities, Existing Conditions, Alternative Solutions, Alternative Design Considerations
2	June 12, 2019	Preferred Solutions, Evaluation of Alternative Designs Methodology and Criteria, Results of Technical Studies, Alternative Alignments and Designs, Alternative Train Storage Facility Locations
3	October 16, 2019	Alternative Alignments and Designs (Baseline-West Hunt Club), Preliminary Plan to Convert Southwest Transitway to LRT, Preliminary Plan for Rail Grade-Separations, Alternative Train Storage Facility Locations
4	August 20, 2020	Evaluation and Confirmation of Alternative Alignments and Designs (Baseline-West Hunt Club), Evaluation and Confirmation of Alternative Train Storage and Servicing Facility Locations, Preliminary Recommended Plan, Impact Assessment
5	August 16, 2022	Introduction, purpose of meeting, background, what has evolved since last meeting, Woodroffe new median LRT plan overview, current study scope, next steps and timelines and roundtable discussion.
6	January 24, 2023	Background, what we've heard so far, detailed description of the Recommended Plan, constructability review, impact assessment, next steps and timelines and roundtable discussion. Narration of the plan and profile of the Pinch Point.

1.4.1.2 Business Consultation Group

The BCG was formed to review work completed to-date and to provide comments on study activities, issues and concerns that reflect each group's interests and values. Throughout the study, BCG membership was revisited to capture changes to those with business interest in the Study Area. The BCG consisted of representatives from:

- Aera Investments Ltd.
- Algonquin College

- Barrhaven Business Improvement Association
- Barrhaven Town Centre
- Campanale Homes
- Caivan Communities
- Chapman Mills Marketplace
- College Square
- Conseil des écoles publiques de l'Est de l'Ontario
- Community, Recreation, Cultural Programs Service
- Minto Properties Inc.
- Minto Communities - Canada
- N.A. Development Group (Barrhaven Town Centre)
- Novatech (representing an undisclosed property north of West Hunt Club)
- Ottawa Catholic School Board
- Ottawa-Carleton District School Board
- Ottawa Catholic School Board
- Ottawa Transportation Student Authority
- Richcraft
- Royale Equestrian Centre
- Smart Living Properties, (Forum SLP)

Meeting agendas and notes are contained in **Appendix A. Table 1-2** outlines the meeting dates and main agenda topics.

Table 1-2 Business Consultation Group Meetings

Meeting #	Date	Main Agenda Topics
1	November 28, 2018	Study Overview, Study Background, Needs and Opportunities, Existing Conditions, Alternative Solutions, Alternative Design Considerations
2	October 17, 2019	Preferred Solutions, Evaluation of Alternative Designs Methodology and Criteria, Results of Technical Studies, Alternative Alignments and Designs (Baseline-West Hunt Club), Preliminary Plan to Convert Southwest Transitway to LRT, Preliminary Plan for Rail Grade-Separations, Alternative Train Storage Facility Locations
3	September 3, 2020	Evaluation and Confirmation of Alternative Alignments and Designs (Baseline-West Hunt Club), Evaluation and Confirmation of Alternative Train Storage and Servicing Facility Locations, Preliminary Recommended Plan and Impact Assessment
4	August 18, 2022	Introduction, purpose of meeting, background, what has evolved since last meeting, Woodroffe new median LRT plan overview, current study scope, next steps and timelines and roundtable discussion.
5	January 26, 2023	Background, what we've heard so far, detailed description of the Recommended Plan, constructability review, impact assessment, next steps and timelines and roundtable discussion. Narration of the plan and profile of the Pinch Point.

1.4.1.3 Public Consultation Group

The PCG was formed to enable community and interest groups to provide direct input to the study and to comment on technical and local issues and concerns. PCG members included representatives from City wards adjacent to the corridor, interest groups and City of Ottawa advisory committees. Representation included, but was not limited to:

- Ward 8 – College
- Ward 9 – Knoxdale-Merivale
- Ward 3 – Barrhaven
- Ward 22 – Gloucester-South Nepean
- City of Ottawa Accessibility Advisory Committee (AAC)
- Arts, Culture, Heritage and Recreation Advisory Committee
- Barrhaven Seniors' Council
- East Barrhaven Community Association
- West Barrhaven Community Association
- Bel-Air Community Association
- Bike Ottawa
- Big Brothers Big Sisters Ottawa
- Centrepointe Community Association
- Confederation Education Centre
- Country Place Community Association
- Ecology Ottawa
- Environmental Stewardship Advisory Committee
- Fisher Heights & Area Community Association
- General Burns Community Association
- Glens Community Association
- Greenspace Alliance of Canada's Capital
- Grenfell Glen Community Association
- Half Moon Bay Community Association
- Healthy Transportation Coalition
- Little Scholars Montessori Academy
- Merivale Gardens Community Association
- Manordale-Woodvale Community Association
- Peter D. Clark Long Term Care
- QTSR Community Association
- Tanglewood/Hillsdale Community Association
- Stonebridge Community Association

Meeting agendas and notes are contained in **Appendix A. Table 1-3** outlines the meeting dates and main agenda topics.

Table 1-3 Public Consultation Group Meetings

Meeting #	Date	Main Agenda Topics
1	November 28, 2018	Study Overview, Study Background, Needs and Opportunities, Existing Conditions, Alternative Solutions, Alternative Design Considerations
2	October 17, 2019	Preferred Solutions, Evaluation of Alternative Designs Methodology and Criteria, Results of Technical Studies, Alternative Alignments and Designs (Baseline-West Hunt Club), Preliminary Plan to Convert Southwest Transitway to LRT, Preliminary Plan for Rail Grade-Separations, Alternative Train Storage Facility Locations
3	September 8, 2020	Evaluation and Confirmation of Alternative Alignments and Designs (Baseline-West Hunt Club), Evaluation and Confirmation of Alternative Train Storage and Servicing Facility Locations, Preliminary Recommended Plan, and Impact Assessment
4	August 18, 2022	Introduction, purpose of meeting, background, what has evolved since last meeting, Woodroffe new median LRT plan overview, current study scope, next steps and timelines and roundtable discussion.
5	January 26, 2023	Background, what we've heard so far, detailed description of the Recommended Plan, constructability review, impact assessment, next steps and timelines and roundtable discussion. Narration of the plan and profile of the Pinch Point.

1.4.2 PUBLIC OPEN HOUSES

Three public open houses (POH) were held at key stages during the study to obtain feedback from the general public on the project information being provided. These events presented work on confirming the problem or opportunity (needs assessment) and evaluation of alternative solutions, evaluation of alternative designs (and alignments), and presenting the Preliminary Recommended Plan for the corridor. The first POH was organized to allow informal viewing of display panels about the project, examination of resource material related to the various stages of the EA and included a presentation and question and answer period. All presentations, displays and maps were available in both official languages. Study Team members were present to answer questions and explain various aspects of the study as well as work completed to-date. The second public consultation event was organized online for a period of two weeks due to the public health guidelines for COVID-19. Presentation boards, and three videos presented materials for the public and a comment/questionnaire was provided to obtain feedback on the City of Ottawa's study's website. The third event was also online, a live presentation followed by question and answer period was provided. A two week comment period was provided for review of materials presented and to provide feedback. POH content and summaries are contained in **Appendix A. Table 1-4** outlines POH dates and main presentation topics.

Table 1-4 Public Open Houses

Meeting #	Date	Main Agenda Topics
1	October 30, 2019	Study Overview, Study Background, Needs and Opportunities, Existing Conditions, Alternative Solutions, Alternative Design Considerations, Alternative Alignments and Designs (Baseline-West Hunt Club), Preliminary Plan to Convert Southwest Transitway to LRT, Preliminary Plan for Rail Grade-Separations, Alternative Train Storage Facility Locations
2	September 9-23, 2020	Study Overview, Study Background, Feedback Received to date, Evaluation and Confirmation of Alternative Alignments and Designs (Baseline-West Hunt Club), Evaluation and Confirmation of Alternative Train Storage and Servicing Facility Locations, Preliminary Recommended Plan, and Impact Assessment
3	February 8-22, 2023	Background, what we've heard so far, detailed description of the Recommended Plan, constructability review, impact assessment, next steps and timelines and roundtable discussion. Narration of the plan and profile of the Pinch Point.

1.4.3 INDIVIDUAL STAKEHOLDER MEETINGS

During the study, the Study Team met with individual stakeholders and landowners to discuss specific elements of the study and proposed design. Comments provided are included in Consultation Summary Reports provided in **Appendix A**.

These individual stakeholder meetings focused on topics such as the impact on adjacent properties, how the project relates to specific policies or mandates of agencies, connections to employment and residential land uses and future development opportunities. To obtain direction and feedback regarding LRT and Transit service, the Study Team also met with the City's Rail Office and OC Transpo.

Table 1-5 outlines the individual stakeholder meeting dates and main agenda topics. More details regarding the meetings can be found in Annex 4 of **Appendix A**.

Table 1-5 Individual Stakeholder Meetings

Meeting #	Date	Stakeholder	Main Agenda Topics
1	June 27, 2018	VIA Rail	Study Introduction
2	September 27, 2018	NCC	Study Introduction and background
3	April 3, 2019	Hydro One	Study Introduction and background
4	August 15, 2019	Aera Investments	Study Introduction and background potential project impacts
5	August 27, 2019	Minto Investments	Study Introduction and background potential project impacts
6	November 14, 2019	Hydro One	Study Introduction and background potential project impacts
7	March 26, 2020	Hydro Ottawa	Study Introduction and background potential project impacts
8	July 7, 2020	VIA Rail	Study Recommendations
9	July 14, 2020	NCC	Study Recommendations
10	September 2, 2020	Aera Investments	Study Recommendations
11	September 2, 2020	Smart Living Properties	Study Recommendations
12	September 23, 2020	Richcraft and Minto	Study Recommendations
13	October 7, 2020	NCC	Impacts to Greenbelt lands
14	October 13, 2020	Royale Equestrian Centre	Study Recommendations
15	October 14, 2020	NCC	Impacts to Greenbelt lands
16	October 20, 2020	Royale Equestrian Centre	Study Recommendations follow-up
17	October 26, 2020	ACORN	Study Recommendations
18	November 24, 2020	Hydro One	Study Recommendations
19	January 7, 2021	MECP	TPAP process meeting; Notice of Commencement and next steps.
20	November 30, 2021	Royale Equestrian Centre and NCC	On-site visit to discuss REC's concerns with the Recommended Plan.
21	February 8, 2022	MECP	TPAP process meeting; Notice of Issue discussions
22	August 4, 2022	C. Harder & Barrhaven BIA	Discussions on the new median LRT Functional Design
23	August 19, 2022	Accessibility Advisory Committee	Discussions on the new median LRT Functional Design
24	August 30, 2022	Hydro One	Discussions on the new median LRT Functional Design
25	October 18, 2022	Hydro Ottawa	Discussions on the new median LRT Functional Design
26	March 14, 2023	Royale Equestrian Centre	On-site visit to discuss REC's concerns with the Recommended Plan.
27	April 25, 2023	MECP	Consultation outcomes; TPAP process meeting; Notice of Commencement and next steps.
28	October 24, 2023	MECP	Consultation outcomes; TPAP process meeting; Agency Pre-Review comments received, Notice of Commencement and next steps.
29	December 12, 2023	MECP	Consultation updates; TPAP process discussion; next steps.
30	April 10, 2024	MECP	Consultation updates; Transit and Rail Project Assessment Process discussion; next steps.
31	September 18, 2024	MECP	Consultation updates; TRPAP discussion and next steps.

1.4.4 INDIGENOUS CONSULTATION

Consultation with Indigenous Communities was undertaken as per the guidelines described in the regulation. The Communities consulted as part of the study were determined in coordination between the City of Ottawa, the Ontario Ministry of Aboriginal Affairs, Aboriginal Affairs and Northern Development Canada and the MECP. Communities consulted include: Ottawa Region Métis Council, Algonquins of Ontario Consultation Office (AOO), Algonquins of Pikwàkanagàn First Nation, Kitigan Zibi Anishinabeg, and the Métis Nation of Ontario.

Initial contact was made to inform each group of the project and identify opportunities for involvement. Official notices were also sent throughout the study process. The EPR was made available for review by all the identified Communities. Consultation was achieved through email with representatives of the Communities identified for this study.

In January 2021, prior to issuing the Notice of Commencement, during the Agency and Indigenous Pre-Review period of the EPR, the AOPFN and the AOO expressed interest in further consultation. The AOPFN expressed interest in reviewing and providing comment on the EPR. In December 2022 the City entered into a Capacity Agreement to facilitate the AOPFN to make formal comments on the EPR. **Table 1-6** outlines meetings held for Indigenous consultation dates and main agenda topics.

In 2024 the study team received feedback from AOPFN on the draft EPR which was reviewed and incorporated into the EPR as required.

Correspondence and additional details related to Indigenous Consultation is contained in **Appendix A**.

Table 1-6 Indigenous Consultation Meetings

Meeting #	Date	Community/Representatives	Main Agenda Topics
1	March 1, 2021	Don Bilodeau (on behalf of the Algonquins of Pikwàkanagàn First Nation)	Scope of the project, highlighting environmental, archaeological and cultural heritage resources within the corridor and history of outreach to Indigenous Groups for the project, and next steps.
2	April 19, 2021	Algonquins of Ontario Consultation Office (AOO) Representatives	Meeting to discuss the project scope and approach to consultation. Links to the Stage 1 Archaeological Assessment resent in advance.
3	May 10, 2021	AOO's Planning and Environment Working Group (PEWG)	Scope of the project, highlighting environmental, archaeological and cultural heritage resources within the corridor and history of outreach to Indigenous Groups for the project, and next steps.
4	May 18, 2021	Algonquins of Ontario Consultation Office (AOO) Representatives	Meeting to discuss outcome of the PEWG meeting, consultation efforts and next steps.
5	November 10, 2021	Algonquins of Pikwàkanagàn First Nation	Discussed capacity support need, critical dates, archaeological studies, an overview of environmental assessment.
6	December 13, 2021	Algonquins of Pikwàkanagàn First Nation	Reviewed Schedule B of Capacity Agreement Consultation.
7	March 24, 2022	Algonquins of Pikwàkanagàn First Nation	Discussed Capacity Agreement and invoicing.
8	October 13, 2022	Algonquins of Pikwàkanagàn First Nation	Discussed AOPFN comments on Capacity Agreement.
9	November 16, 2022	Algonquins of Pikwàkanagàn First Nation	Discussed legal comments on Capacity Agreement.
10	March 28, 2023	Algonquins of Pikwàkanagàn First Nation	Presentation of the design re-alignment through the pinch point.
11	April 20, 2023	Algonquins of Pikwàkanagàn First Nation	Provided details of the change in design to the median LRT alignment, archaeological and cultural heritage resources within the corridor, species at risk and next steps.
12	July 27, 2023	Algonquins of Pikwàkanagàn First Nation	Shared information on the discussion had with AOPFN community members.
13	September 20, 2023	Algonquins of Pikwàkanagàn First Nation	Discussed functional and detail design, detail that can be included in the draft EPR, Table 1-6 and Annex 1, site visit and next steps.
14	November 1, 2023	Algonquins of Pikwàkanagàn First Nation	Reviewed potential locations of interest for site visit based on draft EPR findings, next steps.
15	April 10, 2023	Algonquins of Pikwàkanagàn First Nation	Planning for the site visit. Confirmation receipt of preliminary comments on the draft EPR.
16	April 10, 2024	Algonquins of Pikwàkanagàn First Nation	Site visit discussion and preparations.
17	May 15, 2024	Algonquins of Pikwàkanagàn First Nation	Site visit of selected points of interest in the Study Area.

1.4.5 CITY OF OTTAWA WEBSITE

The City of Ottawa developed and maintained a project website with consultation materials for the study, key milestones, and the overall EA process.

English: www.Ottawa.ca/BarrhavenLrt

French: www.Ottawa.ca/Barrhaventlr

The information posted on the website was also formatted in a manner compatible with the City's accessibility guidelines for on-line graphics, videos, and printed materials.

1.5 Report Organization

The purpose of this EPR is to document the study rationale, the planning, design, and consultation processes of the project, and make that documentation available for review by the public and review agencies. The report consists of the following sections:

- Executive Summary
- Introduction
- Project Need and Opportunities
- Existing Environmental Conditions
- Evaluation of Alternative Solutions
- Update to Existing Environmental Conditions
- Evaluation of Alternative Designs
- Recommended Plan and Assessment
- Recommended Plan - Functional Design Drawings
- Implementation and Approvals
- Conclusion Regarding the Project
- References

The Appendices contain the technical reports and technical documentation prepared throughout the course of the study. These reports and documentation contributed to the decision-making process and the development of recommendations that led to the selection of the preferred design (Recommended Plan).

2 Project Need and Opportunities

This section outlines the need and opportunities for the project, which is based on the City's planning policies and studies, current and future transit demand, transit network requirements and land use objectives. As the Barrhaven LRT extension is the last section of the Confederation Line without EA approval status, there is a need to complete this Study to enable decision-making on future transportation investment and choices. Further, there is also a need derived from the Transportation Safety Board of Canada (TSB) Recommendation R15-05, in its Railway Investigation Report R13T0192 on the September 2013 VIA Rail and OC Transpo crossing collision in Barrhaven. The EA requirement of the TSB recommendation that *"the City of Ottawa reconsider the need for grade separations at the Woodroffe Avenue, [Southwest] Transitway, and Fallowfield Road level crossings"* will be addressed through this study's findings.

2.1 Need for the Project

2.1.1 MEETING PLANNING POLICY

2.1.1.1 Official Plan

During the course of finalizing this study the City of Ottawa adopted a new OP which was approved by the Ministry of Municipal Affairs and Housing in 2022. The information provided in this section remains the basis for subsequent evaluation and development of the Recommended Plan therefore, it remains unchanged. Discussion of the new OP and its influence on the project or process, is documented in **Section 6.8**.

The City of Ottawa Official Plan, 2013 (OP) provides a vision of future growth for the City and sets the policy framework to guide its physical development over the planning horizon to the year 2031. The plan is updated every five years to meet statutory requirements, the last review having been completed in 2013. This EA study aims to address the OP's Strategic Directions, as follows:

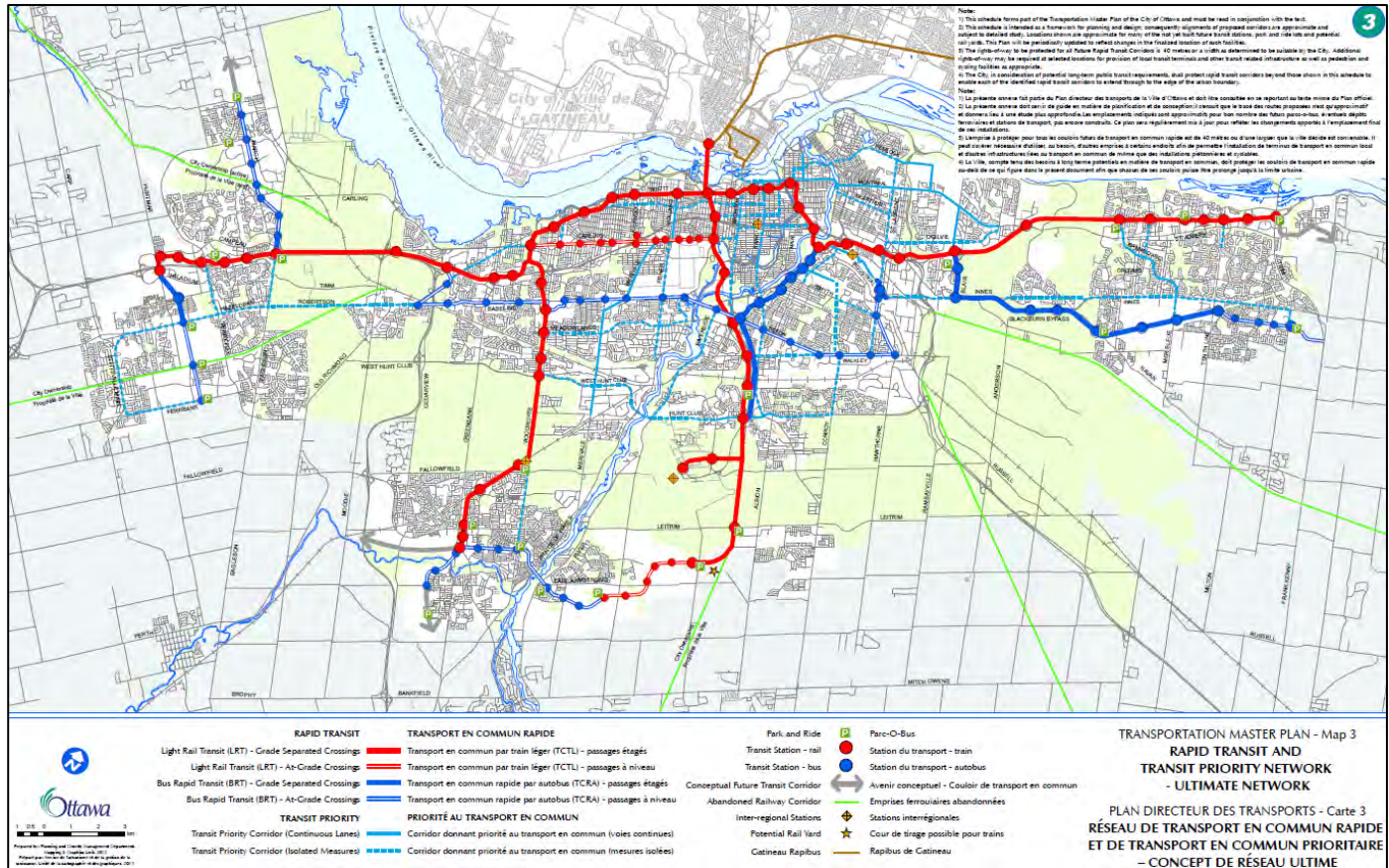
- The Barrhaven LRT and Rail Grade-Separations project will support sustainable growth in the Barrhaven community which is located within the City's urban boundary. It will foster mixed-use growth around transportation nodes, which can provide affordable housing, community services, employment and leisure opportunities to the Barrhaven community (OP Section 2 – Strategic Directions, 2.1 Patterns of Growth, Managing Growth).
- It will connect Barrhaven Town Centre with the City's LRT network and will also supply increased and safer transportation network capacity necessary to support increased development densities (OP Section 2 – Strategic Directions, 2.1 Patterns of Growth, Building Liveable Communities).
- The Barrhaven LRT will connect to the walking and cycling networks, fostering an active and multi-modal transportation network. Implementation of this and other rapid transit projects in the Barrhaven community will encourage automobile users to switch to transit, necessary to achieve the significant transit ridership increases contemplated in the OP (OP Section 2 – Strategic Directions, 2.1 Patterns of Growth, Providing Infrastructure).
- The project will contribute to improved local air quality by providing an alternative to automobile use, by removing cars idling at intersections and by replacing the diesel Bus Rapid Transit (BRT) vehicles with electric LRT. The project supports a compact urban form, which will contribute to reduced energy use, carbon and pollution emissions (OP Section 2 – Strategic Directions, 2.1 Patterns of Growth, Maintaining Environmental Integrity).
- As the project will generally follow the existing transitway corridor, it will require minimal alteration to existing green spaces and environmental areas (OP Section 2 – Strategic Directions, 2.1 Patterns of Growth, Providing Infrastructure).

2.1.1.2 Transportation Master Plan

During the course of finalizing this study the City of Ottawa has begun developing a new TMP. The information provided in this section remains the basis for subsequent evaluation and development of the Recommended Plan therefore, it remains unchanged. Discussion of the new TMP and its influence on the project or process is documented in **Section 6.8**.

The City's 2013 TMP identifies extension of the Confederation Line LRT to Barrhaven Town Centre as part of the Ultimate Rapid Transit and Transit Priority (RTTP) Network as shown in **Figure 2-1**, with an implementation timeline currently envisaged beyond the TMP's 2031 planning horizon. As part of the RTTP 2031 Network Concept, the TMP identifies completion of the Southwest Transitway as an exclusive Bus Rapid Transit (BRT) facility prior to extension and conversion to LRT technology south of Baseline Station. This staging will be re-evaluated as part of the evaluation of alternative solutions (**Section 4**) for this study and any updates brought forward for consideration as part of the next TMP update.

Figure 2-1 TMP Ultimate Rapid Transit Network



The Barrhaven LRT (Baseline Station to Barrhaven Town Centre) extension is the last remaining segment of the Confederation Line for which EA approval is not yet in place. Therefore, there is a need to complete this EA Study so that planning and decision-making for the City's LRT network can be advanced. This EA Study will help inform the next TMP update, which will consider future rapid transit investment priorities as part of the City's Affordable RTTP Network.

2.2 Rapid Transit Network Overview

The City's current TMP, updated in 2013, identifies the following RTTP network serving the Barrhaven LRT and Rail Grade-Separation EA Study Area:

1. A grade-separated rapid transit corridor running in the existing Southwest Transitway from Baseline Station to Barrhaven Centre Station, with BRT technology implemented as part of the 2031 network concept and conversion to LRT implemented as part of the ultimate network concept.
2. An at-grade BRT corridor is identified for Chapman Mills Drive/Strandherd Drive between Greenbank Road and the future Limebank O-Train Line 2 Station. This facility currently exists between Longfields Drive and Nepean Woods Park and Ride. Future extension of the Chapman Mills BRT corridor to west of Cedarview Road is proposed (Chapman Mills Extension and Bus Rapid Transit EA Study, IBI, 2016).

3. An at-grade BRT corridor is identified (future Southwest Transitway Extension) in the re-aligned Greenbank Road corridor running from Chapman Mills Drive to Cambrian Road, with a future extension to Barnsdale Road and a Park and Ride facility in the vicinity of Kilbirnie Drive.
4. Transit priority corridors (isolated measures) are identified for:
 - a. Meadowlands between the Southwest Transitway and Heron Road;
 - b. West Hunt Club Road between Woodroffe Avenue and Riverside Drive; and
 - c. Woodroffe Avenue between Fallowfield Station and Nepean Woods Park and Ride.

2.2.1 PREVIOUS PLANNING STUDIES

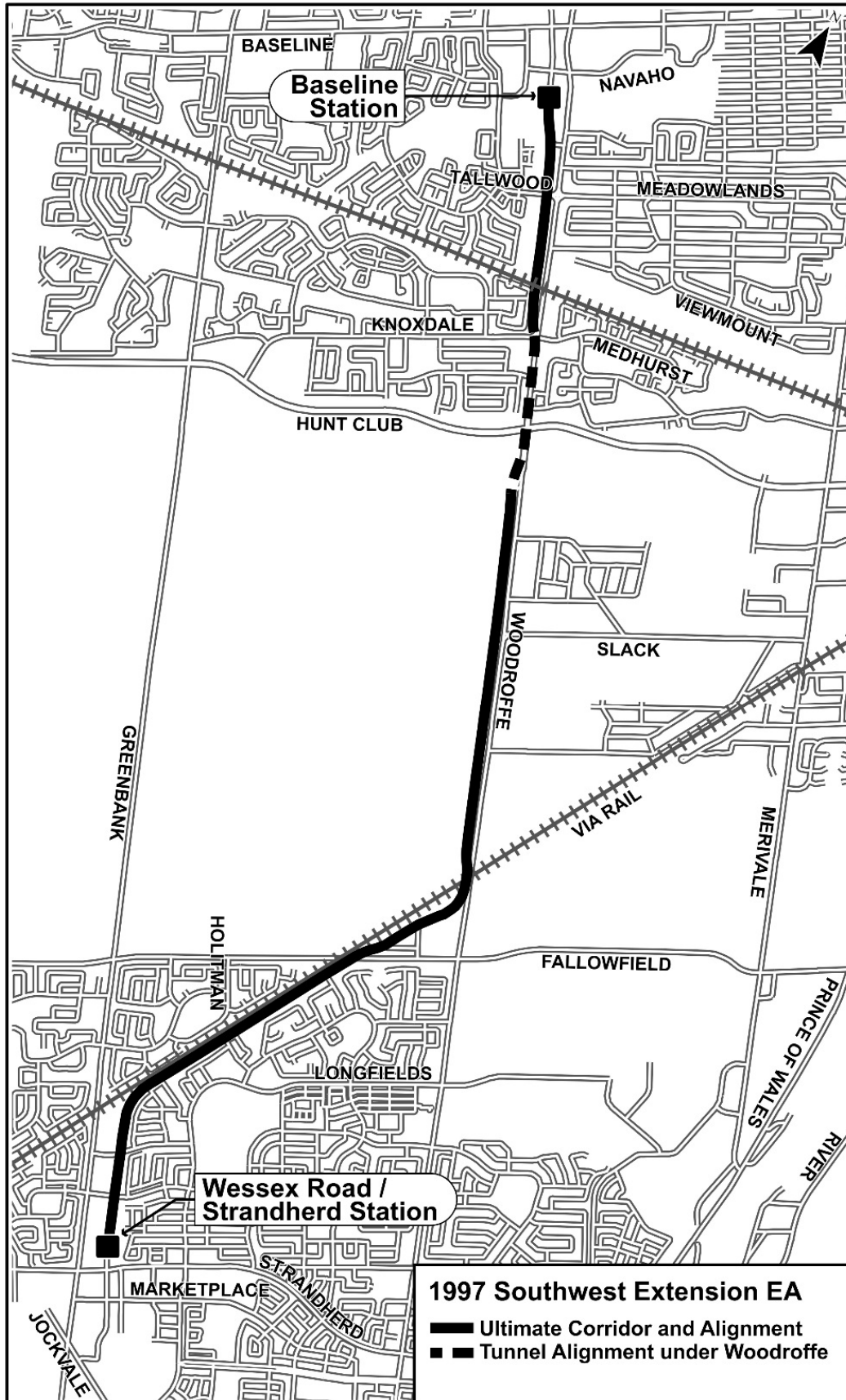
2.2.1.1 Southwest Transitway Extension Environmental Assessment (1997)

To enable construction of the existing Southwest Transitway corridor, the Southwest Transitway Extension EA was completed in 1997 by McCormick Rankin (hereafter, “the 1997 Southwest Transitway EA”). The goal of the EA was to identify a fully segregated Bus Rapid Transit (BRT) facility to extend transit service from Baseline Station to the growing southern urban community of Barrhaven.

Among the alternatives considered, the EA assessed bus versus heavy-rail technology, widened roadways featuring bus-only lanes and travel demand measures. It concluded that all non-transitway alternatives would not provide a robust solution to address future transit capacity and need for the south urban community, and that the Woodroffe Avenue corridor offered the best potential for development of a transit facility to improve transit services. A phased approach was identified, which included initial widening of Woodroffe Avenue to accommodate dedicated bus-only lanes as a first stage of project implementation.

The EA identified that the ultimate Southwest Transitway corridor would be grade-separated, in an open-cut, urban style section west of Woodroffe Avenue between Baseline Station and Knoxdale Road. It would then be tunneled under Woodroffe Avenue between Knoxdale and West Hunt Club roads. Through the Greenbelt, the transitway would be placed west of Woodroffe Avenue at-grade, crossing under the VIA Rail line (then CN Rail line) to a new Park and Ride facility and station (Fallowfield Station) located north and west of the Woodroffe/Fallowfield intersection. The transitway would then continue at-grade and parallel to the VIA Rail line to Wessex Road where it would terminate at-grade. Full grade-separation was proposed at all transitway crossings, including roads, railways, and walkways. This alignment is illustrated on **Figure 2-2**.

Figure 2-2 The 1997 Southwest Transitway EA alignment



The EA also noted that construction of the transitway facility could be staged over a number of years as funding demand and increased revenues permitted. The EA recommended construction of interim measures, such as bus only lanes from Norice Drive to Hunt Club along Woodroffe Avenue and widening of Woodroffe Avenue as a four-lane divided roadway through the Greenbelt. Since approval of the 1997 Southwest Transitway EA, bus only lanes have been implemented between Baseline Station and the Nepean Sportsplex and widening of Woodroffe Avenue through the Greenbelt has taken place. The new Fallowfield Station and Park and Ride have also been constructed. Widening of Fallowfield Road (west and east of Woodroffe Avenue at the Park and Ride site) and widening of Woodroffe Avenue (south of Fallowfield Road) were also completed.

Both the Southwest Transitway's ultimate alignment as well as Bus Only Lane alternatives would provide grade-separations at all rail crossings, roadways, walkways, and trails. As per **Figure 2-3**, the VIA Rail line (then CN Rail line) would be at-grade with underpasses for both Woodroffe Avenue and transitway, and as per **Figure 2-4** the transitway would run parallel to the rail, with Fallowfield Road as an underpass. Therefore, grade-separations between the transitway/Woodroffe Avenue and rail line as well as Fallowfield Road and the rail line were an intrinsic part of the 1997 Southwest Transitway EA study.

Figure 2-3 1997 Southwest Transitway EA, exhibit 6-22, grade-separations of CN Rail, Woodroffe Ave and proposed Transitway

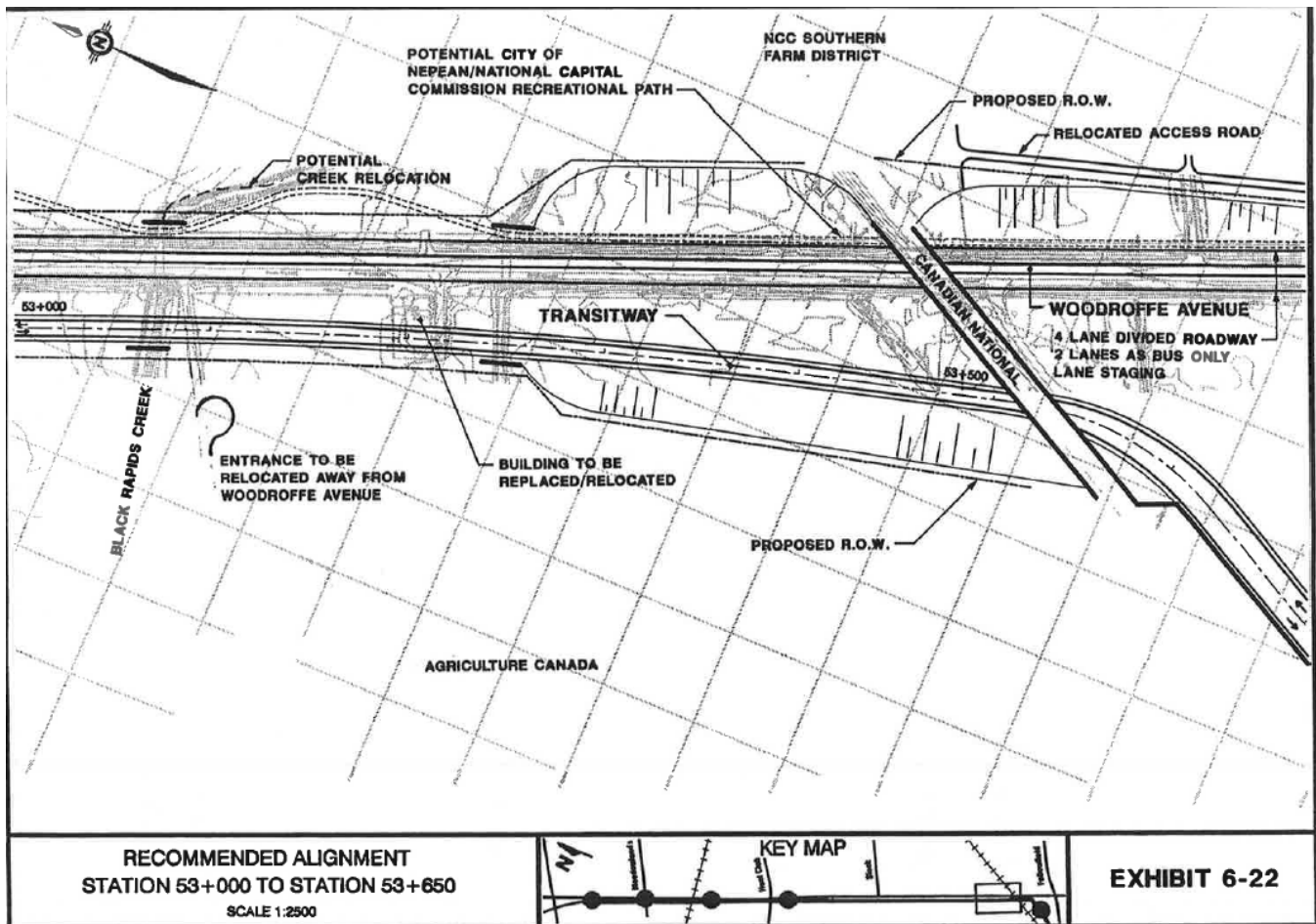
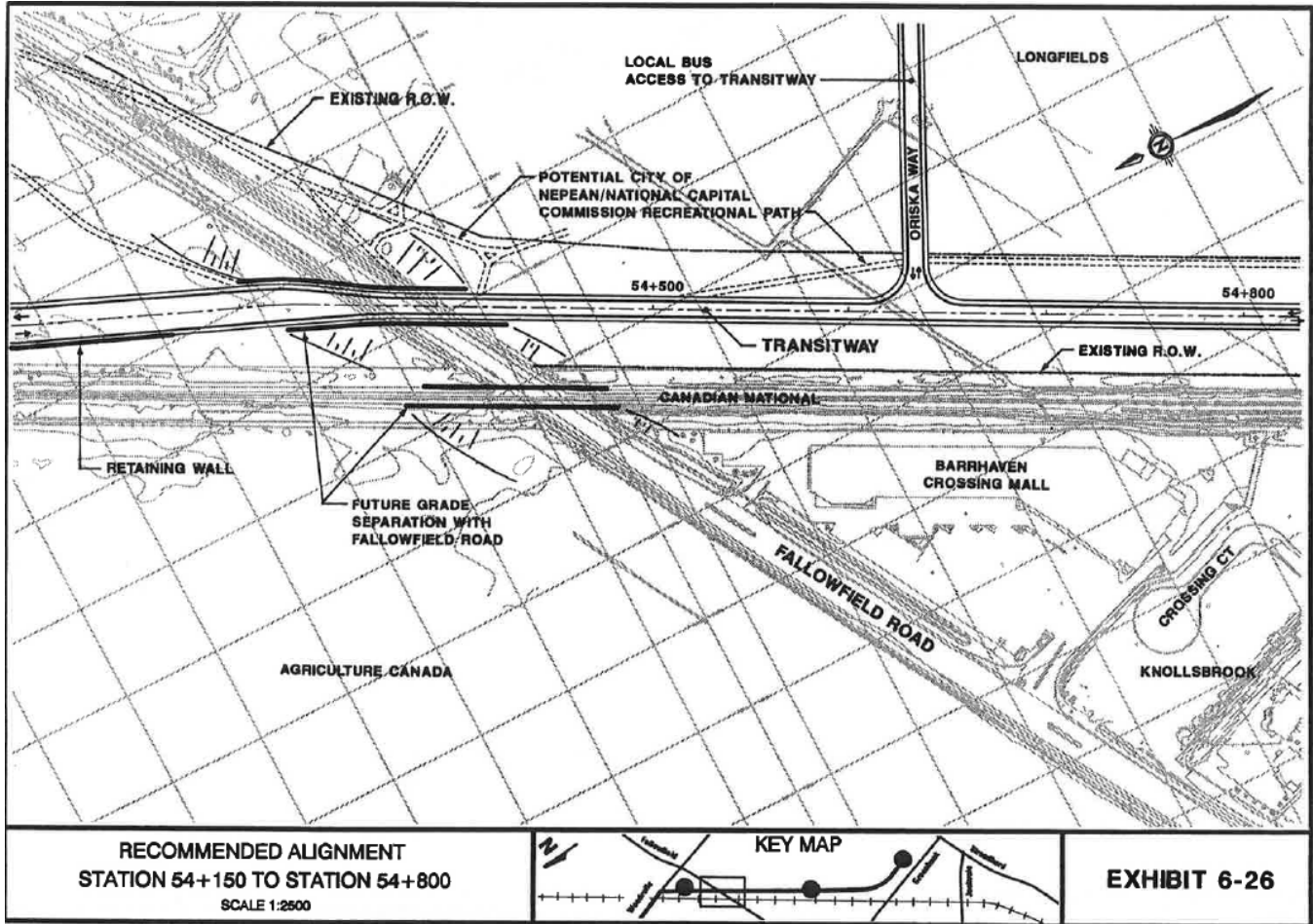


Figure 2-4 Southwest Transitway EA, exhibit 6-22, grade-separations of CN Rail, proposed Transitway and Fallowfield Road



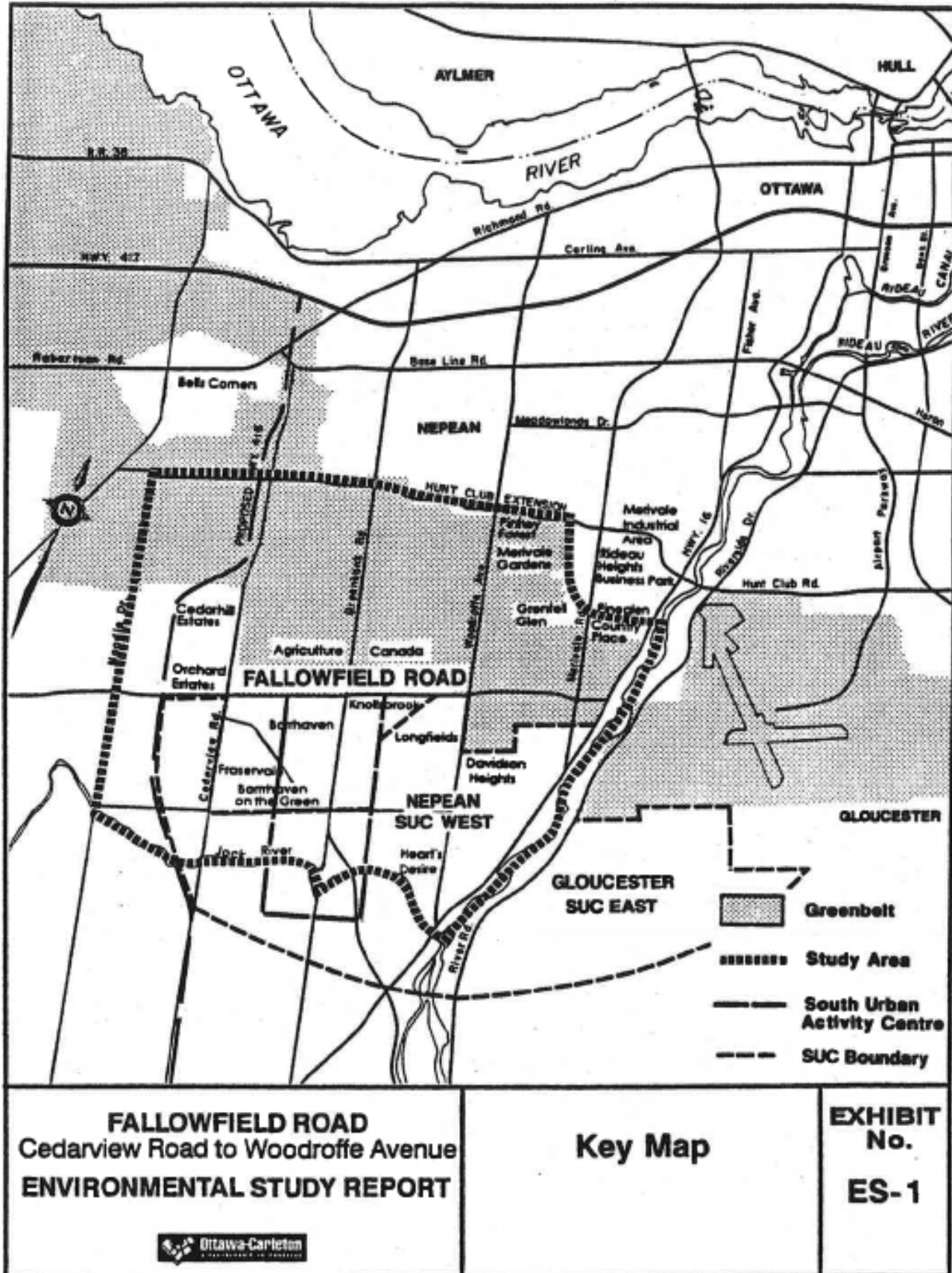
The 1997 Southwest Transitway EA study also had as a key requirement to “be a facility which can be flexible enough that a range of future demand levels and technologies can be accommodated” (Section 2.4). The geometric design and structural elements of the Southwest Transitway were planned so that the possibility of eventually operating a rail technology on it would not be precluded.

