

SCARBOROUGH
WATERFRONT PROJECT

Environment Assessment

from Bluffer's Park to East Point Park in the City of Toronto

TORONTO

Toronto and Region Conservation
for The Living City®

ENVIRONMENTAL ASSESSMENT

Prepared by:
Toronto and Region Conservation Authority
5 Shoreham Drive
Downsview, Ontario
M3N 1S4

In partnership with:

In association with:

With additional support provided by:

Dillon Consulting Limited

Modelling Surface Water Limited

WSP Canada Inc.

Table of Contents

Glossary of Terms GL-1

Acronyms and Abbreviations AC-1

Executive Summary ES-1

1. Introduction 1-1

1.1 Project Background 1-3
1.2 Project Vision and Objectives 1-4
1.3 Proponent 1-6
1.4 EA Framework 1-6
1.4.1 EA Report 1-6
1.4.2 *Canadian Environmental Assessment Act* (CEAA), 2012 1-7
1.5 Other Approvals 1-13
1.6 Public and Agency Review of the Draft EA Report 1-13
1.7 Overview of EA Report 1-13

2. Purpose of the Undertaking 2-1

2.1 Planning Context 2-1
2.2 Key Studies and Plans 2-1
2.2.1 City of Toronto Official Plan 2-1
2.2.2 TRCA Living City Policies 2-7
2.2.3 Regeneration: Toronto's Waterfront and the Sustainable City 2-8
2.2.4 Accessibility for Ontarians with Disabilities Act (AODA) 2-9
2.2.5 Understanding Natural Hazards: Great Lakes – St. Lawrence System and Large Inland Lakes, River and Stream Systems and Hazardous Sites 2-9
2.2.6 Integrated Shoreline Management Plan 2-9
2.2.7 Bikeway Trails Implementation Plan 2-10
2.2.8 Multi-use Trail Design Guidelines 2-10
2.2.9 Scarborough Shoreline Terrestrial Biological Inventory and Assessment 2-10
2.2.10 Fish Community Objectives for Lake Ontario 2-11
2.2.11 Toronto Waterfront Aquatic Habitat Restoration Strategy 2-11
2.2.12 TRCA and City of Toronto's Management Plan for the Guild Park and Gardens 2-11

2.2.13 Metrolinx Lakeshore East Rail Corridor Expansion (Guildwood to Pickering) Environmental Assessment Process 2-12
2.3 Study Areas 2-12
2.3.1 Project Area 2-12
2.3.2 Project Study Area 2-14
2.3.3 Regional Study Areas 2-14
2.4 Temporal Boundaries 2-14
2.5 Problem/Opportunity Assessment 2-14
2.5.1 Project Vision Element: Erosion and Risk to Public Safety and Property 2-15
2.5.1.1 Key Problems 2-15
2.5.1.2 Project Opportunities 2-16
2.5.2 Project Vision Element: Limited Access to and Along the Waterfront 2-18
2.5.2.1 Key Problems 2-18
2.5.2.2 Project Opportunities 2-20
2.5.3 Project Vision Element: Habitat Integrity 2-20
2.5.3.1 Key Problems 2-20
2.5.3.2 Project Opportunities 2-22

3. Description of the Potentially Affected Environment 3-1
3.1 Physical Environment 3-1
3.1.1 Physiography 3-1
3.1.2 Geology and Hydrogeology 3-3
3.1.3 Source Protection Planning 3-5
3.1.4 Surface Water Conditions and Flow Volumes 3-6
3.1.4.1 Deep Ravines 3-10
3.1.4.2 Minor Ravines 3-10
3.1.4.3 Linear Slope Sections (No Ravines) 3-10
3.1.5 Stormwater Run-Off, Infrastructure and Hydraulics 3-10
3.1.6 Surface Water Quality and Sediment Quality 3-12
3.1.7 Lake Ontario Bathymetry 3-12
3.1.8 Coastal Processes, Engineering and Geomorphology 3-13
3.1.8.1 Water Levels 3-13
3.1.8.2 Wave Climate 3-17
3.1.8.3 Wave Uprush and Overtopping Levels 3-20
3.1.8.4 Shoreline Classification 3-20
3.1.8.5 Shoreline Condition 3-25
3.1.8.6 Sediment Loadings 3-30
3.1.8.7 Ice and Debris 3-32
3.1.9 Climate Change 3-36
3.1.10 Shoreline and Bluff Erosion 3-36

3.1.10.1 Slope Stability Considerations and Hazard Setback Delineation 3-36
3.1.10.2 Risk Lines 3-39
3.1.10.3 Shoreline Erosion 3-44
3.1.10.4 Stages of Bluff Stabilization 3-45
3.1.11 Landfills and Brownfield Sites 3-46
3.1.11.1 Landfills 3-46
3.1.11.2 Brownfield Sites 3-46
3.1.12 Air Quality 3-46
3.2 Natural Environment 3-47
3.2.1 Terrestrial Habitat 3-47
3.2.1.1 Terrestrial Habitat Types 3-47
3.2.1.2 Vegetation Communities 3-47
3.2.1.3 Vascular Plants 3-60
3.2.1.4 Wildlife and Wildlife Habitat 3-61
3.2.1.5 Significant Natural Areas 3-65
3.2.2 Aquatic Habitat and Fish Community 3-72
3.2.2.1 Connected Lake Ontario Ecosystem Zones 3-73
3.2.2.2 Aquatic Habitat Types 3-73
3.2.2.3 Fish Community 3-78
3.2.3 Species at Risk (SAR) 3-85
3.2.3.1 SAR Recognition and Protection 3-85
3.2.3.2 Plant SAR 3-87
3.2.3.3 Terrestrial SAR 3-87
3.2.3.4 Fish SAR 3-88
3.3 Socio-Economic Environment 3-89
3.3.1 Land Use 3-89
3.3.1.1 Planned Land Use 3-89
3.3.1.2 Existing Land Use 3-91
3.3.1.3 Future Land Use 3-91
3.3.1.4 Land Ownership 3-92
3.3.2 Population and Demographics 3-92
3.3.3 Infrastructure, Community Services and Recreation 3-96
3.3.3.1 Infrastructure 3-96
3.3.3.2 Community Facilities and Services 3-98
3.3.3.3 Parks and Recreation 3-98
3.3.3.4 Boat Clubs 3-102
3.3.3.5 Regional and Local Trails 3-103
3.3.4 Access 3-104
3.3.4.1 Shoreline Access 3-104
3.3.4.2 Parking 3-107
3.3.4.3 Transit Services 3-110
3.3.5 Traditional Use, Interests and Identification of Indigenous and Treaty Rights within the Project Study Area 3-110

3.3.6 Cultural Heritage/Archaeology 3-111
3.3.6.1 Archaeology (Terrestrial) and Built Heritage and Cultural Heritage Landscapes 3-111
3.3.6.2 Archaeology (Marine) 3-115

4. Description, Evaluation and Rationale for "Alternatives To" 4-1

4.1 Description of "Alternative To" the Undertaking 4-1

5. Description, Evaluation and Rationale for "Alternative Methods" 5-1

5.1 Step 1: Consideration of Baseline Environmental and Social Conditions 5-1

5.2 Step 2: Confirm Problems and Opportunities by Shoreline Segment 5-1

5.3 Step 3: Develop Alternatives by Shoreline Segment 5-2

5.3.1 West Segment Alternatives 5-5
5.3.1.1 West Segment, Do Nothing (Leave As Is) 5-5
5.3.1.2 West Segment, Alternative 1: Headland Beach 5-6
5.3.1.3 West Segment, Alternative 2A/2B: Bridge (Short Span and Long Span) 5-6
5.3.1.4 West Segment, Alternative 3A/3B: Island-Bridge (Short Span and Long Span) 5-11
5.3.1.5 West Segment, Alternative 4: Causeway 5-11
5.3.1.6 West Segment, Alternative 5A/5B: Beach Expansion (Narrow/Wide) 5-15
5.3.2 Central Segment Alternatives 5-18
5.3.2.1 Central Segment, Do Nothing (Leave As Is) 5-18
5.3.2.2 Central Segment, Alternative 1: Headland Beach 5-18
5.3.2.3 Central Segment, Alternative 2: Revetment 5-21
5.3.3 East Segment Alternatives 5-21
5.3.3.1 East Segment, Do Nothing (Leave As Is) 5-21
5.3.3.2 East Segment, Alternative 1A/1B: Headlands with Top-of-Bluffs/Base-of-Bluffs Connection 5-23
5.3.3.3 East Segment, Alternative 2A/2B: Bridge with Top-of-Bluffs Connection (Headlands/Headlands + Revetment) 5-27
5.3.3.4 East Segment, Alternative 3A/3B: Island-Bridge with Top-of-Bluffs Connection (Headland Beach/Headland Beach + Revetment) 5-27
5.3.3.5 East Segment, Alternative 4A/4B: Headland Beach with Revetment to East Point Park/Headland Beach to East Point Park 5-31
5.3.3.6 East Segment, Alternative 5: Tableland Connection Over Grey Abbey Ravine 5-36

5.4 Step 4: Select the Preferred Alternative 5-36
5.4.1 Evaluation Methodology 5-36
5.4.1.1 Criteria and Indicators 5-38
5.4.1.2 Effects Assessment and Ranking 5-38
5.4.1.3 Comparative Evaluation 5-45
5.4.2 Evaluation Results – West Segment 5-46
5.4.2.1 Objective 1: Protect and Enhance Terrestrial and Aquatic Natural Features and Linkages 5-46
5.4.2.2 Objective 2: Manage Public Safety and Property Risk 5-47
5.4.2.3 Objective 3: Provide an Enjoyable Waterfront Experience 5-49
5.4.2.4 Objective 4: Consistency and Co-ordination with Other Initiatives 5-49
5.4.2.5 Objective 5: Achieve Value for Cost 5-51
5.4.2.6 West Segment – Overall Evaluation Results 5-53
5.4.3 Evaluation Results – Central Segment 5-53
5.4.3.1 Objective 1: Protect and Enhance Terrestrial and Aquatic Natural Features and Linkages 5-54
5.4.3.2 Objective 2: Manage Public Safety and Property Risk 5-54
5.4.3.3 Objective 3: Provide an Enjoyable Waterfront Experience 5-56
5.4.3.4 Objective 4: Consistency and Co-ordination with Other Initiatives 5-56
5.4.3.5 Objective 5: Achieve Value for Cost 5-58
5.4.3.6 Central Segment – Overall Evaluation Results 5-59
5.4.4 Evaluation Results – East Segment 5-59
5.4.4.1 Objective 1: Protect and Enhance Terrestrial and Aquatic Natural Features and Linkages 5-59
5.4.4.2 Objective 2: Manage Public Safety and Property Risk 5-62
5.4.4.3 Objective 3: Provide an Enjoyable Waterfront Experience 5-63
5.4.4.4 Objective 4: Consistency and Co-ordination with Other Initiatives 5-66
5.4.4.5 Objective 5: Achieve Value for Cost 5-68
5.4.4.6 East Segment – Overall Evaluation Results 5-70
5.5 Sensitivity Analysis of Alternate Plan for the Central and East Segments Submitted by the Friends of the Bluffs 5-70

6. Description of the Preferred Alternative 6-1
6.1 Refinements to the Preferred Alternative 6-1
6.1.1 West Segment 6-1
6.1.2 Central Segment 6-3
6.1.2.1 Sylvan Section 6-3
6.1.2.2 Guild Park and Gardens Section 6-4
6.1.3 East Segment 6-5
6.2 Overview of the Conceptual Design 6-6
6.2.1 Shoreline Configuration and Protection Features 6-9
6.2.1.1 West Segment 6-9