At the time of this study, the ultimate transitway corridor and alignment as approved via the 1997 Southwest Transitway EA has not yet been fully implemented, with the fully exclusive transitway facility existing south of West Hunt Club Road. In the segment north of West Hunt Club Road to Baseline Station, buses currently operate in dedicated curb lanes along Woodroffe Avenue.

2.2.1.2 Fallowfield Road Environmental Assessment (1997)

An EA was completed in 1997 (McCormick Rankin) for the widening of Fallowfield Road, from Cedarview Road to Woodroffe Avenue, from a two-lane rural undivided roadway to a four-lane divided urban arterial road to address future peak-hour traffic volumes. The EA’s Study Area map is shown in Figure 2-5.

Figure 2-5 1997 Fallowfield Road (Cedarview Road to Woodroffe Avenue) EA, Study Area



As part of this EA, the proposed planning and design criteria for reconstruction of Fallowfield Road included: providing a four-lane divided roadway geometry, including commuter bicycle lanes, greening strips, and noise attenuation measures. During consultation with the Public Advisory Committee, it was agreed that an underpass solution for Fallowfield Road was preferred to grade-separate the then proposed Southwest Transitway and the then VIA Rail line (then CN Rail). An underpass was proposed primarily as it was considered that the visual impact of an overpass (Fallowfield Road over Southwest Transitway and the VIA Rail line) was deemed significantly adverse and the limited geotechnical investigations undertaken at that time considered an underpass a feasible option.

Approval for the need and construction of the rail grade-separation of Fallowfield Road, the Southwest Transitway and VIA (CN) Rail was established and granted via approval of this EA as a Schedule C project under the Ontario's Class EA for Municipal Road Projects.

Subsequent to approval of the 1997 Southwest Transitway EA and Fallowfield Road EA studies, the City undertook preliminary engineering in support of constructing rail grade-separations at the Woodroffe, Southwest Transitway and Fallowfield crossings. Additional geotechnical assessments done as part of this work identified significant cost and risk implications with the proposed underpasses, with a recommendation that the open-cut option should not be pursued, and that it was necessary to consider other alternatives.

2.2.1.3 Southwest Transitway Extension and Woodroffe Widening Federal Environmental Assessment (2004)

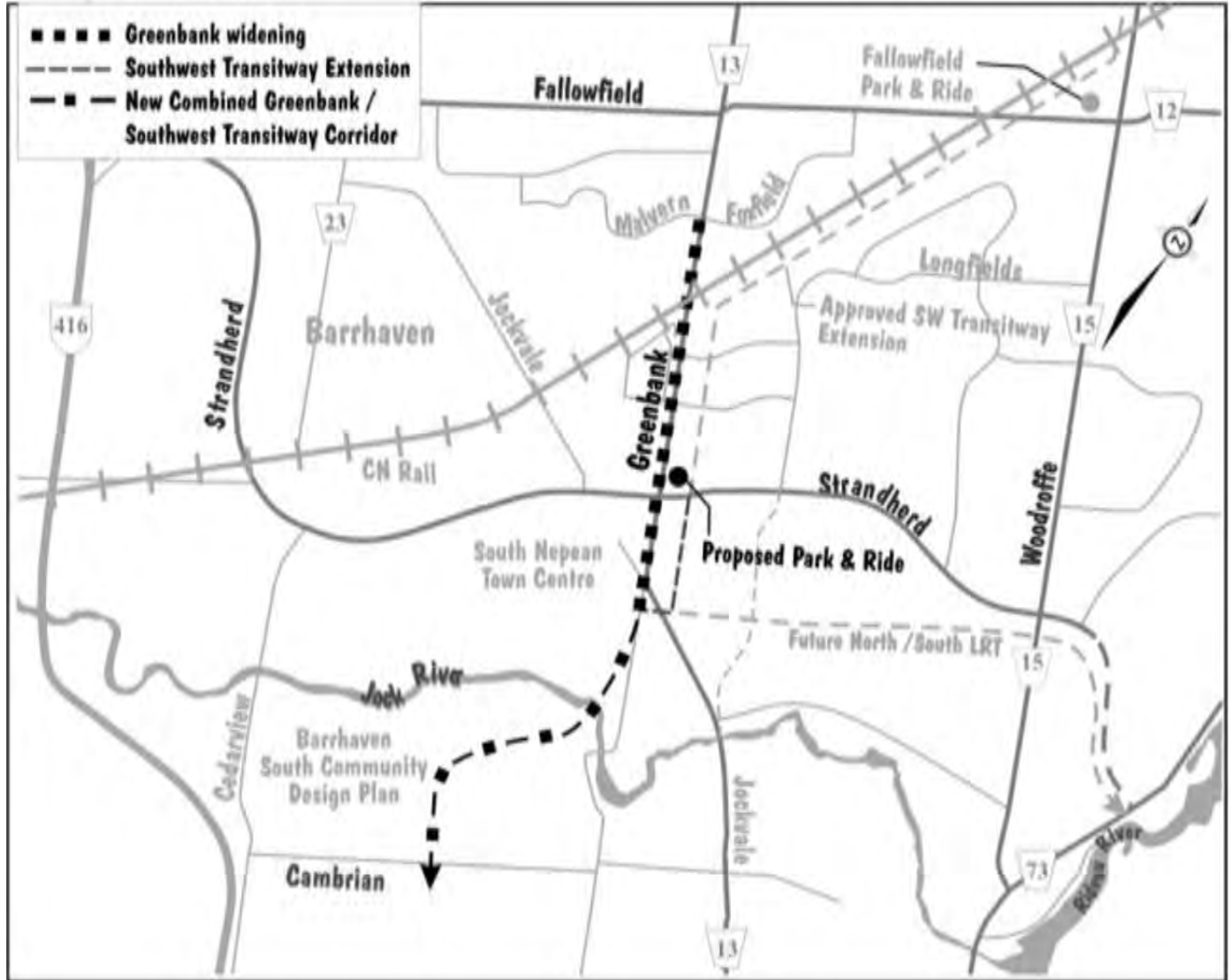
A federal EA was completed in 2004 (TSH) under the Canadian Environmental Assessment Act (CEAA). The CEAA was triggered due to funding provided by the Federal Government (under the Millennium Fund program) and due to the need for land acquisition from the NCC. The 2004 EA assessed construction of a two-lane Transitway placed adjacent and to the west of Woodroffe Avenue from the Nepean Sportsplex to Fallowfield Station and Park and Ride site, as well as reconstruction of Woodroffe Avenue as a four-lane arterial roadway from north of Slack Road to Fallowfield Road.

2.2.1.4 Southwest Transitway Extension EA Study (2006)

On 7 April 2004, the City's Transportation Committee approved the Statement of Work setting out the methodology, public consultation, and deliverables for an EA study for the Southwest Transitway Extension Project and the Greenbank Road Widening Project (Malvern to Cambrian) (TSH, 2006). Both facilities were evaluated together under one analysis but followed separate EA processes due to the physical proximity to each other and similar study areas. The Southwest Transitway Extension study was carried out as an Individual Environmental Assessment, with a separate Terms of Reference developed and approved by the Minister of the Environment. The Greenbank Road study followed the Municipal Class EA process. The recommended alignment of each new facility resulting from EA is presented on **Figure 2-6**.

The Southwest Transitway Extension EA study from Strandherd Drive to Cambrian Road was completed in 2006. It represents a continuation of the transitway established from the 1997 Southwest Transitway EA which terminated at Strandherd Drive. It includes 3.2 km of exclusive and shared Right-of-Way, extending from Strandherd Drive southerly, through the South Nepean Town Centre, across the Jock River to Cambrian Road reaching the planned Barrhaven South community. It consists of exclusive transit lanes throughout its length, five stations (including provision for an integrated BRT/LRT station in the heart of the South Nepean Town Centre). Trip projections (2021) estimated that up to 4,075 riders per hour could be served by the project (representing a 25% modal split as proposed by the Barrhaven South Community Design Plan).

Figure 2-6 Recommended Alignments for the Southwest Transitway Extension and the Greenbank Road Widening Studies

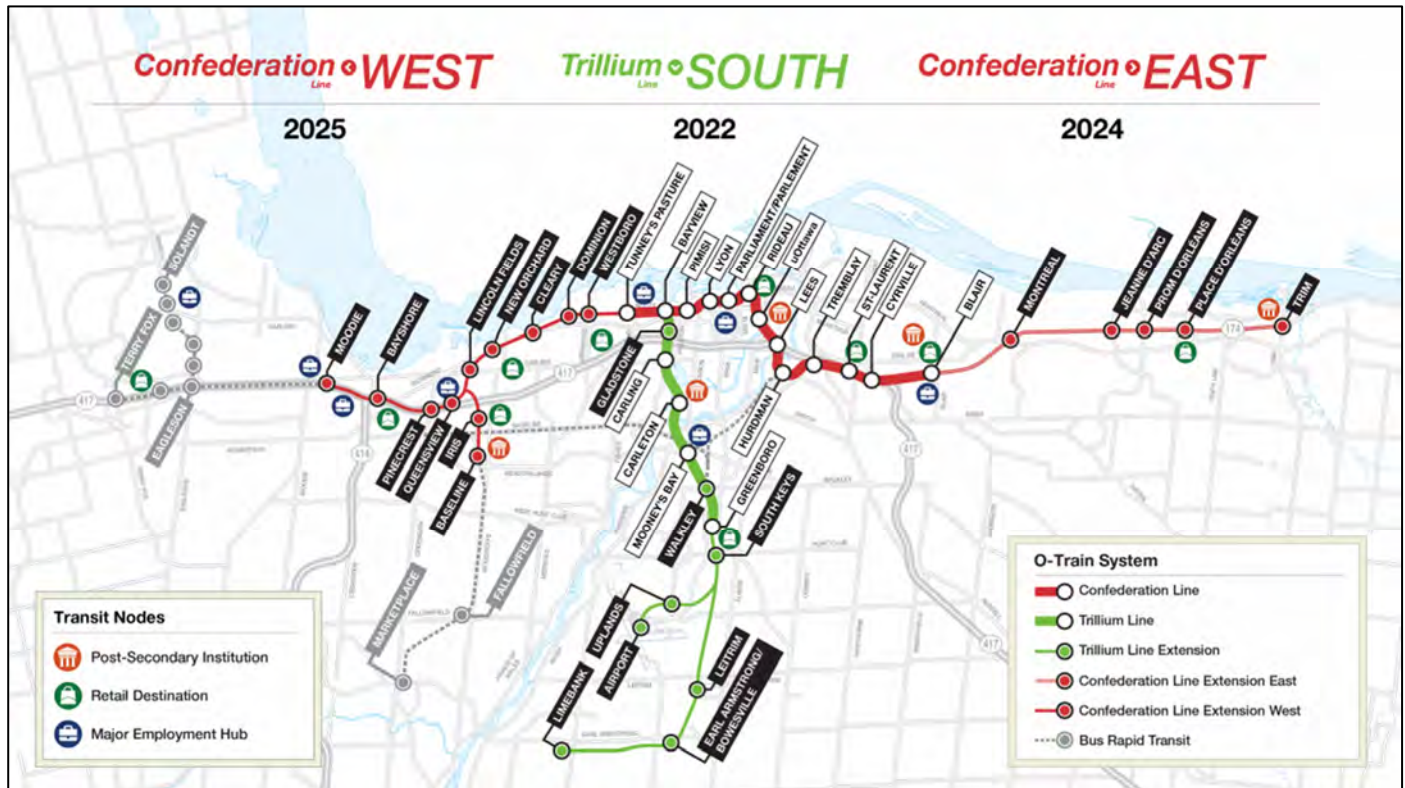


2.2.1.5 Confederation Line West LRT Extension (2016)

A planning and EA study was completed in June 2016 (Parsons Inc.) for the Confederation Line West LRT Extension to extend light rail service further west from Tunney’s Pasture Station to Baseline and Bayshore stations as part of the City’s proposed Stage 2 LRT network.

The study also gained approval for a new Light Maintenance and Storage Facility, to be located at the western portion of the vacant lands immediately north of the CN Rail line running north of Knoxdale Road (CN Beachburg Subdivision) between Woodroffe Avenue and Merivale Road. Subsequent to completion of the study, this Light Maintenance and Storage Facility was superseded by a facility proposed to the west of Moodie Drive, which was identified as part of the Stage 2 LRT project, and which also includes a further extension of the West LRT from Bayshore Station to Moodie Station (Figure 2-7). The anticipated opening of the Confederation Line West LRT extension is 2025.

Figure 2-7 Confederation Line West LRT Extension Alignment



2.2.1.6 Barrhaven and Merivale Road Rail-Grade Separation Study (2017)

The Barrhaven and Merivale Road Rail-Grade Separation Study (BMRRGSS), completed in June 2017 (Parsons Inc.), addressed five potential rail-grade separations along the VIA Rail line (Smiths Falls Subdivision) between Merivale Road in the east and Jockvale Road in the west. The study was undertaken in response to TSB Recommendation R15-05 from the Transportation Safety Board of Canada in its Railway Investigation Report R13T0192 on the VIA Rail/OC Transpo train and bus collision that occurred on 18 September 2013 at the VIA Rail line/Southwest Transitway level crossing. The TSB Recommendation R15-05 states: “The City of Ottawa reconsider the need for grade separations at the Woodroffe Avenue, [Southwest] Transitway, and Fallowfield Road level crossings”.

As per the Railway Investigation Report, “the safety of a crossing is dependent on a roadway vehicle driver making appropriate decisions based on the information displayed and responding appropriately to any additional warnings. Consequently, the only way to ensure that similar accidents do not occur at such high-traffic locations is to physically separate the roadway from the railway through grade separation (Section 4.2.4).”

The BMRRGSS assessed opportunities for rail grade-separation and made recommendations based on an assessment of the “Grade Crossing Regulations” prepared by Transport Canada which provide guidance as to when grade-separation should be considered. Common practice for determining grade-separation requirements in Canada is to use a Crossing Exposure Index (CEI) calculation, also known as cross-product value, and a review of risks at the crossing. Historically a cross-product value of 200,000 has been accepted as the benchmark used by Transport Canada in determining when grade-separation should be considered. The cross-product is determined by multiplying the Average Annual Daily Traffic (AADT) by the average daily number of trains at the at-grade crossing.

Table 2-1 provides a summary of the cross-product values for Woodroffe Avenue, Southwest Transitway and Fallowfield Road with the preferred grade-separation solution.

Table 2-1 Crossing Exposure Index analysis and recommended solution

VIA Rail (Smiths Falls Subdivision line) crossing	Mile	Traffic Volume *AADT			Train Volume HFR	Crossing Exposure Index / Cross-Product Value	Preferred Grade-Separation Solution
		2016	2021	2031			
Woodroffe Ave	3.28	30,619			26	796,094	Overpass
		33,806			33	1,115,598	Road over rail
		41,209			49	2,019,241	
Southwest Transitway	3.30	1,136 x 32			26	945,152	Overpass
		1,389 x 32			33	1,466,784	Road over rail
		2,076 x 32			49	3,255,168	
Fallowfield Road	3.88	29,468			19	559,892	Overpass
		32,535			21	683,235	Road over rail
		39,660			37	1,467,420	

The BMRRGSS recommended that the grade-separations be phased over time. Prioritization could be based on the greatest exposure of vehicle/train conflict which would result in an implementation order, from first to last, of: Woodroffe Avenue and the Southwest Transitway, Fallowfield Road, Merivale Road and Jockvale Road.

As the alignment identified for the Barrhaven LRT project will follow the existing Southwest Transitway corridor, which crosses the VIA Rail line at-grade immediately adjacent to the existing Woodroffe Avenue crossing of the VIA Rail line, and also will need to be grade-separated at Fallowfield Road, it is prudent to consider an integrated planning and EA approach to both LRT extension and rail grade-separation facilities.

2.2.2 ADDRESSING TRANSPORTATION ISSUES

Currently, transit service within the Study Area consists of a mixture of local, express and transitway services. Local routes generally circulate within the community and connect with transitway Stations. “Connexion” (express) routes are peak only direct services provided by OC Transpo between various neighborhoods and downtown Ottawa. Transitway routes serve as the backbone of the rapid transit network, connecting Barrhaven with downtown Ottawa and other important destinations across the City.

With implementation of the Stage 1 and Stage 2 LRT projects, the existing BRT corridor will be converted to LRT technology as far as Tunney’s Pasture (2019) and Baseline Station (2025). While implementation of LRT should address some of the existing short-term capacity and reliability issues currently affecting transit service to the Barrhaven community (by eliminating reliability issues due to on-street operation through the downtown core and permitting reallocation of existing resources to provide capacity improvements), conversion of the existing BRT corridor north/east of Baseline Station will introduce a transfer requirement for trips originating in Barrhaven and travelling beyond the LRT terminus point. While transfers are a component of many transit trips, particularly those not beginning and ending along a rapid transit line, the introduction of a transfer and resulting increase in travel time can impact ridership, particularly where the transfer represents a break in a journey to continue in the same direction and at the same or similar level of service quality (i.e., BRT to LRT). However, in the long-term, conversion of existing BRT corridors to LRT technology will improve the overall customer experience, particularly as Ottawa’s LRT network is extended to serve more destinations.

With respect to the Woodroffe Avenue, Southwest Transitway and Fallowfield Road/rail level crossings, existing issues revolve around the safety and traffic operations impacts associated with conflicts between trains, transit, and vehicular traffic. Given the limited road network serving north-south travel into and out of Barrhaven, disruptions at these crossings can result in significant congestion and delay to both the road and transit networks and represent a potential public safety issue.

2.3 LRT Maintenance and Storage Facility

Expansion of the City's LRT network will require additional Light Rail Vehicles (LRVs) to operate services and support ridership growth. As part of the Stage 1 (Tunney's Pasture – Blair) Confederation Line LRT project, the City has constructed a Maintenance and Storage Facility (MSF) at Belfast Road, with an additional Light Maintenance and Storage Facility (LMSF) identified and under construction as part of the Stage 2 Confederation Line East and West LRT Extensions project, located west of Moodie Drive.

As part of this study a review of future fleet requirements was undertaken to confirm the number of additional LRVs needed to operate the Barrhaven LRT extension as well as to reflect overall fleet growth to the year 2048, based on current planned LRT projects and anticipated ridership growth. The conclusion of this review was that the Belfast and Moodie sites will have sufficient capacity to accommodate heavy maintenance and storage of the LRV fleet in the long-term. However, given the distance from either the Moodie or Belfast facility to Barrhaven Town Centre and the need for trains travelling to/from the Moodie facility to make a reverse move at Lincoln Fields Station, it was determined that a storage and servicing facility capable of accommodating 16 LRVs (8 trains) be provided as part of the Barrhaven LRT extension. This will permit off-peak and overnight storage as well as servicing of trains (e.g., cleaning, inspection and minor “running repairs”), improving the efficiency of LRT operations by reducing non-revenue train movements and increasing the overnight time window available to undertake inspection and maintenance of LRT infrastructure.

Alternative locations for the Train Storage and Servicing Facility (TSSF) and their evaluation are discussed in the evaluation of alternative designs section of this report (**Section 6.2.4**).

2.4 Opportunities

2.4.1 MEETING FUTURE RIDERSHIP TARGETS

The City's OP encourages areas around major transit stations to develop as compact, walkable, mixed-use developments with densities that support transit use. The areas to be served by the Barrhaven LRT are anticipated to grow substantially over the planning horizon. The City's population is forecasted to grow 23% from 2011 to 2031 with 79% of that growth predicted to occur in urban areas outside the Greenbelt. The number of jobs is projected to grow about 24% from 2011 to 2031, with 72% occurring in the inner area and suburbs. This points to a need to move an increased number of people efficiently, reliably, and safely from outer areas into the central area, and vice-versa. As such, the number of transit trips taken into the inner area and suburbs is expected to rise substantially. The areas targeted for Transit Oriented Development (TOD) and intensification at mixed-use centres located at Centrepointe and Barrhaven Town Centre within the Study Area will see an increased demand for people wanting to live, play and work both in their neighborhood and downtown. Higher rapid transit technology such as LRT supports these forecasted trends by fueling growth and redevelopment.

Coinciding with this growth are the aggressive modal splits the City aims to achieve by 2031. By 2031, the City of Ottawa aims to have nearly 26% of all morning-peak period travel occur via public transit. This is an aggressive target considering that over the same period, the total number of trips taken is projected to grow by 32%. To support achievement of these splits, the Barrhaven LRT will provide a more efficient and reliable level of transit service, as well as an improved user experience than the current BRT service. With substantial planned improvements to transit service downtown and limited planned increases to road capacity, the modal share of transit within the travel market will increase. High rates of transit ridership to, from and within the inner area and suburbs are expected to continue.

Future transportation demand for both road and transit networks is modelled using the City's Regional Transportation (TRANS) model, which uses future population/employment projections, broken down by traffic zone, and assigns trips to various modes and on to the future transportation network. The model is calibrated based on existing travel data (origin-destination, traffic volumes) and provides a good approximation of likely future travel demand at both the screenline and corridor level.

As part of the 2013 TMP, future (2031) transit ridership projections were developed based on the proposed affordable rapid transit network. This model was further refined as part of the Stage 2 LRT project. The model indicates an existing (2011) transit demand of 5,900 two-way trips along the Southwest Transitway crossing the Greenbelt screenline during the weekday

morning peak period. This demand is estimated to increase to 9,750 by 2031. Extension of LRT to Barrhaven would generate approximately 1,400 additional trips during the same period.

The Barrhaven LRT corridor will connect two major areas of the planned growth – the Barrhaven Town Centre and CentrepoinTE Town Centre. Both are designated for future intensification and development as mixed-use centres. It will also connect Barrhaven directly with downtown and allow connections to many other destinations and transit corridors across the City.

The Barrhaven LRT will provide for a connection with the existing VIA Rail Fallowfield Station. The LRT project and potential VIA Rail High Frequency Rail project offer increased access for intercity rail travel to/from the south and west areas of the City of Ottawa as well as the potential opportunity for an integrated multi-modal station at Fallowfield.

Construction of the LRT project will also offer opportunities to advance additional transit priority measures along the corridor to increase local transit integration with rapid transit services, improving transit rider experience and encouraging additional transit ridership by prioritizing transit services.

2.4.2 ENVIRONMENTAL GAINS

Electric LRT can have net positive environmental impacts when compared against comparable levels of diesel BRT service required to move a similar number of people. In addition to electric propulsion, which reduces greenhouse gases, particularly sulphur and nitrogen oxides and other contaminants, LRT also reduces the number of vehicles required to carry the large volumes of passengers predicted. Modern LRT vehicles are also typically quieter than the buses they replace and provide a high-quality service for riders while reducing impacts on the areas around BRT facilities. The rail grade-separations will also provide an opportunity to eliminate vehicle idling and congestion while waiting for trains to pass, thus contributing to a cleaner local environment.

Replacement of existing BRT services in the Southwest Transitway corridor will remove approximately 200,000 annual revenue bus trips, resulting in lower diesel fuel consumption and greenhouse gas emissions. Conversion of the existing bus-only roadway between Nepean Sportsplex and Barrhaven Centre will reduce the amount of road salt needed during winter operations, resulting in improved water run-off quality from transit infrastructure in the corridor.

As part of the LRT project, additional pedestrian and cycling connectivity elements will be identified and constructed to encourage station access by those modes. These facilities will also add to the overall pedestrian and cycling network in the City, providing greater opportunities for residents to use walking or cycling modes for local trips, reducing automobile dependence and associated environmental impacts.

2.4.3 SAFETY

Implementation of the rail grade-separations at the Woodroffe, Southwest Transitway and Fallowfield crossings of the VIA Rail line represent a significant opportunity to improve safety, accessibility and connectivity in this area of the City. As per the 1997 Southwest Transitway EA as well as 1997 Fallowfield Road EA, rail grade-separation has been one of the fundamental design criteria for construction of the transitway as well as major roads. Extension of LRT to Barrhaven will require grade-separation at the existing Southwest Transitway and Fallowfield Road crossings of the VIA Rail line based on operating requirements for LRT. These grade-separations will eliminate risk of collision between trains and roadway users at the Woodroffe and Fallowfield crossings and between trains and transit at the Southwest Transitway crossing. As mentioned in **Section 2.2.1.6**, Woodroffe, Fallowfield and the Southwest Transitway crossings with the railway are all currently above the 200,000 cross-product value thresholds and by 2031 will be well beyond the threshold.

2.4.4 ENHANCED TRANSIT EXPERIENCE

The current BRT system within the Study Area includes a mixture of exclusive roadway (transitway) and dedicated (curb) bus lanes between Baseline Station and Barrhaven Town Centre. A completely segregated LRT system extending into Barrhaven Town Centre will enhance the experience for all transit passengers by increasing accessibility to LRT, reducing bus-rail transfers for many users, and providing high quality connecting facilities that promote walking and cycling access to stations along the LRT corridor.

Modern LRVs provide a higher quality trip through increased rider comfort, frequent and predictable travel times and efficient connections with bus feeder routes at stations. New stations provide the opportunity for enhanced amenities and services to passengers including information about next train arrival and journey times as well as increased capacity and weather protection for passenger transfers. Station facilities will be sized to meet expected need, preventing over-crowding and improving the customer experience.

A new Park and Ride facility at Barrhaven Centre Station will provide Improved transit access for residents beyond the LRT terminus. This Park and Ride facility is envisaged as a temporary facility to accommodate existing demand and support transit ridership, with ultimate co-location of parking facilities within a proposed “Civic Complex” to be located adjacent to Barrhaven Centre station.

Stations along the line, particularly within the Barrhaven Town Centre provide significant opportunities for economic uplift through new transit-oriented development which will enable residents to access housing, retail, institutional and employment opportunities by transit.

The insertion of the LRT infrastructure within the Woodroffe Avenue corridor, including the alignment shift and reconstruction of a portion of that roadway between Knoxdale Road and the Nepean Sportsplex, and conversion of the existing Southwest Transitway offer opportunities to refresh existing landscape/streetscaping and provide for new amenities including public art, pathways and benches, parks and public gathering spaces.

2.4.5 HEALTH BENEFITS

The OP lays out strategic directions to meet the challenge of growth in ways that support healthy and liveable communities and healthy environments. This includes a focus on making services accessible by transit, encouraging walking and cycling, and will contribute to the needs of an aging population by increasing accessibility to health services and community facilities.

Healthy, liveable communities are at the core of the OP and are addressed in part through the strategic direction of providing infrastructure (OP Section 2.3), with a focus on complete streets, active transportation, and transit (City of Ottawa 2013, as amended). Healthy communities are further defined by Ottawa Public Health (OPH) as being: Compact, Complete, Connected, Cool, and Convivial (Ottawa Public Health, 2019). The project supports a compact, complete, and connected built environment through public transit which improves access for a variety of ages and incomes to shops and services, schools, and employment, as well as improved access to green spaces throughout the city including the NCC Greenbelt and Capital Pathways network. This complements the goal of creating complete streets, which support public health through the integration of transit with active modes of transportation such as walking and cycling, which are often included in the trip chain for transit users. OPH identifies active modes of transportation as contributing to overall healthy living including mental health and disease prevention (Ottawa Public Health, 2020).

Additionally, benefits of the project include a reduction in greenhouse gas (GHG) emissions and associated improvements to air quality, supporting cooler air temperatures through the increased capacity and service of the public transit network and the associated reduction of vehicle kilometres travelled through private and corporate fleet automobiles. GHG emissions are identified in the Climate Change Master Plan (2020) as a major contributing factor to climate change and have related implications to human health. The City of Ottawa tracks GHG emissions annually, with transportation accounting for 44% of community GHG emissions by sector and fleet accounting for 68% of corporate GHG emissions in the 2017-2018 inventory results (City of Ottawa 2019). The project has the potential to significantly reduce emissions, particularly those associated with commuters travelling from the rapidly growing suburbs of Barrhaven, Riverside South, and the surrounding rural area.

2.5 Conclusion

The justification for extending LRT to Barrhaven Town Centre and implementing the associated rail grade-separations is well established in the City’s OP and TMP, as well as within previous EA studies dating back to 1997. Extending LRT to Barrhaven Town Centre will support increased transit ridership as well as TOD-growth and development of compact and sustainable communities, while reducing overall greenhouse gases and other contaminant emissions through the shift to electrically powered transit. Additional pedestrian and cycling infrastructure constructed as part of the project will encourage use of

active transportation modes for transit access as well as supporting local trips within the corridor, allowing residents to reduce dependence on private vehicles and access housing, employment and services by sustainable travel modes.

The proposed rail grade-separations will address TSB Recommendation R15-05 in its Railway Investigation Report R13T0192 on the September 2013 VIA Rail/OC Transpo train and bus collision at the VIA Rail line/Southwest Transitway level crossing. This need is further established and confirmed by the recently completed study (BMRRGSS, 2017).

An expanded LRT network, supported by rail grade-separations to create a safer environment, will increase the attractiveness of transit thereby helping the City achieve many of its key strategic directions and objectives. Combining the planning of LRT extension and rail grade-separations within this EA study enables the City to investigate integrated design solutions for both the rapid transit and roadway crossings, which are within the same Study Area.

3 Existing Environmental Conditions

3.1 Study Area

This section of the EPR presents the studies and investigations undertaken to document the existing conditions within the Study Area. Overall, baseline data was collected and analyzed for key environmental parameters to:

- Provide an understanding of existing conditions;
- Allow for future predictions of how the proposed project may cause these environmental conditions to change;
- Allow for future predictions of how adverse effects can be mitigated and beneficial effects enhanced; and,
- Provide a basis for designing monitoring programs.

3.1.1 PHYSICAL AND TEMPORAL BOUNDARIES

The Study Area is shown in **Figure 1-1**. However, the Study Area limits may change depending on the element of the environment being assessed as some potential environmental effects (e.g., noise) may be much more localized, whereas others may have broader extents.

The information in this section is intended to represent a ‘snapshot’ in time and was documented primarily during 2018-2019. Information will continue to be updated during the study period as it becomes available. Results of subsequent detailed and seasonal field surveys are provided in **Section 5** of the EPR, and additional analysis of existing conditions as they pertain to the modification to the Preferred Design is described in **Section 6.7** and **Annex 18 of Appendix B**.

3.2 Methods of Investigation

The information presented in this section was prepared by a multidisciplinary team of land use planners, biologists, geologists, archaeologists, landscape architects, municipal engineers, transportation planners, and experts in rail safety, agriculture, air quality, noise, and vibration. This team of specialists collected, consolidated, reviewed and screened the available information with a view towards establishing the basis for development, analysis and evaluation of alternatives.

The existing conditions reporting considered all available background material. The inventory is of sufficient detail to enable the analysis and evaluation of alternative transportation solutions, designs, mitigating measures and monitoring programs. As noted, this information will be supplemented by on-site surveys and/or detailed studies where warranted.

The general methodology involved the following elements:

- The submission of requests for data, drawings and reports to relevant agencies;
- Contacting and meeting with affected parties as required;
- Consolidating, reviewing and analyzing relevant material for each element;
- Conducting air photo interpretation and field verification as required; and,
- Identifying elements or criteria that could be considered potential evaluation criteria.

Specific methods of investigation may be discussed in further detail in respective sections below as warranted. Transportation conditions and planning policies related to transportation were summarized in the Needs and Opportunities section of the report and form part of the existing conditions for the Study Area.

3.3 Social Environment

The social environment for the Study Area is documented through a review of relevant policy and summary of existing conditions throughout the following sections.

3.3.1 REGULATORY PLANNING POLICIES

3.3.1.1 Federal Policy

The federal policy and development context affecting the study corridor consists of National Capital Commission (NCC) policy documents as described below and includes the Plan for Canada’s Capital and more specifically, the Greenbelt Master Plan.

3.3.1.1.1 The Plan for Canada’s Capital, 2017 - 2067

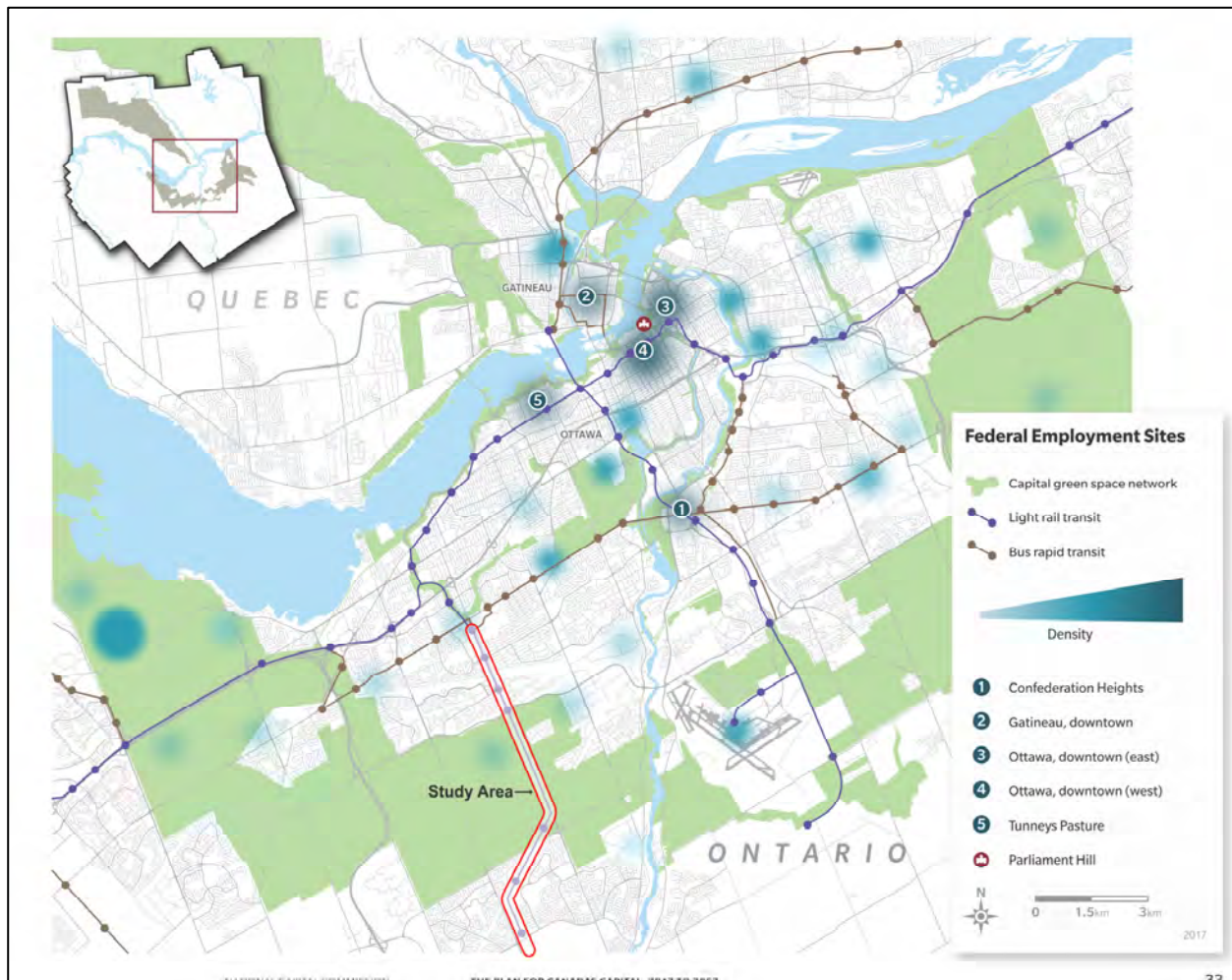
The Plan for Canada’s Capital, 2017-2067 (the Plan) is a long-range planning document that acts as a blueprint for the planning and use of federal lands within the National Capital Region. It guides the federal management of lands to ensure that the capital reflects its national importance. The Plan acknowledges a shared and collective responsibility with municipal and provincial planning authorities to achieve the objectives of the plan.

The Plan has three strategic pillars that guide it, including:

- An Inclusive and Meaningful Capital;
- A Picturesque and Natural Capital; and,
- A Thriving and Connected Capital.

The Plan aims to protect the legacy from the past while building on and strengthening the unique character of Canada’s Capital Region looking towards Canada’s bicentennial in 2067. The Plan acknowledges investments in LRT and BRT networks (including the extension to Barrhaven) to connect residents across the large geography of the City (**Figure 3-1**).

Figure 3-1 Plan for Canada’s Capital Transit Context



3.3.1.1.2 NCC Greenbelt Master Plan (2013)

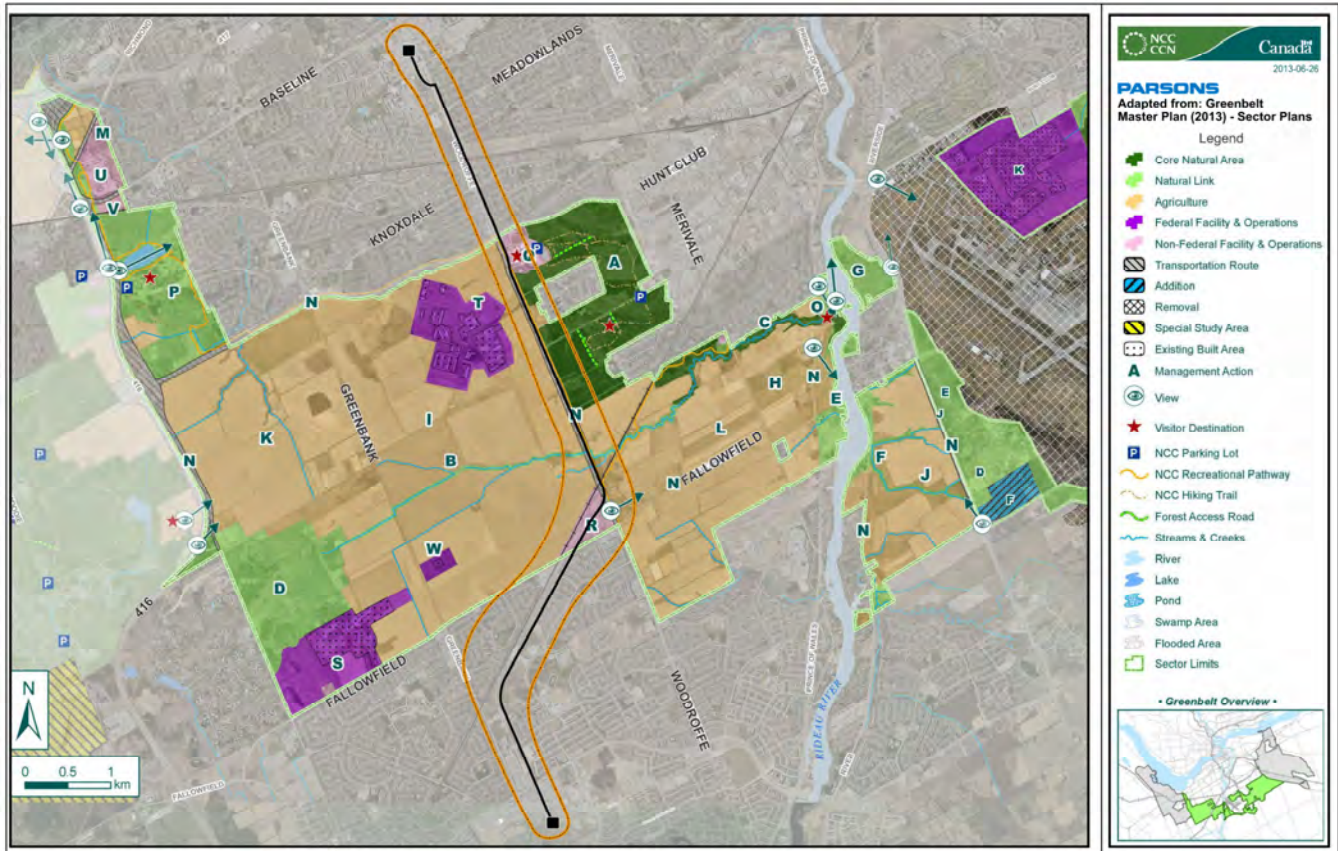
The Greenbelt Master Plan (GMP) directs and guides the preservation and evolution of the National Capital Greenbelt out to 2067. One of the goals outlined in the GMP with respect to sustainable transportation and infrastructure involves ensuring that “*environmental best management practices are applied in the design, operation and maintenance of existing infrastructure.*” Furthermore, the GMP highlights that new infrastructure within the Greenbelt should not be permitted “*unless there is demonstration that there are no alternatives outside of the Greenbelt and no net loss will result to ecological or overall Greenbelt integrity.*” The GMP is updated approximately every 10 years.

The portion of the Study Area within the Greenbelt is within or adjacent to four land use designations: 1) Agriculture, 2) Core Natural Areas, 3) Natural Link and 4) Non-Federal Facility. The primary objectives of these land use designations are outlined in **Table 3-1** and shown in **Figure 3-2**.

Table 3-1 Greenbelt Master Plan Land Use Designations

Land Use Designation	Primary Objectives
Agriculture	<ul style="list-style-type: none"> • Practice sustainable agriculture • Support productive Greenbelt farms that contribute to local and regional food supply • Diversify Greenbelt farming and provide opportunities for agri-tourism • Reduce the area covered by large mono-culture farming operations and promote diverse agriculture lands • Enhance Canada’s Capital through conservation of natural visual landscapes
Core Natural Area	<ul style="list-style-type: none"> • Protect biodiversity and ecosystem health for the long term • Restore and enhance terrestrial and aquatic biodiversity • Enhance Canada’s Capital through the conservation of natural visual landscapes
Natural Link	<ul style="list-style-type: none"> • Protect natural linkages between Core Natural Areas • Establish or restore terrestrial and aquatic linkages in fragmented landscapes with the Greenbelt • Provide public activities and interpretation away from sensitive features • Facilitate adaption to environmental change (resiliency) • Enhance Canada’s Capital through conservation of natural visual landscapes
Non-Federal Facility	<ul style="list-style-type: none"> • Complement the Natural Environment, Agriculture, and Capital Experiences & Recreation • Ensure Agriculture Canada Research Facility located within the Study Area contributes to the Greenbelt’s visual landscape

Figure 3-2 Greenbelt Sector Plan applicable within the Study Area



Greenbelt Implementation: Sector Plans

The GMP includes Sector Plans which provides more detailed information on the land use designations, Capital experiences, and the recreation networks in specific parts of the Greenbelt. The Southern Farm & Pinhey Forest Sector Plans are applicable to the Study Area. The GMP aspires to enhance the VIA Rail Train Station located at the intersection of Fallowfield Road and Woodroffe Avenue as a Capital Arrival through visitor information and promotion of the Greenbelt and the Capital, illustrating the importance of the location of the Study Area. The Plan identifies transportation as a key component of the Capital experience, committing to achieving sustainable transportation that complies with environmental conservation best practices. Potential impacts to the visual quality, natural links and farming practices in the Greenbelt need to be mitigated/avoided to preserve Greenbelt value.