6.2.1.2 Central Segment 6-11
6.2.1.3 East Segment 6-13
6.2.2 Naturalization 6-13
6.2.2.1 Terrestrial Habitat 6-13
6.2.2.2 Aquatic Habitat 6-19
6.2.3 Recreational 6-25
6.2.3.1 West Segment 6-25
6.2.3.2 Central Segment 6-25
6.2.3.3 East Segment 6-26
6.2.4 Shoreline Access Routes 6-26
6.2.4.1 Brimley Road 6-27
6.2.4.2 Doris McCarthy Trail/Bellamy Ravine 6-29
6.2.4.3 Guild Construction Access Route 6-29
6.2.4.4 Beechgrove Drive 6-30
6.3 Operations and Maintenance 6-30
6.3.1 Shoreline Protection Features 6-30
6.3.2 Naturalization Components 6-31
6.3.3 Recreational Trails 6-31
6.3.4 Site Access Routes 6-31
6.4 Construction Access 6-31
6.4.1 Brimley Road 6-32
6.4.2 Guild Construction Access Route 6-32
6.4.3 Alternative Access Routes 6-32
6.5 Construction Activities 6-32
6.5.1 Large Headlands (Bluffer's Park, Guild Public Gathering Space) 6-35
6.5.2 Headlands within the Headland Beach System 6-35
6.5.3 Beaches within the Headland Beach System 6-36
6.5.4 Guild Park and Gardens Shoreline Regeneration Zone 6-36
6.5.5 Corkscrew Ramp 6-36
6.5.6 Brimley Road Separated Pathway Access Improvement 6-36
6.6 Construction Phasing 6-37
6.7 Climate Change 6-37

7. Potential Effects, Effects Assessment and Mitigation Measures for Preferred Alternatives 7-1

7.1 Approach to Step 4: Detailed Assessment of the Preferred Alternatives 7-1
7.2 Assessment Criteria and Indicators 7-1
7.2.1 Identifying Net Effects 7-1
7.3 Effects Assessment by Objective 7-2

7.3.1 Objective 1: Project and Enhance Terrestrial and Aquatic Natural Features and Linkages 7-2
7.3.1.1 Construction Effects 7-2
7.3.1.2 Operation/Establishment Effects 7-13
7.3.1.3 Summary of Objective 1 7-20
7.3.2 Objective 2: Manage Public Safety and Property Risk 7-21
7.3.2.1 Construction Effects 7-21
7.3.2.2 Operation/Establishment Effects 7-21
7.3.2.3 Summary of Objective 2 7-27
7.3.3 Objective 3: Provide an Enjoyable Waterfront Experience 7-28
7.3.3.1 Construction Effects 7-28
7.3.3.2 Operation/Establishment Effects 7-34
7.3.3.3 Summary of Objective 3 7-43
7.3.4 Objective 4: Consistency and Co-ordination with Other Initiatives 7-44
7.3.4.1 Construction Effects 7-44
7.3.4.2 Operation/Establishment Effects 7-53
7.3.4.3 Summary of Objective 4 7-57
7.3.5 Objective 5: Achieve Value for Cost 7-59
7.3.5.1 Construction Effects 7-59
7.3.5.2 Operation/Establishment Effects 7-61
7.3.5.3 Summary of Objective 5 7-62

8. Monitoring and Adaptive Environmental Management 8-1

8.1 SWP Monitoring Program 8-1
8.1.1 Baseline Conditions Monitoring 8-2
8.1.2 EA Compliance Monitoring 8-2
8.1.3 Environmental Performance Monitoring 8-3

8.2 Adaptive Environmental Management 8-5
8.2.1 What is Adaptive Environmental Management? 8-5
8.2.2 AEM Strategy for the SWP 8-5
8.2.2.1 Monitoring and Evaluation within the SWP AEM Process 8-7
8.2.2.2 Adjustments, Refinements and Modifications within the SWP AEM Process 8-8
8.2.2.3 Learning within the SWP AEM Process 8-8

9. EA Amendment Process 9-1

9.1 Regulatory Provisions for Post-EA Modifications 9-1
9.2 Screening Criteria for Post-EA Modification 9-1
9.3 SWP Approach to Post-EA Modifications 9-3

10. Consultation 10-1

10.1 Consultation on Environmental Assessment 10-1

10.2 Guiding Principles and Objectives 10-1
10.3 Consultation Mechanisms 10-2
10.3.1 Mandatory Notices and Other Notifications 10-2
10.3.1.1 Notice of Commencement and Public Information Centre #1 10-2
10.3.1.2 Notice of Public Information Centre #2 10-2
10.3.1.3 Notice of Public Information Centre #3 10-3
10.3.1.4 Notice of Submission of Draft EA 10-3
10.3.2 E-Newsletter Project Updates 10-5
10.3.3 Project Information Materials 10-7
10.3.3.1 Information Sheets 10-7
10.3.4 Project Website 10-7
10.3.5 Social Media 10-8
10.3.6 Project Videos 10-8
10.4 Public Consultation & Engagement 10-9
10.4.1 Stakeholder Committee 10-9
10.4.1.1 Stakeholder Committee Workbooks 10-10
10.4.2 Public Information Centres (PICs) 10-10
10.4.3 Direct Community Engagement 10-13
10.4.4 Landowners and Community Organizations 10-13
10.4.4.1 Landowners 10-13
10.4.4.2 Community Organizations & Local Residents 10-13
10.4.5 Petitions 10-17
10.4.6 Utilities 10-18
10.4.7 Response to Public Comments 10-19
10.5 Indigenous Consultation 10-42
10.5.1 Potentially Interested Indigenous Communities 10-42
10.5.2 Identification of Indigenous and Treaty Rights within the Study Area 10-43
10.5.3 Correspondence with Indigenous and Métis Communities 10-43
10.5.3.1 Indigenous Communities Outreach/Communication 10-43
10.5.3.2 Additional Indigenous Communities Outreach/Communication 10-44
10.5.4 Summary of Indigenous and Métis Comments 10-45
10.6 Agency Consultation 10-46
10.6.1 Agency Contact List 10-47
10.6.2 Technical Advisory Committee (TAC) 10-48
10.6.3 Agency Meetings 10-48
10.6.3.1 Agency Working Groups 10-48
10.6.3.2 City of Toronto 10-49
10.6.3.3 Fisheries and Oceans Canada (DFO) 10-50
10.6.3.4 GO Transit/Metrolinx 10-50
10.6.3.5 Ministry of Environment and Climate Change (MOECC) 10-50

10.6.3.6 Ministry of Natural Resources and Forestry (MNRF)..... 10-51
10.6.3.7 Ministry of Tourism, Culture and Sport (MTCS)..... 10-51
10.7 TRCA Authority Meeting..... 10-51
10.8 Draft Environmental Assessment Report Review..... 10-52
10.9 Future Consultation Activities..... 10-52

11. Advantages and Disadvantages..... 11-1

12. References and Works Cited..... 12-1

List of Tables

Table 1-1: Concordance with Commitments Made in the ToR 1-8
Table 1-2: Potential Permits and Approvals 1-11
Table 2-1: List of Background Studies 2-2
Table 2-2: List of Erosion Protection Projects Previously Undertaken by TRCA 2-4
Table 3-1: Summary of Vegetation Communities, Ranked L1 to L5, within the Project Area Segments 3-48
Table 3-2: Individual Species of Vascular Plants Observed in the Project Area Based on Level of Conservation Concern 3-60
Table 3-3: Herpetofauna Species Detected within the Project Area 3-64
Table 3-4: Summary of Fish Species and Habitat Type Within the Project Area, Between 2006 and 2016 3-79
Table 3-5: Annual and Average Species Richness Values by Habitat Type Between 2006 and 2016 3-81
Table 3-6: Annual Species Richness at the Meadowcliffe Headland Beach System, Pre- and Post- Headland Beach System Construction 3-83
Table 3-7: SAR Levels of Recognition and Protection 3-86
Table 3-8: Terrestrial SAR Found in the Project Area 3-88
Table 5-1: Criteria and Indicators Considered for the Comparative Evaluation 5-39
Table 5-2: Criteria and Indicators Screened Out by Segment and Rationale for the Screening 5-44
Table 5-3: West Segment, Objective 1 Criteria Level Evaluation Summary 5-48
Table 5-4: West Segment, Objective 2 Criteria Level Evaluation Summary 5-48
Table 5-5: West Segment, Objective 3 Criteria Level Evaluation Summary 5-50
Table 5-6: West Segment, Objective 4 Criteria Level Evaluation Summary 5-52
Table 5-7: West Segment, Objective 5 Criteria Level Evaluation Summary 5-52
Table 5-8: West Segment – Objective Level Evaluation Results Summary 5-53
Table 5-9: Central Segment, Objective 1 Criteria Level Evaluation Summary 5-55
Table 5-10: Central Segment, Objective 2 Criteria Level Evaluation Summary 5-55
Table 5-11: Central Segment, Objective 3 Criteria Level Evaluation Summary 5-57
Table 5-12: Central Segment, Objective 4 Criteria Level Evaluation Summary 5-57
Table 5-13: Central Segment, Objective 5 Criteria Level Evaluation Summary 5-58
Table 5-14: Central Segment – Objective Level Evaluation Results Summary 5-59
Table 5-15: East Segment, Objective 1 Criteria Level Evaluation Summary 5-60
Table 5-16: East Segment, Objective 2 Criteria Level Evaluation Summary 5-64
Table 5-17: East Segment, Objective 3 Criteria Level Evaluation Summary 5-65
Table 5-18: East Segment, Objective 4 Criteria Level Evaluation Summary 5-67
Table 5-19: East Segment, Objective 5 Criteria Level Evaluation Summary 5-69
Table 5-20: East Segment – Objective Level Evaluation Results Summary 5-70
Table 6-1: Terrestrial Habitat Enhancements by Project Study Area Segment 6-15
Table 6-2: Native Species That May be Included in Restoration Plantings 6-15
Table 6-3: Potential Aquatic Habitat Enhancement Techniques Overview 6-20
Table 7-1: Effects Assessment Criteria and Indicators Relevant to Phase 7-3
Table 7-2: Existing Vegetation Communities to be Removed 7-8

Table 7-3: Detailed Effects Assessment: Objective 1 Construction 7-11
Table 7-4: Terrestrial Habitat Enhancements by Project Study Area Segment 7-16
Table 7-5: Detailed Effects Assessment: Objective 1 Operation/Establishment 7-18
Table 7-6: Net Gains and Losses with Respect to Objective 1 7-20
Table 7-7: Overall Effects Related to Objective 1 7-20
Table 7-8: Detailed Effects Assessment: Objective 2 Operation/Establishment 7-25
Table 7-9: Overall Effects Related to Objective 2 7-27
Table 7-10: Detailed Effects Assessment: Objective 3 Construction 7-32
Table 7-11: Detailed Effects Assessment: Objective 3 Operation/Establishment 7-40
Table 7-12: Overall Effects Related to Objective 3 7-43
Table 7-13: Detailed Effects Assessment: Objective 4 Construction 7-51
Table 7-14: Fish Community Objectives for Lake Ontario Goals for the Nearshore and Offshore Pelagic Zones 7-53
Table 7-15: Detailed Effects Assessment: Objective 4 Operation/Establishment 7-56
Table 7-16: Ongoing and Proposed Construction Projects with the Potential to Impact the Guildwood Community 7-58
Table 7-17: Overall Effects Related to Objective 4 7-59
Table 7-18: Detailed Effects Assessment: Objective 5 Construction 7-61
Table 7-19: Detailed Effects Assessment: Objective 5 Operation/Establishment 7-62
Table 7-20: Overall Effects Related to Objective 5 7-62
Table 8-1: Summary of Commitments Resulting from the SWP EA 8-4
Table 8-2: Examples of Environmental Performance Monitoring for Ecological Components of the SWP 8-5
Table 8-3: Potential AEM Triggers and Adaptive Measures for SWP Components 8-8
Table 10-1: Publication and Notification Information 10-4
Table 10-2: Email/Mail Notifications 10-4
Table 10-3: Project E-Newsletters 10-6
Table 10-4: Social Media Platforms 10-8
Table 10-5: Project Videos 10-9
Table 10-6: Stakeholder Committee Meeting Summary 10-11
Table 10-7: PIC Summaries 10-12
Table 10-8: Direct Community Engagement – Project Team Led 10-14
Table 10-9: Direct Community Engagement – Partner Organizations 10-15
Table 10-10: Consultation with Community Organizations and Local Residents 10-16
Table 10-11: Consultation with Utilities 10-19
Table 10-12: Summary of Comments and Comment Consideration 10-20
Table 10-13: Outgoing Consultation with Indigenous Communities. 10-43
Table 10-14: Responses from Indigenous Communities 10-45
Table 10-15: Agencies and Working Groups Contacted During the EA 10-47
Table 10-16: Consultation Activities with Agency Working Groups 10-49
Table 10-17: City of Toronto Consultation 10-49
Table 10-18: Consultation Activities with GO Transit/Metrolinx 10-50
Table 10-19: Consultation Activities with MOECC 10-51
Table 10-20: Consultation Activities with MNRF 10-51
Table 11-1: Advantages and Disadvantages of the SWP 11-2