The Sector Plan illustrated in **Figure 3-2** identifies several Guidelines and Actions (denoted by characters on the Sector Plan) that may impact the evaluation of alternatives. These include:

A – The Pinhey Forest Core Natural Area:

- The sector is accessible to visitors and residents by transit, boat (via the Rideau River) and recreational pathways. and aspires to offer outdoor recreational and educational experiences in a forest setting.
- The Plan aims at preserving and promoting visual landscapes of farms and forest.
- The adjacent Nepean Sportsplex, (denoted as Q) will help in integrating conservation, forest management and recreational value into an urban setting.
- The Plan suggests working with community and agency partners to enhance the promotion and education value of the Visitor Destination.

B – Southern Farms Natural Link

- To aim for a fully functioning natural link; reduce the tile drain system area as part of regular maintenance.

- To partner with Rideau Valley Conservation Authority (RVCA), farm owners and tenants to restore riparian areas and enhance natural links along Black Rapids Creek and the headwaters of Graham Creek.

I – Greenbelt Research Farm Lands

- Encourage use and demonstration of provincial and federal recognized farm best management practices and diversify farm crop production over time.

N – Visual Quality along Sector Roadways:

- To enhance visual quality of Greenbelt along transportation routes through context sensitive design and landscape management (planting of naturalized trees and shrubs), that maintain views and reduce effects of wind on roads.
- Protect views and enhance visual quality.
- Explore ways to protect and enhance visual experience along scenic routes of Fallowfield Road, Woodroffe Avenue.

Q – The Nepean Sportsplex and Confederation Education Centre

- Permit future continued intensive use and adaptive re-use of the site, including maintenance of existing sports fields and use of the (former) school's existing site for recreational uses.

R – The Fallowfield Park and Ride Facility

- Enhance the VIA Rail Train Station as a Capital Arrival through visitor information and promotion of the Greenbelt and the Capital.

T – Greenbelt Research Farm:

- Allow shared and mixed use of built facilities and explore potential for partnerships to provide sustainable agriculture support at this site, through activities such as farming, processing or value-added facilities, markets, asset sharing.
- Reserve this site for federal use in the long-term.

3.3.1.2 Provincial Policy

The Provincial Policy Statement (PPS) (MMAH, 2020) is issued under Section 3 of the *Planning Act*. The Provincial Policy Statement provides policy direction on matters of provincial interest related to land use planning and development. As a key part of Ontario's policy-led planning system, the PPS sets the policy foundation for regulating the development and use of land. It also supports the provincial goal to enhance the quality of life for all Ontarians by building strong, healthy, and resilient communities with long-term economic prosperity. It includes policies on key issues that affect our communities, such as:

- The efficient use and management of land and infrastructure;
- Protection of public health and safety;
- Protection of the environment and wise use and management of resources; and,
- Ensuring appropriate opportunities for employment and residential development, including support for a mix of these uses.

Municipalities use the PPS to develop their Official Plans and to guide and inform decisions on planning matters. All decisions affecting land use planning matters “shall be consistent with” the PPS (MMAH, 2020).

The PPS defines *Development* as “the creation of a new lot, a change in land use, or the construction of buildings and structures requiring approval under the *Planning Act*.” Many land use policies outlined in the PPS restrict development in and/or near elements of provincial interest (e.g., provincially significant wetlands) unless it can be demonstrated that there will be no negative impact on the environmental features nor their ecological functions. However, as per the PPS, “activities that create or maintain infrastructure authorized under an environmental assessment process” are not considered development.

Notwithstanding, environmental assessments have regard to matters of provincial interest and where impacts cannot be avoided shall be minimized to the extent possible through appropriate mitigation, monitoring and/or compensation.

3.3.1.3 Municipal Policy

The municipal policy context affecting the Study Area consists of the City of Ottawa Official Plan (OP); Secondary Plans; and the Comprehensive Zoning By-Law.

3.3.1.3.1 City of Ottawa Official Plan (2013, as amended)

During the course of finalizing this study the City of Ottawa adopted a new OP that was approved by the Ministry of Municipal Affairs and Housing in November 2022. The information provided in this section remains the basis for subsequent evaluation and development of the Recommended Plan therefore, it remains unchanged. Discussion of the new OP and its influence on the project or process is documented in **Section 6.8**.

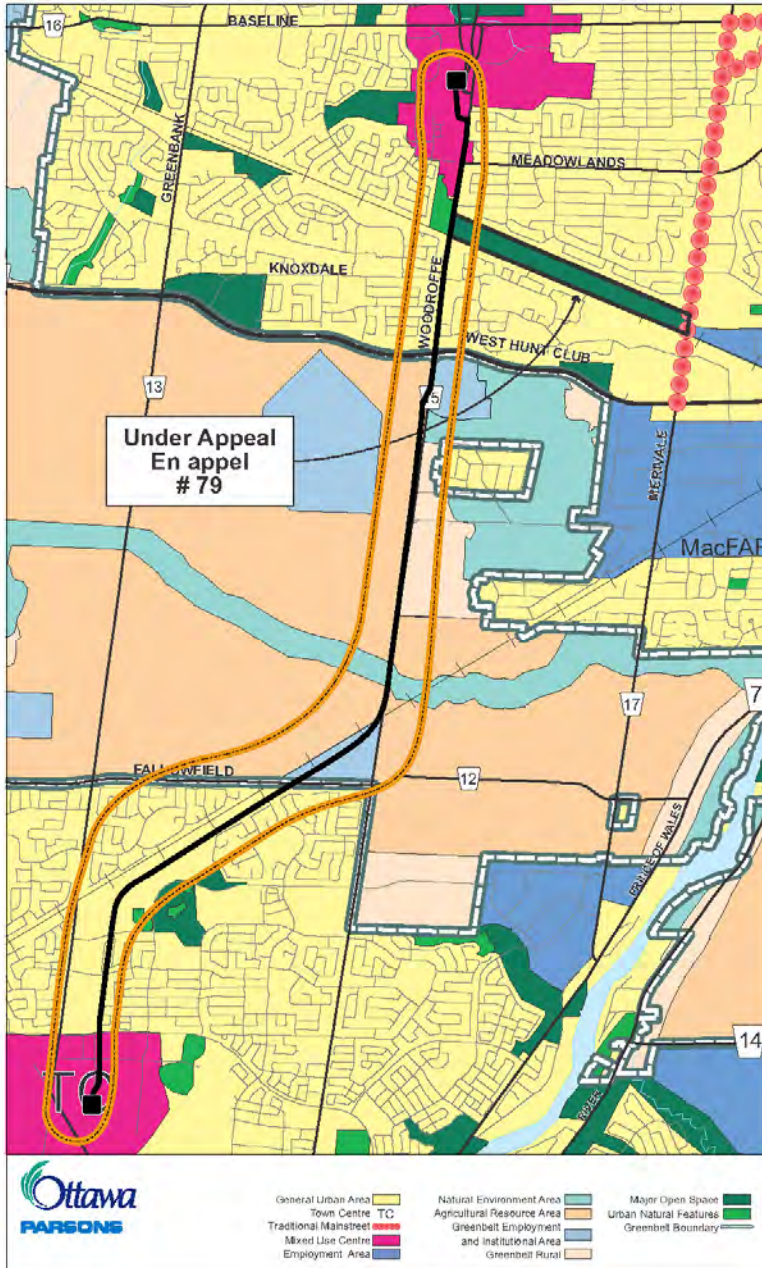
The OP provides a vision of the future growth of the City and a policy framework to guide its physical development to the year 2031. It is a legal document that addresses matters of provincial interest defined by the PPS. The OP serves as a basis for, and provides guidance on, a wide range of municipal activities. **Table 3-2** outlines the various land use and other designations that apply within the Study Area. **Figure 3-3** illustrates the land use designations of the OP. Municipal services (including LRT) are generally permitted in all land use designations if authorized under an EA where issues of impact and mitigation are addressed.

Table 3-2 Land Use Designations applicable to the Study Area

Schedule	Designation	Location within Study Area
B – Urban Policy Plan	GENERAL URBAN AREA	Lands north and south of the Greenbelt and includes existing and developing residential communities.
	MIXED USE CENTRE	Just south of Meadowlands Drive north to Baseline Road and South of Strandherd Drive.
	AGRICULTURE RESOURCE AREA	Greenbelt lands more specifically, between West Hunt Club Road and Fallowfield Road to the west and portions north of Fallowfield Road to the east.
	GREENBELT EMPLOYMENT AND INSTITUTIONAL AREA	Defined area just west of the Study area south of West Hunt Club Road and includes the former Agricultural Research Farm, VIA Rail Station at Fallowfield Road and Woodroffe Avenue.
	MAJOR OPEN SPACE	Corridor extending east from Woodroffe Avenue along the CN Railway and narrow corridor along the north side of West Hunt Club Road and South Nepean Park.
	NATURAL ENVIRONMENT AREA	Greenbelt lands coinciding with Pinhey forest and along Black Rapids Creek
	GREENBELT RURAL	Greenbelt lands east of Woodroffe Avenue south of the Nepean Sportsplex to just north of Black Rapids Creek.
	URBAN NATURAL FEATURE	Tallwood Woods south of Tallwood Drive, north of the CN Railway and Highbury Woods north of Highbury Park Drive, west of Longfields Drive.
C – Primary Urban Cycling Network	ON-ROAD CYCLING ROUTES	Woodroffe Avenue and Fallowfield Road.
	OFF-ROAD CYCLING ROUTES	Portions of Woodroffe Avenue and along the VIA Rail corridor in the southern portion of the Study Area.
D – Rapid Transit and Transit Priority Network	BUS RAPID TRANSIT (BRT)	West of Woodroffe Avenue
	INTER-REGIONAL STATION	The VIA Rail Station at the intersection of Woodroffe Avenue and Fallowfield Road
E – Urban Road Network	ARTERIAL ROADS	Baseline Road West Hunt Club Road Woodroffe Avenue

Schedule	Designation	Location within Study Area
		Fallowfield Road Strandherd Road Greenbank Road
	MAJOR COLLECTOR ROADS	Meadowlands Drive Longfields Drive Jockvale Road Tallwood Drive Centrepointe Drive
	COLLECTOR ROADS	Berrigan Drive Highbury Park Drive Mountshannon Drive Holitman Drive Foxfield Drive Wolfgang Drive Grenfell Crescent Riocan Avenue Slack Road Vaan Drive Majestic Drive Knoxdale Road Medhurst Drive Norce Street Constellation Drive Navaho Drive
K – Environmental Constraints	INTAKE PROTECTION ZONE	Woodroffe Avenue from Baseline Road to approximately Slack Road
	UNSTABLE SLOPES	Main channel of Black Rapids Creek Pinecrest Creek northern limit of Study Area to Meadowlands Drive
L1 – Natural Heritage System Overlay (East)	GREENBELT	West Hunt Club Road to Fallowfield Road
	NATURAL HERITAGE SYSTEM FEATURES	Tallwood Woods at Tallwood Drive to CN Rail line Pinhey Forest West Hunt Club Road to Grenfell Crescent Wetland parcel west of Woodroffe Avenue on main channel of Black Rapids Creek Highbury Woods
Annex 2a – Watershed and Subwatershed Plans	OTTAWA WATERSHED, PINECREST CREEK SUBWATERSHED	Northern limit of Study Area to mid-Greenbelt
	LOWER RIDEAU WATERSHED, BLACK RAPIDS CREEK AND BARRHAVEN CREEK SUBWATERSHEDS	Mid Greenbelt to Fallowfield Road and Fallowfield Road to approximately Berrigan Drive
	JOCK WATERSHED, JOCK DOWNSTREAM REACH SUBWATERSHED	Berrigan Drive to southern limit of the Study Drive
Annex 2b – Subwatershed Studies and Environmental Plans	PINECREST CREEK STORMWATER MANAGEMENT RETROFIT STUDY	Northern Study Area limit to approximately mid Greenbelt
	LOWER RIDEAU WATERSHED STRATEGY	Mid Greenbelt to approximately Berrigan Drive
	JOCK RIVER REACH 1 SUBWATERSHED STUDY	Berrigan Drive to southern limit of Study Area
Annex 10 – Land Use Constraints Due to Aircraft Noise	25 LINE (COMPOSITE 25 NEF/NEP)	Fallowfield Road, along transitway alignment to Greenbank Road south to Strandherd Drive
	AIRPORT ZONING REGULATIONS/AIRPORT VICINITY DEVELOPMENT ZONE	East side of Woodroffe Avenue from the Nepean Sportsplex to Fallowfield Road and Study Area limits south of Fallowfield Road

Figure 3-3 City of Ottawa Official Plan



3.3.1.3.2 City of Ottawa Secondary Plans

The City of Ottawa OP is supported by a collection of Secondary Plans and Site-Specific Policies prepared by former municipalities for specific areas. The plans contain complementary and more detailed policy direction for specific areas and neighbourhoods in the City.

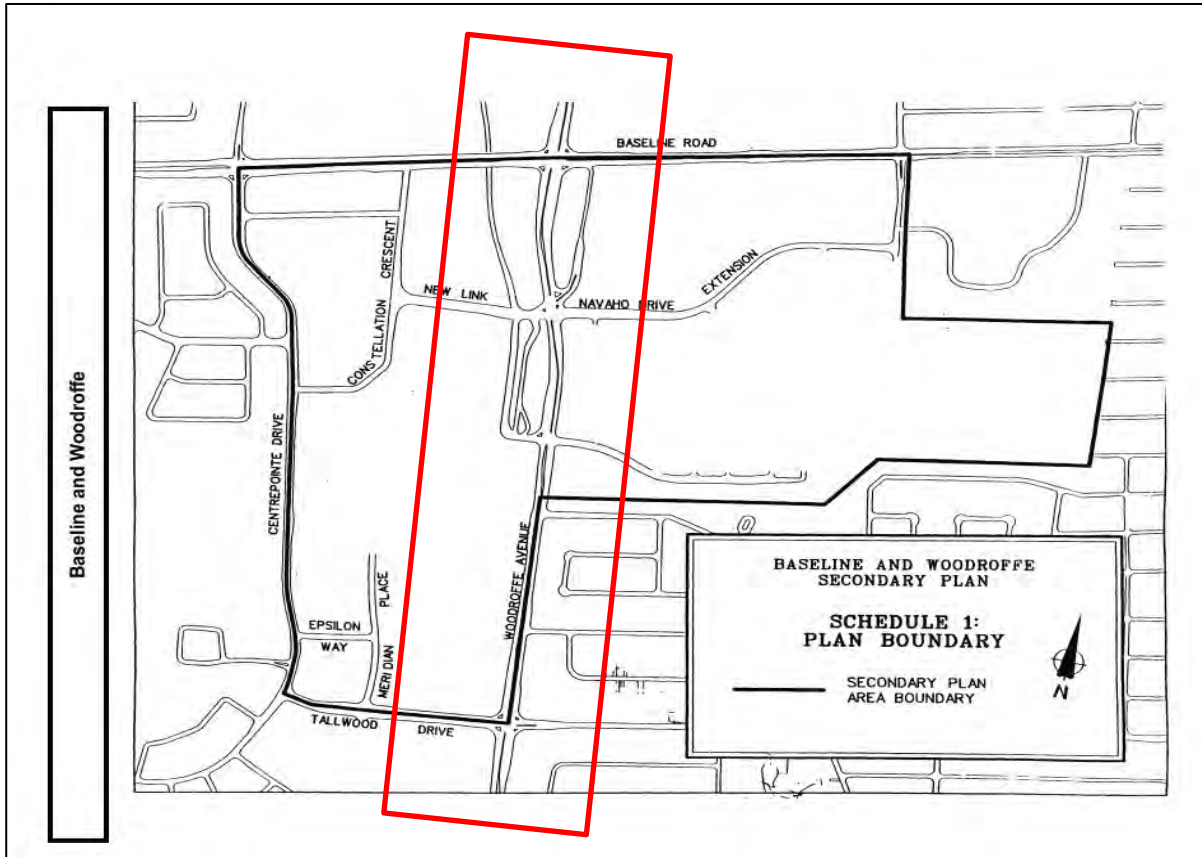
The three (3) secondary plans which provide policy direction within the Study Area are:

- Baseline and Woodroffe Secondary Plan;
- South Nepean Urban Plan for Areas 1, 2 and 3; and,
- Barrhaven Downtown Secondary Plan.

Baseline and Woodroffe Secondary Plan

The Baseline and Woodroffe Secondary Plan illustrated in **Figure 3-4** is intended to function as a focal point for business and activity, accommodating a large amount of employment and related development with good access to transit. The transportation system forms the skeletal structure of the area and determines the level of development that can be accommodated. A notable objective of the plan is creating transit-oriented development at Baseline Station.

Figure 3-4 Baseline and Woodroffe Secondary Plan

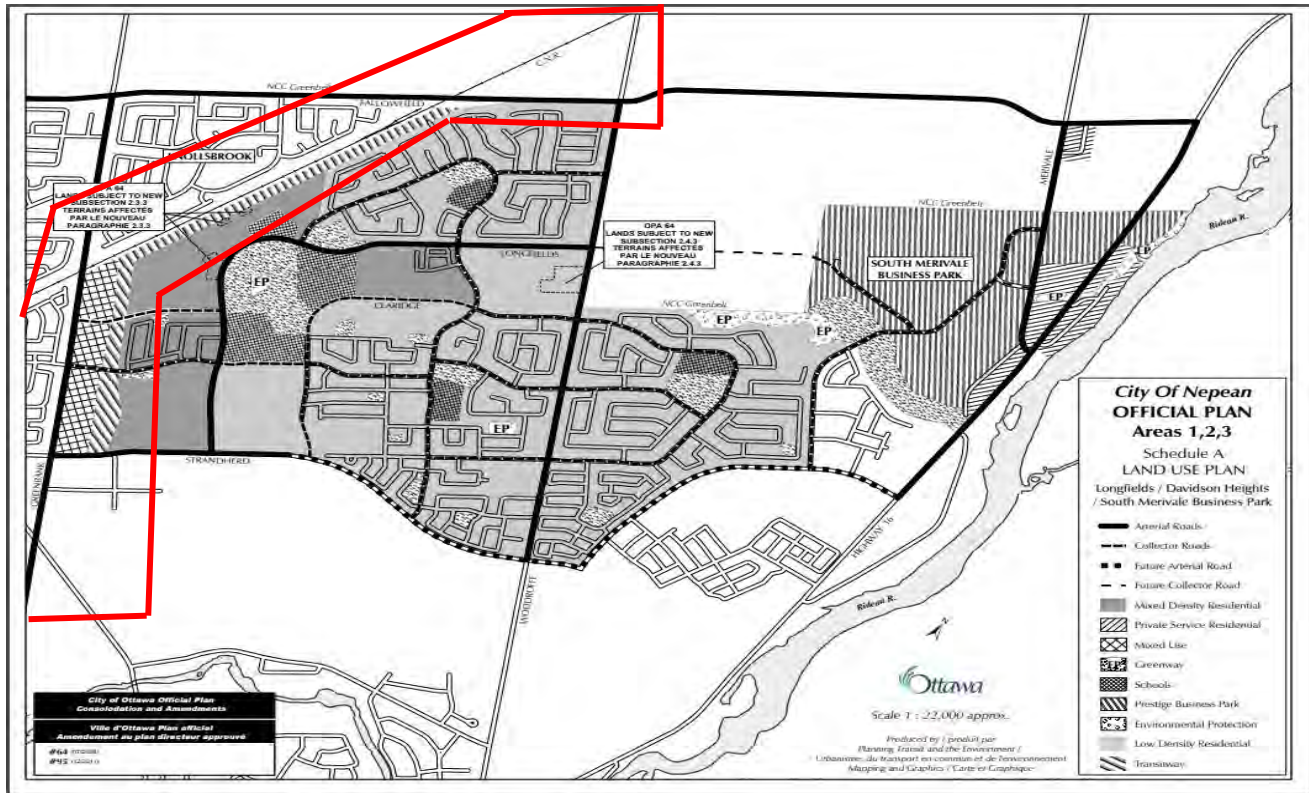


South Nepean Urban Plan for Areas 1, 2 and 3

The South Nepean Urban Plan for Areas 1, 2 and 3 is illustrated in **Figure 3-5**. Fallowfield Road acts as the northern boundary for the Plan and applies to the southern portion of the Study Area. Fallowfield Road is highlighted as it is an Arterial Road for use by pedestrians, cyclists, transit vehicles, trucks and cars and separates the Greenbelt from the mixed-density residential area of the South Nepean Urban Plan Area.

The Secondary Plan emphasizes strong support to the development of transit within the area. It identifies that the Rapid Transit Corridor will be located adjacent to the VIA Rail corridor south of Fallowfield Road (note the railway is labelled as C.N.R. on **Figure 3-5**), extending south to the South Nepean Activity Centre provided there is future service demand.

Figure 3-5 South Nepean Urban Plan for Areas 1, 2 and 3



Barrhaven Downtown Secondary Plan (2019)

During the course of the EA study, the Barrhaven Downtown Secondary Plan (**Figure 3-6**) was drafted and supersedes the Area 7 plan. The new plan puts forward area-based policy direction to support the Barrhaven Town Centre’s evolution into a compact, mixed-use, and transit-supportive community. The Secondary Plan acknowledges OP direction for area intensification and infill and highlights a vision of the Barrhaven Downtown as a meeting place for the community. High-quality urban design, a mix of land uses, and accessible greenspace and transportation are emphasized to support community growth.

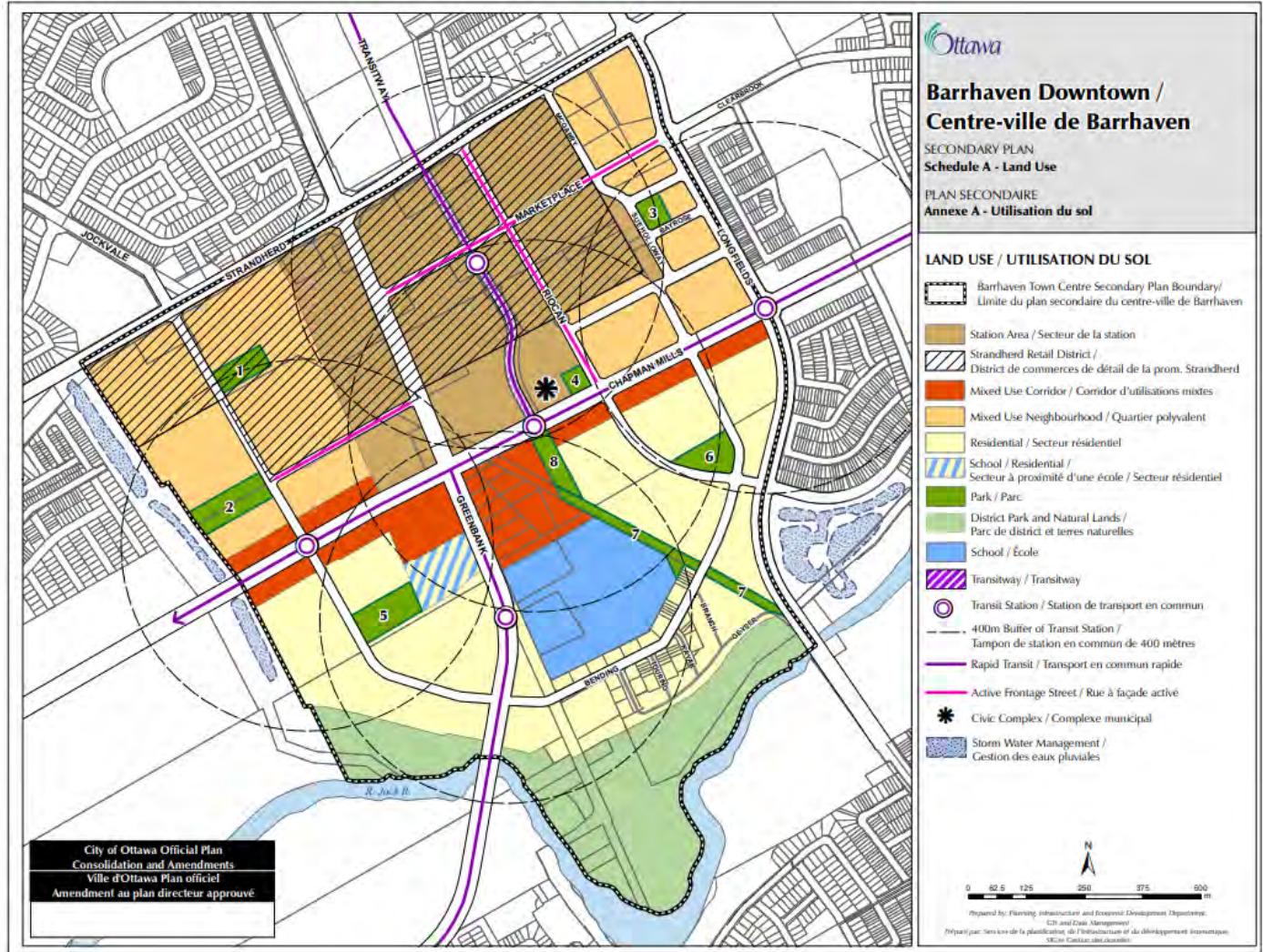
The planning area is intended to be developed with a mix of different building heights and typologies. The southern corridor of Chapman Mills Drive is designated a Mixed-Use Corridor with corresponding policies intended to promote a vibrant streetscape. The lands north of Chapman Mills Drive and south of Strandherd Drive are primarily designated as Station Area. The corresponding planning policies are intended to support future O-Train Line 1 (Barrhaven LRT Extension) by way of a wide range of land uses, an inviting public realm, and a concentration of height and density. The southern portion of the Town Centre towards the Jock River takes on a more residential character according to the suburban context.

The supportive transportation network for the Town Centre will be comprised of transit, street, active transportation, and parking networks, all focused on accessibility and sustainability. For example, all Arterial roads (i.e., Greenbank, Longfields, and Strandherd) and Major Collector roads (Chapman Mills) are to have pedestrian and cycling facilities and a recreation corridor is proposed. The transportation network features two transitway lines (one East-West and one North-South). The East-West line operates entirely in median-separated central lanes along Chapman Mills Drive, while the North-South line uses a dedicated transit corridor north of Chapman Mills and central lanes south of Chapman Mills along Greenbank Road. Five transitway stations (existing and proposed) are identified in the Secondary Plan Downtown area. The intersection of these two transitway lines is considered a transit “hub” as well as a community focal point which is intended to evolve over time as construction of rapid transit lines occurs. The Transit Hub is planned adjacent to the municipal civic complex.

As part of the transit network, the Plan highlights that temporary Park & Ride facilities are permitted within any land use designation in the Town Centre in the immediate vicinity of planned or existing transit stations. Policy for temporary Park &

Ride facilities intends to locate them where they conform with plans for long-term acquisition of public streets or public parks and plans for transit-supportive development. The Plan also permits permanent Park & Ride facilities. Policy promotes locating permanent facilities where they can be integrated with a proposed development, below- or above-grade, or shared with other uses in the Barrhaven Downtown.

Figure 3-6 Barrhaven Downtown Secondary Plan, 2019



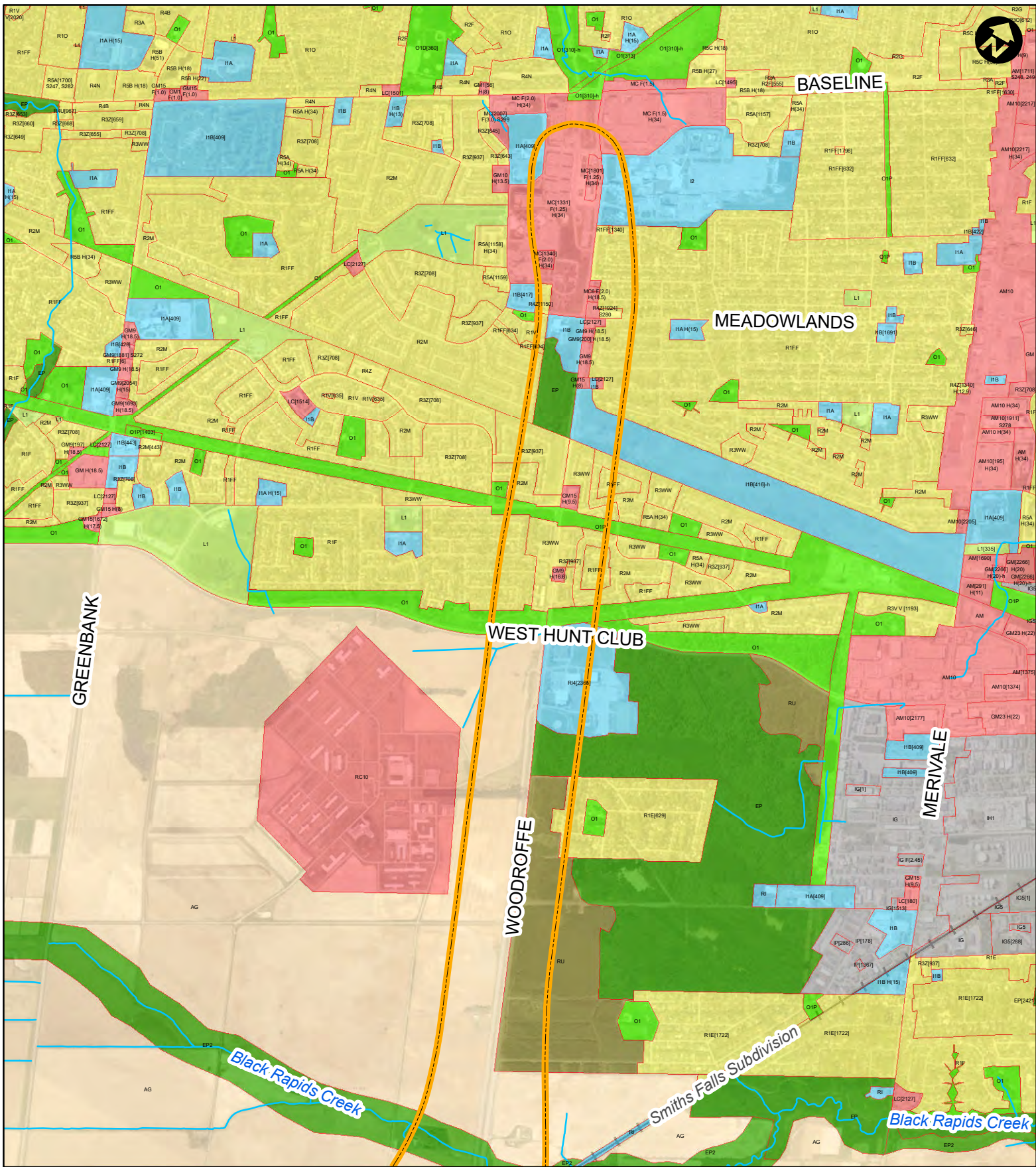
3.3.2 COMPREHENSIVE ZONING BY-LAW

The City of Ottawa Zoning By-Law implements the land use objectives of the Official Plan at a site-specific level. Given the detailed nature of land use zoning provisions, a characterization of zoning is provided rather than a detailed inventory of applicable zones and related standards. Zoning for the Study Area is shown in **Figure 3-7, Figure 3-8 and Figure 3-9.**

The lands adjacent to the Study Area are contained within a range of zones including Agricultural (AG), Environmental Protection (EP), Ground Transportation (T2), Residential First Density (R1), Residential Second Density (R2), Residential Third Density (R3), General Mixed-Use (GM), Mixed-Use Centre (MC), Minor Institutional (I1), Major Institutional (I2), Local Commercial (LC), Parks and Open Space (O1), as well as Rural Countryside (RU).

3.3.3 EXISTING LAND USE

Figure 3-10, Figure 3-11 and Figure 3-12 illustrate existing land use within the Study Area.

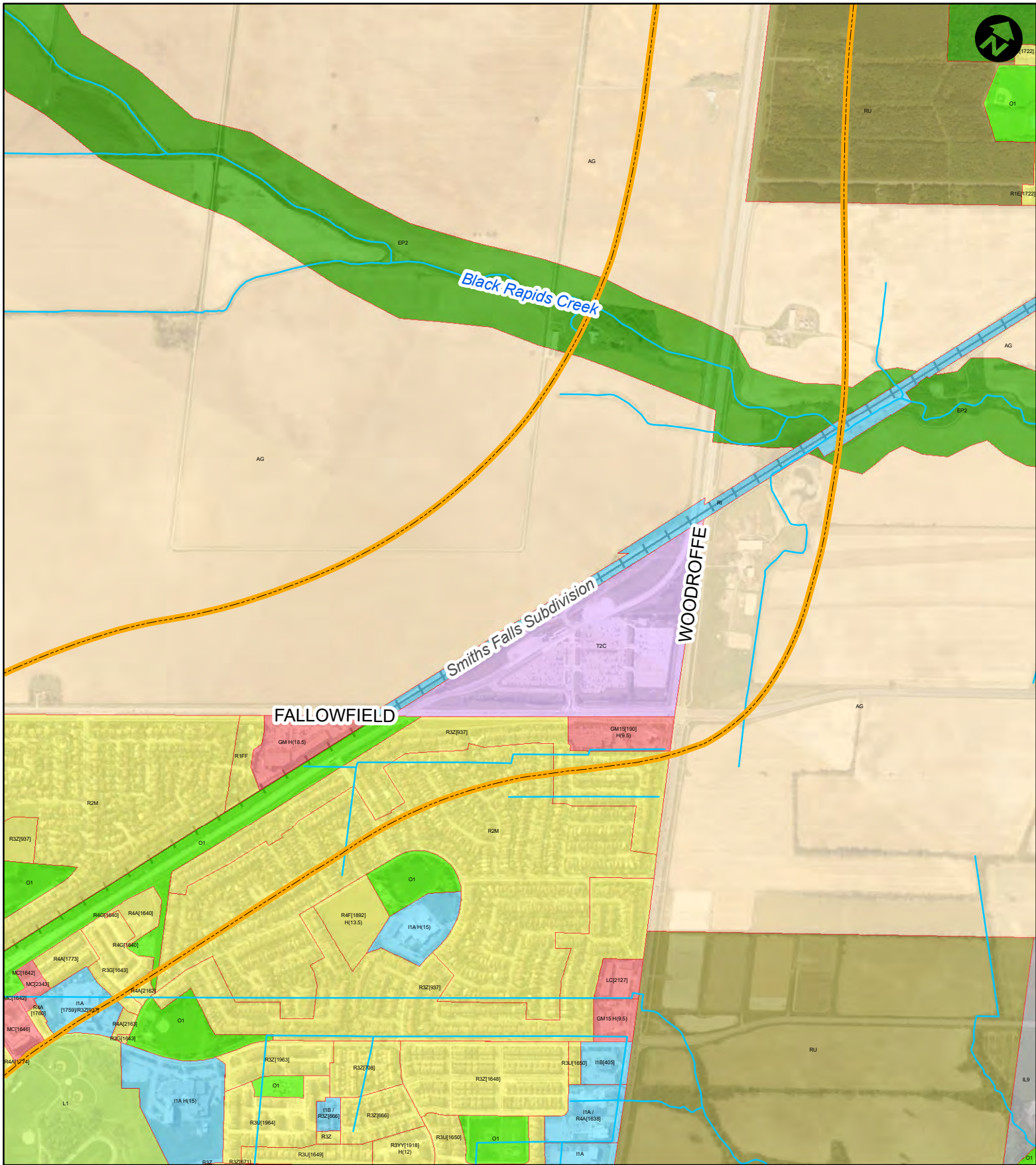


Legend

Study Area	Industrial
Watercourse	Leisure
Zoning (Sept 2018)	Open space
Commercial/Mixed Use	Residential
Environmental Protection	Rural Country Side
Institutional	Agriculture

Barrhaven Light Rail Transit
 (Baseline Station to Barrhaven Town Centre)
Planning and Environmental Assessment Study

Zoning



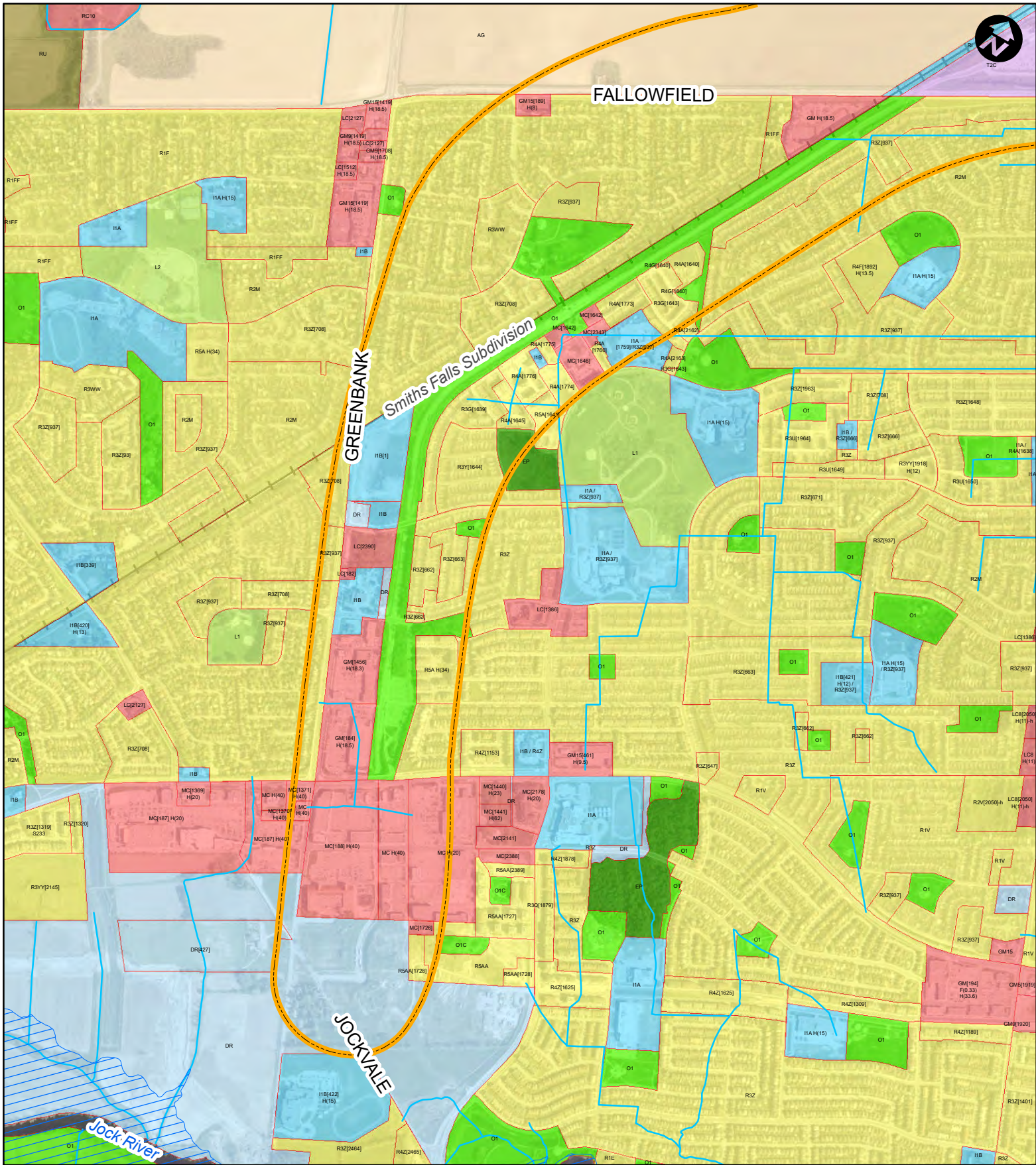
Legend

Study Area	Leisure
Watercourse	Open space
Zoning (Sept 2018)	Residential
Commercial/Mixed Use	Rural Country Side
Environmental Protection	Transportation
Institutional	Agriculture
Industrial	

Barrhaven Light Rail Transit
(Baseline Station to Barrhaven Town Centre)
Planning and Environmental Assessment Study

0 0.15 0.3 0.6
 Km

Zoning



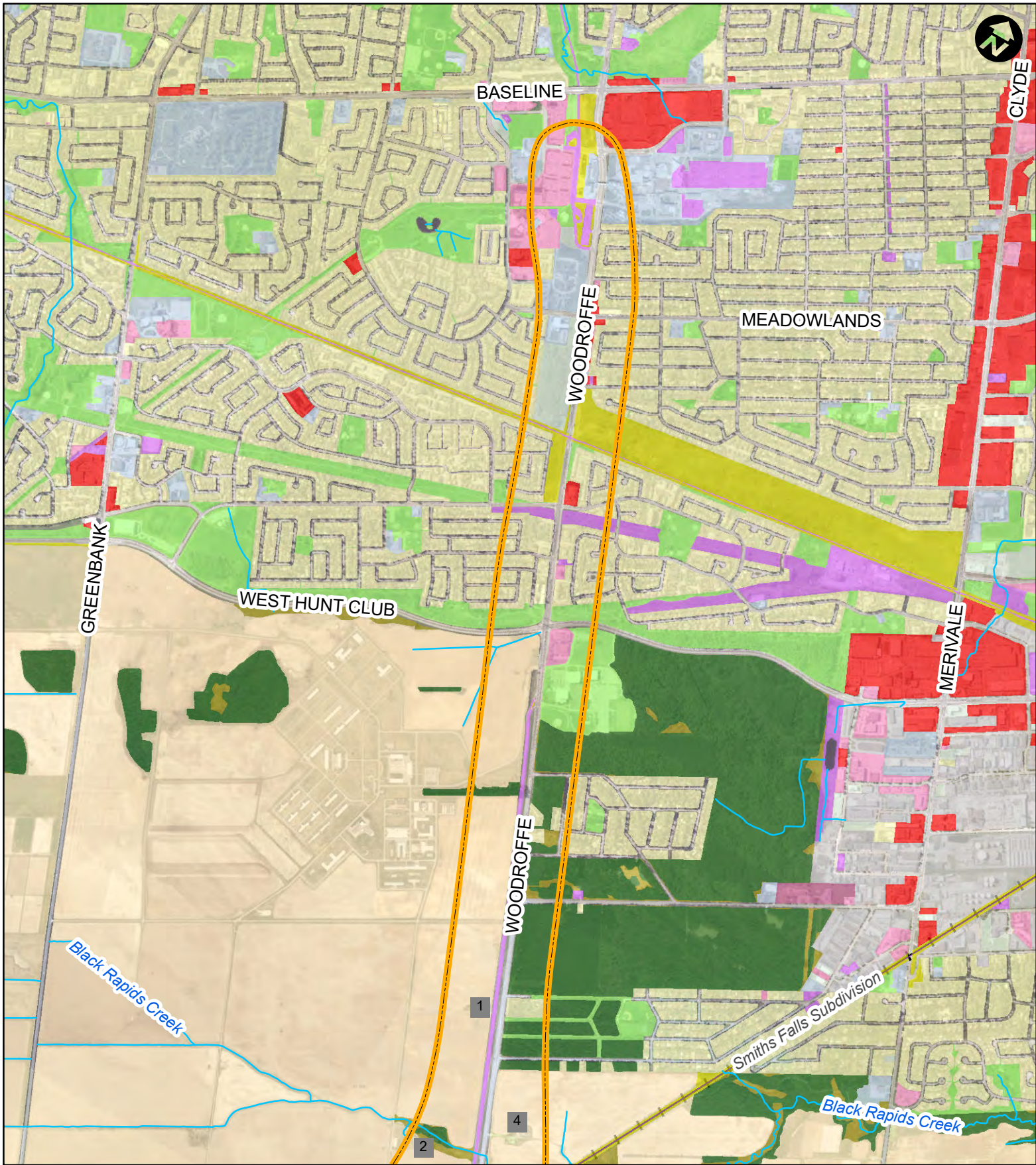
Legend

Study Area	Leisure
Watercourse	Open space
Zoning (Sept 2018)	Residential
Commercial/Mixed Use	Rural Country Side
Development Reserve	Transportation
Environmental Protection	Agriculture
Institutional	Flood Plain

Barrhaven Light Rail Transit
 (Baseline Station to Barrhaven Town Centre)
Planning and Environmental Assessment Study

0 0.2 0.4 0.8
 Km

Zoning



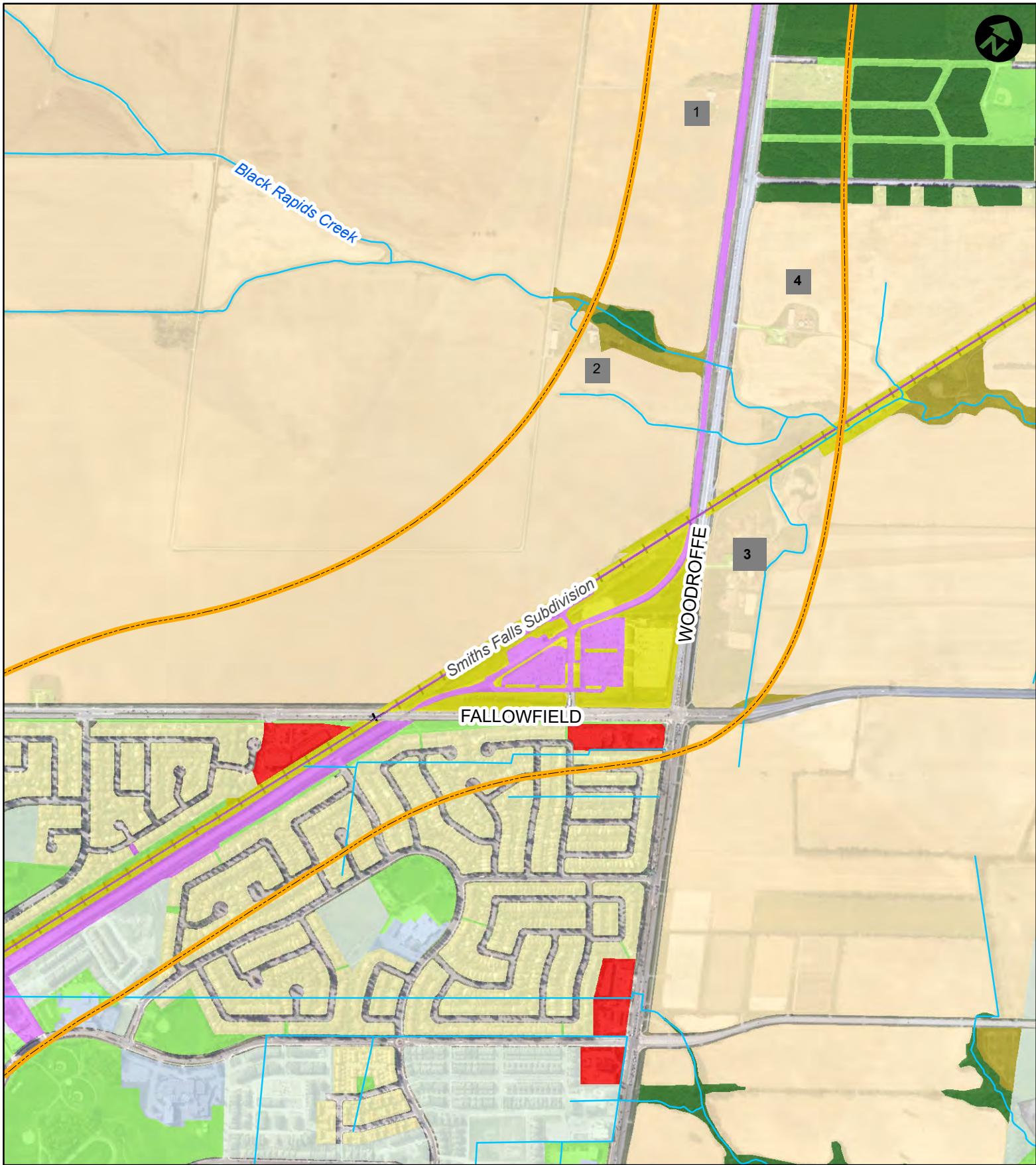
Legend

Study Area	Trans and Utility	Quarries
Watercourse	Office	Vacant land
Residential	Recreation	Vacant building
Commercial	Open space	Forest
Institutional	Idle and shrub land	Wetland
Industrial	Agriculture	Farm Number

Barrhaven Light Rail Transit
 (Baseline Station to Barrhaven Town Centre)
Planning and Environmental Assessment Study

0 0.325 0.65 1.3
 Km

Land Use



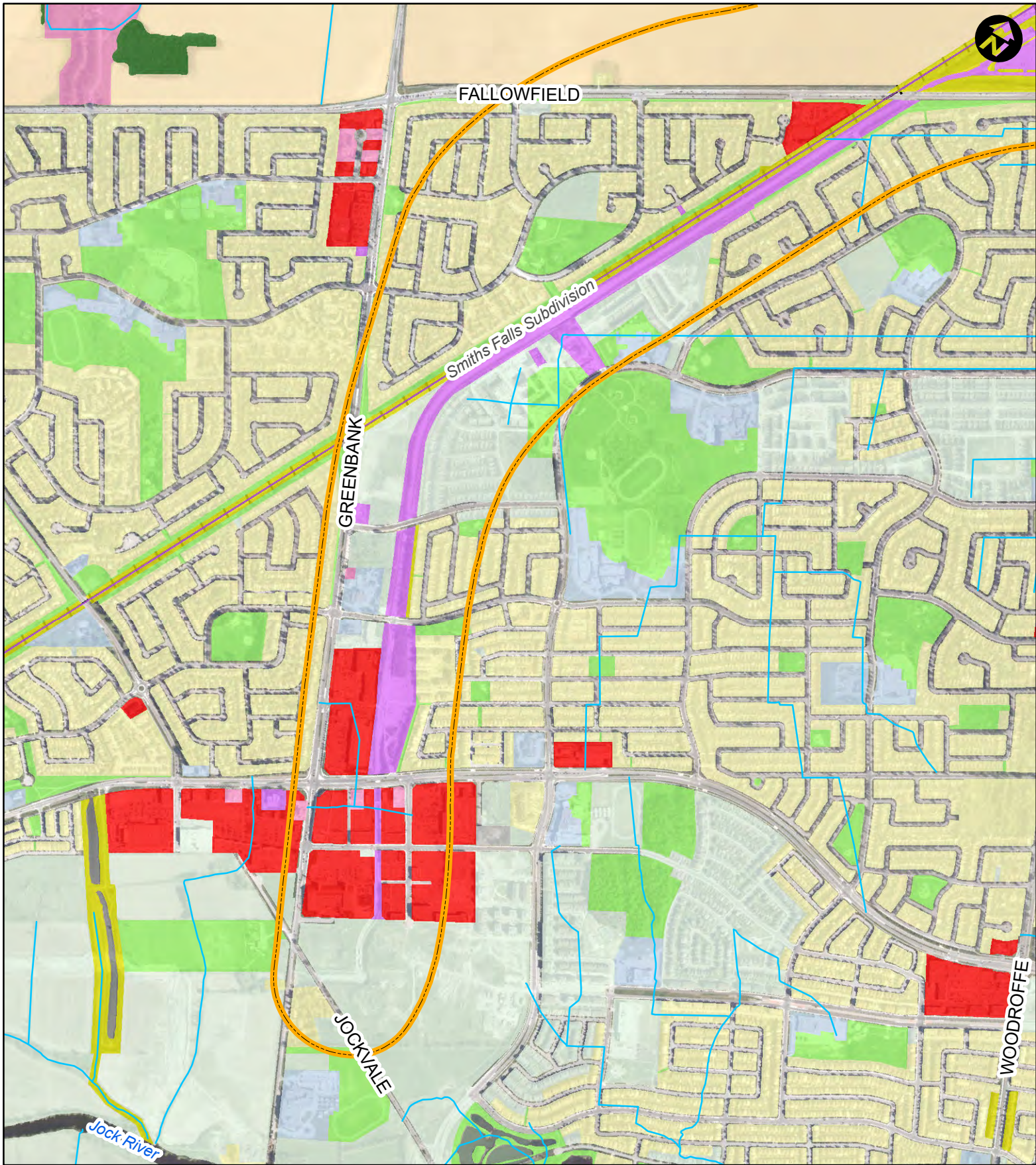
Legend

Study Area	Trans and Utility	Quarries
Watercourse	Office	Vacant land
Residential	Recreation	Vacant building
Commercial	Open space	Forest
Institutional	Idle and shrub land	Wetland
Industrial	Agriculture	Farm Number

Barrhaven Light Rail Transit
 (Baseline Station to Barrhaven Town Centre)
Planning and Environmental Assessment Study

0 0.15 0.3 0.6
 Km

Land Use



Legend

Study Area	Trans and Utility	Quarries
Watercourse	Office	Vacant land
Residential	Recreation	Vacant building
Commercial	Open space	Forest
Institutional	Idle and shrub land	Wetland
Industrial	Agriculture	

Barrhaven Light Rail Transit
 (Baseline Station to Barrhaven Town Centre)
Planning and Environmental Assessment Study

0 0.2 0.4 0.8
 Km

Land Use

3.3.3.1 Agricultural Land Use

An Agricultural Assessment was undertaken to support the EA study. The full report is located in **Appendix B**. Four farms were identified within the Study Area (**Figure 3-10** and **Figure 3-11**), two of which are retired operations (Farms 1 and 2), while Farm 3 is a former livestock operation that is currently in crop production and Farm 4 is the Royale Equestrian Centre (horse riding stables). The retired farms still have outbuildings that could be suitable if farm operations were started up again.

Aside from the farms, crop production is most common throughout the Greenbelt lands. Investments include tile drainage and an interior road network.

3.3.4 LANDSCAPE AND URBAN DESIGN CHARACTER

3.3.4.1 Woodroffe Avenue: North edge of the Study Area to Baseline Station

In the northern part of the study area, Algonquin College is located between Navaho Drive and College Avenue. An arched glass pedestrian bridge is located above Woodroffe Avenue providing connection to the campus on both sides of Woodroffe Avenue (**Figure 3-13**). North of the pedestrian bridge, there are nine (9) travel lanes including dedicated northbound and southbound bus lanes. A median chain-link fence separates northbound from southbound traffic in this section. There is an approximately 1.8m wide concrete sidewalk along both sides of Woodroffe Avenue and a southbound bike lane commencing at Navaho Drive. There are no bus stops nor shelters along this section. Ornamental plantings, grass boulevards and trees are located along the Right-of-Way. Standard utilities such as hydro lines, water hydrants, light poles, street signage and overhanging directional signs are located within the boulevard space. This section contains public realm enhancements associated with Algonquin Campus in the form of picnic tables and benches.

Figure 3-13 Pedestrian bridge across Woodroffe Avenue looking south



3.3.4.2 Woodroffe Avenue: Baseline Station to Knoxdale Road/Medhurst Drive

Along this section, Woodroffe Avenue includes six (6) travel lanes, the northbound and southbound dedicated bus lanes continue in the curbside lane; concrete road medians replace the chain-link fence and transition to grassed medians further south. An on-road bike lane is provided southbound. However, a northbound bike lane exists between Medhurst Drive and at Norice Street. Sidewalks are located on both sides of Woodroffe Avenue and are approximately 2m throughout. Bus stops and shelters are located within this section. Standard utilities such as hydro lines, water hydrants, light poles, street signage and overhanging directional signs are located within the Right-of-Way. Noise walls are located on the east side of the road for the residences at Parkglen Drive and David Drive siding onto Woodroffe Avenue. Grassed medians and boulevards are the only landscaping enhancements provided along this section.

Baseline Station and affiliated Park & Ride facility are located at the intersection of College Avenue on the west side of Woodroffe Avenue (**Figure 3-14**). They are setback considerably from Woodroffe Avenue accommodating grass boulevards, some trees, overhead signage posts and road signage. Major institutional areas on the west side include the City of Ottawa offices located on Constellation Drive (Mary Pitt Centre), Meridian Theatres, CentrepoinTE Library, Ben Franklin Place and the Peter D. Clark Long Term Care Centre (**Figure 3-15**). A small asphalt path connects the Centre's parking lot to a transit stop

located on Woodroffe Avenue. The east side is composed of residential homes behind commercial uses fronting on Woodroffe Avenue located between David Drive and Norice Street.

Figure 3-14 Transit priority corridor along Woodroffe Avenue entering the Baseline Southwest Transitway Station and Park-and-Ride looking southwest



Figure 3-15 Woodroffe Avenue looking south. Southwest Transitway Park-and-Ride (west) with the Peter D. Clark Centre behind, noise walls for residences (east)



Tallwood Woods is located on the west side of Woodroffe Avenue, south of Tallwood Drive, and acts as a natural buffer between Woodroffe Road and the Centrepointe residential community (**Figure 3-16**). A multi-use pathway (MUP) extends through the woods to Woodroffe Avenue. The Crestview-Meadowlands community is located on the east side of Woodroffe Avenue. A large open space is located south of Norice Street extending eastwards adjacent to the CN Rail line. The CN Rail line passes over Woodroffe Avenue between Norice Street and Knoxdale Road/Medhurst Drive (**Figure 3-17** and **Figure 3-18**).

Tallwood woods gives way to open space buffering Beechcliffe Street to Woodroffe Avenue on the west (**Figure 3-19**). The Tanglewood community is located to the east.

Figure 3-16 Woodroffe Avenue north of Norice Street looking south. Tallwood Woods (west) Commercial uses (east)



Figure 3-17 CN Rail line overpass of Woodroffe Avenue looking south



Figure 3-18 CN Rail line overpass of Woodroffe Avenue



Figure 3-19 Woodroffe Avenue south of the CN Rail line overpass looking south. Open space to the west with residences on Beechcliffe Street behind (west) and Brockington Court residences backing onto Woodroffe Avenue (east)



3.3.4.3 Woodroffe Avenue: Knoxdale Road/Medhurst Drive to West Hunt Club Road

Along this section Woodroffe Avenue, residences are located immediately adjacent to the Right-of-Way on both sides of the roadway. Woodroffe Avenue continues to maintain six (6) travel lanes including the northbound and southbound dedicated curbside bus lanes; with a combination of concrete and grass medians. Northbound and southbound on-road bike lanes are provided on the outer edges of the roadway. 2m concrete sidewalks continue along both sides of Woodroffe Avenue. Bus stops and shelters are located within this section. Standard utilities such as hydro lines, water hydrants, light poles, street signage and overhanging directional signs are located within the Right-of-Way. Noise walls are located on the west side of the road for the residences at Manor Village and Cheryl Gardens backing onto Woodroffe Avenue (**Figure 3-20**). There is an 11m grassed buffer to the residences on the east side. Grassed medians provide the only landscaping enhancements along this section.

In this section, Hydro One transmission lines cross Woodroffe Avenue twice. Two sets of lines –115 kV circuit (C7BM) twin wood pole line and a 230 kV transmission line (M32S) supported by steel towers. are located immediately south of the

intersection of Knoxdale Road/Medhurst Drive (**Figure 3-21**). Two sets of lines, four transmission lines on two sets of steel towers voltages vary from 115 kV to 500 kV are located north of West Hunt Club Road. These transmission line corridors stretch to the east and west, with both corridors incorporating MUPs throughout (**Figure 3-22**).

Figure 3-20 Noise walls located along the residential area on the west side of Woodroffe Avenue (Cheryl Gardens)



Figure 3-21 Hydro One transmission lines crossing Woodroffe Avenue south of the intersection of Knoxdale Road/Medhurst Drive looking south



Figure 3-22 Hydro One transmission line crossing Woodroffe Avenue north of the intersection of West Hunt Club Road looking southwest



3.3.4.4 Woodroffe Avenue: West Hunt Club Road to Fallowfield Road

The Greenbelt is located on both sides of Woodroffe Avenue between West Hunt Club Road and Fallowfield Road and is the dominant land use within this section (**Figure 3-23**). Six (6) travel lanes with curbside northbound and southbound dedicated bus lanes transition to four (4) travel lanes separated by a 2m central concrete median (width varies to accommodate turn lanes). The transit facilities transition to the Southwest Transitway on the west side of Woodroffe Avenue opposite the Nepean Sportsplex (**Figure 3-24**). Northbound and southbound on-road bike lanes transition to paved shoulders at the Nepean Sportsplex. Sidewalks on both sides of Woodroffe Avenue transition to a MUP on the east side only. The MUP crosses water

features via bridges. The only bus stop (there are no shelters) located within this section is at Vaan Drive. Standard utilities such as hydro lines, water hydrants, light poles, street signage and overhanging directional signs are located within the Right-of-Way. The MUP and the Southwest Transitway are buffered from the roadway.

The agricultural vistas of the Greenbelt expand to the west of the roadway with some shelterbelt elements and a guard rail in the Right-of-Way. The east side of the Greenbelt is shaded by the mature coniferous Pinhey Forest (Figure 3-25). South of Pinhey Forest the landscape opens up to agriculture and the Royale Equestrian Centre.

Figure 3-23 Woodroffe Avenue looking south. Greenbelt Agriculture lands and the Southwest Transitway to the west. The Nepean Sportsplex and Pinhey Forest to the east



Figure 3-24 The Southwest Transitway exiting Woodroffe Avenue to the west



Figure 3-25 Woodroffe Avenue looking south with Pinhey Forest to the east



The VIA Rail line crosses Woodroffe Avenue and the Southwest Transitway at-grade just north of Fallowfield Road (**Figure 3-26**). The rail-crossing contains train gates, bells and lights including a set for pedestrians using the MUP and a set for buses using the Southwest Transitway. The MUP at this location is secured by a chain-link fence as it approaches the at-grade rail crossing. An east-west NCC Pathway connects to a north-south MUP running parallel to Woodroffe Avenue just south of the VIA Rail line on the east side.

Figure 3-26 Woodroffe Avenue VIA Rail line at-grade crossing looking south. Southwest Transitway crossing (west) and MUP crossing (east)



3.3.4.5 Southwest Transitway: Woodroffe Avenue to Fallowfield Road

The OC Transpo Fallowfield Station and affiliated Park & Ride facility is located in the northwest quadrant of the intersection of Woodroffe Avenue and Fallowfield Road. The entrance to the Park & Ride facility serves the Fallowfield Transit Station and provides access to the VIA Rail Fallowfield Station (**Figure 3-27**). The Park & Ride facility is accessed from Via Park Place connected to Fallowfield Road. The Southwest Transitway has four (4) travel lanes through the station area. The station area specific to the Southwest Transitway consists of a lighted platform and bus shelter area. A memorial dedicated to the bus and train collision of September 18, 2013 is located in the northeast portion of the parking area.

Figure 3-27 Fallowfield Transit Station on the Southwest Transitway looking west. VIA Rail Station (west)



3.3.4.6 Fallowfield Road: Woodroffe Avenue to Greenbank Road

In this section, Fallowfield Road has four (4) travel lanes, and eastbound and westbound bike lanes with a concrete median. It also includes ten bus stops (five eastbound and five westbound) provided to serve the local community. From Woodroffe Avenue to Via Park Place there is a sidewalk on the south side of the roadway and a MUP on the north side. Low-rise commercial uses and parking lots are setback from the roadway. West of Via Park Place to the Study Area boundary of Greenbank Road there is a MUP on the south side of the road and an approximately 15m of sidewalk at the three transit stops on the north side of the road. Noise walls typically setback approximately 7.5m from the edge of pavement are located

along the residences that are backing onto Fallowfield Road. Standard utilities such as hydro poles, light poles, and signage posts are located within the Fallowfield Road Right-of-Way.

West of Via Park Place the Southwest Transitway and the VIA Rail line cross Fallowfield Road on an angle at-grade (**Figure 3-28**). The crossings are approximately 65m apart. Traffic is controlled via traffic lights and train gates, bells and lights for the rail line including a set for pedestrians using the MUP. There is a median chain-link fence between Via Park Place and Barrhaven Crossing commercial retail plaza. West of the Southwest Transitway where it crosses Fallowfield Road, the westbound bike lane transitions to a paved shoulder.

Beyond the at-grade crossings, the vista of the NCC Greenbelt is located to the north while the Barrhaven West residential community is located to the south (**Figure 3-29**). Nearing Greenbank Road, the median becomes grassed and bus stops contain shelters with benches (in some cases).

Figure 3-28 Fallowfield Road at-grade crossing of the Southwest Transitway and VIA Rail line looking west



Figure 3-29 Fallowfield Road Greenbelt vistas (north) looking west



3.3.4.7 Southwest Transitway: Fallowfield to Barrhaven Town Centre

The Southwest Transitway is two lanes wide in this section and runs parallel to the VIA Rail line until just north of Highbury Park Drive where it turns south to head towards the Barrhaven Town Centre. Stations located along the Southwest Transitway in this section include Longfields, Strandherd, Marketplace and Barrhaven Centre. Trees are located along both sides of the Southwest Transitway, providing a green buffer to the commercial uses on Greenbank Road on the west side and residential community on the east side. A MUP is located parallel on the east side of the Southwest Transitway to Strandherd Drive. Another MUP is located along the east side of the Southwest Transitway starting just south of Marketplace Avenue (**Figure 3-31**). The Southwest Transitway crosses Berrigan Drive at-grade just before widening to four (4) lanes at the Strandherd Station (**Figure 3-30**). South of Berrigan Drive there are sidewalks on the east side until Marketplace Avenue. South of Marketplace Avenue sidewalks continue on the west side and tie into the MUP from the east side at the terminus of the Southwest Transitway.

The Southwest Transitway intersects Market Place Avenue arriving at the Market Place Station through a narrow concrete corridor in the commercial core of Marketplace (**Figure 3-32** and **Figure 3-33**). Within this intersection the street character changes to accommodate wide sidewalks, light poles, signal posts, and signage posts on both sides of the Southwest Transitway.

The Southwest Transitway ends intersecting with Jockvale Road. Areas south and east are largely undeveloped. West and south, there are some houses (**Figure 3-34**). Jockvale Road in this area is two (2) lanes, with gravel shoulders and no cycling or pedestrian facilities. There are two bus stops on Jockvale Road but no shelters.

Figure 3-30 Strandherd Transit Station and Park & Ride



Figure 3-31 MUP located to the east of the Southwest Transitway underpass at Highbury Park looking south



Figure 3-32 Southwest Transitway at Marketplace Avenue Intersection looking south



Figure 3-33 Southwest Transitway seen from Strandherd Drive overpass

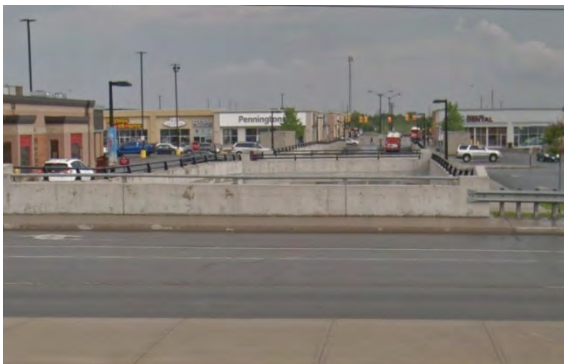
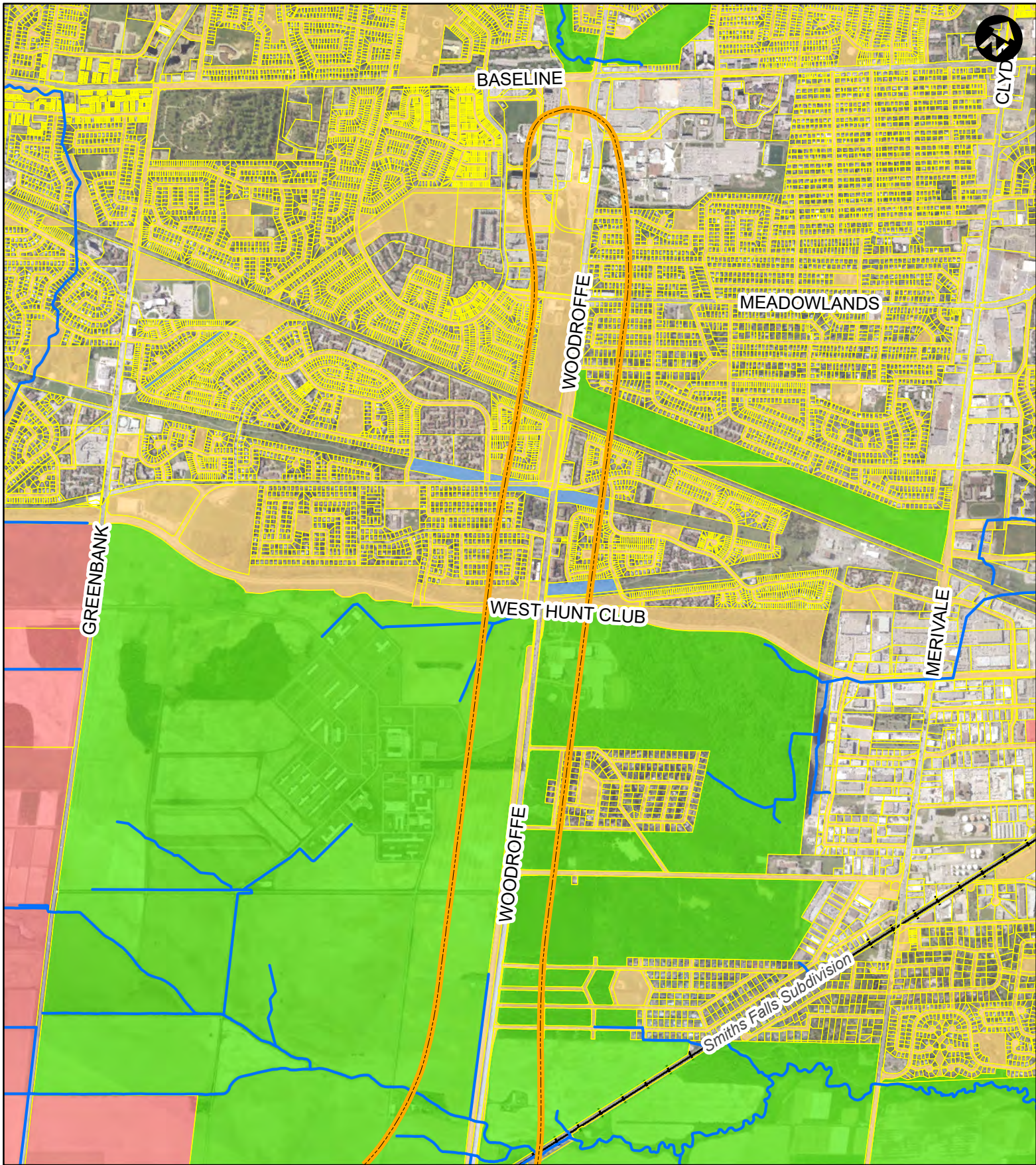


Figure 3-34 Terminus of the Southwest Transitway at Jockvale Road looking south










3.3.5 LAND OWNERSHIP

Figure 3-35, Figure 3-36 and Figure 3-37 illustrate land ownership in the Study Area. A major landowner in the Study Area is the NCC.



Legend

	Study Area	Public Ownership
	Watercourse	 Federal parcels
	Parcels	 NCC parcels
		 Ontario parcels
		 Ottawa parcels

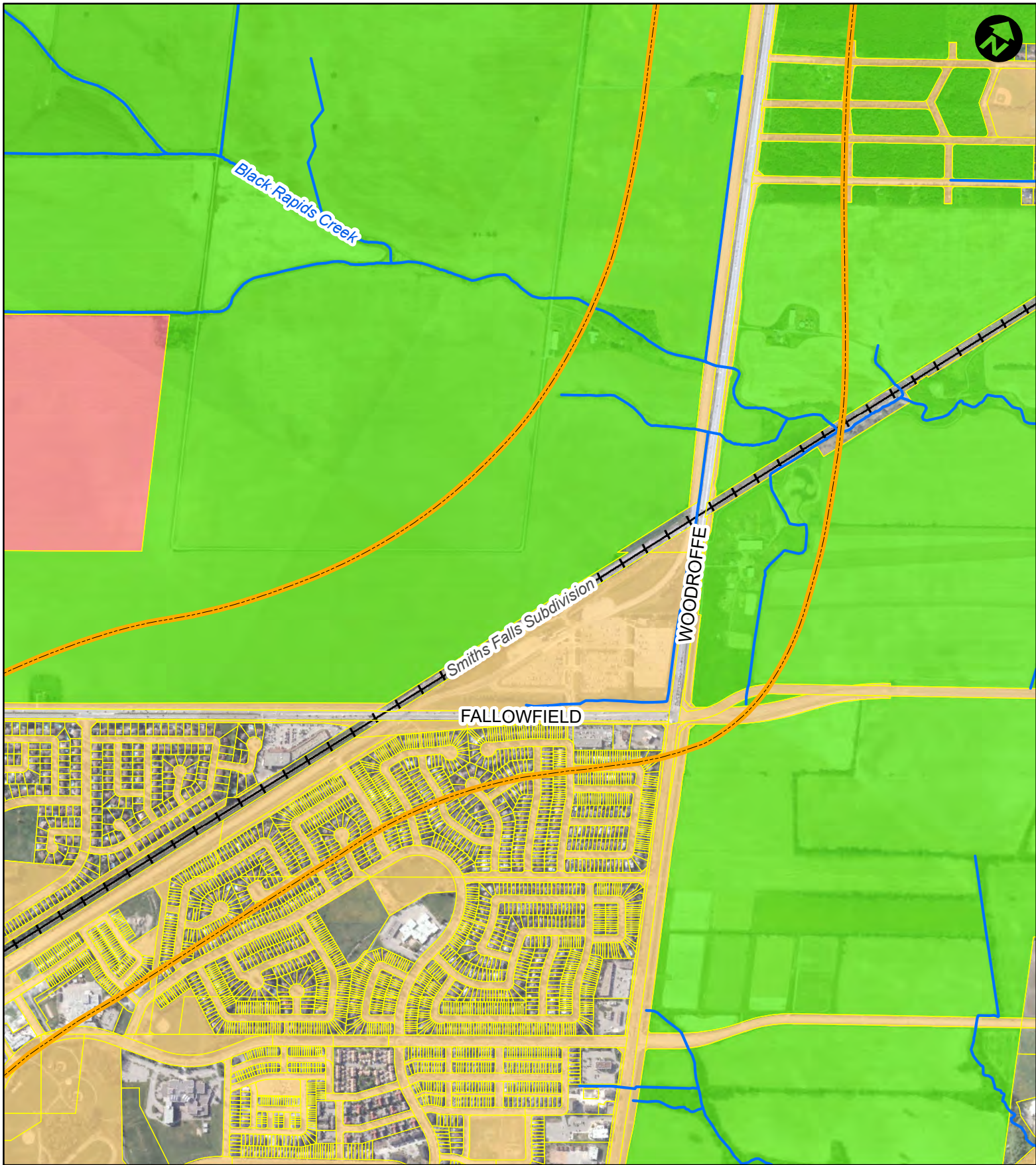
Barrhaven Light Rail Transit
(Baseline Station to Barrhaven Town Centre)







Planning and Environmental Assessment Study

0 0.325 0.65 1.3
Km

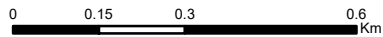
Land Ownership





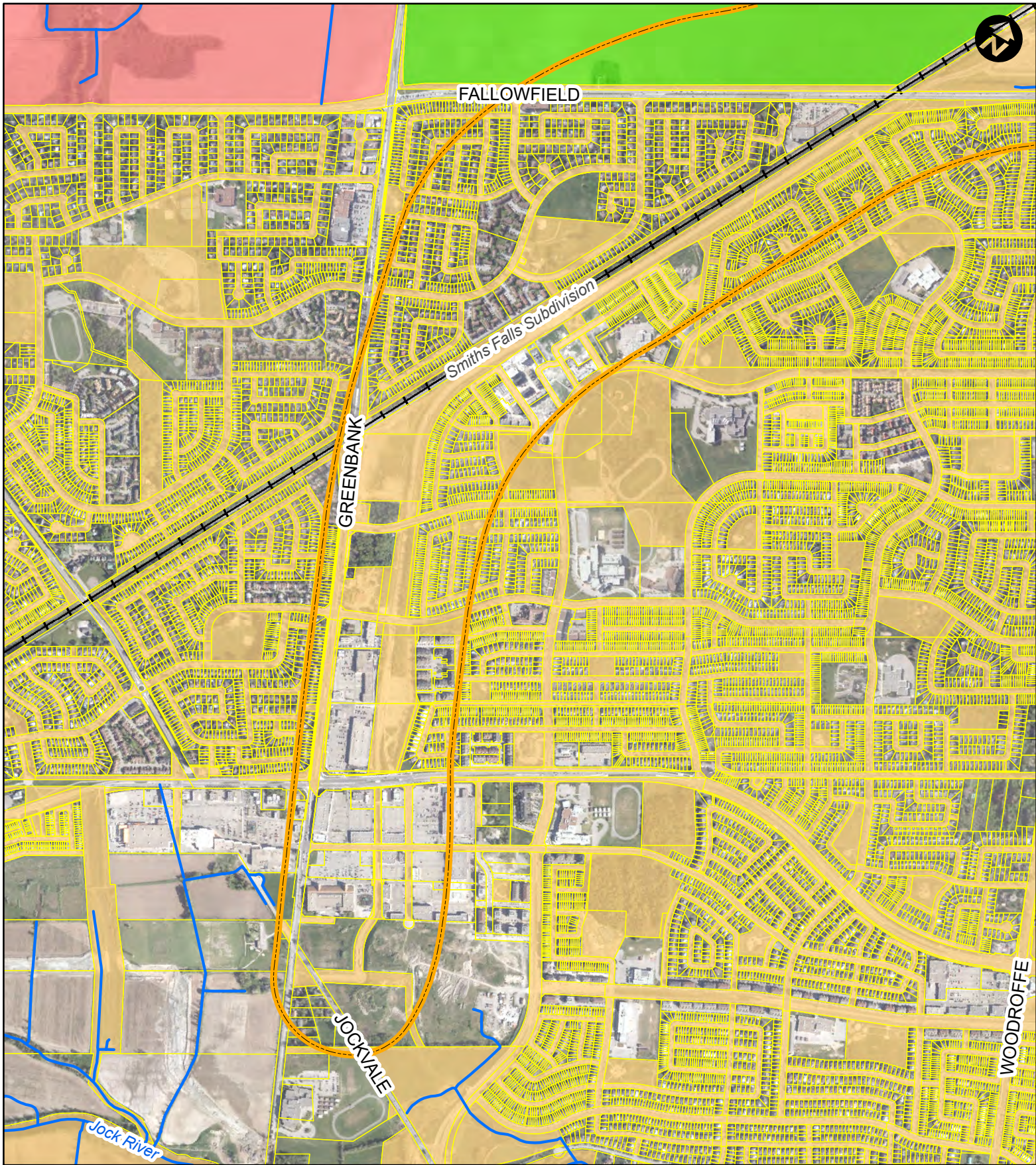
Legend	
	Study Area
	Watercourse
	Parcels
	Public Ownership Federal parcels
	NCC parcels
	Ottawa parcels

Barrhaven Light Rail Transit
 (Baseline Station to Barrhaven Town Centre)
Planning and Environmental Assessment Study



Land Ownership

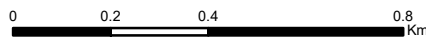




- Legend**
- Study Area
 - Parcels
 - Watercourse
 - Federal parcels
 - NCC parcels
 - Ottawa parcels

Barrhaven Light Rail Transit
(Baseline Station to Barrhaven Town Centre)
Planning and Environmental Assessment Study

Land Ownership



3.3.6 CLIMATE CHANGE

There is global consensus that planet Earth is experiencing climate change resulting from anthropogenic effects. Climate change effects include such things as increased drought, flooding, heat waves, extreme storm events and warmer winters. The impacts of these events in Ontario have resulted in water shortages, forest fires, flooding, declines in agricultural production, lower Great Lakes water levels, power outages and outbreaks of water-borne diseases (OCCCIAR (2012)). These impacts result in unexpected economic and social costs.

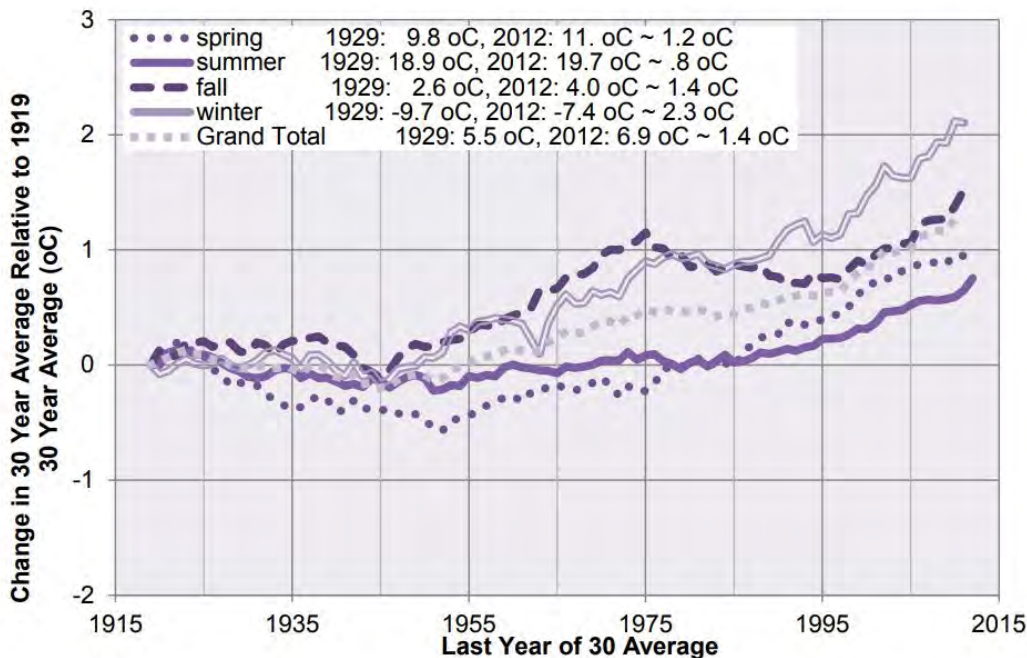
The existing conditions information related to common climate change effects are described in the sections below. Most studies discuss climate change on provincial or national scales, however, where possible, Ottawa specific information is described.

3.3.6.1 Temperature

The average annual mean temperature in the City of Ottawa has increased over the last century by 1.7°C (City of Ottawa, 2014), as shown in **Figure 3-38**. This in turn results in an increase of the number of extreme heat days, days in a year when temperature exceeds 30°C and increases to daily maximum and minimum temperatures. Research analyzing historical temperature trends to predict future trends for Ottawa is consistent with global trends of warming temperatures (Zhai, 2018).

The Ontario Climate Change Data Portal (Ontario CCDP) models climate data regionally throughout Ontario. This model indicates that the mean average annual temperature in the Ottawa region has and will continue to increase by approximately 2.27°C from the period 1960-1990, to the current period, 2015-2045 (Ontario CCDP, 2018).

Figure 3-38 Average Temperatures (City of Ottawa, 2013)



3.3.6.2 Precipitation

The body of Canadian research indicates it is getting wetter across Canada. The World Meteorological Organization has found that wetter-than-average conditions occurred in 2013, compared to averages dating back to 1960 (World Meteorological Organization, 2013). Over the last century, there has been a 25% to 30% increase in the number of days with precipitation (City of Ottawa, 2013). Additionally, the frequency of precipitation events lasting three or more consecutive days has increased from 18% to 31% (City of Ottawa, 2013).

The Ontario CCDP indicates that annual precipitation in the Ottawa region has and will continue to increase by approximately 50mm from the period 1960-1990, to the current period, 2015-2045 (University of Regina, 2018). In the winter months, this increase is approximately 15mm from the period 1960-1990, to the current period, 2015-2045 (University of Regina, 2018).

3.3.6.3 Wind

High wind speeds and wind gusts are a significant meteorological hazard. Ontario has been experiencing increased windstorms and is projected to experience more frequent and severe wind gust events in the future as a result of the changing climate (Cheng, 2012). Studies have found that all regions across Canada are expected to see the frequency of localized windstorms, particularly in summer season, increase due to warmer temperatures under a future changing climate. Increased wind events can also lead to the uproot of trees in forested areas, leaving areas susceptible to fire.

3.3.6.4 Extreme Weather Events

Extreme weather events are increasing in both frequency and intensity, resulting in larger, torrential style precipitation events, punctuated with droughts and dry conditions. Both Natural Resources Canada and the MECP expect that precipitation will change to more pronounced periods of both flooding and drought (McBean, 2012) (Ministry of Environment, 2014). These events are also increasing in randomness (McBean, 2012).

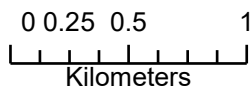
There has been an increase in the occurrence of hot dry periods over the last thirty years, compounding the risks from the urban heat island effect (Martin, G. and P. Ballamingie, 2016). Extreme weather events featuring high temperatures and a lack of precipitation are contributing to the occurrence of forest fires. Climate change provides the appropriate weather conditions, which allows for the drying of fuel and subsequent spread of wildland fires (Wotton, 2017). Fire activity in boreal forest environments is anticipated to increase with climate change (Wotton, 2017).

There have been increases in the extreme minimum temperatures in Ottawa since 1919 to present day (City of Ottawa, IMP, 2013). As a result, it is expected that snowmelt amounts will increase as well as winter rainfall, possibly leading to an increase in flood events. Recent flood events have caused significant stress on private and public property, and indications are that these conditions will continue to occur.