List of Figures

Figure 1-1: Project Location Within the Context of the City of Toronto 1-2
Figure 2-1: Project Area and Study Area 2-13
Figure 2-2: Existing Shoreline Protection Structures within the Project Study Area 2-17
Figure 3-1: Physiographic Regions within the Project Study Area 3-2
Figure 3-2: Project Study Area Bluff Stratigraphy 3-4
Figure 3-3: Seepage Along the Cudia Park Bluff Face 3-5
Figure 3-4: Ravines within the West Segment 3-7
Figure 3-5: Ravines within the Central Segment 3-8
Figure 3-6: Ravines within the East Segment 3-9
Figure 3-7: Stormwater Outfall Locations in the Project Study Area 3-11
Figure 3-8: Project Study Area Bathymetry 3-14
Figure 3-9: Lake Ontario Hydrograph 3-15
Figure 3-10: Lake Ontario Mean Water Levels from 1918 to 2015 3-16
Figure 3-11: Distribution of Highest Hindcast Wave Heights and Total Wave Power 3-17
Figure 3-12: Wave Height and Period Exceedance Curves 3-18
Figure 3-13: Annual Distribution of Total Wave Power 3-18
Figure 3-14: Monthly Distribution of Total Wave Power 3-18
Figure 3-15: Extreme Value Analysis of Easterly Wave Heights 3-19
Figure 3-16: Extreme Value Analysis of Southwesterly Wave Heights 3-19
Figure 3-17: CMS Wave Model Results, 100-year Easterly Wave Condition 3-21
Figure 3-18: CMS Wave Model, 100-year Southwesterly Wave Condition 3-22
Figure 3-19: SWP Study Area Shoreline Conditions – June 7, 2017 3-23
Figure 3-20: Windshield/Walking Survey Reaches in West Segment 3-27
Figure 3-21: Windshield/Walking Survey Reaches in Central Segment 3-28
Figure 3-22: Windshield/Walking Survey Reaches in East Segment 3-29
Figure 3-23: Alongshore Sediment Transport Rates 3-31
Figure 3-24: 3.0 m 7s East Wave Used for Sediment Transport Pathway Example 3-33
Figure 3-25: Alongshore Current from 3.0 m 7s East Wave for the Project Study Area 3-34
Figure 3-26: Sediment Transport Rates from 3.0 m 7s East Wave for the Project Study Area 3-35
Figure 3-27: Existing Shoreline Conditions through East Segment – April 5, 2017 3-38
Figure 3-28: SWP Study Area Landslides in 2017 3-40
Figure 3-29: West Segment Risk Line 3-41
Figure 3-30: Central Segment Risk Line 3-42
Figure 3-31: East Segment Risk Line and Erosion Hazard Limit 3-43
Figure 3-32: Vegetation Community Types within the West Segment 3-49
Figure 3-33: Vegetation Community by L-Rank within the West Segment 3-50
Figure 3-34: Vegetation Community Types within the Central Segment 3-51
Figure 3-35: Vegetation Community by L-Rank within the Central Segment 3-52
Figure 3-36: Vegetation Community Types within the East Segment 3-53
Figure 3-37: Vegetation Community by L-Rank within the East Segment 3-54

Figure 3-38: ANSIs and ESAs Overlapping West Segment with the Locations of Existing Formal and Informal Trails Identified 3-68
Figure 3-39: ANSIs and ESAs Overlapping Central Segment with the Locations of Existing Formal and Informal Trails Identified 3-69
Figure 3-40: ANSIs and ESAs Overlapping East Segment with the Locations of Existing Formal and Informal Trails Identified 3-70
Figure 3-41: Open Coast Aquatic Habitat in West Segment 3-75
Figure 3-42: Open Coast Aquatic Habitat in Central Segment 3-76
Figure 3-43: Open Coast Aquatic Habitat in East Segment 3-77
Figure 3-44: Land Use Designations within the Project Study Area (City of Toronto, 2002; consolidated 2015) 3-90
Figure 3-45: Shoreline Ownership in West Segment 3-93
Figure 3-46: Shoreline Ownership in Central Segment 3-94
Figure 3-47: Shoreline Ownership in East Segment 3-95
Figure 3-48: East Segment Infrastructure 3-97
Figure 3-49: Existing Parks and Trails in West Segment 3-99
Figure 3-50: Existing Parks and Trails in Central Segment 3-100
Figure 3-51: Existing Parks and Trails in East Segment 3-101
Figure 3-52: Existing Access Points to the Waterfront 3-105
Figure 3-53: Cudia Park Bluffs Shoreline – May 10, 2017 3-106
Figure 3-54: Doris McCarthy Trail and Guild Construction Access Route 3-108
Figure 3-55: Beechgrove Drive Extension 3-109
Figure 5-1: Framework for the Development and Evaluation of Alternatives 5-3
Figure 5-2: West Segment, Do Nothing (Leave Shoreline As Is) – Overview 5-7
Figure 5-3: West Segment, Alternative 1: Headland Beach – Overview 5-8
Figure 5-4: West Segment, Alternative 2A: Bridge (Short Span) – Overview 5-9
Figure 5-5: West Segment, Alternative 2B: Bridge (Long Span) – Overview 5-10
Figure 5-6: West Segment, Alternative 3A: Island-Bridge (Short Span) – Overview 5-12
Figure 5-7: West Segment, Alternative 3B: Island-Bridge (Long Span) – Overview 5-13
Figure 5-8: West Segment, Alternative 4: Causeway – Overview. 5-14
Figure 5-9: West Segment, Alternative 5A: Beach Expansion (Narrow) – Overview 5-16
Figure 5-10: West Segment, Alternative 5B: Beach Expansion (Wide) – Overview 5-17
Figure 5-11: Central Segment, Do Nothing (Leave Shoreline As Is) – Overview 5-19
Figure 5-12: Central Segment, Alternative 1: Headland Beach – Overview 5-20
Figure 5-13: Central Segment, Alternative 2: Revetment – Overview 5-22
Figure 5-14: East Segment, Do Nothing (Leave Shoreline As Is) – Overview 5-24
Figure 5-15: East Segment, Alternative 1A: Headland Beach with Top-of-Bluffs Connection – Overview 5-25
Figure 5-16: East Segment, Alternative 1B: Headland Beach with Base-of-Bluffs Connection (Revetment) – Overview 5-26
Figure 5-17: East Segment, Alternative 2A: Bridge with Top-of-Bluffs Connection (Headland Beach) – Overview 5-28
Figure 5-18: East Segment, Alternative 2B: Bridge with Base-of-Bluffs Connection (Headland Beach + Revetment) – Overview 5-29