3.3.7 ARCHAEOLOGICAL RESOURCES


A Stage 1 Archaeological Assessment was undertaken for the Study Area to determine areas with archaeological potential. The Stage 1 Archaeological Assessment consisted of a review of available previously completed reports, historical, archaeological and environmental research relevant to the local area. The full report is available in **Appendix B**.

The results of the study indicate that there are portions of the Study Area that exhibit archaeological potential. Developed areas, a portion of the Southwest Transitway (Fallowfield Road to Berrigan Drive) and some areas near Greenbank Road are “cleared” of archaeological potential through previous studies. Portions of the Study Area that still contain archaeological potential are illustrated in **Figure 3-39** and **Figure 3-40**.



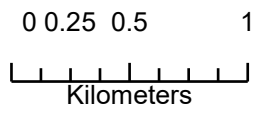
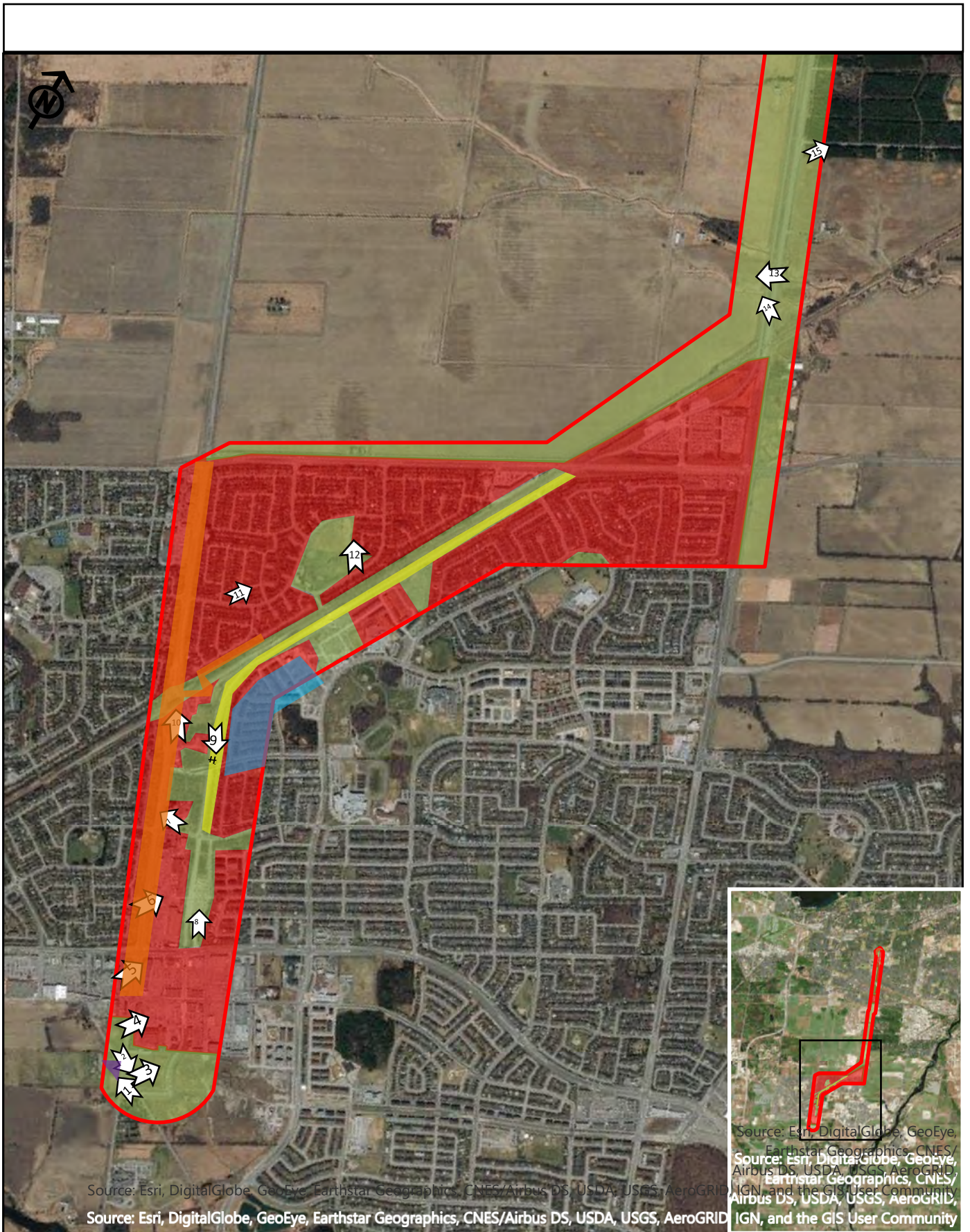
 Study Area

Archaeological Potential

 Stage 2 Assessment Recommended

Low Archaeological Potential

 Developed Lands



- Study Area
- Photo Location

Archaeological Potential

- Stage 2 Assessment Recommended

Low Archaeological Potential

- Developed Lands
- Previously Assessed (Golder 2008)
- Previously Assessed (Paterson 2013)
- Previously Assessed (Stantec 2011)
- Previously Assessed (Golder 2011)

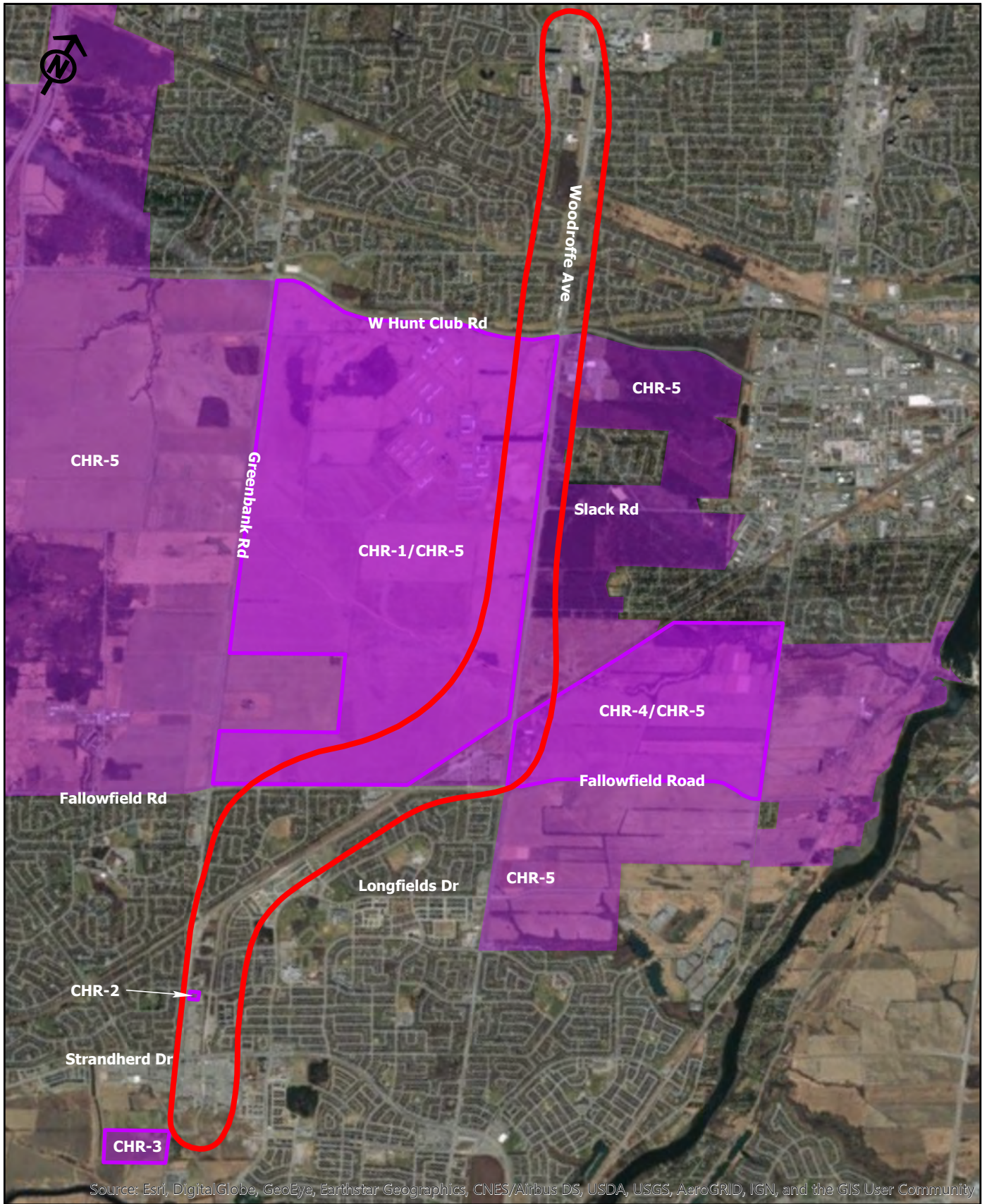
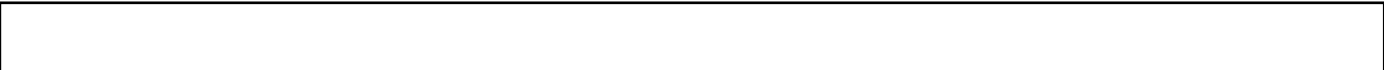
3.3.8 BUILT HERITAGE RESOURCES AND CULTURAL HERITAGE LANDSCAPES

A Cultural Heritage Evaluation Report (CHER) (later renamed to: *Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment and Addendum - Heritage Impact Assessment*, 2020) was undertaken for the Study Area to provide an overview of recognized and potential Cultural Heritage Resources (CHR) which includes both built heritage resources (BHR) and cultural heritage landscapes (CHL). Built heritage resource means a building, structure, monument, installation, or any manufactured remnant that contributes to a property's cultural heritage value or interest as identified by a community, including an Aboriginal community. Built heritage resources are generally located on a property that has been designated under Parts IV or V of the *Ontario Heritage Act*, or included on local, provincial and/or federal registers. A cultural heritage landscape means a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Aboriginal community. Farms and cemeteries are examples of cultural heritage landscapes. The complete heritage report can be found in **Appendix B**. The heritage report included completion of the Cultural Heritage Screening Checklist, previously completed cultural heritage reports, a review of online databases and historical and environmental background research of the Study Area.

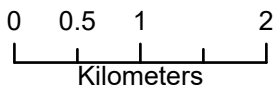
Known and potential CHRs are listed in **Table 3-3** and shown in **Figure 3-41**. No properties which are subject to federal, provincial, or municipal heritage protections are located within, or adjacent to the Study Area. Portions of the Study Area are located within the NCC Greenbelt, which is considered by the NCC as a CHL. Two properties within the Greenbelt are also individually identified as CHLs: 2191 Woodroffe Avenue (part of 2070 Merivale Road) and 3641 Fallowfield Road (part of 1470 Woodroffe Avenue). 3641 Fallowfield Road is also included on the Heritage Reference List. Two additional properties, 1081 Greenbank Road and 3288 Greenbank Road were identified during the screening process as properties of potential cultural heritage value or interest. These potential CHRs were screened for their potential to meet the criteria outlined in Ontario Regulation 9/06: *Criteria for Determining Cultural Heritage Value or Interest* under the *Ontario Heritage Act* and it was determined that both properties have the potential to meet one or more of the criteria.

Table 3-3 Summary of Known and Potential Cultural Heritage Resources

CHR	Category	Address	Current Recognition
CHR-1	Cultural Heritage Landscapes (CHL)	3641 Fallowfield Road (part of 1740 Woodroffe Avenue)	Heritage Reference List, NCC Greenbelt
CHR-2	Built Heritage Resources (BHR)	1081 Greenbank Road	None
CHR-3	CHL	3288 Greenbank Road	None
CHR-4	CHL	2191 Woodroffe Avenue (part of 2070 Merivale Road, NCC Greenbelt lands) Royale Equestrian Centre	NCC Greenbelt
CHR-5	CHL	National Capital Greenbelt	NCC Greenbelt



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



 Study Area

 Cultural Heritage Resource, CHR-#

3.3.9 NOISE, AIR QUALITY AND VIBRATION

Existing conditions for noise, air quality, and vibration were assessed within the Study Area, with results summarized below. The full report is available in **Appendix B**.

3.3.9.1 Noise

Environmental noise levels in the Study Area vary based on proximity to high-volume roadways and the VIA Rail corridor. The City of Ottawa's Environmental Noise Control Guidelines (ENCG) (2016) objective level is 55 A-weighted decibel unit (dBA) before noise attenuation should be provided as part of transportation infrastructure projects and mitigation.

Based on the ENCG, the following categories are applicable to describe the existing noise conditions from transportation sources for the Study Area:

- ELEVATED Daytime (daytime equivalent sound energy level) Leq noise levels at receivers are expected to exceed 60 dBA.
- MODERATE Daytime Leq noise levels at receivers are expected to fall in the range of 55 to 60 dBA.
- LOW Daytime Leq noise levels are expected to fall below 55 dBA.

Noise levels throughout the Study Area fall into one of the three above categories. Environmental noise levels are generally moderate to elevated depending on proximity to roadways and railways. Generally, beyond 100m from arterial roadways and 300m from railways, noise levels fall below the ENCG objective level of 55 dBA.

3.3.9.2 Air Quality

In the Study Area, roadway vehicle traffic is the primary source of air-borne pollutants. Emissions from roadway vehicles Carbon Monoxide (CO), Hydrocarbons (HC), Oxides of Nitrogen (NOx) and Particulate Matter (PM), among other volatile organic compounds (VOC), which contribute to ambient air quality levels.

Based on the Ambient Air Quality Criteria (AAQC), recorded ambient levels and land usage within the Study Area, the following categories are applicable to describe air quality conditions from transportation sources in the Study Area:

- ELEVATED Selected pollutants are expected to approach AAQC standards on a regular basis, or occasionally exceed them.
- MODERATE Selected pollutants are expected to approach AAQC standards occasionally.
- LOW Selected pollutants are expected to rarely approach AAQC standards.

Existing conditions found the concentrations of pollutants produced by vehicle and train emissions are low throughout the Study Area.

3.3.9.3 Ground Vibrations and Ground Borne Noise Assessment

Railway traffic and heavy roadway vehicles on uneven terrain can produce perceptible levels of ground vibrations, and incidentally ground-borne noise.

Based on the ground vibration criteria for human perception, the following categories are applicable to describe the existing ground vibrations within the Study Area:

- ELEVATED Vibrations at receptors exceed 1 mm/s (92 dBV) rms particle velocity and are likely to cause adverse reactions with building occupants.
- MODERATE Vibrations at receptors fall between 0.1 mm/s (72 dBV) to 1 mm/s (92 dBV) rms particle velocity and will be noticeable but will not cause adverse reactions in the building occupants.
- LOW Vibrations at receptors fall below 0.1 mm/s (72 dBV) and will not be noticeable to building occupants.

The estimated ground vibration levels are low to moderate throughout the Study Area based on the analysis undertaken as part of the EA study. The highest concentrations of ground vibrations are along the VIA Rail, within 50m of the centerline. Ground-borne noise levels produced by ground vibrations have similar impacts.

3.3.10 INDIGENOUS LAND CLAIMS

The Study Area is within the Algonquins of Ontario land claim area. There is no known current use of lands and/or resources for traditional purposes within the Study Area. Known areas used for traditional fishing include the Rideau River which is more than 3 km east of the Study Area (Algonquins of Ontario, 2014). Potential past use of lands for traditional purposes is described in the Stage 1 Archaeological Assessment found in **Appendix B**.

The negotiators for the Algonquins of Ontario and the Canadian and Ontario Government drafted an Agreement-in-Principle in December 2012. The aforementioned parties signed this non-binding Agreement-in-principle, by the signing, negotiations towards a Final Agreement can begin. Within the revised Agreement-in-Principle (2016) there are land parcels within the Ottawa area identified for potential transfer to the Algonquins of Ontario. There are no identified parcels of land for transfer within the Study Area.

3.4 Natural Environment

This section provides a high-level summary of natural environment features of provincial interest as identified by the PPS (MMAH, 2014), MNRF and City's Official Plan (2013). The full Natural Environment Existing Conditions Report can be found in **Appendix B**. Existing Natural Environment Features are shown in **Figure 3-42**, **Figure 3-43** and **Figure 3-44**.

3.4.1 TERRESTRIAL ENVIRONMENT

The Study Area is mostly comprised of agricultural fields (in the NCC Greenbelt), transit corridors, commercial and residential properties. Small watercourse channels with naturally occurring riparian areas represent a small portion of the Study Area. Mature coniferous plantations and other deciduous woodlands of moderate size are also present within the central portion of the Study Area.

The Study Area is located within the Kemptville Ecodistrict 6E-12. The physiography of this area consists of limestone plain and sandstone bedrock with sand, silt, loam, and clay soils (OMAFRA, 2018); (Henson & Bodribb, 2005). The Study Area occurs close to the northern boundary of the physiographic region between the Russell and Prescott Sand Plains and the Ottawa Valley Clay Flats. Vegetated natural cover within this Ecodistrict is primarily deciduous forest at 37%, where 22% is composed of swamp wetlands (Henson and Brodribb 2015).

The Study Area is located within the Great Lakes-St. Lawrence Forest Region, within the forest section of Upper St. Lawrence. Although the Forest Region is characterized by deciduous forests of sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), red maple (*Acer rubrum*), yellow birch (*Betula alleghaniensis*), basswood (*Tilia americana*), and white ash (*Fraxinus americana*) (Rowe, J.S., 1972) to name a few; the Study Area is now highly developed with urban lands and only small, fragmented deciduous woodlots occur.

3.4.1.1 Wildland Fire Risk

Table 3-4 provides a description of forest species composition categorized by wildland fire risk level as described in the Wildland Fire Risk Assessment and Mitigation Reference Manual (Ministry of Natural Resources and Forestry (MNRF), 2017). The risks associated with wildland fire in the Study Area are anticipated to be generally low, with some areas of moderate risk, based on the MNRF's generalized wildland fire hazard data which provides a coarse scale assessment of areas with the greatest potential for risks associated with wildland fire.

The Study Area contains several mixedwood and coniferous communities which present a moderate risk of wildland fire, located within Pinhey Forest. However, these communities may represent a higher risk level based both on forest species composition, age and other available fuel types and factors (i.e., forest density, needle litter accumulation, woody debris, ladder fuels), therefore further fire risk assessment is recommended to confirm.

Potential fire risk forest species communities present in the Study Area include ELC communities: Naturalized Coniferous Hedgerow, Naturalized Coniferous Plantation, Dry-Fresh White Pine Naturalized Coniferous Plantation, Dry-Fresh Red Pine Naturalized Coniferous Plantation, Dry-Fresh Scots Pine Naturalized Coniferous Plantation, Dry-Fresh White Pine-Hardwood Mixed Forest. Detailed ELC results are discussed in **Section 5.1.1**.

Table 3-4 Hazardous Forest Types Characteristic and Risk Level (MNRF, 2017)

Wildland Fire Risk Level	Forest Species Composition
Extreme	<ul style="list-style-type: none"> • Immature jack pine • Boreal spruce • Black or white spruce • Balsam fir • Immature red, white pine
High	<ul style="list-style-type: none"> • Mature jack pine • Mixedwood with >50% conifer (jack pine, spruce, balsam fir, immature red or white pine)
Moderate to Low	<ul style="list-style-type: none"> • Mixedwood forests ranging from 25% (low) to 50% (moderate) conifer composition. • Mature red, white, and Scots pine • Hardwood/deciduous forests composed of maple, birch, oak, poplar, ash etc. • Typically standing cedar, hemlock and tamarack are low risk • Mature red, white and Scots pine with clean or deciduous understory are low risk.

3.4.2 AQUATIC ENVIRONMENT

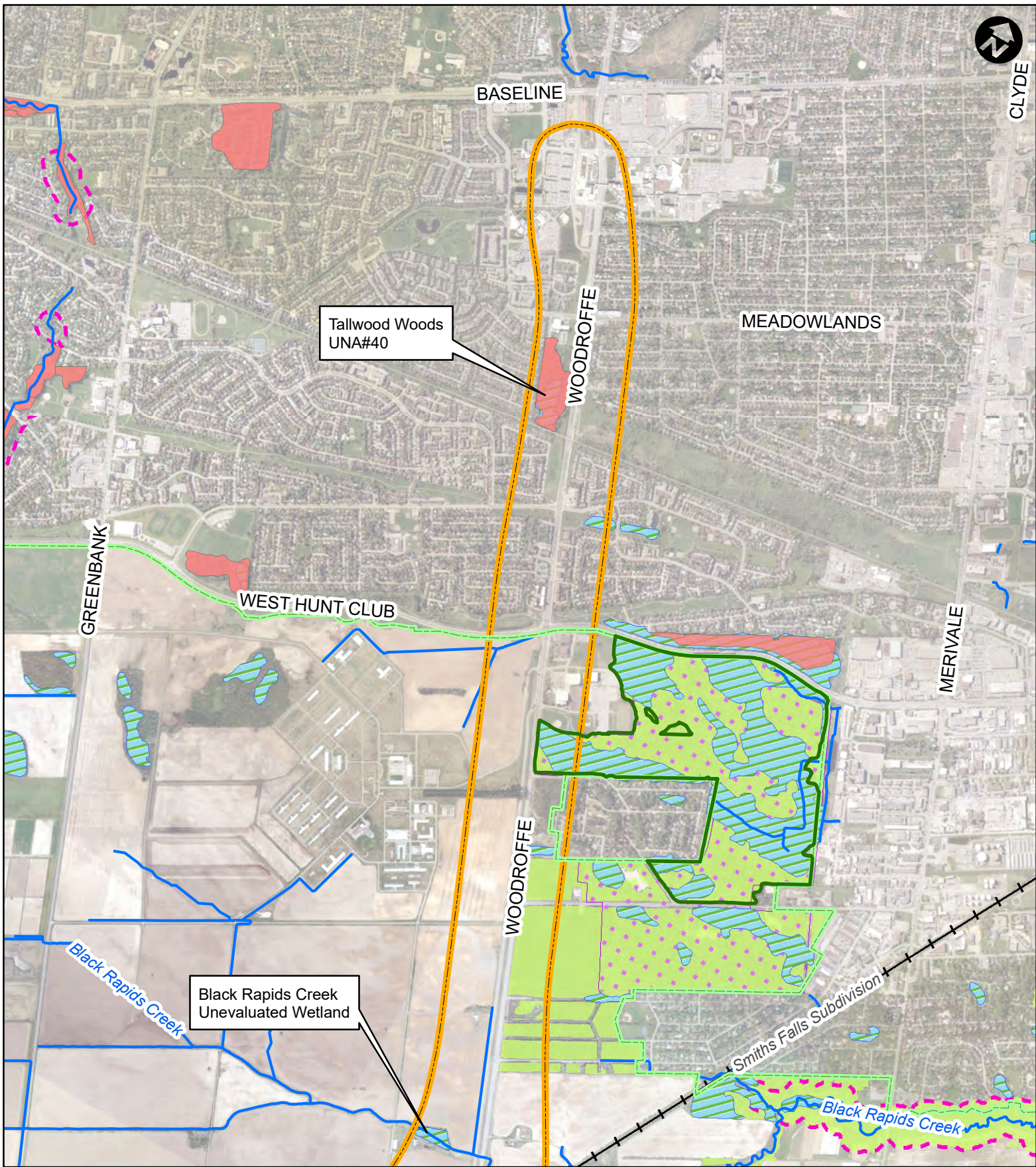
3.4.2.1 Hydrology

The hydrology in the Study Area includes three subwatersheds of the Rideau River and one of the Ottawa River. The Study Area falls primarily within two catchments of the Lower Rideau subwatershed, and partially within the Jock River subwatershed. The Lower Rideau is the most populated and urbanized subwatershed of the Rideau River system as it occupies the confluence of the Rideau and Ottawa Rivers. The Pinecrest Creek catchment area is also present in the Study Area but is part of the Ottawa River West subwatershed and is 17.1 square kilometers (RVCA, 2017).

Water quality within the Lower Rideau subwatershed ranges from good to poor depending on the sampling site and adjacent land uses. There are no surface water features that drain into the catchment areas of Nepean Creek (RVCA, 2012c) and Barrhaven Creek (RVCA, 2012d). Subwatershed catchment areas for the Study Area are listed in **Table 3-5** and shown in **Figure 3-45** below.

Table 3-5 Rideau River Subwatersheds and Catchment Areas related to the Study Area

Drainage Area	Subwatershed	Catchment Area
Baseline Road to south of Nepean Sportsplex	Ottawa River West	Pinecrest Creek
Nepean Sportsplex to south of Fallowfield Road	Lower Rideau River	Black Rapids Creek
South of Fallowfield Road to south of Berrigan Drive	Lower Rideau River	Barrhaven Creek
South of Berrigan Drive to Jockvale Road	Jock River	Jock River – Barrhaven



Legend	
	Study Area
	Watercourse
	Unevaluated Wetlands (City of Ottawa)
	Significant Valleylands
	Pinhey Forest Candidate ANSI, Life Science
	Natural Heritage System (City OP)
	Urban Natural Areas
	Greenbelt Limits 2013 (NCC)
	Significant Woodlands (City of Ottawa 2011)

Barrhaven Light Rail Transit
 (Baseline Station to Barrhaven Town Centre)
Planning and Environmental Assessment Study

0 250 500 1,000
 Meters



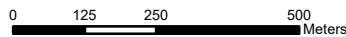
Black Rapids Creek
Unevaluated Wetland

Black Rapids Creek
Restoration Wetland

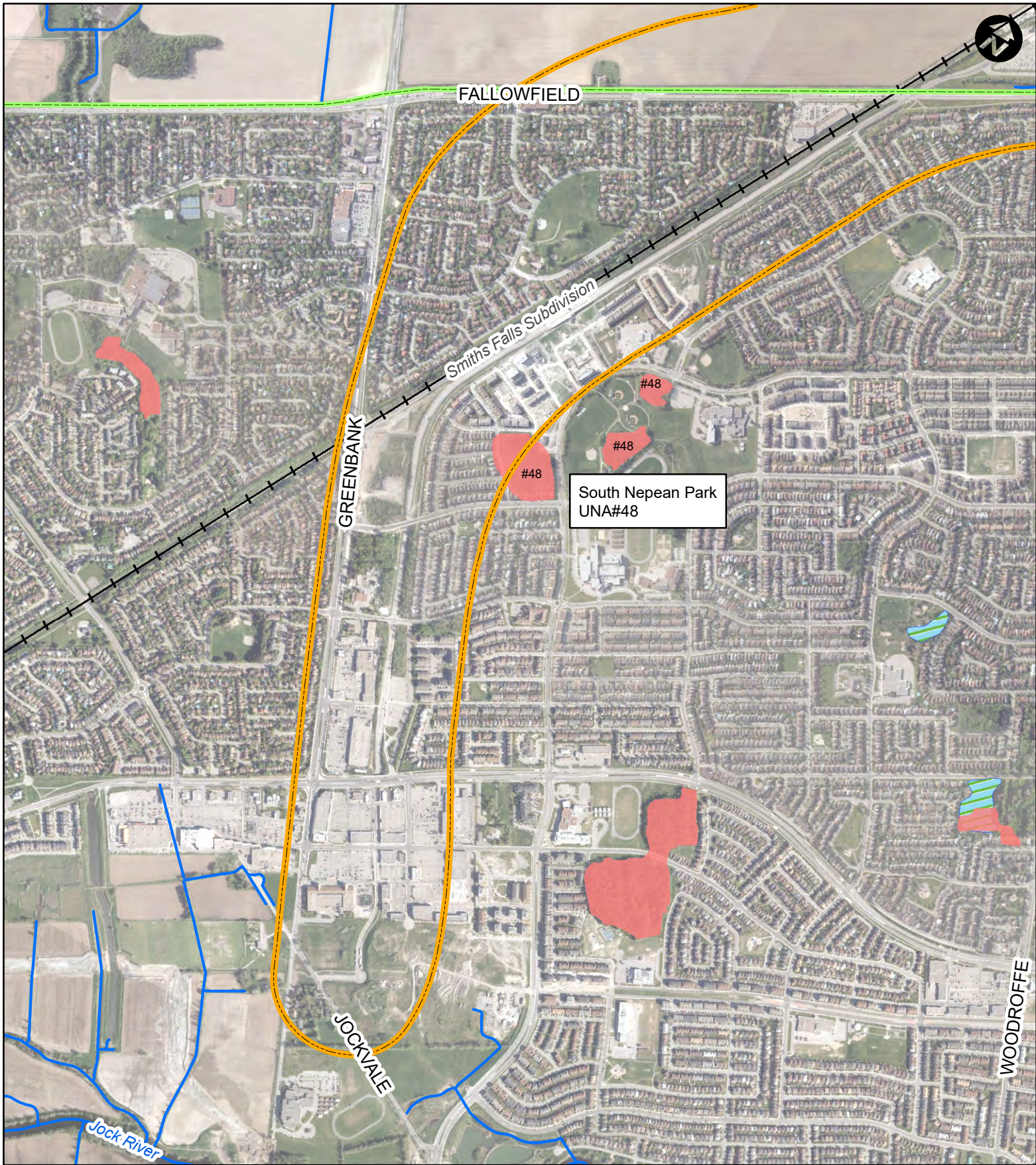
#48
South Nepean Park
UNA#48

Legend	
	Study Area
	Watercourse
	Significant Woodlands 2011 (City of Ottawa)
	Unevaluated Wetland (City of Ottawa)
	Significant Valleylands
	Pinhey Forest Candidate ANSI, Life Science
	Natural Heritage System (City OP)
	Urban Natural Areas
	Greenbelt Limits 2013 (NCC GBMP)

Barrhaven Light Rail Transit
(Baseline Station to Barrhaven Town Centre)
Planning and Environmental Assessment Study



Natural Environment

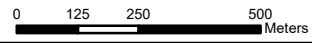


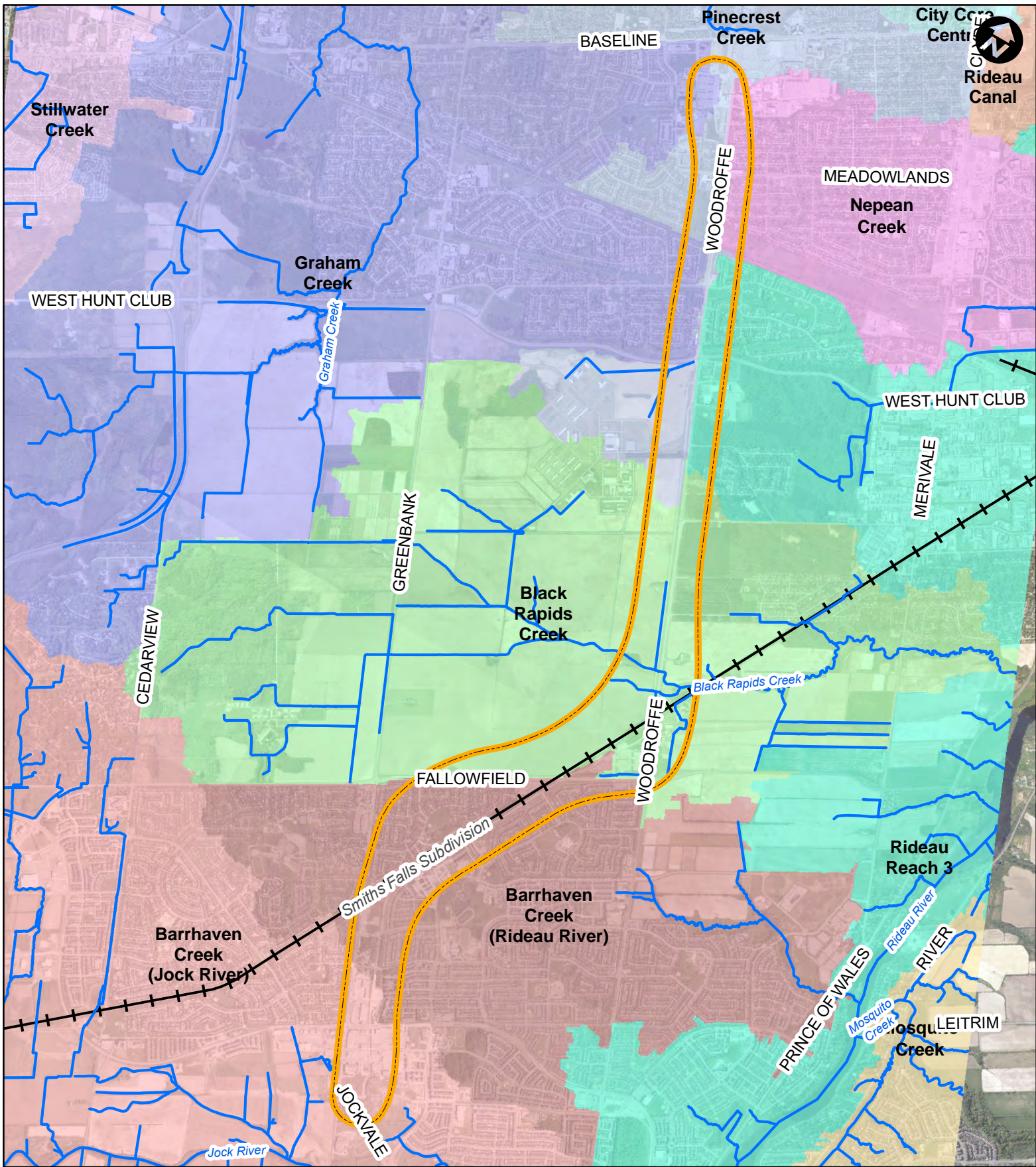
- Legend**
- Study Area
 - Watercourse
 - Significant Woodlands 2011 (City of Ottawa)
 - Unevaluated Wetland (City of Ottawa)
 - Significant Valleylands
 - Natural Heritage System (City OP)
 - Urban Natural Areas
 - Greenbelt Limits 2013 (NCC GBMP)

Barrhaven Light Rail Transit
(Baseline Station to Barrhaven Town Centre)

Planning and Environmental Assessment Study

Natural Environment





Legend

Study Area	Graham Creek
Watercourse	Mosquito Creek
Rail Lines	Nepean Creek
Barrhaven Creek	Pinecrest Creek
Barrhaven Creek_	Rideau Canal
Black Rapids Creek	Rideau Reach 3
City Core Centre	Stillwater Creek

Barrhaven Light Rail Transit
 (Baseline Station to Barrhaven Town Centre)
Planning and Environmental Assessment Study

0 0.5 1 2 Km

Subwatershed Catchment Areas

3.4.2.2 Surface Water Features

Black Rapids Creek is the only perennial natural watercourse within the Study Area (Figure 3-42). It is approximately 6km long and flows east from its headwaters near Greenbank Road through the NCC Greenbelt to the Rideau River, where it has been identified as an important ecological link for fish and wildlife (RVCA, 2014). It is comprised of two branches (north and south) and crosses both Woodroffe Avenue and the Southwest Transitway. The north branch is approximately 1-3m wide and 10 to 40cm deep. The south branch is approximately one meter wide and 5 to 25cm deep (McCormick Rankin, 1997a). Black Rapids Creek is classified as a cool to warmwater system and permanent water channel (RVCA, 2014).

Surface water quality conditions are monitored through the City of Ottawa’s Baseline Water Quality Program. The water quality rating for Black Rapids Creek was “Fair” in 2016 and based on parameters such as nutrients (i.e., total phosphorous, nutrients, and nitrates), E. coli, metals (i.e., aluminum and copper), and additional chemical/physical parameters (i.e., alkalinity, chlorides pH, and suspended solids). To summarize; the nutrients, E. coli, and metals all exceeded guidelines and it was recommended that efforts should be made to reduce contamination to the creek for overall water quality and aquatic life (RVCA, 2012a). However, the Black Rapids Creek Restoration Project began in 2016 and since that time water quality may have improved due to recent enhancements. An updated monitoring/summary report has yet to be released at the time of this review.

3.4.2.3 Fish and Fish Habitat

Black Rapids Creek contains habitat that supports various fish species that have adapted to cool-warmwater systems. It has been classified as habitat primarily for warmwater baitfish in the vicinity of Woodroffe Avenue (RVCA, 2012a), (EcoTec Environmental Consultants, 2003). During the City Stream Watch monitoring activities in 2003, 2008, and 2014; 29 fish species were observed throughout Black Rapids Creek (RVCA, 2012a)(RVCA, 2014) and eight fish species during EcoTec’s investigations (2003). Those fish species captured where Black Rapids Creek intersect with Woodroffe Avenue are highlighted in Table 3-6. Mottled sculpin (*Cottus bairdii*) was captured within the south branch of Black Rapids Creek at Woodroffe Avenue.

Table 3-6 Fish Species observed in Black Rapids Creek

Common Name	Scientific Name	RVCA 2012a, 2014	EcoTec 2003
Black crappie	<i>Pomoxis nigromaculatus</i>	X	
Blackchin shiner	<i>Notropis heterodon</i>	X	
Blacknose shiner	<i>Notropis heterolepis</i>	X	
Bluntnose minnow	<i>Pimephales notatus</i>	X	X
Brassy minnow	<i>Hybognathus hankinsoni</i>	X	
Brook stickleback	<i>Culaea inconstans</i>	X	X
Central mudminnow	<i>Umbra limi</i>	X	X
Common shiner	<i>Luxilus cornutus</i>	X	
Sculpin species	<i>Cottus spp.</i>	X	
Creek chub	<i>Semotilus atromaculatus</i>	X	X
Carp/Minnow species	<i>Cyprinid spp.</i>	X	
Darter species	<i>Etheostoma spp.</i>	X	
Fallfish	<i>Semotilus corporalis</i>	X	
Fathead minnow	<i>Pimephales promelas</i>	X	X
Finescale dace	<i>Phoxinus neogaeus</i>	X	X
Largemouth bass	<i>Micropterus salmoides</i>	X	
Common logperch	<i>Percina caprodes</i>	X	
Longnose dace	<i>Rhinichthys cataractae</i>	X	
Mottled sculpin	<i>Cottus bairdii</i>	X	

Common Name	Scientific Name	RVCA 2012a, 2014	EcoTec 2003
Northern redbelly dace	<i>Chrosomus eos</i>	X	X
Pearl dace	<i>Margariscus margarita</i>	X	
Pumpkinseed	<i>Lepomis gibbosus</i>	X	
Rock bass	<i>Ambloplites rupestris</i>	X	
Slimy sculpin	<i>Cottus cognatus</i>	X	
Smallmouth bass	<i>Micropterus dolomieu</i>	X	
Tesselated darter	<i>Etheostoma olmstedi</i>	X	
Walleye	<i>Sander vitreus</i>	X	
White sucker	<i>Catostomus commersonii</i>	X	X
Yellow perch	<i>Perca flavescens</i>	X	

3.4.3 WETLANDS

Wetlands within Ontario can have varying designations based on whether a wetland has been evaluated as per the Ontario Wetland Evaluation System (OWES). This is the only means of evaluating wetlands within Ontario to determine Provincial Significance and is administered through the MNR. As such, wetlands can be defined as either provincially significant, other-evaluated, or unevaluated. Provincially Significant Wetlands (PSW) are the most valued and receive protection under the PPS (MMAH, 2014) and the City of Ottawa Official Plan (2013). Any wetlands found in association with significant woodlands, however, are considered part of the City’s Natural Heritage System (City of Ottawa, 2013) and must be considered during planning processes. Wetlands on federal lands regardless of provincial significance are subject to the federal policies and the corresponding Canadian Wetland Classification system. The Canadian Wetlands Classification system is discussed further in **Section 5.1.5**.

3.4.3.1 Provincially Significant Wetlands

No wetlands within the Study Area have been designated as provincially significant and are therefore considered absent from the Study Area.

3.4.3.2 Other-Evaluated Wetlands

No wetlands within the Study Area have been evaluated as per the provincial evaluation system and are therefore considered absent from the Study Area.

3.4.3.3 Unevaluated Wetlands

Unevaluated wetlands are mapped by the MNR and the City of Ottawa (2011) in the Study Area and are illustrated in **Figure 3-42**, **Figure 3-43** and **Figure 3-44**. Several small isolated unevaluated wetlands occur throughout and in proximity to the Study Area, including some found in association with the Pinhey Forest Significant Woodland.

The Black Rapids Creek unevaluated wetland occurs on the west side of Woodroffe Avenue and the Southwest Transitway, adjacent to Black Rapids Creek. It occurs on federal lands and as such is subject to the Federal Policy on Wetland Conservation.

One section of Black Rapids Creek (located east of Woodroffe Avenue and south of the VIA Rail) has recently undergone an extensive restoration project due to findings of poor water quality and overall lack of wildlife habitat. The RVCA in collaboration with NCC and the Great Lakes Guardian Community Fund has enhanced and enlarged the wetland to improve water quality, increase biodiversity, and to provide important habitat and movement corridors for flora and fauna. Enhancements include side slopes, woody debris, and re-planting of native vegetation (RVCA, 2018).

3.4.4 NATURAL HERITAGE FEATURES

3.4.4.1 NCC Greenbelt Lands

The NCC Greenbelt consists of farms, forests, and wetlands covering approximately 20,000 hectares (ha) of land within the City of Ottawa and is a mosaic of land uses and facilities. The Study Area includes a large portion of the Greenbelt, specifically, the Southern Farm & Pinhey Forest Sector which includes a large portion of Agricultural Resource Area, Pinhey Forest as well as Black Rapids Creek (**Figure 3-2**).

Southern Farm/Pinhey Forest became a conservation area in 1948. This tract of land was donated to the NCC to enhance overall forest cover in the watershed, demonstrate forest conservation practices, and for human health. The NCC currently maintains the woodland and the rare post-glacial sand dunes on which it grows (NCC, 2018).

3.4.4.2 Areas of Natural and Scientific Interest

Areas of Natural and Scientific Interest (ANSI) are identified by the MNRF. Pinhey Forest is a Candidate Life Science ANSI within the Study Area (**Figure 3-42**). This forest contains a rare inland sand dune complex with eastern white pine (*Pinus strobus*) and red pine (*Pinus resinosa*) occurring either naturally in small areas or as large plantations. It extends from Woodroffe Avenue just south of the Nepean Sportsplex to the Grenfell Crescent and Burnbank Street intersection (NCC, 2018). Deciduous swamp forests of red maple and silver maple (*Acer saccharinum*) also occur amongst the dunes and support unique and regionally rare flora which are known to occur in wet acidic sites (MNRF, 2018). Despite historical disturbance to the site and extensive coniferous plantations, the area still hosts rare flora and insect species indicative of exceptional dune elements (MNRF, 2018). As previously noted, this forest is also part of the NCC Greenbelt.

3.4.4.3 Significant Woodlands

Criteria established for Significant Woodlands in the City of Ottawa are defined by the Official Plan (City of Ottawa, 2013) as amended by Official Plan Amendment (OPA) 179. The City identifies one Significant Woodland feature in proximity to the Study Area, within Pinhey Forest. This woodland includes several small areas of unevaluated wetlands which are also part of the City's Natural Heritage System. The criteria for significance are different for urban and rural (i.e., Greenbelt) policy areas. In consultation with Amy MacPherson at the City, the Study Team was made aware of the change to the criteria and completed the analysis of Significant Woodlands based on the new criteria. Any changes to the status of woodlands within the Study Area as a result of the new policies will be addressed through subsequent stages of the planning process for this project if applicable.

3.4.4.4 Significant Valleylands

The City of Ottawa identifies Significant Valleylands by slopes greater than 15% and a length of more than 50m with water present for some period of the year and are typically, part of the Natural Heritage System (City of Ottawa, 2013).

There are no Significant Valleylands within the Study Area. However, one is present approximately 700m east of the Study Area boundary. This area coincides with Black Rapids Creek to the east of Woodroffe Avenue.

3.4.4.5 Linkage Features

A strong component of the Natural Heritage System incorporates and promotes linkages/corridors to support ecological functions. OPA 150 describes and maps areas that provide linkage opportunities between significant features (City of Ottawa 2013, Schedule L).

OPA 150 identifies land parcels within the NCC Greenbelt, specifically the southern portions of Pinhey Forest and a small wet woodland (unevaluated wetland) on Black Rapids Creek, and beyond the Study Area as wildlife linkage opportunities. The creek corridor has also been designated as a Natural Link within the GMP (National Capital Commission, 2013).

3.4.4.6 Urban Natural Features

The City of Ottawa undertook the Urban Natural Areas Environmental Evaluation Study (UNAEES; (Muncaster and Brunton, 2006) (Muncaster and Brunton, 2005) in conjunction with the Greenspace Master Plan (City of Ottawa, 2006). The purpose

of the UNAEES was to identify woodlands, wetlands and ravines throughout the City of Ottawa urban area and evaluate their environmental significance.

Once the UNAEES was completed, those Urban Natural Areas (UNAs) worthy of protection and/or acquisition were identified using strategic guidelines set forth within the Urban Natural Features Strategy (City of Ottawa, 2007). UNAs identified as priority areas included high and moderate-rated sites, natural features currently in City ownership (including sites with low environmental rating), areas with recognized planning status, and the ability to promote environmental stewardship on privately-owned lands with a low environmental rating (City of Ottawa, 2007). A total of 40 UNAs were re-designated to Urban Natural Features based on this strategy. UNFs are shown on Schedule B of the Official Plan (2013) as land use designations and are included on Schedule L as part of the City's Natural Heritage System.

Two Urban Natural Areas (UNA) are located within the Study Area: Tallwood Woods (UNA #40) and South Nepean Park (UNA #48), both of which have been designated as Urban Natural Features.

Tallwood Woods is approximately 5.4 ha in size and located at the northwest corner where the CN Rail corridor and Woodroffe Avenue meet (**Figure 3-42**). This woodlot has been described as a lowland deciduous forest over substrates of sand and clay. A mature canopy of red maple and sugar maple is present within the central portion of the forest; however, the edge boundary is composed of early successional trees of trembling aspen, white birch, and green ash (*Fraxinus pennsylvanica*) (Muncaster and Brunton, 2005). At the time of the evaluation, no standing or flowing water occurred within the forest. A formal paved pathway bisects the forest along with several informal trails offering recreational opportunities to nearby residents. This greenspace is highly valued and the pathways are well-used by the surrounding community (MacPherson, Amy, November 2018). It received an overall ecological rating of "Moderate" due to habitat maturity that potentially supports uncommon flora and fauna, and for its aesthetic value within an urban landscape (Muncaster and Brunton, 2005).

South Nepean Park is approximately 5.5 ha and located southwest of Fallowfield Road and the VIA Rail corridor **Figure 3-44**. Three isolated disturbed forest units occur amongst a recreational park and have been described as disturbed upland deciduous forests with a canopy of white elm (*Ulmus americana*), green ash, and sugar maple. The understory is densely occupied by buckthorn species limiting natural diversity. It received an overall ecological rating of "Low" due to urban disturbances and lack of biodiversity, connectivity, and wildlife habitat (Muncaster and Brunton, 2006). As a City-owned natural area, however, it was preserved and integrated into the greenspace network for the developing Longfields community.

One of the three forest units, known locally as Highbury Woods is located along the edge of the Study Area.

3.4.4.7 Official Plan Designations

Land use designations for the Study Area are discussed in **Section 3.3.1.3.1**. Designations specific to natural heritage features include: Natural Environment Area, Agricultural Resource Area, Greenbelt Rural, Major Open Space and Urban Natural Features. These are briefly described below and shown in **Figure 3-3**.

3.4.4.7.1 Natural Environment Area

Natural Environment Areas are lands that hold a high environmental value assessed through either federal, provincial, and/or municipal studies. Lands with such a designation contain components of wetlands, significant woodlands, and wildlife habitat and are of most significance within the City as they maintain biodiversity and ecological functions. Natural Environment Areas within the Greenbelt were identified by the NCC. Designated lands are protected and preserved to ensure the inherent function of natural features (Section 3.2.2; City of Ottawa, 2013).

Black Rapids Creek and Pinhey Forest have been designated as a Natural Environment Area.

3.4.4.7.2 Agricultural Resource Area

To protect this resource for future generations, the City limits development in prime agricultural areas (Section 3.7.3; City of Ottawa, 2013). Agricultural Resource Areas may also support valuable habitat for wildlife, including some species at risk, depending upon their use and management.

Prime agricultural lands are present in the Study Area west of Woodroffe Avenue.

3.4.4.7.3 Greenbelt Rural

This designation is part of the greater Greenbelt policy but has specific policy activities for farming, forestry, recreation, and small-scale commercial uses directly related to rural activities within the Greenbelt (Section 3.5.1; City of Ottawa, 2013).

The pine plantation within Pinhey Forest is designated Greenbelt Rural lands within the Study Area.

3.4.4.7.4 Urban Natural Features

Tallwood Woods (UNA # 40) and South Nepean Park (UNA #48) have been designated as urban natural features in the Study Area (Section 3.2.3; City of Ottawa, 2013). This designation contributes to biodiversity and wildlife habitat in the urban area.

3.4.4.7.5 Major Open Space

Major open space areas are a key component of the Greenspace Network which also contributes to neighbourhood quality of life and the overall integrity of the natural environment (Section 3.3.1; City of Ottawa, 2013). A linear stretch of major open space area is present in the Study Area north of the Canadian National (CN) Railway and Medhurst Drive on the east side of Woodroffe Avenue, across from Tallwood Woods as well as along the north side of West Hunt Club Road. The non-wooded portions of South Nepean Park are also designated as Major Open Space.

3.4.4.8 Other

One natural heritage feature that the MNRF classifies only as a “Life Science Site” is located within the Study Area (**Figure 3-42**). The footprint of this feature is similar to that of Tallwood Woods, located within the northwest section of the Study Area. MNRF describes this feature as a disturbed lowland deciduous forest with occurrences of red maple, yellow birch, black ash (*Fraxinus nigra*), white cedar (*Thuja occidentalis*), and white elm on Clay Plain (MNRF, 2018).

3.4.5 SPECIES AT RISK AND SPECIES OF CONSERVATION CONCERN

A review of online resources and personal communication (e.g., wildlife atlas records, NHIC database, A. MacPherson, 2018) identified 27 species at risk (SAR) with current occurrence records (≤ 30 years) that exist in the vicinity of the Study Area either within 1km (as per NHIC and A. MacPherson 2018) or 10km (as per wildlife atlas records; **Table 3-7**). S-Ranks are a provincial status used by the NHIC to set protection priorities for rare species and is based on the number of occurrences in Ontario. The MNRF tracks species with S1 to S3 (vulnerable to critically imperiled) designations and are considered Species of Conservation Concern. SAR potential will be confirmed following completion of focused field studies detailed in a subsequent section of the Environmental Study Report: Update to Existing Conditions (**Section 5.1.4**).

Table 3-7 SAR and Species of Conservation Concern Wildlife Records for the Study Area

Common Name	Scientific Name	S-Rank ¹	ESA Status ²	SARA (Schedule 1) Status ³
PLANTS				
Butternut	<i>Juglans cinerea</i>	S2?	Endangered	Endangered
INSECTS				
Monarch	<i>Danaus plexippus</i>	S2N, S4B	Special Concern	Special Concern
REPTILES				
Blanding’s Turtle	<i>Emydoidea blandingii</i>	S3	Threatened	Threatened
Northern Map Turtle	<i>Graptemys geographica</i>	S3	Special Concern	Special Concern
Snapping Turtle	<i>Chelydra serpentina</i>	S3	Special Concern	Special Concern
Eastern Milksnake	<i>Lampropeltis triangulum</i>	S4	Not at Risk	Special Concern
BIRDS				
Black-crowned Night-heron	<i>Nycticorax nycticorax</i>	S3B, S3N	No status	No status
Peregrine Falcon	<i>Falco peregrinus</i>	S3B	Special Concern	Special Concern
Short-eared Owl	<i>Asio flammeus</i>	S2N, S4B	Special Concern	Special Concern
Common Nighthawk	<i>Chordeiles minor</i>	S4B	Special Concern	Threatened
Chimney Swift	<i>Chaetura pelagica</i>	S4B, S4N	Threatened	Threatened

Common Name	Scientific Name	S-Rank ¹	ESA Status ²	SARA (Schedule 1) Status ³
Eastern Wood-pewee	<i>Contopus virens</i>	S4B	Special Concern	Special Concern
Purple Martin	<i>Progne subis</i>	S3S4B	No status	No status
Bank Swallow	<i>Riparia riparia</i>	S4B	Threatened	Threatened
Barn Swallow*	<i>Hirundo rustica</i>	S4B	Threatened	Threatened
Wood Thrush	<i>Hylocichla mustelina</i>	S4B	Special Concern	Threatened
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	S4B	Special Concern	Special Concern
Bobolink	<i>Dolichonyx oryzivorus</i>	S4B	Threatened	Threatened
Eastern Meadowlark	<i>Sturnella magna</i>	S4B	Threatened	Threatened
MAMMALS				
Little Brown Myotis	<i>Myotis lucifugus</i>	S4	Endangered	Endangered
Northern Myotis	<i>Myotis septentrionalis</i>	S3	Endangered	Endangered
FISH				
Northern Brook Lamprey	<i>Ichthyomyzon fossor</i>	S3	Special Concern	Special Concern
Bridle Shiner	<i>Notropis bifrenatus</i>	S2	Special Concern	Special Concern
River Redhorse	<i>Moxostoma carinatum</i>	S2	Special Concern	Special Concern
Greater Redhorse	<i>Moxostoma valenciennesi</i>	S3	No status	No status
Channel Darter	<i>Percina copelandi</i>	S2	Special Concern	Threatened

* Species downlisted prior to finalizing EPR. Special Concern under provincial ESA as of January 25, 2023

Status Source:

¹S-Rank (MNRF 2017)

S1: Critically Imperiled – Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2: Imperiled – Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3: Vulnerable – Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4: Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5: Secure – Common, widespread, and abundant in the nation or state/province.

SNA: Not Applicable – A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

S#S#: Range Rank – A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

SR or ? - Recorded within a nation or subnation, but local status not available or not yet determined. When combined with a global rank of G1 to G3, local status is 'Indeterminate,' but the entity is nevertheless presumed vulnerable, if still extant.

N – rank for non-breeding populations in the province.

B – rank for breeding populations in the province.

²ESA (Endangered Species Act) Status (MNRF 2018)

³SARA (Species at Risk Act) Status (federal status - listed) (Government of Canada, 2018)

Extinct - A species that no longer exists anywhere.

Extirpated (EXT) - Lives somewhere in the world, and at one time lived in the wild in Ontario, but no longer lives in the wild in Ontario.

Endangered (END) - Lives in the wild in Ontario but is facing imminent extinction or extirpation.

Threatened (THR) - Lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address factors threatening it.

Special Concern (SC) - Lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered due to a combination of biological characteristics and identified threats.

Not at Risk (NAR) - A species that has been evaluated and found to be not at risk.

Data Deficient (DD) - A species for which there is insufficient information for a provincial status recommendation.

3.5 Physical Environment

The physical environment is documented through several varying studies including an agricultural assessment, geotechnical report and a Phase I Environmental Site Assessment (ESA).

3.5.1 SOIL SERIES

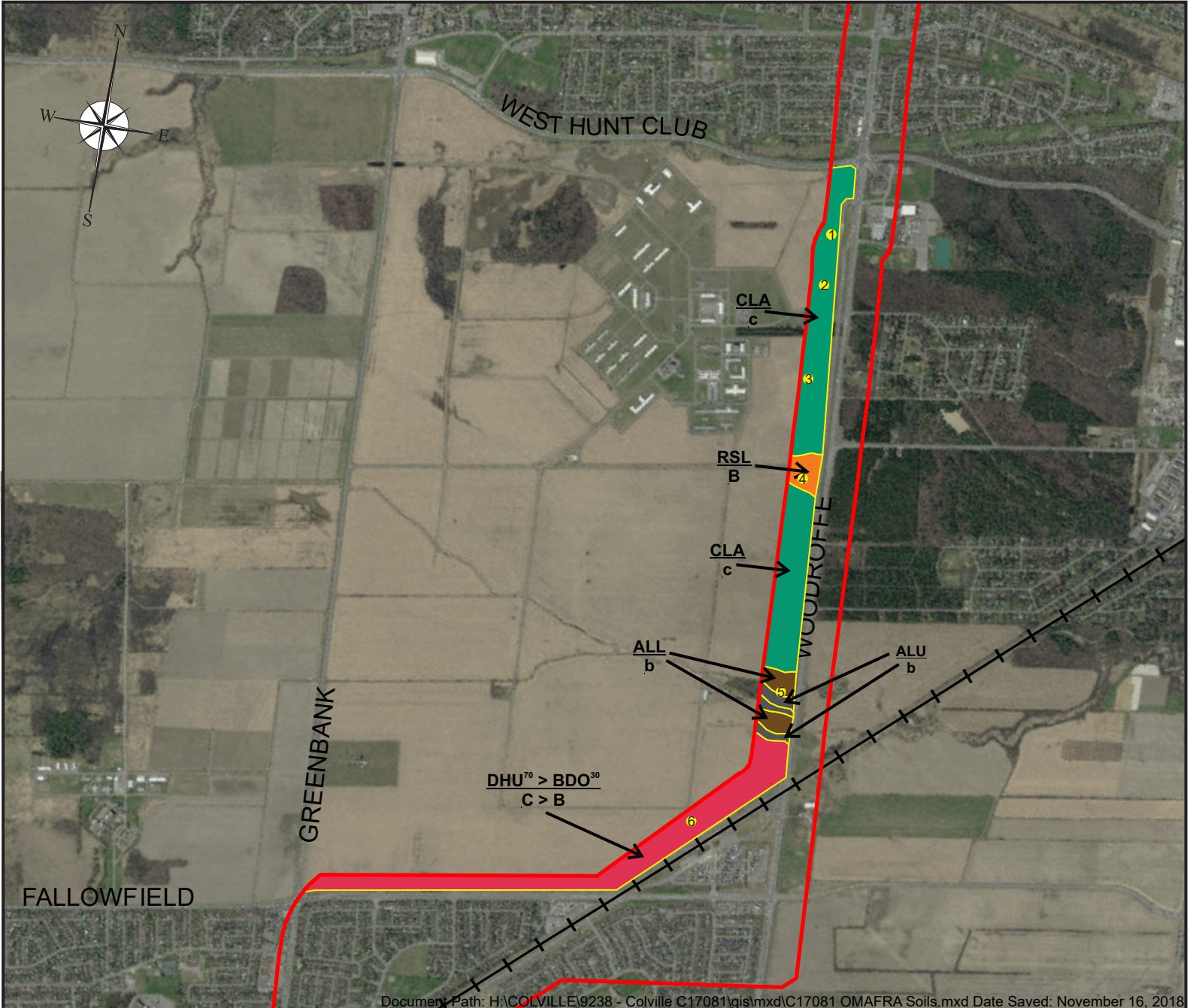
An Agricultural Assessment for the Study Area was undertaken to support the study. The full report is included in **Appendix B**. Detailed soil surveys confirmed the presence of Carlsbad, Ramsayville, Dalhousie, Brandon, Allendale and Alluvial soils within the Study Area (**Figure 3-46**).

Canada Land Inventory (CLI) capability rating indicates that the Study Area has a mix of prime and non-prime agricultural lands with CLI capability ratings of CLI Class 2, 3, 4 and 5 (descending in quality from Class 1 having no limitations and is

absent from the Study Area) (**Table 3-8**) (**Figure 3-47**). Approximately 44.04% of the lands within the Study Area consist of prime agricultural lands (CLI Classes 2 and 3).

Table 3-8 CLI Capability Ratings for the Study Area

Soil Series	Area (Ha)	% of Study Area	CLI Capability Class
Carlsbad	30.18	48.57	4
Dalhousie	16.86	27.14	2
Brandon	7.35	11.83	3
Allendale	3.15	5.07	3
Ramsayville	2.90	4.67	4
Alluvial	1.70	2.74	5



Document Path: H:\COLVILLE\9238 - Colville C17081\gis\mxd\C17081 OMAFRA Soils.mxd Date Saved: November 16, 2018

Legend	Study Area	Soil Boundary
		Soil Sample Location
Soil Symbol		
Soil Name → <u>ALL</u>	Soil Name → <u>DHU⁷⁰ > BDO³⁰</u>	Percent
<u>b</u> ← Slope	<u>C > B</u> ← Slope	
Soil Series		
DHU	Dalhousie: imperfectly drained and consists of soils developed in fine-textured, modified marine materials.	
BDO	Brandon: poorly drained and found in combination with Dalhousie series, on level to very gently sloping topography.	
CLA	Carlsbad: well drained member of the Uplands association and developed from marine and estuarine deposition medium to fine grained sands.	
RSL	Ramsayville: imperfectly drained and developed from marine and estuarine deposition medium to fine grained sands. Soils has a higher groundwater table found in upper metre of soil.	
ALL	Allendale sandy loam: poor drainage and consists of water-laid sand over clay.	
ALU	Alluvial: variable drainage and soil textures and consist of finer textured sediments.	

Figure 3-46 Refined Soil Series Mapping

Scale 1:28,000

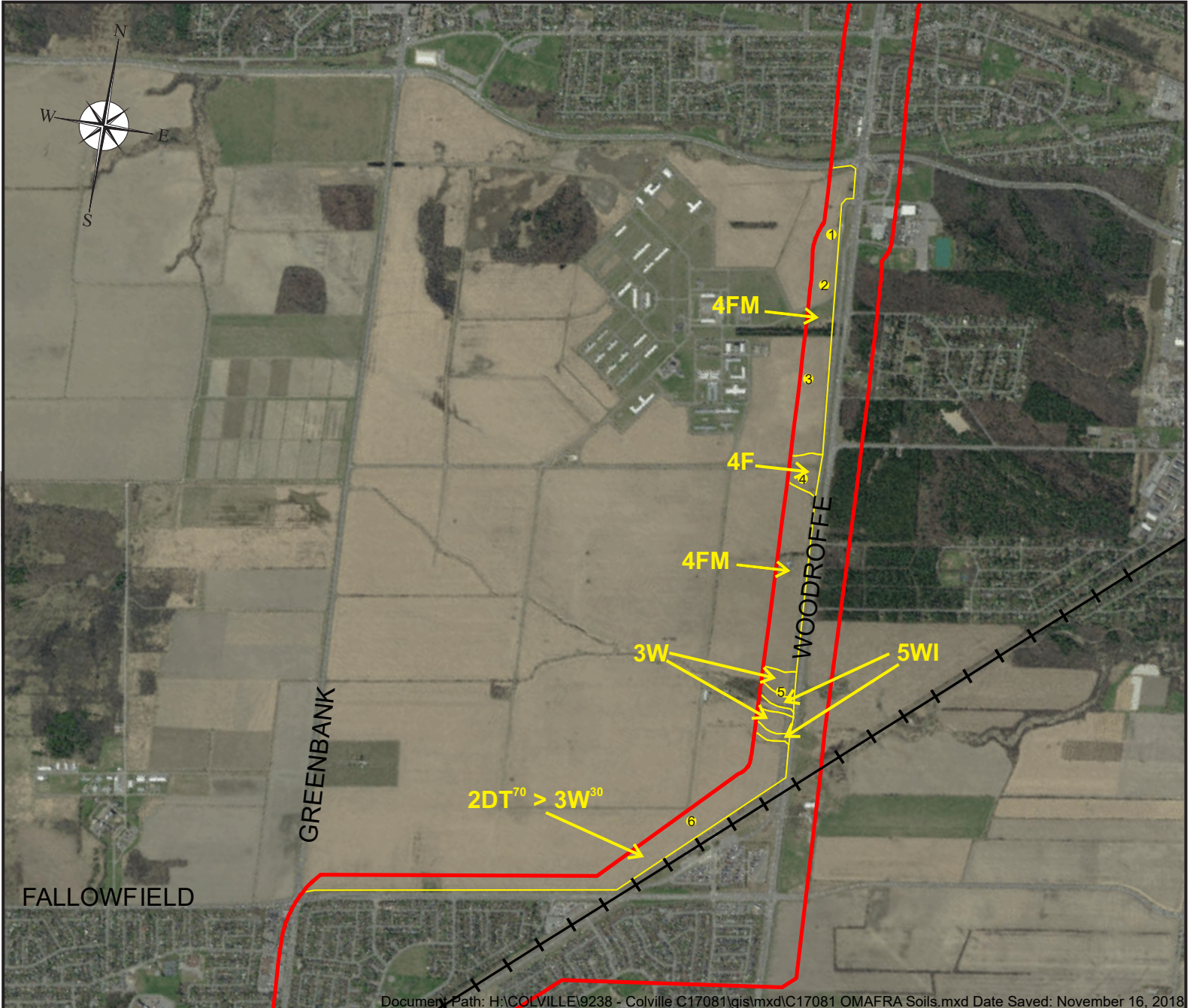
- SLOPE CLASSES(%)**
- A a Level slopes (0.0 - 0.5%)
 - B b Nearly level slopes (0.5 - 2.0%)
 - C c Very Gentle slopes (2.0 - 5.0%)
 - D d Gentle slopes (5 - 9%)
 - E e Moderate slopes (9 - 15%)
 - F f Strong slopes (15 - 30%)
 - Gg Steep slopes (30 - 45%)
- Simple Slopes (uniform, lengths > 50 metres) denoted in upper case
 Complex Slopes (short, irregular slopes) denoted in lower case

Prepared for: **PARSONS**

Prepared by: **COLVILLE CONSULTING INC.**

Revised: December 4, 2018

FILE: C17081



Document Path: H:\COLVILLE\9238 - Colville C17081\gis\mxd\C17081 OMAFRA Soils.mxd Date Saved: November 16, 2018

Legend

Soil Classification

- CLI Class 2** - Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices.
- CLI Class 3** - Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices.
- CLI Class 4** - Soils in this class have severe limitations that restrict the range of crops or require special conservation practices.
- CLI Class 5** - Soils have very severe limitations that restrict their capability in producing perennial forage crops, and improvement practices are feasible.

Soil Classification Subclass

- W** Excess Water - limitations for agriculture due to poor drainage; improvements not feasible.
- T** Topography - limitations from both the percent of slope and the pattern or frequency of slopes in different directions.
- F** Low Fertility - soils having low fertility; limitations may be due to lack of plant nutrients.
- M** Moisture Limitations - this consists of soils where crops are affected by drought owing to inherent soil characteristics.
- D** Undesirable soil structure and/or low permeability.
- I** Inundation by streams or lakes; soils subjected to inundation.

Figure 3-47

Refined Soil Series CLI Mapping

Scale 1:28,000

 Metres

Soil Symbol

Soil \rightarrow **4T** \leftarrow Subclassification
 Classification

- Primary Study Area
- Soil Boundary
- Soil Sample Location

Prepared for: **PARSONS**

Prepared by: **COLVILLE CONSULTING INC.**

3.5.2 SUBSURFACE CONDITIONS

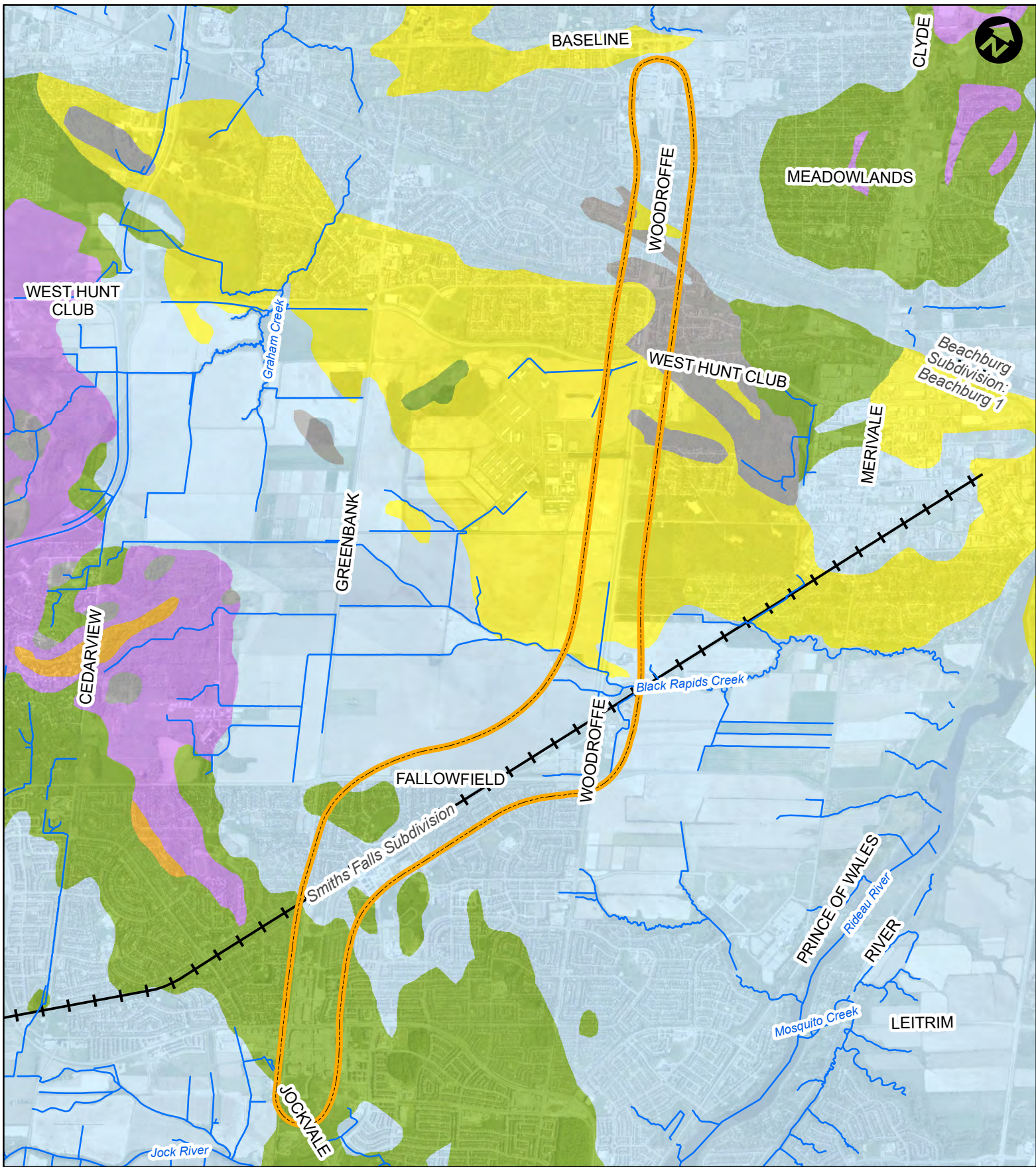
A geotechnical report was undertaken to characterize the subsurface conditions for the Study Area. The full report is included in **Appendix B**. More detailed geotechnical investigations are described in **Section 5.2**.

The general stratigraphic sequence in the Study Area typically consists of fill or topsoil, overlying sensitive marine clays, underlain by sands and silts, glacial till, and bedrock. Not all of these deposits are present at all locations, but all units are mapped within the Study Area.










Surficial geology in the Study Area is shown in **Figure 3-48**. Surficial geology maps indicate the occasional presence of organic deposits, like peat, between Norice Street and Vaan Drive. However, organic deposits have not been encountered in boreholes put down in this area as completed for different projects, with the exception of surficial topsoil or thin layers of topsoil beneath fill. Large portions of the Study Area are also underlain by deposits of offshore marine clay. The upper few metres of the clay deposit is typically weathered to form a stiff to very stiff crust. The underlying unweathered grey clay is typically of firm consistency, but is occasionally soft, very sensitive to disturbance, and is highly compressible. Throughout the Study Area, deposits of glacial till exist beneath the sands, silts, and clays, or near the ground surface between Berrigan Drive and Jockvale Road. The glacial till typically consists of a heterogeneous mixture of gravel, cobbles, and boulders in a matrix of silty sand or sandy silt. Lenses and layers of more permeable sand and gravel outwash deposits can be found within the glacial till. Cobbles and boulders are also frequently encountered within the glacial till deposit.

Bedrock Geology in the Study Area is shown in **Figure 3-49**. The bedrock throughout most of the Study Area consists of sedimentary sequences of sandstone, dolostone, and limestone of Rockcliffe, Oxford, and March Formations.

The thickness of the overburden varies over the Study Area as shown in **Figure 3-50**. The depth to bedrock varies significantly throughout the Study Area. Geological mapping indicates that the bedrock depth varies from about 10 to 25m between Navaho Drive and VIA Rail and decreases to about 3 to 10m between VIA Rail and Strandherd Drive. South of Strandherd Drive, the bedrock depth is indicated to increase again and range from about 10 to 25m. The depth to bedrock encountered in boreholes is generally consistent with the published geological mapping. However, between Elm Park Avenue and Berrigan Drive, completed for a different project, it was learned that auger refusal was encountered as shallow as 0.4m below ground surface, and rock outcrops are visible at ground surface.



Legend


-  Study Area
-  Paleozoic Bedrock
-  Watercourse
-  Clay
-  Rail Lines
-  Diamicton
-  Gravel
-  Organic deposits
-  Sand

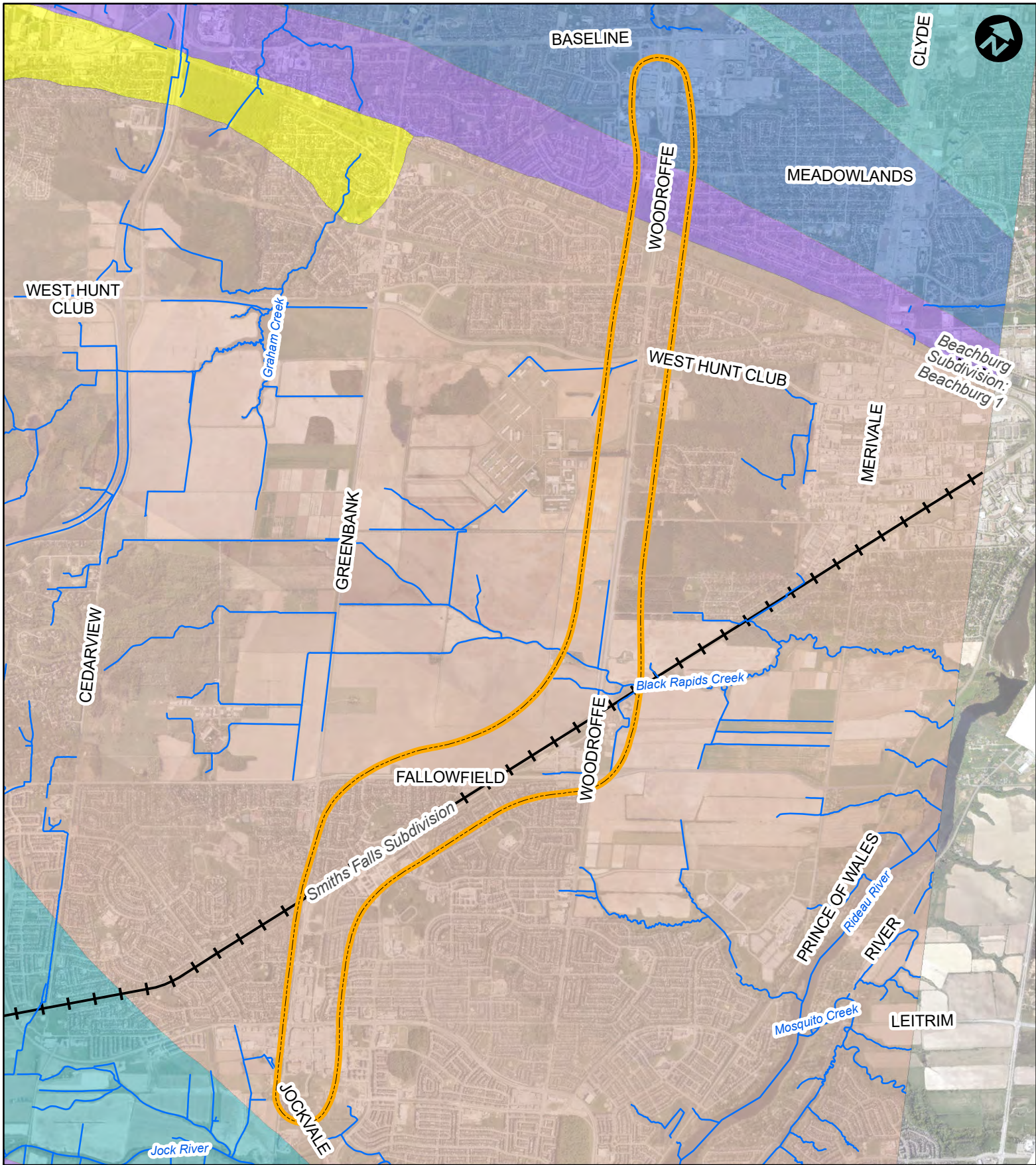
**Barrhaven Light Rail Transit
(Baseline Station to Barrhaven Town Centre)**

Planning and Environmental Assessment Study

0 0.5 1 2 Km

Surficial Geology

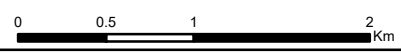




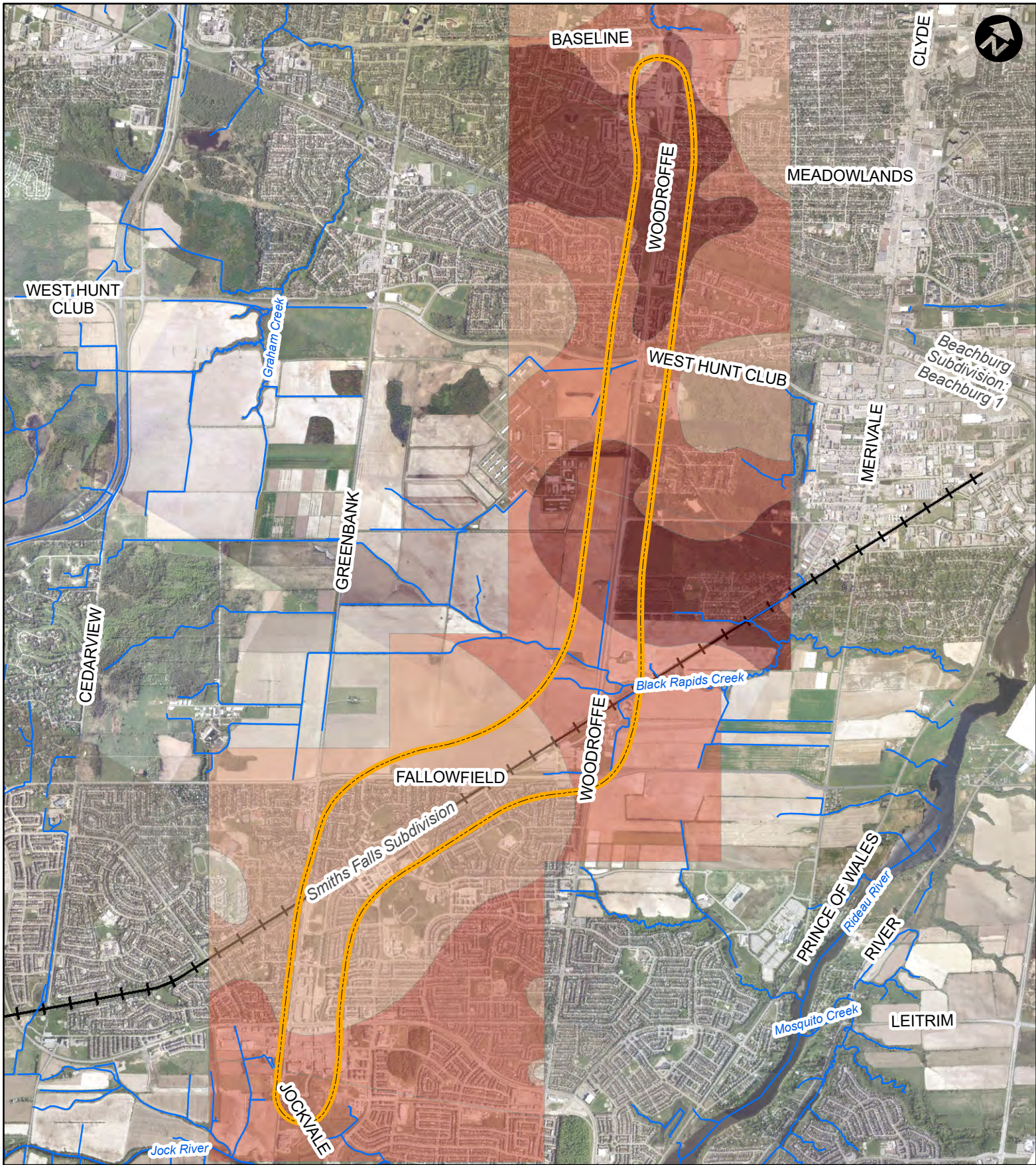
Legend





- Study Area
- Dolomite
- Limestone & Dolomite interbeds
- Watercourse
- Sandstone
- Rail Lines
- Sandstone & Dolomite interbeds
- Shale

Barrhaven Light Rail Transit
(Baseline Station to Barrhaven Town Centre)
Planning and Environmental Assessment Study



Bedrock Geology



Legend	
	Study Area
	Watercourse
	Less than 1 m
	1 m to 8 m
	8 m to 15 m
	Greater than 15 m

Barrhaven Light Rail Transit
 (Baseline Station to Barrhaven Town Centre)
Planning and Environmental Assessment Study



Drift Thickness



3.5.3 FLUVIAL GEOMORPHOLOGY

Fluvial Geomorphic and Hydrologic existing conditions were characterized for the Study Area. The full report is included in **Appendix B**. More detailed geotechnical investigations are described in **Section 5.3**.

There are six (6) watercourse or drainage features within the Study Area. The channels of four of these features cross the existing Southwest Transitway, while the channels of the two others will traverse in close proximity (referred to as 'proximity watercourses'). The features are described in **Table 3-9** and shown in **Figure 3-51** and **Figure 3-52**.

Figure 3-51 Overview of Watercourse and Drainage Feature Crossings

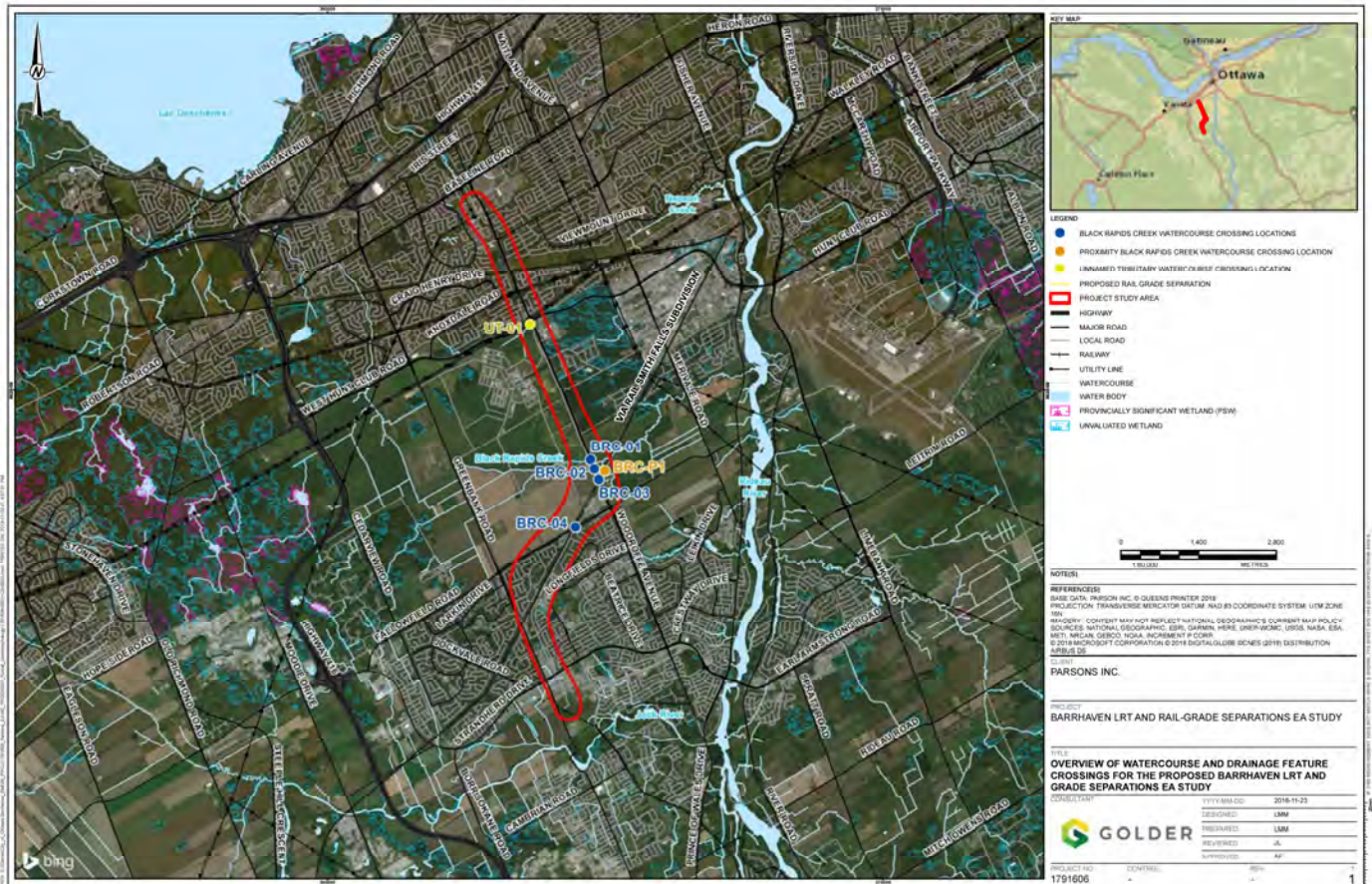


Figure 3-52 Watercourse and Drainage Feature Crossings Near the Intersection of Fallowfield Road and Woodroffe Avenue



Table 3-9 Summary of Existing Fluvial Geomorphic and Hydrologic Conditions at Watercourse Crossings

General Location	Crossing	General Description of Channel Morphology and/or Water Feature Conditions	Presence or Absence of Crossing Structures Along Channel Reach	*Estimated Bankfull Width (m)	Riparian Conditions	Estimated Drainage Area (hectares)	**Mean Annual Flow (m ³ /s)
West Hunt Club & Woodroffe	UT-01	Small unnamed watercourse or drainage feature (potential tributary of Nepean Creek) that supports ephemeral to intermittent flows and altered/engineered channel form (e.g., ditch feature of low sinuosity) Channel inferred to include poorly-defined bed and banks Channel expected to be crossed by the Project Anticipated to drain in a north-easterly direction	Possible Corrugated Steel Pipe (CSP) culvert under roads	2	Dense cover of grasses with instances of shrubs and small trees	60	0.01
Woodroffe Rail Crossing	BRC-01	Black Rapids Creek (tributary of Rideau River) Small to medium sized watercourse that supports perennial flows and a combination of natural and altered/engineered channel form Channel inferred to include well defined bed and banks and alluvial controls Channel expected to be crossed by the Project	Concrete box culverts under Woodroffe Avenue and pedestrian/cycling bridge at Greenbelt Pathway	10	Dense cover of grasses, shrubs and small trees, with instances of riprap armouring	Up to 800	0.098
	BRC-02	Small watercourse or drainage feature (tributary of Black Rapids Creek) that supports perennial flows and a combination of natural and altered/engineered channel form (e.g., agricultural ditch of low sinuosity) Channel inferred to include poor to moderately defined bed and banks and alluvial controls Channel expected to be crossed by the Project	Concrete box culverts under Woodroffe Avenue and pedestrian/cycling bridge at Greenbelt Pathway	10	Dense cover of grasses, shrubs and small trees, with instances of riprap armouring	230	0.027
	BRC-03	Small watercourse or drainage feature (tributary of Black Rapids Creek) that supports intermittent flows and altered/engineered channel form (e.g., roadside ditch of low sinuosity) Channel inferred to include poorly-defined bed and banks Channel is currently crossed by the VIA Rail and is expected to be in close proximity to the Project Anticipated to drain generally south to north	Possible Corrugated Steel Pipe (CSP) culvert under the VIA Rail	2	Dense cover of grasses with instances of gravel and/or paved areas	80	0.01
	BRC-P1	Small watercourse or drainage feature (potential of Black Rapids Creek) that supports intermittent flows and a combination of natural and altered/engineered channel form (i.e., channel upstream of the crossing appears to have been straightened) Channel inferred to include poor to moderately defined bed and banks and alluvial controls Channel expected to be in close proximity to the Project Anticipated to drain generally south to north	CSP culvert under pedestrian/cycling bridge at Greenbelt Pathway	5	Dense cover of grasses, shrubs and small trees, with instances of rip rap armouring	100	0.013

Fallowfield VIA Rail Crossing	BRC-04	<p>Small watercourse or drainage feature (tributary of Black Rapids Creek) that supports intermittent flows and altered/engineered channel form (e.g., ditch feature of low sinuosity)</p> <p>Channel inferred to include poorly-defined bed and banks</p> <p>Channel is currently crossed by the VIA Rail and is expected to be crossed by the Project</p> <p>Anticipated to drain generally south to north</p>	Concrete box culvert under Fallowfield Road	5	Dense cover of grasses with some shrubs and trees at locations upstream of the crossing	Up to 100	Up to 0.013
<p>BRC = Black Rapids Creek; UT = Unnamed Tributary; m³/s = cubic metres per second.</p> <p>* Bankfull width estimated based on aerial imagery</p> <p>** Annual Mean Flow derived using the Ministry of Natural Resources and Forestry (MNRF) Ontario Flow Assessment Tool (OFAT)</p>							

3.5.4 HYDROGEOLOGY

Groundwater in the area of the Southwest Transitway and Woodroffe Avenue VIA Rail crossing is approximately 4 to 5m below surface (McCormick Rankin, 1997). Groundwater between Baseline Station and West Hunt Club ranges between 2-6m below ground surface.