Figure 5-19: East Segment, Alternative 3A: Island-Bridge with Top-of-Bluffs Connection (Headland Beach) – Overview 5-30
Figure 5-20: East Segment, Alternative 3B: Island-Bridge with Base-of-Bluffs Connection (Headland Beach + Revetment) – Overview 5-32
Figure 5-21: East Segment, Alternative 4A: Headland Beach with Revetment to East Point Park – Overview 5-33
Figure 5-22: Proposed Tableland Connection at East Point Park 5-34
Figure 5-23: East Segment, Alternative 4B: Headland Beach to East Point Park – Overview 5-35
Figure 5-24: East Segment, Alternative 5: Tableland Connection Over Grey Abbey Ravine – Overview 5-37
Figure 5-25: Alternatives Comparative Evaluation Process 5-46
Figure 5-26: Constraints in the East Segment 5-73
Figure 6-1: Refined West Segment Preferred Alternative – Bluffer's Park Headland 6-2
Figure 6-2: Refined West Segment Preferred Alternative – Berm and Interim Groyne 6-3
Figure 6-3: Refined Central Segment Preferred Alternative – Sylvan Headland Beach 6-4
Figure 6-4: Refined Central Segment Preferred Alternative – Guild Park and Gardens Shoreline 6-5
Figure 6-5: Refined East Segment Preferred Alternative – Headland Beach 6-7
Figure 6-6: Proposed Tableland Connection on the East Side of Grey Abbey Ravine 6-8
Figure 6-7: Refined West Segment Preferred Alternative 6-10
Figure 6-8: Refined Central Segment Preferred Alternative 6-12
Figure 6-9: Refined East Segment Preferred Alternative 6-14
Figure 6-10: Surcharged Revetment Technique 6-21
Figure 6-11: Shoreline Shoal Treatment Technique 6-22
Figure 6-12: Boulder Pavement Restoration Technique 6-23
Figure 6-13: Proposed Path Along Brimley Road 6-28
Figure 6-14: Brimley Road Access Route 6-33
Figure 6-15: Guild Construction Access Route 6-34
Figure 6-16: Overall Refined Preferred Alternative 6-38
Figure 7-1: Possible Construction Access Routes through Guildwood Village 7-48
Figure 7-2: Preferred Construction Access Route through Guildwood Village 7-50
Figure 8-1: Relationship Between Monitoring Phases and SWP Implementation 8-2
Figure 8-2: Relationship Between SWP Design and AEM 8-6
Figure 8-3: Monitoring and Evaluation within the AEM Cycle 8-7
Figure 9-1: Approval Process for Proposed Modifications to the SWP 9-4

List of Appendices

Appendix A Terms of Reference
Appendix B Geotechnical Report
Appendix C Coastal Technical Report
Appendix D Natural Environment Technical Report
Appendix E Terrestrial Archaeology Stage 1 Report
Appendix F Detailed Evaluation of Alternatives Tables
Appendix G Friends of the Bluffs Alternate Plan Sensitivity Analysis
Appendix H Mitigation Tables
Appendix I Water Quality Modeling Report
Appendix J Traffic Impact Assessment Report
Appendix K Supplementary Coastal Wave Model Technical Memo
Appendix L Consultation Activities
- **Appendix L1** Mandatory Notices and Other Notifications
- **Appendix L2** E-Newsletters and Project Updates
- **Appendix L3** SWP EA Information Sheets
- **Appendix L4** Stakeholder Committee
- **Appendix L5** Public Information Centres
- **Appendix L6** Commercial Landowner Communication
- **Appendix L7** Direct Community Organization Engagement
- **Appendix L8** Utility Engagement
- **Appendix L9** Public Comments
- **Appendix L10** Indigenous Communities Outreach/Communication
- **Appendix L11** Authority Meeting
- **Appendix L12** Draft EA Review

Appendix M Renderings
Appendix N CTC Source Protection Assessment & Consultation

Glossary of Terms

Active recreation: Includes higher impact outdoor recreational activities, such as organized sports.

Alongshore transport: The process of sediment being moved along a coastline by nearshore currents.

Alternatives To: Functionally different ways of solving the identified problem or opportunity.

Alternative Methods: Different ways of implementing the preferred Alternative To.

Area of Natural and Scientific Interest (ANSI): Areas of land and/or water that have unique natural features or landscapes, as identified by the Ministry of Natural Resources and Forestry (MNRF).

Archaeology: Includes artifacts, archaeological sites, and marine archaeological sites, as defined under the *Ontario Heritage Act*. The identification and evaluation of such resources are based upon archaeological fieldwork undertaken in accordance with the *Ontario Heritage Act*.

Amourstone: Large irregular hard rock used in hydraulic structures, such as lakeshore defenses and river bank protection.

Baseline conditions: The current or anticipated future conditions of the environment without the proposed project in place. Baseline conditions provide the benchmark from which to assess the effects of the project.

Best management practices (BMPs): Methods or techniques found to be the most effective and practical means in achieving an objective (e.g., preventing or minimizing water pollution, impacts to wildlife, effects of truck traffic, etc.).

Bi-nodal distribution: A condition in which two distinct peaks occur in a directional distribution.

Biodiversity: A term describing the variety of species, both flora and/or fauna, contained within an ecosystem.

Blue Flag Beach: A voluntary eco-label awarded to beaches that meet high environmental and quality standards.

Bluffs: A steep bank, high ridge or cliff located near a river or body of water.

Borehole: A narrow vertical or horizontal hole made in the earth using a drill.

Brownfield site: Vacant or underutilized places where past industrial or commercial activities may have left contamination (chemical pollution) behind, including factories, gas stations or waterfront properties (port lands) formerly used for industrial or commercial activities.

Built heritage: One or more significant buildings, structures, monuments, installations or remains associated with architectural, cultural, social, political, economic or military history and identified as being important to a community. These resources may be identified through designation or heritage conservation easement under the *Ontario Heritage Act*, or listed by local, provincial or federal jurisdictions.