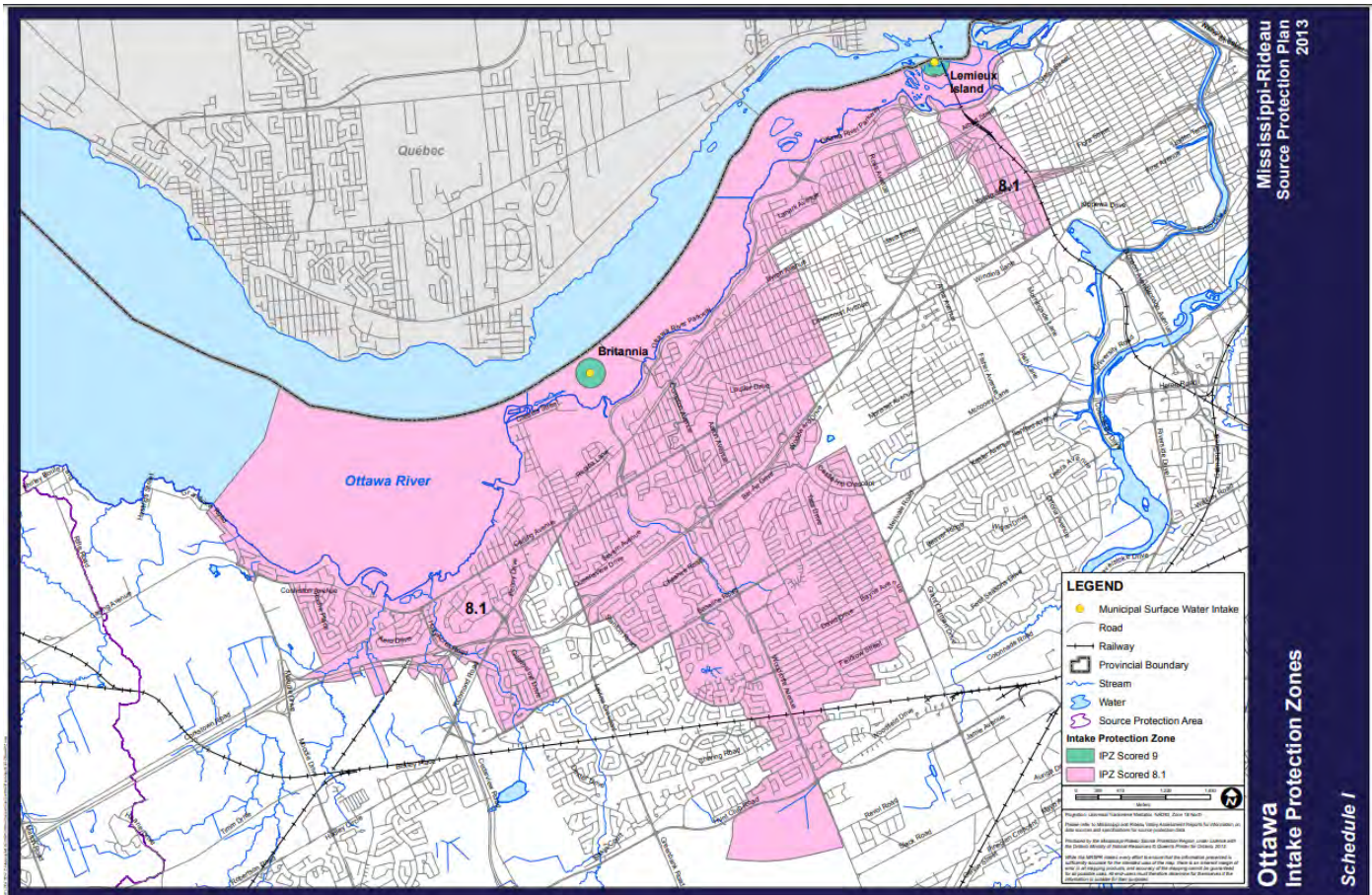
3.5.5 SOURCE PROTECTION AREA

The *Clean Water Act*, 2006 provides the legislative framework for Source Protection in Ontario. The Study Area for the corridor falls within the Rideau Valley Source Protection Area, as described in the Mississippi-Rideau Source Protection Plan (MRSPP) (2020). The Rideau Valley Source Protection Region is 8,500km². Source protection plans exist to protect drinking water across municipal boundaries. The Source Protection plan identifies four vulnerable areas: Intake Protection Zones, Wellhead Protection Areas, Highly Vulnerable Aquifers, and Significant Groundwater Recharge Areas.

3.5.5.1 Intake Protection Area

The Study Area intersects with Intake Protection Zones (IPZ) 2 and 3 with a vulnerability score of 8.1. The northern limits of the Study Area to West Hunt Club are within IPZ-2 (**Figure 3-53**). IPZ-2 extends on the west side of Woodroffe Avenue to just south of Vaan Drive. Areas with an IPZ of 1 and 2 are sensitive and contaminants could reach a drinking water intake pipe at the water treatment plant within, or less than two hours. The vulnerability scoring for these areas is above 8 which means that surface waters in the IPZ-2 areas are more vulnerable to contamination than areas scoring less than 8. Activities that pose a risk to sources of drinking water are prescribed as drinking water threats by Ontario Regulation 287/07 made under the *Clean Water Act*, 2006 and source protection plan policies may apply. The MRSPP was reviewed to determine what, if any policies apply based on the described project. As per Appendix C2, the City of Ottawa implements the following policies applicable to the project and specifically IPZ-2 scored 8.1 areas: SALT-2-LB-S57, FUEL-1-LB-S58, FUEL-6-LB-S57 and FUEL-6-LB-S58.

Figure 3-53 IPZ-2 Area for Ottawa (From Mississippi-Rideau Source Protection Plan, 2020)



Mississippi-Rideau Source Protection Plan 2013

Ottawa Intake Protection Zones

Schedule 1

3.5.5.2 Wellhead Protection Area

The Study Area is not located in a Wellhead Protection Zone.

3.5.5.3 Groundwater Recharge and Vulnerable Aquifers

Portions of the Study Area contain Significant Groundwater Recharge Areas and Highly Vulnerable Aquifers, which are more vulnerable to surface contaminants. Black Rapids Creek is included in both of these areas. Most of the Rideau Valley region contains aquifers of similar vulnerability. The MRSPP was reviewed to determine what, if any policies apply based on the described project. No policies apply within Significant Groundwater Recharge Areas. There are no applicable policies for Highly Vulnerable Aquifers under the “prohibit” policy code according to Appendix C of the MRSPP. Policies for Highly Vulnerable Aquifers under “encourage” as per Appendix C of the MRSPP include: policy SALT-5-NLB, Salt-6-NLB these provide road salt management plans and smart salt practices for Highly Vulnerable Aquifers. Appendix B of the MRSPP was reviewed to determine drinking water threat circumstances and the following applies for the project: the application of road salt in Highly Vulnerable Aquifers is identified as a “low” threat level to drinking water.

3.5.6 CONTAMINATION AND HAZARDOUS MATERIALS

A limited Phase I ESA was completed to support the study. The full report can be found in **Appendix B**.

The primary objective of the limited Phase I ESA is to identify, based on available information and without an intrusive investigation, actual or potential issues of environmental concern which may impact the soil and/or groundwater related to former activities within the Study Area and to identify the need for further ESA activities (i.e., Phase II ESA). The ESA consisted of the following tasks:

- provide a general description of the Study Area consisting of legal description, ownership, zoning, and land use;

- conduct a review of various records pertaining to the Site and surrounding properties;
- conduct a site reconnaissance to make specific observations of the Study Area and the surrounding properties from publicly accessible areas;
- review of historical aerial photographs; and,
- a review of the Ecolog Environmental Risk Information Services (ERIS) report.

Based on the information obtained, 28 individual issues of potential environmental concern related to potential impacts to soil and/or groundwater have been identified within the Study Area and are illustrated in **Figure 3-54, Figure 3-55, Figure 3-56 and Figure 3-57.**

Figure 3-54

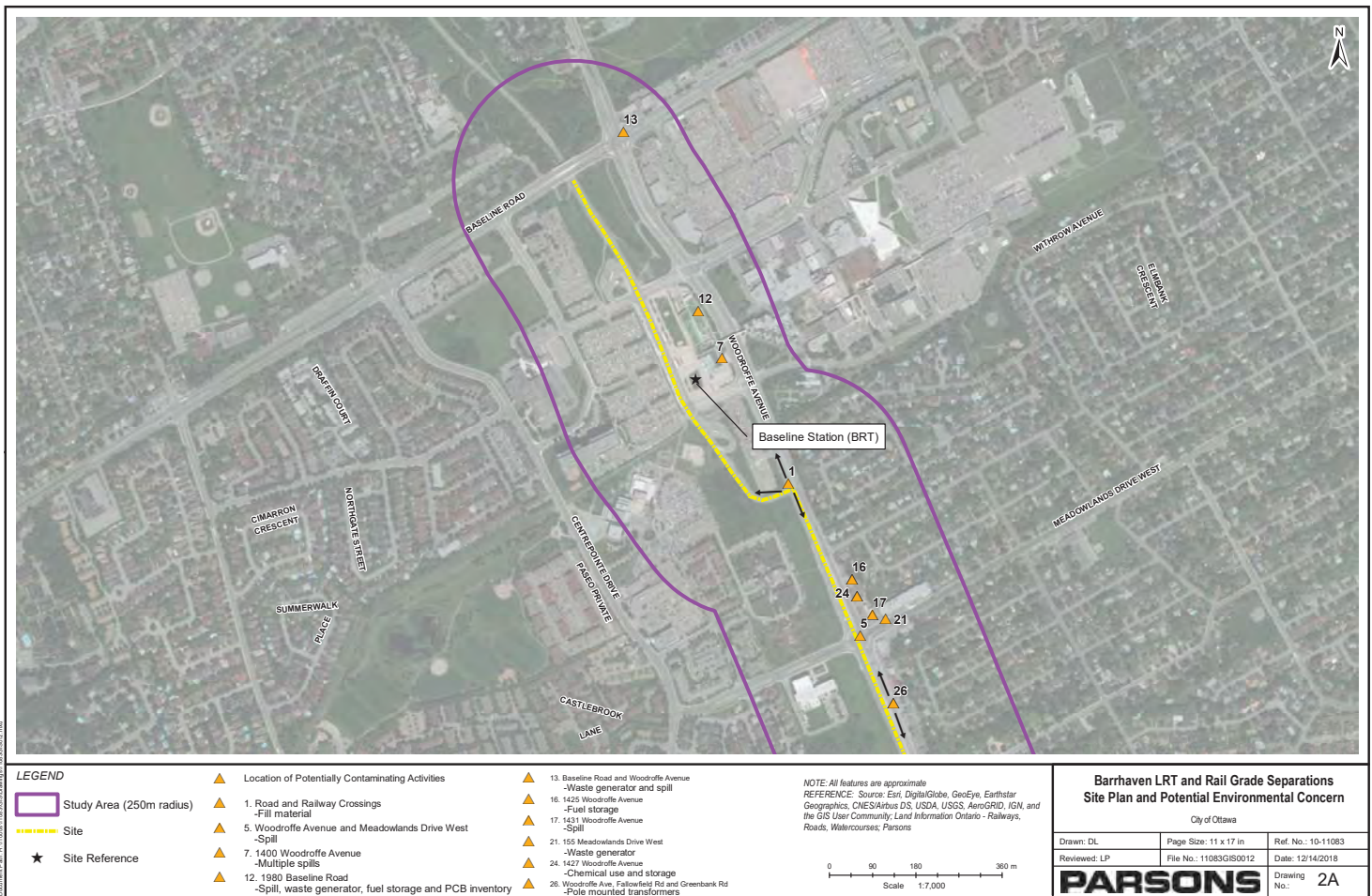
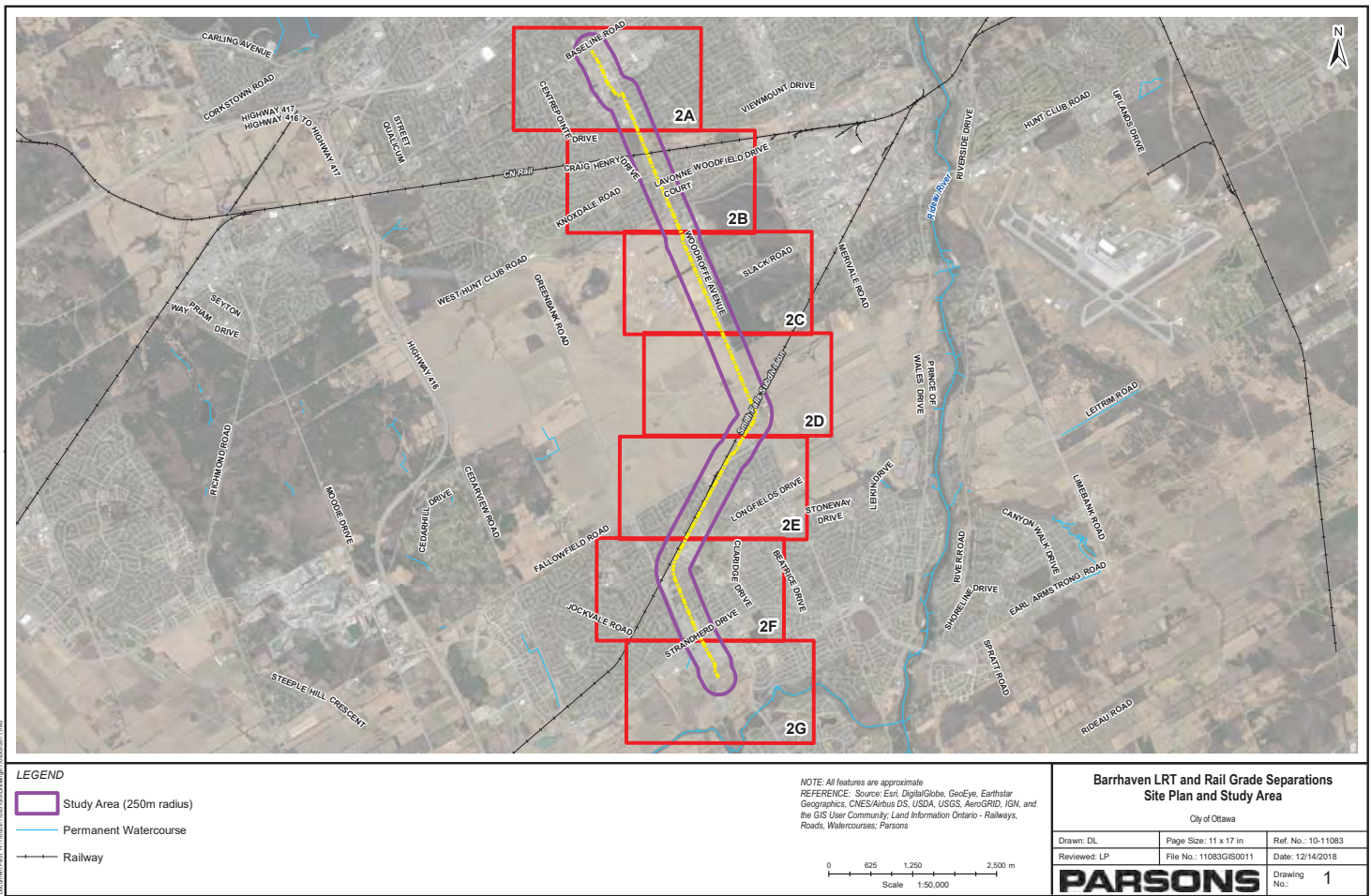


Figure 3 - 55

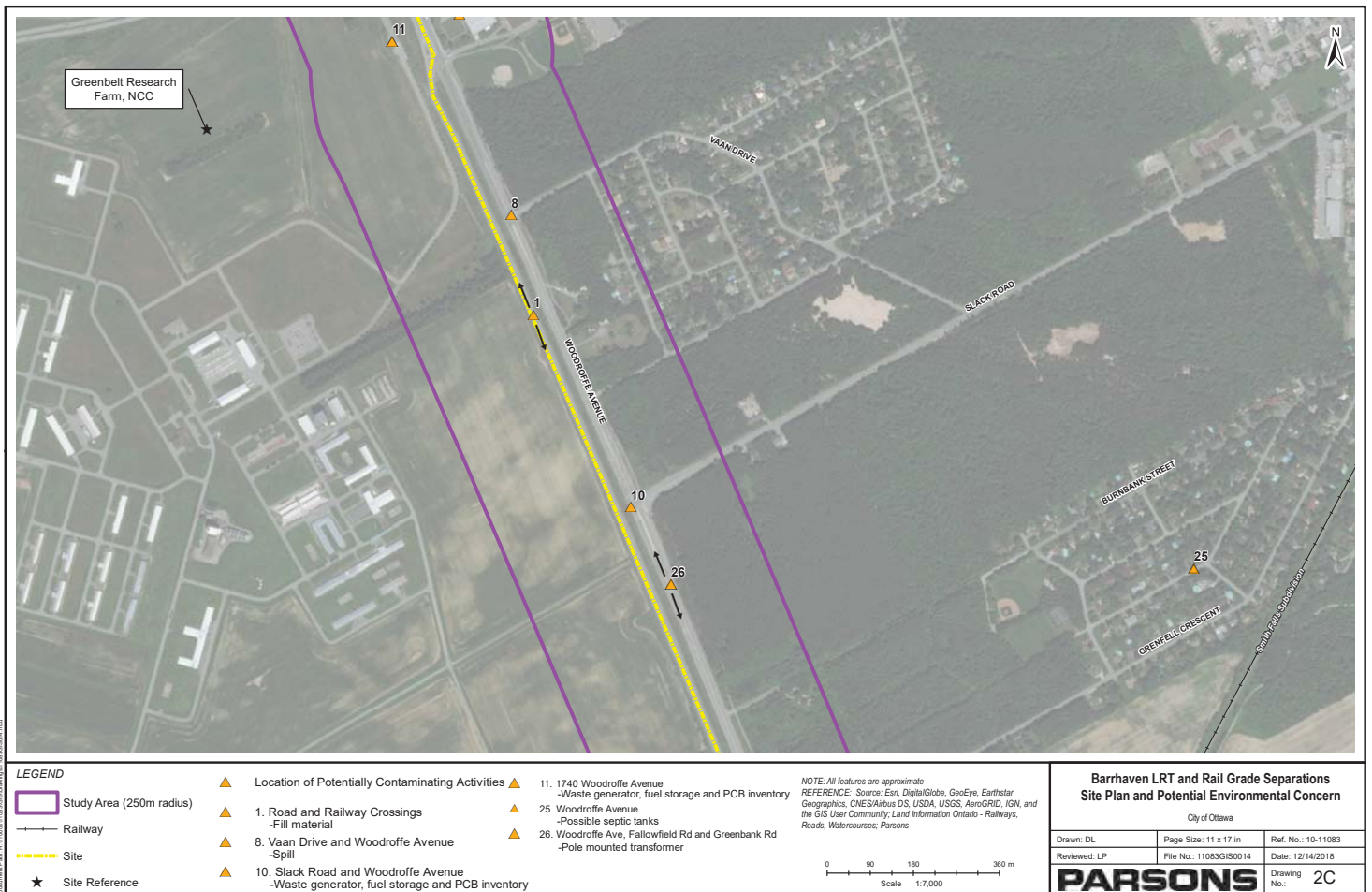
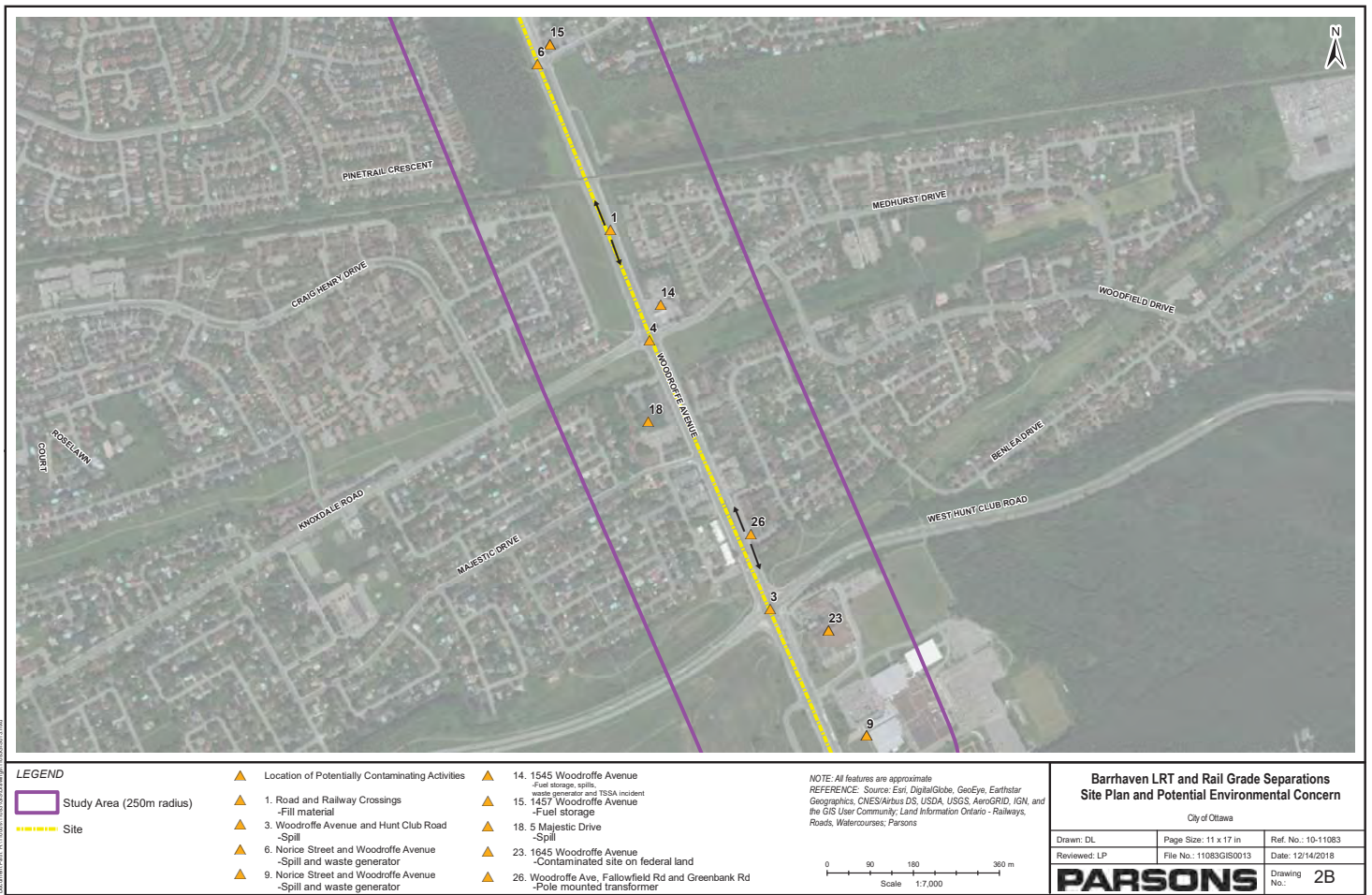


Figure 3 - 56



LEGEND

- Study Area (250m radius)
- Railway
- Site
- ★ Site Reference
- ▲ Location of Potentially Contaminating Activities
- ▲ 1. Road and Railway Crossings
-Fill material
- ▲ 2. Site
-Potential spill and railway
- ▲ 22.3355 Fallowfield Road
-Waste generator
- ▲ 25. Woodroffe Avenue
-Possible septic tanks
- ▲ 26. Woodroffe Ave, Fallowfield Rd and Greenbank Rd
-Pole mounted transformer
- ▲ 27. Woodroffe Avenue and Fallowfield Road railway crossing
-Agricultural properties and pesticides

NOTE: All features are approximate
REFERENCE: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community; Land Information Ontario - Railways, Roads, Watercourses; Parsons

0 90 180 360 m
Scale 1:7,000

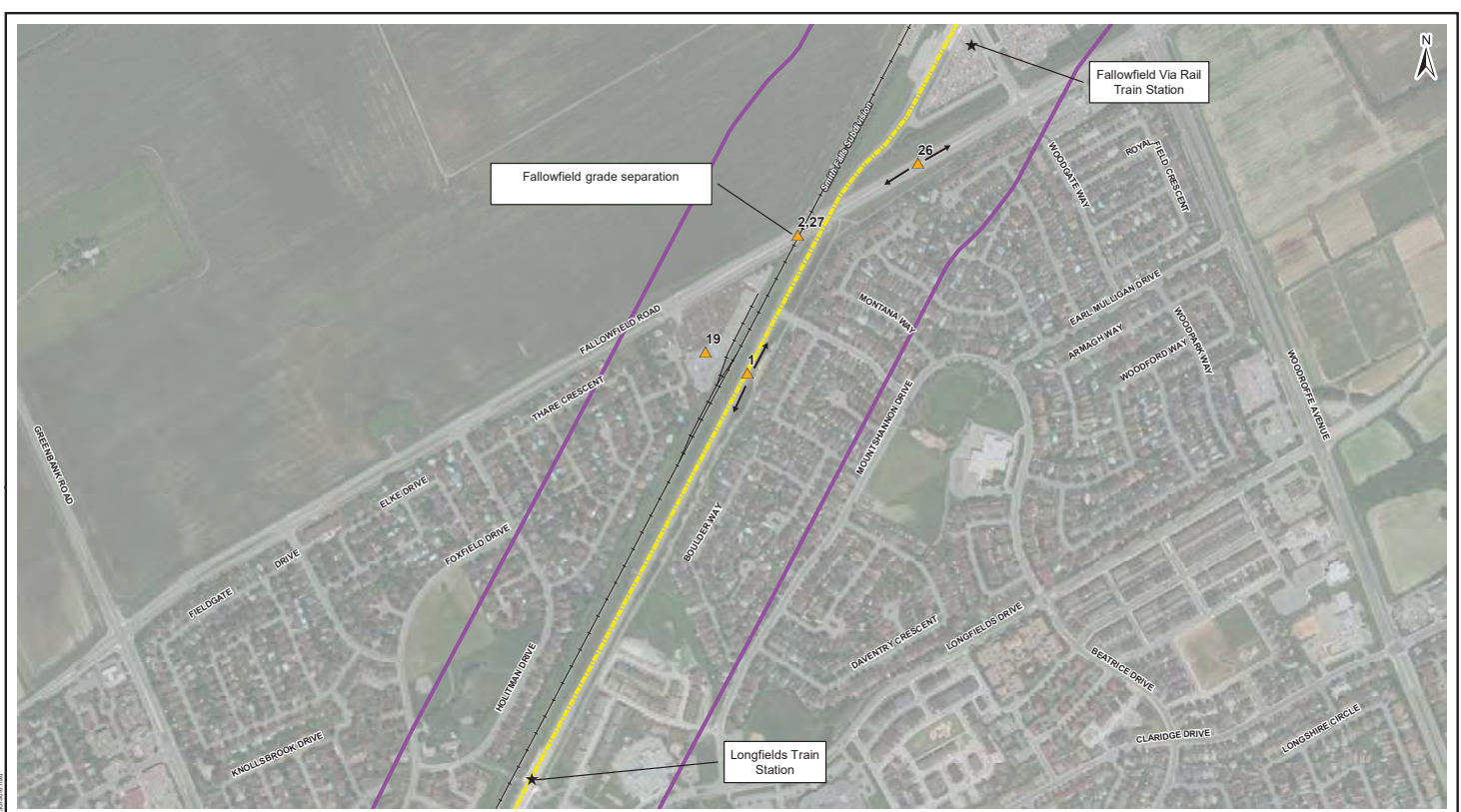
**Barrhaven LRT and Rail Grade Separations
Site Plan and Potential Environmental Concern**

City of Ottawa

<small>Drawn: DL</small>	<small>Page Size: 11 x 17 in</small>	<small>Ref. No.: 10-11083</small>
<small>Reviewed: LP</small>	<small>File No.: 11083GIS0015</small>	<small>Date: 12/14/2018</small>

PARSONS

Drawing No.: **2D**



LEGEND

- Study Area (250m radius)
- Railway
- Site
- ★ Site Reference
- ▲ Location of Potentially Contaminating Activities
- ▲ 1. Road and Railway Crossings
-Fill material
- ▲ 2. Railway Tracks
-Potential spill
- ▲ 19. 3500 Fallowfield Road
-Spill
- ▲ 26. Woodroffe Ave, Fallowfield Rd and Greenbank Rd
-Pole mounted transformers
- ▲ 27. Woodroffe Avenue and Fallowfield Road railway crossing
-Pad mounted transformers

NOTE: All features are approximate
REFERENCE: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community; Land Information Ontario - Railways, Roads, Watercourses; Parsons

0 90 180 360 m
Scale 1:7,000

**Barrhaven LRT and Rail Grade Separations
Site Plan and Potential Environmental Concern**

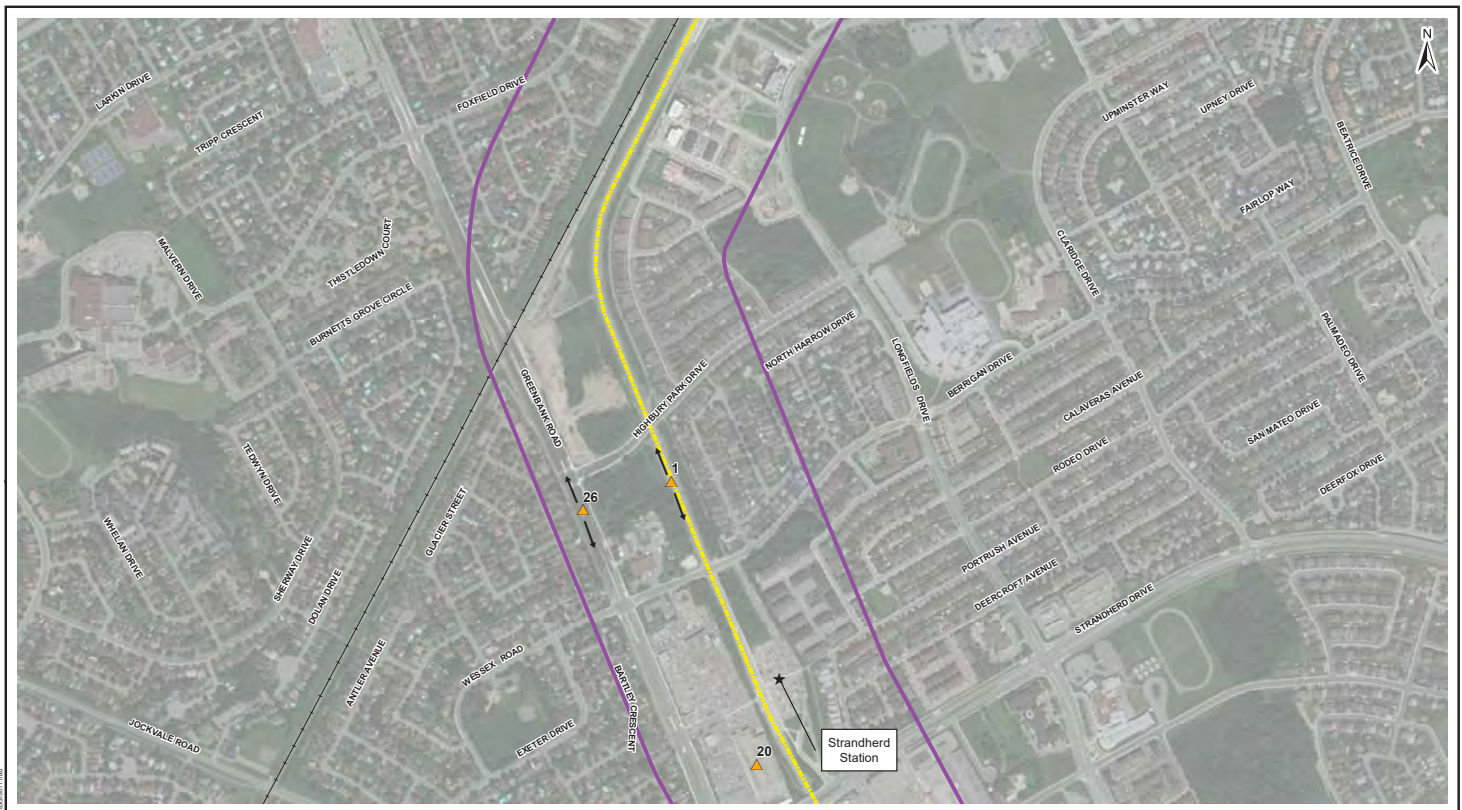
City of Ottawa

<small>Drawn: DL</small>	<small>Page Size: 11 x 17 in</small>	<small>Ref. No.: 10-11083</small>
<small>Reviewed: LP</small>	<small>File No.: 11083GIS0016</small>	<small>Date: 12/14/2018</small>

PARSONS

Drawing No.: **2E**

Figure 3 - 57



LEGEND

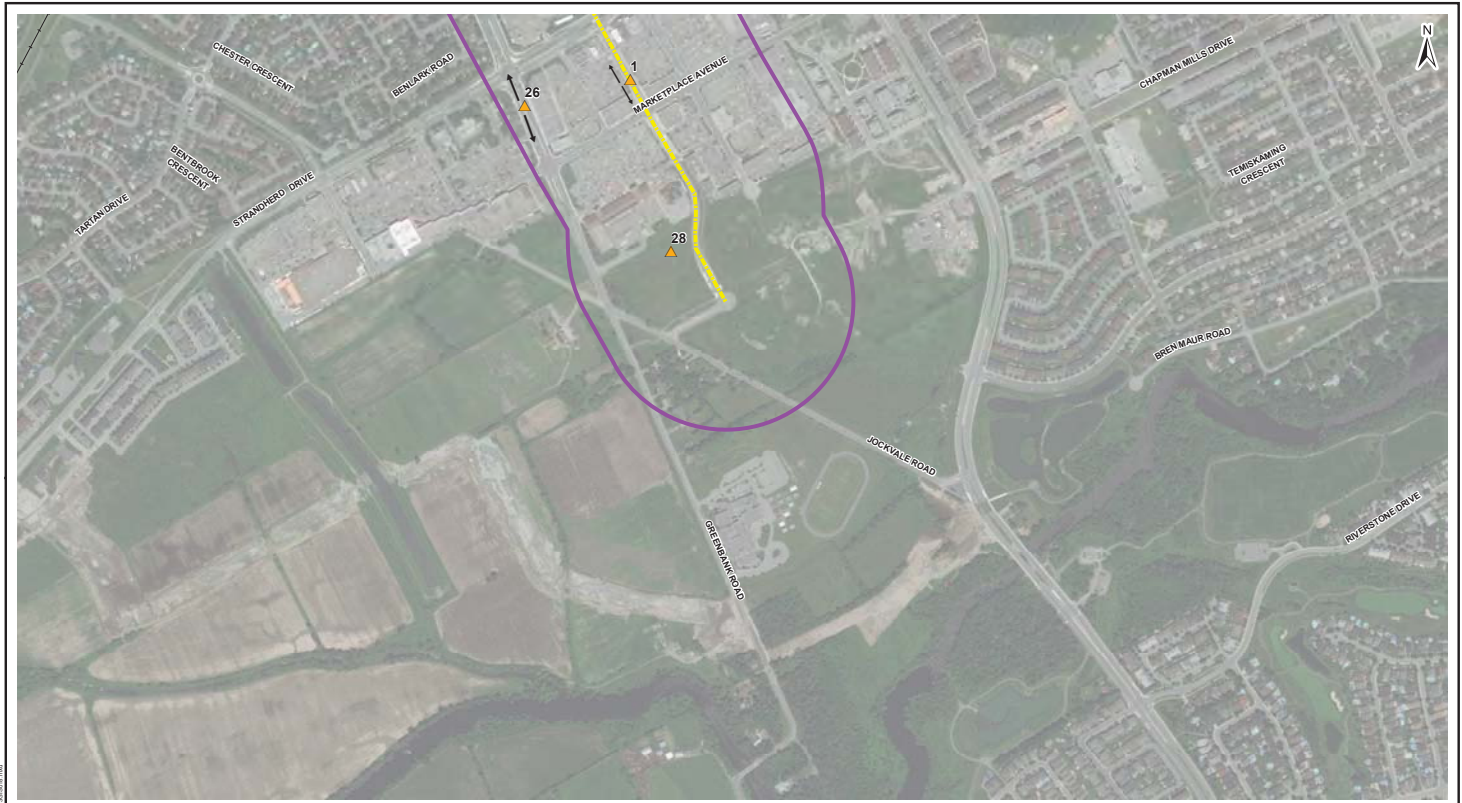
- Study Area (250m radius)
- Railway
- Site
- Site Reference
- Location of Potentially Contaminating Activities
- 1. Road and Railway Crossings
-Fill material
- 20. 2501 Greenbank Road
-Fuel storage, waste generator, spill
- 26. Woodroffe Ave, Fallowfield Rd and Greenbank Rd
-Pole mounted transformers

NOTE: All features are approximate
REFERENCE: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community; Land Information Ontario - Railways, Roads, Watercourses; Parsons

0 90 180 360 m
Scale 1:7,000

**Barrhaven LRT and Rail Grade Separations
Site Plan and Potential Environmental Concern**
City of Ottawa

Drawn: DL	Page Size: 11 x 17 in	Ref. No.: 10-11083
Reviewed: LP	File No.: 11083GIS0017	Date: 12/14/2018
PARSONS		Drawing No.: 2F



LEGEND

- Study Area (250m radius)
- Railway
- Site
- Location of Potentially Contaminating Activities
- 1. Road and Railway Crossings
-Fill material
- 26. Woodroffe Ave, Fallowfield Rd and Greenbank Rd
-Pole mounted transformers
- 28. South of Marketplace bus station
-Mounds of soil

NOTE: All features are approximate
REFERENCE: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community; Land Information Ontario - Railways, Roads, Watercourses; Parsons

0 90 180 360 m
Scale 1:7,000

**Barrhaven LRT and Rail Grade Separations
Site Plan and Potential Environmental Concern**
City of Ottawa

Drawn: DL	Page Size: 11 x 17 in	Ref. No.: 10-11083
Reviewed: LP	File No.: 11083GIS0018	Date: 12/14/2018
PARSONS		Drawing No.: 2G

3.5.7 INFRASTRUCTURE AND UTILITIES

This section summarizes the existing municipal infrastructure and utilities within the Study Area. The documents reviewed to summarize the existing conditions include the City of Ottawa *Utility Coordinating Committee drawings* (UCC) and the 2013 *Infrastructure Master Plan* (IMP). The UCC drawings provide the location and description of existing infrastructure (sanitary sewers, storm sewers, culverts, watermains) and of existing utilities (gas, hydro, telecommunications). The 2013 IMP provides information on future infrastructure works planned within the Study Area.

During the course of finalizing this study the City of Ottawa has begun developing a new IMP. The information provided in this section remains the basis for subsequent evaluation and development of the Recommended Plan therefore, it remains unchanged. Discussion of the new IMP and its influence on the project or process is documented in **Section 6.8**.

The Study Area is divided in three sections with respect to infrastructures and utilities. Two of these sections are fully serviced by sewer/water infrastructure and public utilities. The first is located between Baseline Road and West Hunt Club Road; the second is located between Fallowfield Road to Jockvale Road. The third section, the Greenbelt located between West Hunt Club Road and Fallowfield Road, is partially serviced.

3.5.7.1 Water Distribution Network

3.5.7.1.1 Existing Water Distribution Network

The water distribution network in the Study Area includes backbone watermains, feeder mains, and local distribution watermains. The Study Area is divided in two pressure zones named 2W2C (formerly 2W) and 3SW (formerly named BARR). The Study Area is fully supplied by the municipal water distribution network except for the Greenbelt area between Pineland Avenue and Fallowfield Road. This includes the communities of Grenfell Glen and Merivale Gardens which are located on private well service.

The backbone watermains are the primary suppliers of water within a pressure zone. In the Study Area, they vary in sizes from 406mm diameter up to 1220mm diameter. They are listed in **Table 3-10** and shown on **Figure 3-58**, **Figure 3-59** and **Figure 3-60** below.

Table 3-10 Backbone Watermains in the Study Area

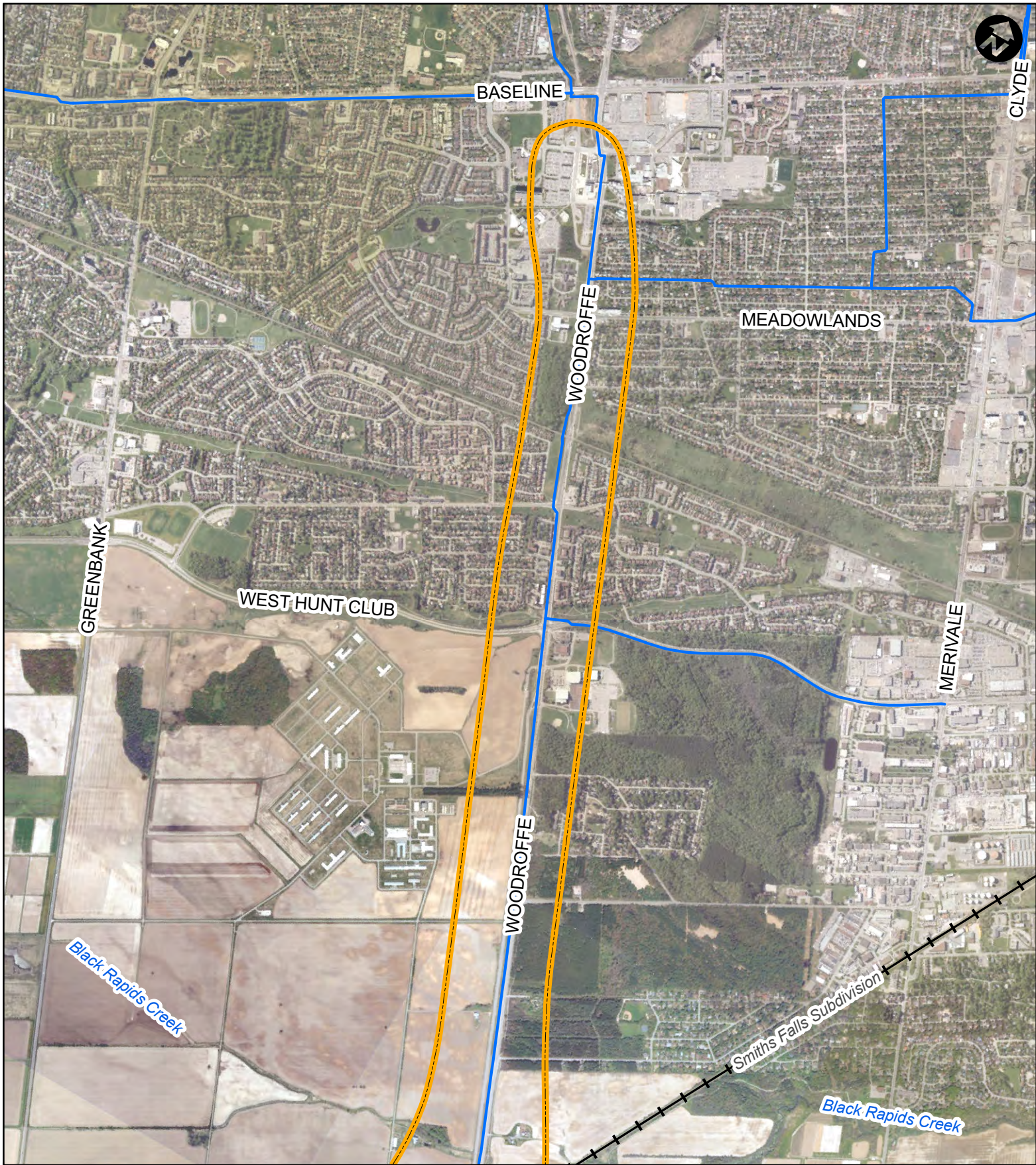
Location/Intersection	Parallel/Perpendicular	Diameter (mm)	Material	Year Installed
Woodroffe Avenue, from Baseline Road to South of Fallowfield Road	Parallel (perpendicular in some areas)	1220	Concrete	1978
Woodroffe Avenue/David Street	Perpendicular	600	Concrete	1974
Woodroffe Avenue/West Hunt Club Road	Perpendicular	600	Concrete	2011
Transitway/ Fallowfield Road	Perpendicular	762	Concrete	1978
Fallowfield Road, from Woodroffe Avenue to Greenbank Road	Parallel	762	Concrete	1978
Transitway/South of Longfields Station	Perpendicular	600	Concrete	2014
Jockvale Road/Transitway (1)	Perpendicular	406	Concrete	1993
Jockvale Road/Transitway (2)	Perpendicular	406	Concrete	2001

3.5.7.1.2 Future Water Distribution Projects


The 2013 IMP has identified one growth-related water project in the Study Area: Greenbank Road Watermain (Project ID S-04). This project involves the construction of a 610mm watermain along Greenbank Road from North of Jockvale to South of the Jock River to replace the twin 406mm diameter watermains on Jockvale Road (numbered 1 and 2 in the above table). The project is pending funding; it is not expected to start construction in the near future unless developers front end the cost of the works.

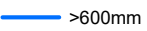
Feeder Main (watermain) Relocation

Currently, there is a large 1220mm feeder main (watermain) that runs in the Woodroffe Avenue corridor from Baseline Road to Fallowfield Road, generally under the southbound lanes. This is a vital water distribution line to the Barrhaven community. As proposed in the 2015 preliminary feeder main replacement design option, the watermain is planned to be relocated to the northbound lanes to allow the watermain to be constructed while leaving the existing watermain in working condition during construction.



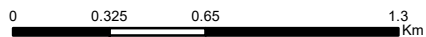
Legend

 Study Area

 Pipe Diameter >600mm


Barrhaven Light Rail Transit
 (Baseline Station to Barrhaven Town Centre)
 Planning and Environmental Assessment Study

Watermain

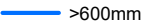




Legend

 Study Area

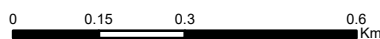
Pipe Diameter

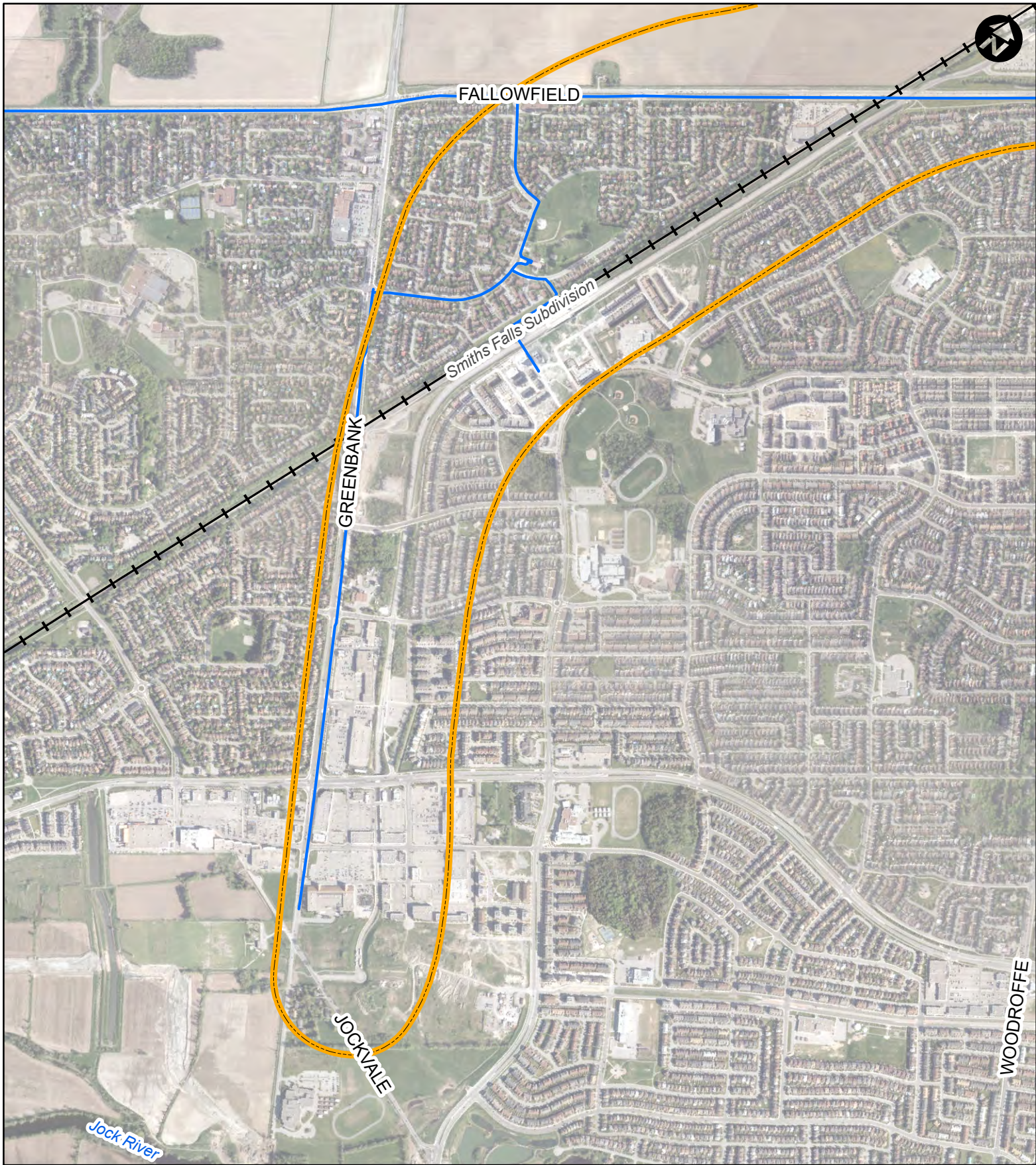
 >600mm

Barrhaven Light Rail Transit
 (Baseline Station to Barrhaven Town Centre)


Planning and Environmental Assessment Study

Watermain

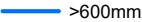




Legend

 Study Area

Pipe Diameter

 >600mm

Barrhaven Light Rail Transit
 (Baseline Station to Barrhaven Town Centre)
Planning and Environmental Assessment Study

0 0.2 0.4 0.8
 Km

Watermain



3.5.7.2 Wastewater Collection System

3.5.7.2.1 Existing Wastewater Collection System

The wastewater collection system includes collector (trunk) sanitary sewers, a forcemain and local sanitary sewers. The Study Area is fully serviced by the municipal wastewater collection system except for the Greenbelt area between Nepean Sportsplex and Fallowfield Road. This includes the communities of Grenfell Glen and Merivale Gardens, which are located on private septic services.

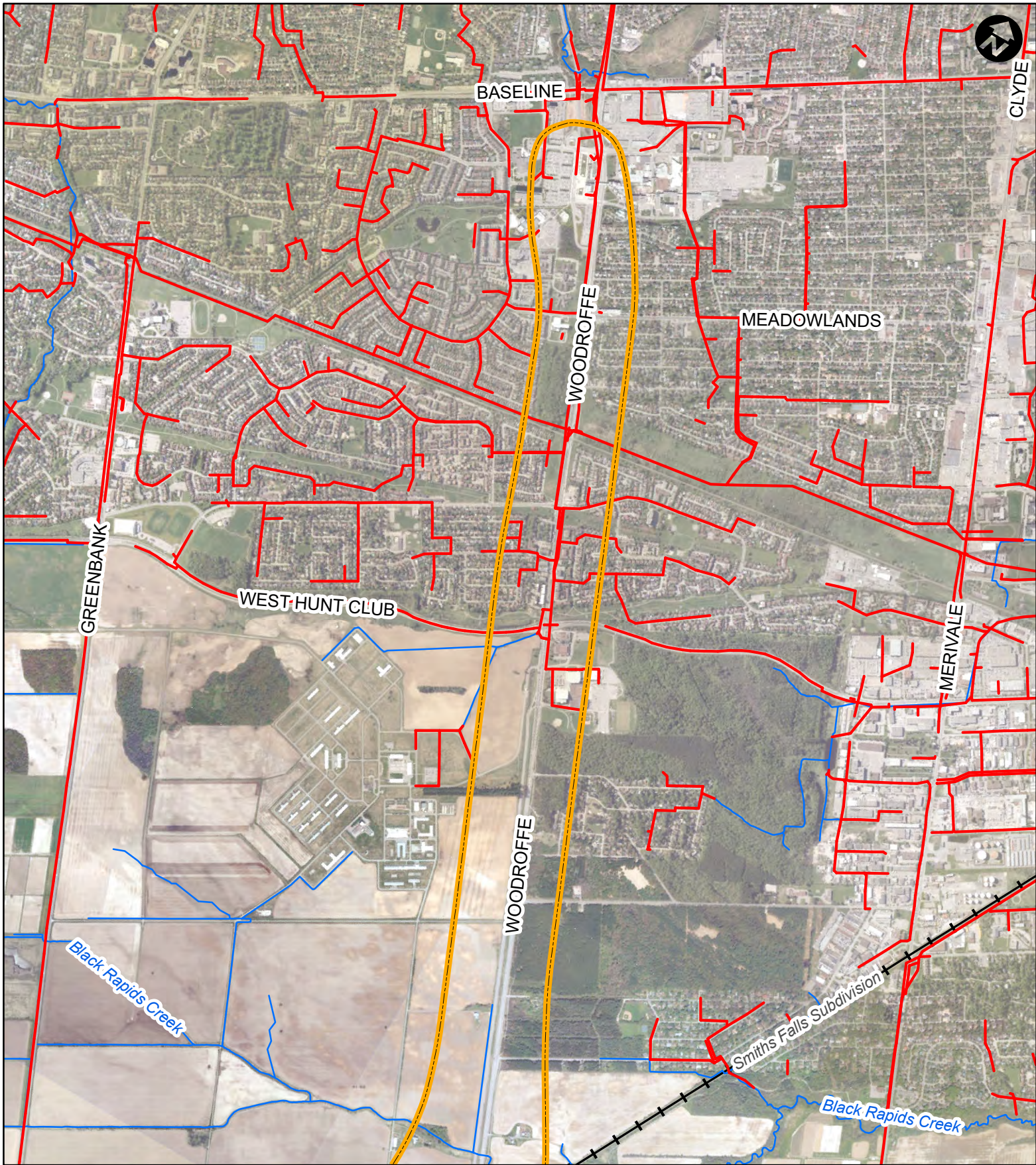
The collector sanitary sewers vary in size from 600mm diameter to 2250mm. The collectors and the forcemain are listed in **Table 3-11** and shown in **Figure 3-61**, **Figure 3-62** and **Figure 3-63** below.

Table 3-11 Sanitary Collectors and Forcemain in the Study Area




Location/Intersection	Collector/Forcemain Name	Parallel/Perpendicular	Diameter (mm)	Material	Year Installed
Woodroffe Avenue, from north of Baseline Road to Norice Street	Woodroffe Diversion Forcemain	Parallel	600	Polyvinyl Chloride	1999
Woodroffe Avenue, from Norice Street to CN Railway	Woodroffe Diversion Sewer	Parallel	675	Concrete	1999
Woodroffe Avenue/CN Rail	Lynwood Collector	Perpendicular	2250	Reinforced Concrete	1981
Woodroffe Avenue, from CN Rail to north of West Hunt Club Road	South Woodroffe Trunk	Parallel	750	Concrete	1974
Woodroffe Avenue/Knoxdale Dr.		Perpendicular	750	Concrete	1974
Woodroffe Avenue/Knoxdale Dr.		Perpendicular	600	Polyvinyl Chloride	1999
Woodroffe Avenue/260m south of Knoxdale Dr.		Perpendicular	525	Concrete	1973
Transitway / Henfield Avenue to Via Verona Avenue	Barrhaven Trunk	Perpendicular	750	Concrete Pressure Pipe	1975

3.5.7.2.2 Future Wastewater Collection Projects

The 2013 IMP has not identified any expansion or replacement projects for major sanitary sewers within the Study Area. Local sewer system extensions are anticipated as development intensifies.




Legend

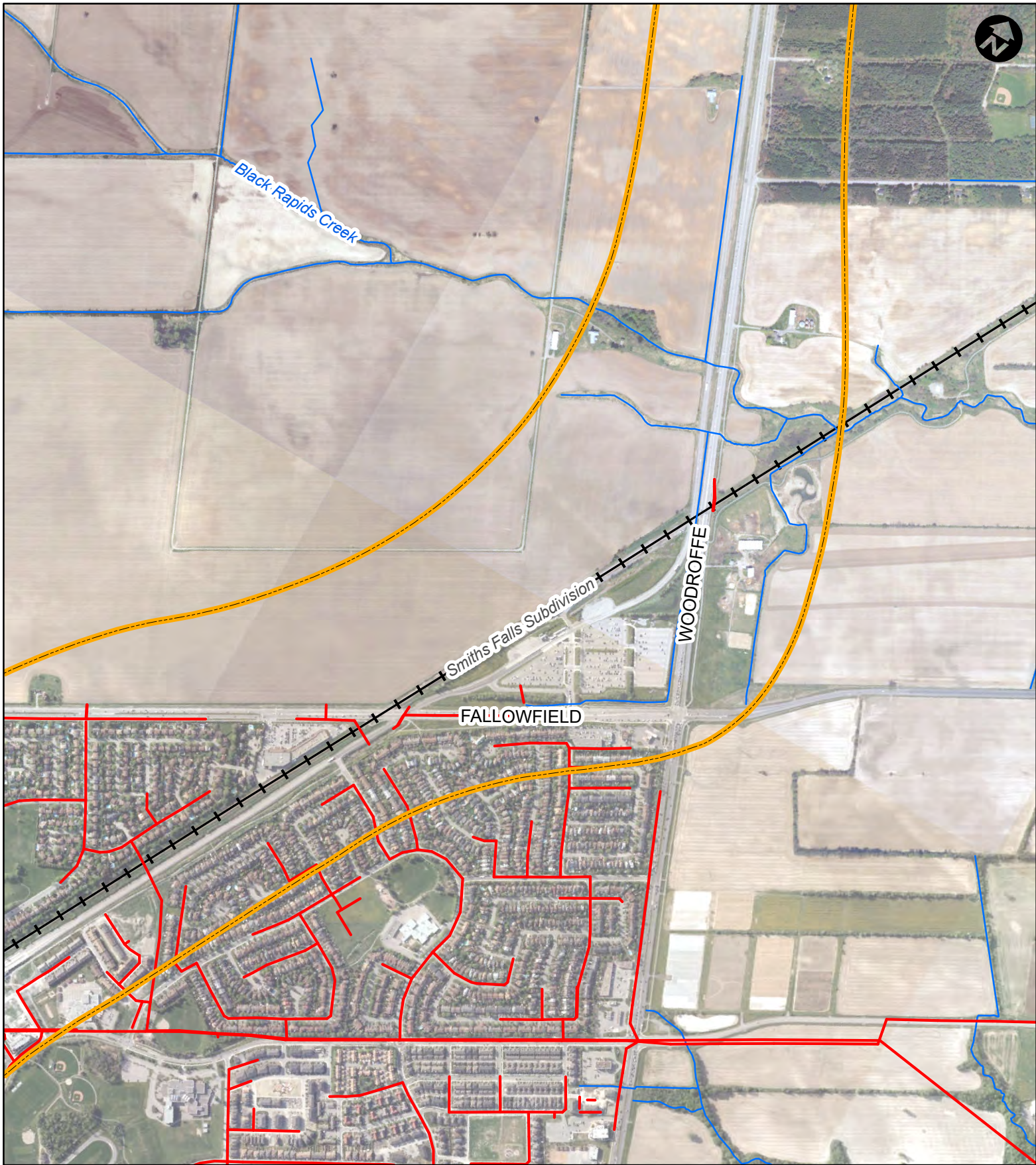
-  Study Area
- Pipe Diameter**
-  >525 mm
-  Watercourse

Barrhaven Light Rail Transit
 (Baseline Station to Barrhaven Town Centre)
Planning and Environmental Assessment Study

0 0.325 0.65 1.3
 Km

Sanitary Pipes





Legend

Study Area

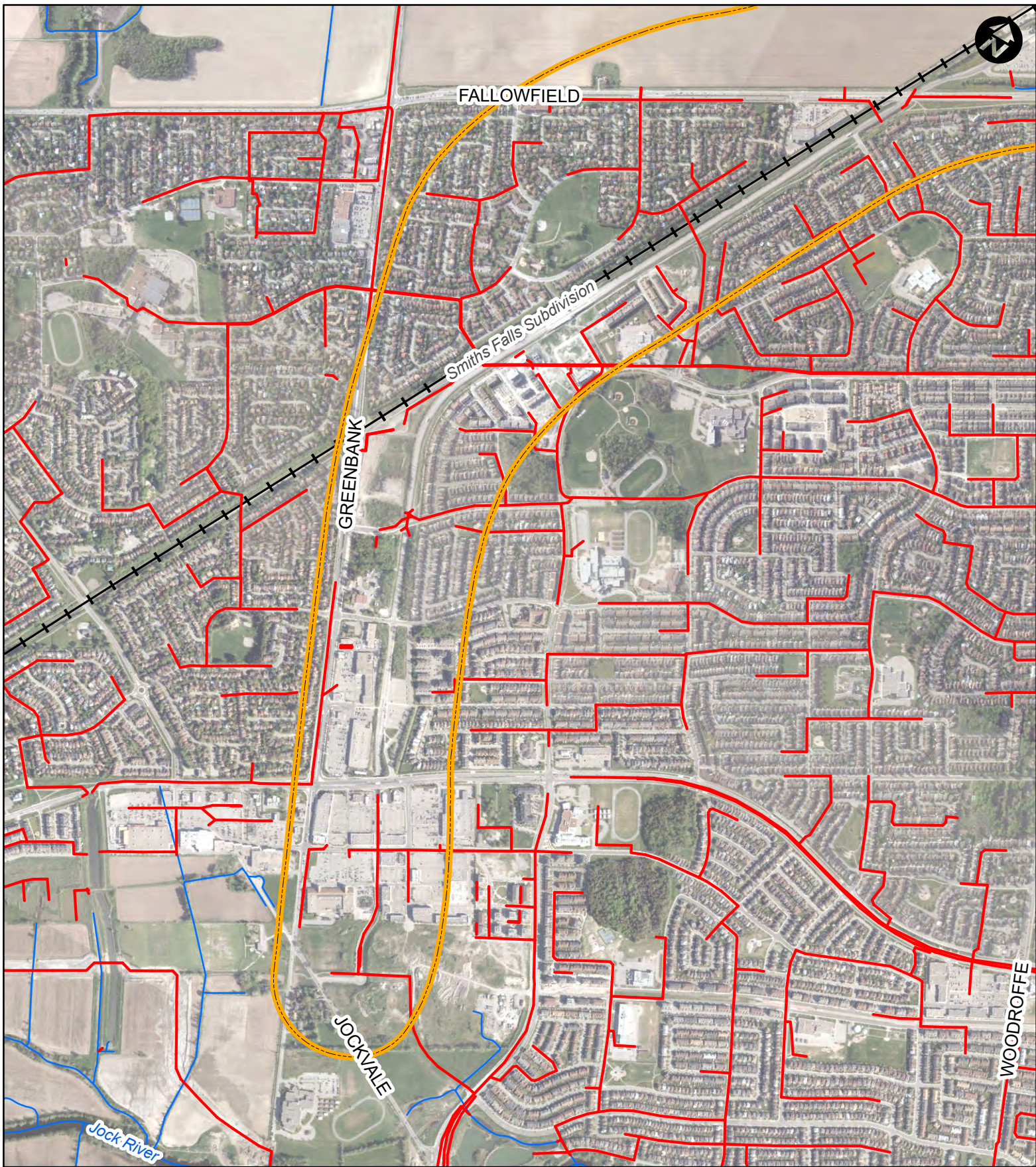
Pipe Diameter
— >525 mm
— Watercourse

Barrhaven Light Rail Transit
 (Baseline Station to Barrhaven Town Centre)

Planning and Environmental Assessment Study

0 0.15 0.3 0.6
 Km

Sanitary Pipes



Legend

- Study Area
- Pipe Diameter**
- >525 mm
- Watercourse

Barrhaven Light Rail Transit
(Baseline Station to Barrhaven Town Centre)

Planning and Environmental Assessment Study

0 0.2 0.4 0.8
Km

Sanitary Pipes

3.5.7.3 Stormwater Collection System

The stormwater collection system in the Study Area includes collector storm sewers, local storm sewers, a stormwater management pond (SWM pond), box culverts and culverts. The Study Area is fully serviced by the municipal stormwater collection system except for the Greenbelt area between south of Nepean Sportsplex and Fallowfield Road. This includes the communities of Grenfell Glen and Merivale Gardens which contain rural stormwater management including ditches.

Black Rapids Creek crosses the existing Southwest Transitway with a series of box culverts ranging in sizes from 1800mm x 3600mm to 2400mm x 3600mm.

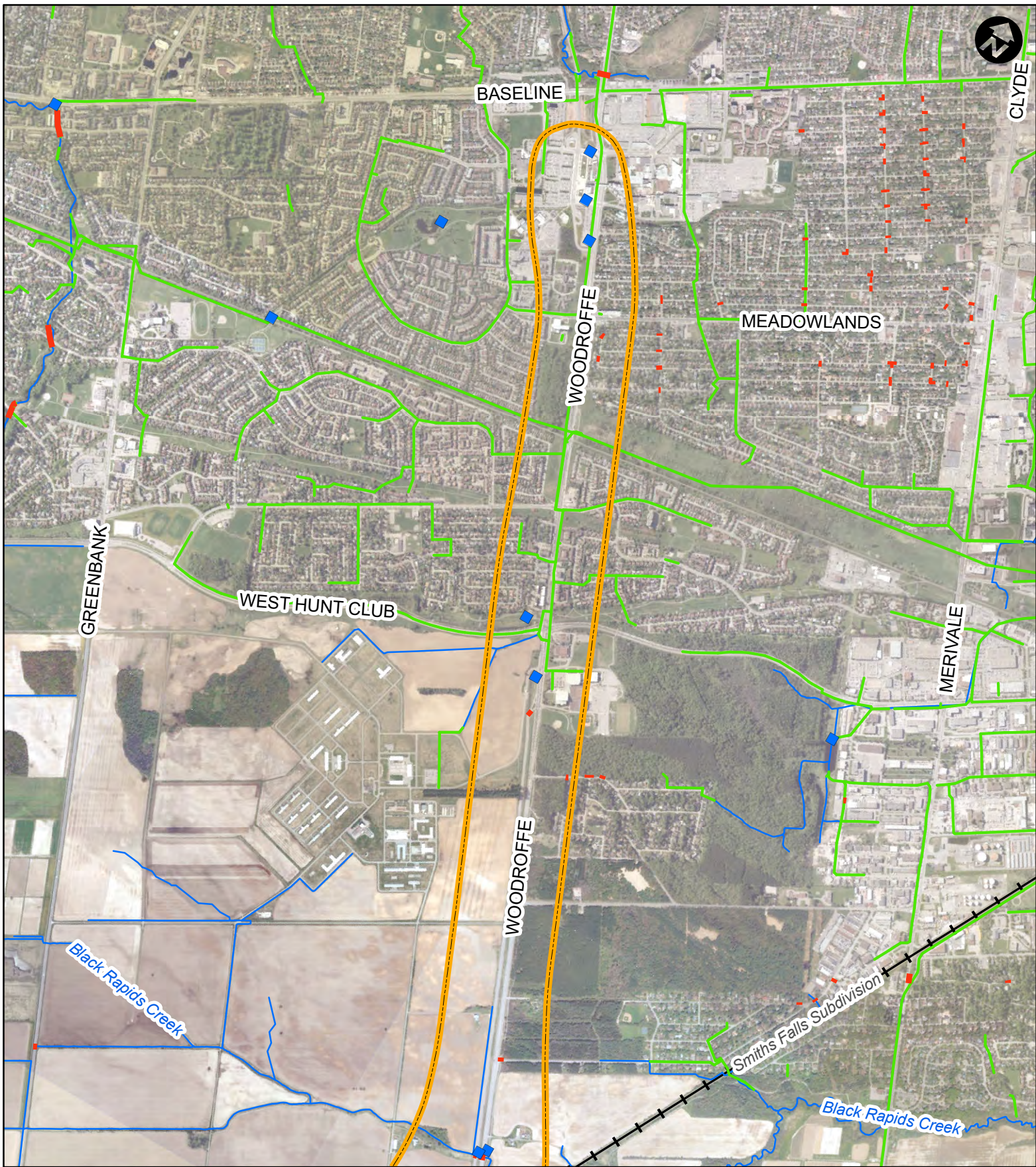
The collector storm sewers through the serviced areas vary in sizes from 750mm diameter up to 2400mm diameter. The local roadways are serviced with smaller storm sewers (300mm-600mm) and runoff is captured through a series of catch basins and maintenance holes. The collectors are listed in **Table 3-12** and shown in **Figure 3-64**, **Figure 3-65** and **Figure 3-66** below.

Table 3-12 Stormwater Collectors in the Study Area

Location/Intersection	Parallel/Perpendicular	Diameter (mm)	Material	Year Installed
Woodroffe Avenue, from Knoxdale Road to Pinecrest Creek (north of Baseline Rd)	Parallel	2400	Concrete	1974
Woodroffe Avenue/Tallwood Dr.	Perpendicular	2100	Concrete	1985
Woodroffe Avenue, from Crestlea Crescent to Knoxdale Road	Parallel	1800	Concrete	1974
Woodroffe Avenue, from Nepean Sportsplex to Crestlea Crescent	Parallel	1200	Concrete	1974
Woodroffe Avenue/260m south of Knoxdale Dr.	Perpendicular	1800	Concrete	1973
Woodroffe Avenue/Majestic Drive	Perpendicular	900	Concrete	1972
Woodroffe Avenue/75m north of Hunt Club Road	Perpendicular	1800 (1200 lined)	Concrete	1974
Woodroffe Avenue/70m south of West Hunt Club Road	Perpendicular	900 (twin)	Concrete	1993
Transitway/Blacks Creek north crossing	Perpendicular	2400 x 3600	Concrete	-
Woodroffe Avenue/Blacks Creek north crossing	Perpendicular	2400 x 3600	Concrete	-
Transitway /Blacks Creek south crossing	Perpendicular	1800 x 3600	Concrete	-
Woodroffe Avenue /Blacks Creek south crossing	Perpendicular	1800 x 3600	Concrete	-
Transitway/Fallowfield Road	Perpendicular	525 (twin)	Polyvinyl Chloride	2005
Transitway/between Cobb Court and Mountshannon Drive	Perpendicular	1350	Concrete	1974
Transitway/between Foxhill Way and Via Verona Avenue	Perpendicular	2250	Concrete	1975
Transitway, from SWM pond to between Foxhill Way and Via Verona Avenue	Parallel	750	Concrete	2014
Transitway, from Strandherd Drive to Jockvale Road	Parallel	Varies from 975 to 1350	Concrete	2010
Transitway/Marketplace Avenue	Perpendicular	1050	Concrete	2002
Transitway, from Jockvale Road to east of transitway	Parallel	Varies from 1500 to 1650	Concrete	2010

3.5.7.3.1 Future Stormwater/Drainage Projects

The 2013 IMP does not identify any expansion or replacement projects for major storm sewers or stormwater management facilities within the Study Area. Local sewer system extensions are anticipated as development intensifies.



Legend

- SWM Facilities
- Culvert
- Study Area

Pipe Diameter

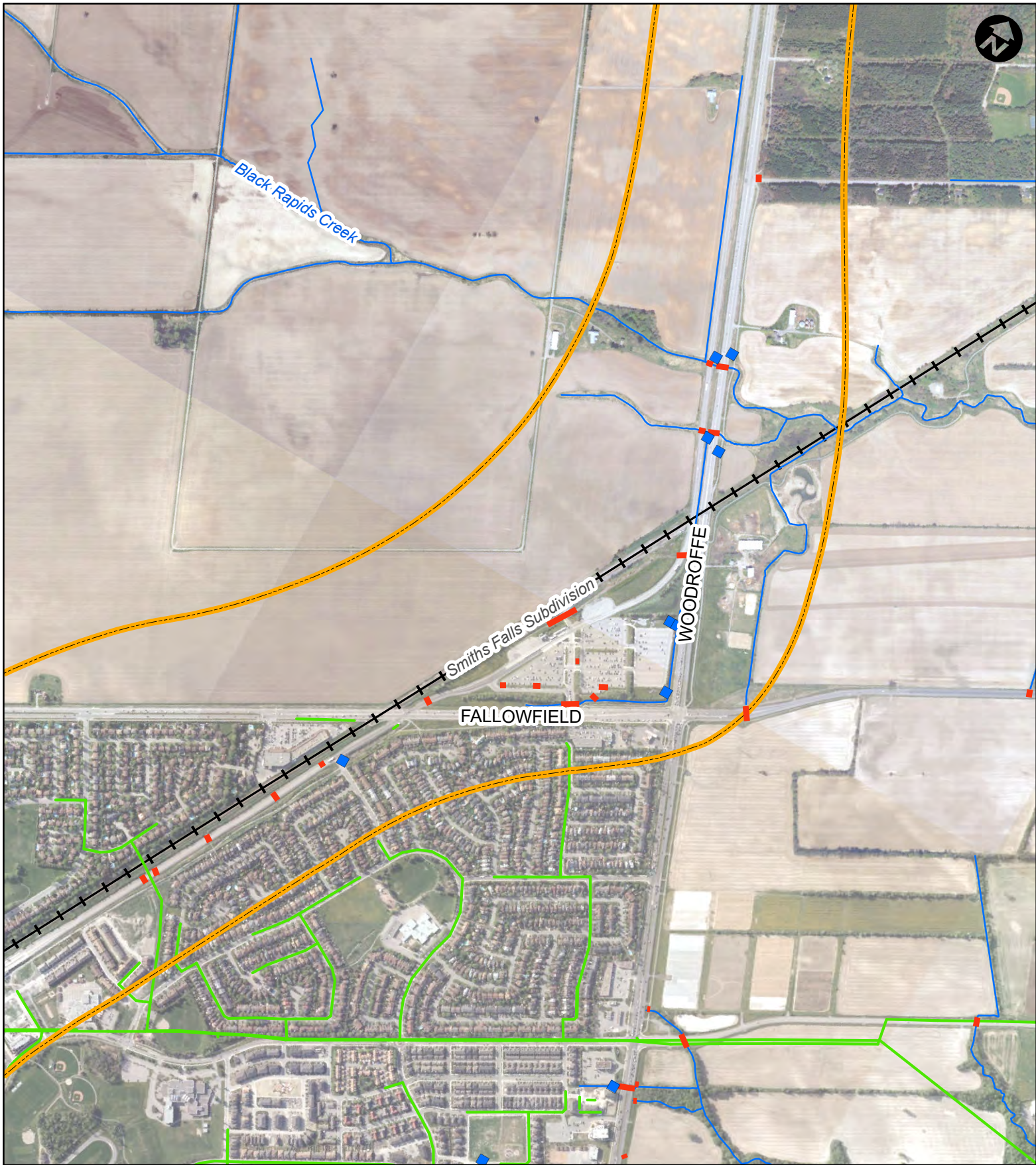
- >750mm
- Watercourse

Barrhaven Light Rail Transit
(Baseline Station to Barrhaven Town Centre)

Planning and Environmental Assessment Study

0 0.325 0.65 1.3
Km

Storm Pipes



Legend

- SWM Facilities
- Culvert
- Study Area

Pipe Diameter

- >750mm
- Watercourse

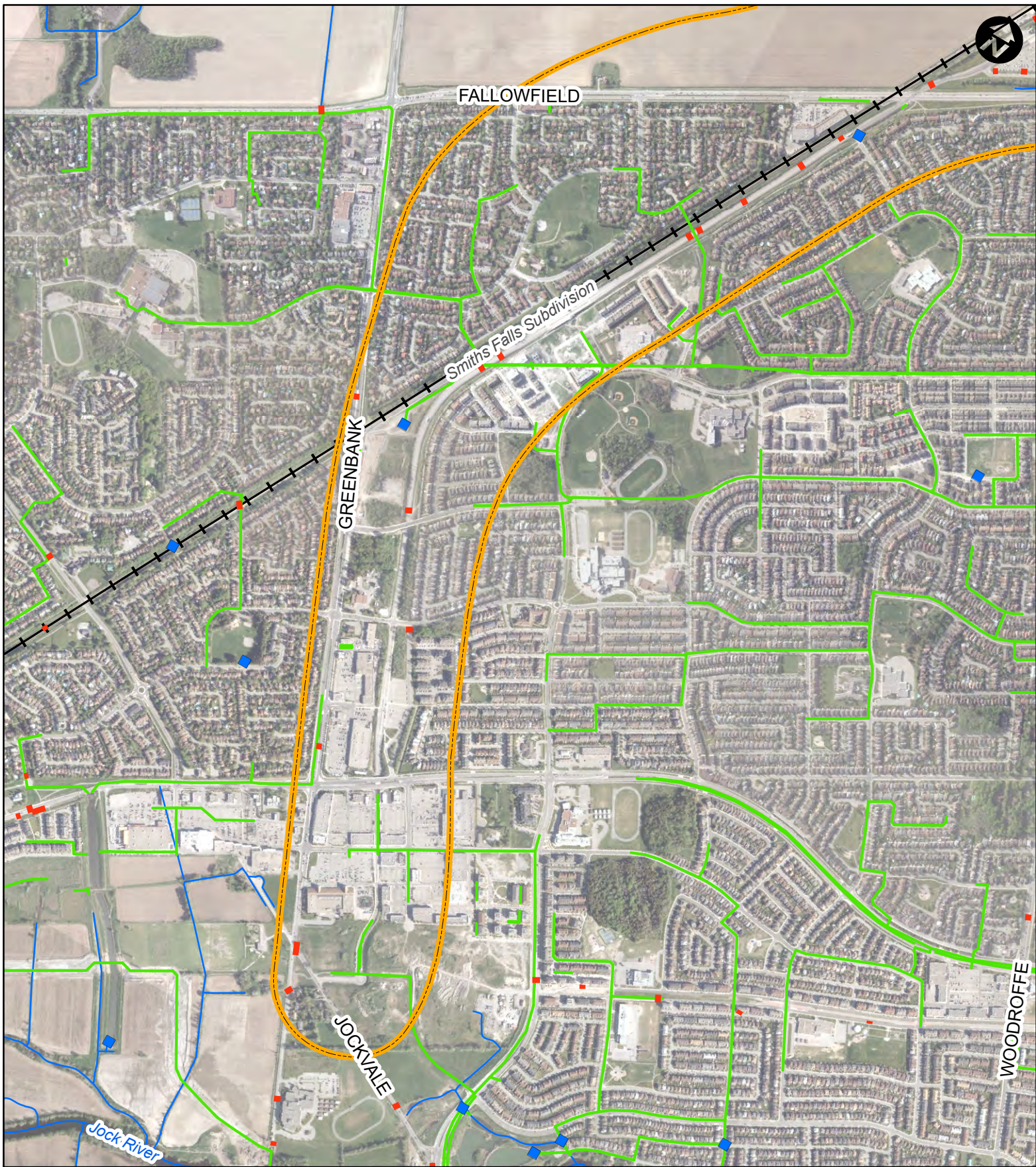
Barrhaven Light Rail Transit
(Baseline Station to Barrhaven Town Centre)

Planning and Environmental Assessment Study






0 0.15 0.3 0.6
Km

Storm Pipes

Ottawa PARSONS



Legend

 Study Area	Pipe Diameter
 SWM Facilities	 >750mm
 Culvert	
 Watercourse	

Barrhaven Light Rail Transit
 (Baseline Station to Barrhaven Town Centre)
Planning and Environmental Assessment Study

0 0.2 0.4 0.8
 Km

Storm Pipes



3.5.7.4 Gas Distribution

Enbridge Gas distributes gas in the Study Area except in the Greenbelt (where no service is provided) between West Hunt Club Road and Fallowfield Road. The gas pipes vary in size from 35mm diameter to 300mm diameter. A 300mm diameter vital gas main is located within Fallowfield Road Right-of-Way under the westbound lanes. Vital gas mains are critical to the gas distribution system. These gas mains are typically more costly to relocate due to their size and operating pressure. There are plans for the extension of a 20"-24" (50 - 60cm) extra high-pressure vital gas main along the north side of West Hunt Club from Greenbank Road to Prince of Wales Drive which will cross Woodroffe Avenue. This work is planned for in the 2020-2025 timeframe.

3.5.7.5 Electricity Distribution

In the Study Area, electricity is distributed either underground through duct banks, conduits, and cables or overhead on poles. The UCC drawings identify the size of duct banks which vary in size from 400mm to 1370mm wide (**Table 3-13**).

A Hydro Ottawa overhead major distribution line runs north-south along the east side of Woodroffe Avenue from north of Knoxdale Road/Medhurst Drive to West Hunt Club Road. Approximately 200m south of West Hunt Club it crosses over to the west side of Woodroffe Avenue and continues south past Fallowfield Road; this overhead line branches out on Fallowfield Road.

Table 3-13 Hydro Duct Banks in the Study Area

Location/Intersection	Parallel/Perpendicular	Width (mm)
Woodroffe Avenue/ Navaho Dr.	Perpendicular	1370
Woodroffe Avenue/College Avenue	Perpendicular	1370
Woodroffe Avenue, from 30m north of College Avenue to 68m north of Parkglen Drive	Parallel	542
Woodroffe Avenue, from Meadowland Drive to 44m south	Parallel	542
Woodroffe Avenue/5m south of Nepean Sportsplex entrance	Perpendicular	404
Woodroffe Avenue, 225m north of Fallowfield	Parallel	400
Fallowfield Road/east of Via Park Place	Perpendicular	400
Fallowfield Road/west of Via Park Place	Perpendicular	400
Transitway/Highbury Park	Perpendicular	542
Transitway/Strandherd Drive	Perpendicular	818
Transitway/Marketplace Avenue	Perpendicular	818

3.5.7.5.1 Hydro One Electricity Transmission

Hydro One transmission lines in the Study Area include two separate corridors:

The first one is running east-west, crossing Woodroffe Avenue immediately south of Knoxdale Road and contains the following lines:

- a 115 kV circuit (C7BM) twin wood pole line.
- a 230 kV transmission line (M32S) supported by steel towers.

The second corridor also runs east-west, crossing Woodroffe Avenue on the north side of West Hunt Club, and contains four transmission lines on two sets of steel towers. The voltages of the transmission lines vary from 115 kV to 500 kV as follows:

- The northernmost line (S7M) is operated at 115 kV.
- The two middle lines (X522A and X523A) are operated at 500 kV.
- The southernmost line (E34M) is operated at 230 kV.

3.5.7.6 Telecommunications Distribution Systems

Telecommunication utilities are distributed throughout the Study Area either underground through duct banks, conduits and cables, or overhead on poles.

Rogers cable runs along Woodroffe Avenue between Knoxdale/Medhurst Drive and Majestic Drive and along VIA Rail from Woodroffe Avenue to Greenbank Road. Atria crosses VIA Rail at Woodroffe Avenue.