Chart datum: The zero water depth displayed on a nautical chart.

Class Environmental Assessment (Class EA): A type of EA that follows a Ministry of Environment and Climate Change (MOECC) pre-approved self-assessment process. Class EAs are generally used for routine projects that have predictable and manageable effects.

Combined sewer outfalls: A type of sewer that collects surface water run-off and sewage as part of a single system.

Conservation concern: Ecologists assess the quality of each habitat patch through an evaluation of size, shape and matrix influence. These criteria are weighted together to determine an average measure of habitat quality that corresponds to a 'local rank' or L-Rank, ranging from L1 (the highest quality) to L5 (the poorest quality). A classification used by TRCA to assign 'local ranks', or L-ranks, to flora and fauna species, and vegetation communities. L-ranks range from L5 (generally secure) to L1 (of regional concern) to L+ (dominated by non-native species).

Crest migration: The natural process of the slope crest (top of bluffs) receding back as a result of slope failures which occur in naturally oversteepened slopes.

Cultural heritage: Consists of places and items of historical or societal value including archaeological sites and the artifacts recovered from them, built heritage resources, and cultural heritage landscapes.

Cultural heritage landscapes: 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. The area may involve features such as structures, spaces, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association. Examples may include, but are not limited to, heritage conservation districts designated under the *Ontario Heritage Act*; villages, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trailways, viewsheds, natural areas and industrial complexes of heritage significance; and areas recognized by federal or international designation authorities (e.g., a National Historic Site or District designation, or a UNESCO [United Nations Educational, Scientific and Cultural Organization] World Heritage Site).

Detailed Design: Engineering design work that is completed on a more refined scale and typically follows design completed at a higher level (referred to as preliminary design).

"Do Nothing" Alternative: The "Do Nothing" alternative needs to be considered as per the *Environmental Assessment Act (EA Act)* and includes the continuation of the base case or status quo conditions.

Downcutting: Vertical or downward erosion that deepens a channel by removing underlying material.

Ecological Land Classification (ELC) System for Southern Ontario: A standardized framework to describe, inventory and interpret ecosystems in southern Ontario.

Ecosystem: An organic community of plants and animals viewed within its physical environment or habitat (e.g., a freshwater pond, a mixed woodland, or a hedge). An ecosystem can be described as a 'complex of interacting phenomena', within which there are many complicated and often subtle relationships (between climate and vegetation, vegetation and soils, animals and vegetation, and so on).

Ecosystem-based approach: An environmental management approach that recognizes the full array of interactions within an ecosystem, including humans, rather than considering single issues, species, or ecosystem services in isolation.

Effect: A change that a proposed undertaking could potentially have on the environment, either positive or negative, direct or indirect, short or long-term.

Embayment: A shoreline recess that forms a bay.

Environment: As defined in the *EA Act* as:

(a) air, land or water,
(b) plant and animal life, including human life,
(c) the social, economic and cultural conditions that influence the life of humans or a community,
(d) any building, structure, machine or other device or thing made by humans,
(e) any solid, liquid, gas, odour, heat, sound, vibration or radiation resulting directly or indirectly from human activities, or
(f) any part or combination of the foregoing and the interrelationships between any two or more of them, in or of Ontario.

***Environmental Assessment Act, 1990*:** The *EA Act* (as amended) is a provincial statute that sets out a planning and decision-making process to evaluate the potential environmental effects of a proposed undertaking. Proponents wishing to proceed with an undertaking must document their planning and decision-making process and submit the results from their EA to the Minister of the MOECC for approval.

Environmental Assessment (EA): An EA is a study that assesses the potential environmental effects (positive or negative) of a proposed project. Key components of an EA include consultation; consideration and evaluation of alternatives; and, the management of potential environmental effects. Conducting EAs promotes good environmental planning before decisions are made about proceeding with a proposal.

Environmentally Significant Area (ESA): Land and/or water-based areas that contain sensitive natural features that warrant protection, as identified by the City of Toronto.

Environmental Assessment Report (EA Report): Any report or documentation prepared that describes how the EA was planned to meet the requirements of the *EA Act*.

Erosion control: Preventing erosion caused by water, wind, slope inclination, or some combination thereof, using engineered solutions.

Extreme value analysis: An extreme value analysis is a statistical calculation required to calculate the probability of occurrence of an extreme event from a data set of a shorter duration. In this instance, wave conditions up to a return period of 100 years were calculated from 40 years of hindcast wave data.

Evaluation criteria: A measure established to evaluate the extent to which alternative solutions meet specific objectives and/or to compare against each other for the purpose of selecting a preferred alternative. Evaluation criteria can be qualitative or quantitative in nature.

Factors of Safety: The ratio of available soil strength resisting movement, divided by the gravitational forces tending to cause movement.

Focused approach (or focused EA): A scoped EA process that is permitted by the MOECC if there is a defined planning process that has already occurred, which provides the rationale for the project.

Footprint: The size and shape of the land creation area.

Geotechnical: The study of soil and rock mechanics in the context of subsurface conditions, slope stability and design earthworks.

Glacial outwash: Sediments deposited by glacial meltwater.

Greenspaces: A regional system of natural areas that provides habitat for plants and animal species, and provides opportunities for the enjoyment of nature and outdoor recreation.

Groundwater: Water located below the earth's surface.

Groyne: Structures that sit perpendicular to the shore and retain beach material that is either naturally moving past the site as littoral drift, or is artificially placed.

Habitat: A term used in ecology to describe the specific environment of plants and animals, in which they are able to live, feed, and reproduce.

Habitat/Ecosystem Assessment Tool (HEAT): HEAT is a science-based management tool that seeks to identify whether there is a net benefit or impairment to the existing ecological function of a project area for a suite of fish species. It is the revised version of the Habitat Alteration Assessment Tool (HAAT), which is used by Fisheries and Oceans Canada (DFO) to assess, from the fisheries perspective, the change in habitat amount and function from an existing condition to the proposed modified condition based on the following variables: depth, substrate and aquatic vegetation.

Habitat fragmentation: A situation where patches of habitat are broken into smaller patches by human use (e.g., informal trails) and development (e.g., roads or buildings).

Habitat integrity: The ability of a habitat type to sustain ecological function and support biotic and abiotic features.

Habitat patches: Natural areas that are divided into smaller discrete areas by unnatural features.

Headland: Promontories that extend out into a large body of water and reduce alongshore currents. Headlands can be a variety of shapes (e.g., rounded, T-shaped, L-shaped) depending on their position and the needs of a given project.

Hindcast: A calculation determining probable past conditions, such as wave characteristics at a given place and time.

Hydrogeology: The movement of groundwater in rock and soils.

Hydrology: The study of the distribution and movement of water.

Intake protection zone: The water and surrounding land around a surface water intake pipe.

International Great Lakes Datum, 1985 (IGLD 1985): The current elevation reference system used to define water levels within the Great Lakes-St. Lawrence River system.

International Joint Commission (IJC): The IJC is a bi-national organization established by the governments of Canada and the United States under the Boundary Waters Treaty of 1909. The IJC is responsible for regulating shared water uses, and investigating transboundary issues and recommending solutions.

Invasive species: A species or organism that is considered to be non-native to a particular region, and whose introduction does, or is likely to cause economic environmental harm or harm to human health.

Lakefill: Fill material that is placed in a lake.

Land-water interface: The point where the biotic and abiotic components of a terrestrial and aquatic ecosystem meet and interact.

Lee-side: The side of an object that is sheltered from the wind.

LIDAR: Light Detection and Radiation, or LIDAR, is a remote sensing method that uses light in the form of a pulsed laser to measure ranges (variable distances) to the earth. These light pulses, in combination with other data recorded by the airborne system, generate precise three-dimensional information about the shape of the earth and its surface characteristics.

Lithic scatter: A localized distribution of Indigenous artifacts that consists primarily of lithic (i.e., stone) material. The scatter may include discarded chipped or ground stone tools such as projectile points, scrapers or axes, or it may contain chipping debris from tool-making activities.

Littoral sediments: Natural deposits located in close proximity to a shoreline.

Littoral zone: The portion of the lake which is in closest proximity to the shoreline.

Mitigation measures: Measures which can lessen potential negative environmental effects or enhance positive environmental effects.

Nearshore: A zone of Lake Ontario that is located parallel to the shoreline and is generally less than 15 m deep.

Natural environment: Part of the human environment that contains natural components, such as vegetation, wetlands, fish and fish habitat, etc.

Natural heritage system: Consists of all of the natural cover in a region. It is often called a "system" because of the interactions and dependencies between and among its parts.

Net effects: Negative environmental effects of a project and related activities that are expected to remain after mitigation measures have been applied.

Non-native species: A species or organism that is considered to be exotic to a particular region.

Offshore: Zone of Lake Ontario located outside of the nearshore.

Open water channels: A channel designed for the purposes of water conveyance.

Overland runoff: Water resulting from surface runoff (i.e., stormwater), or water directed directly onto a slope (via downspouts, etc.).

Passive recreation: Includes lower impact outdoor recreational activities, such as swimming, biking and walking.

Pelagic: The open lake without direct contact with the bottom or the nearshore.

Physical environment: Part of the human environment that contains physical components, such as physiography, bedrock, climate, etc.

Preferred Alternative: An alternative that is considered to be preferred when compared to other options based on criteria which may include elements of the natural environment, socio-economic environment, and/or technical aspects (constructability).

Project Objectives: Project Objectives describe what the Project is ultimately trying to achieve if implemented.

Project Vision: The Project Vision is a high-level, guiding purpose of the Project.

Proponent: A person, agency, group or organization who carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

Provincially Significant Wetland (PSW): Wetlands that meet the criteria within the Ontario Wetland Evaluation System. This MNRF framework provides a standardized method of assessing wetland functions and societal values, which enables the province to rank wetlands relative to one another.

Ravine: A landform that was formed by running water and is often vegetated and narrow.

Revetment: A reinforced surface using brick, stone or another material, to protect an embankment.

Rip-rap: A layer of rock or other material used for protection against erosion by water.

Sediment: A material that occurs naturally and is broken down by the weathering process and often transported by water, wind or ice.

Sedimentation: The process of deposition of a solid material from a state of suspension or solution in a fluid (usually air or water). Geologically, this typically refers to soil particles being deposited by water bodies. It may also include deposits from glacial ice.

Shoreline: The terms “waterfront” and “shoreline” are used interchangeably in this EA and include both the top and toe of the Bluffs. The term “water’s edge” refers to the area along the toe of the Bluffs only.

Shoreline treatment: Various strategies associated with slowing the natural erosion process along a shoreline or coast.

Socio-economic environment: Part of the human environment that contains socio-economic components, such as land use, population, demographics, economy, etc.

Species at Risk (SAR): Naturally-occurring species in danger of local, provincial or federal extinction, as indicated under federal and/or provincial legislation.

Stonehooking: Mining of aggregate and sheets of bedrock from the lakebed for construction purposes conducted in the nearshore areas of Lake Ontario in the 1800s and early 1900s.

Storm surge: A coastal flood (rising water) typically associated with low pressure weather systems.

Stormwater runoff: Surface water runoff that typically occurs during storm events or other natural processes.

Surficial geology: The study of landforms and the sediment that is located underneath them.

Swale: A depression in a tract of land, often used as a drainage feature to convey and treat stormwater (as opposed to a roadside ditch).

Tablelands: A plateau or other high region sometimes located near a watercourse.

Talus: The soil that erodes off a slope face as a result of natural erosion processes (e.g., landslides) and accumulates at the base of the slope typically as a loose unconsolidated deposit.

Talus catchment area: An area designed to restrict falling talus (soil material) from running out over trails, roads, etc.

Terms of Reference (ToR): A document prepared by the proponent and submitted to the Minister of the MOECC for approval. The ToR establishes the framework for the planning and decision-making process to be followed by the proponent during the preparation of the EA Report. In other words, it is the proponent's work plan for what is going to be studied and includes a consultation plan. If approved, the EA must be prepared according to the ToR.

Thermal refuge: Thermally suitable areas for aquatic organisms given their temperature preferences.

Till: A deposit laid down by a glacier or ice sheet on a land surface. Till is highly variable in character, depending on the precise manner of deposition, but it is generally highly mixed (with particle sizes ranging from clay to boulders) and poorly stratified.

the Project: Refers to the Scarborough Waterfront Project. Also referred to as the "undertaking" for the purposes of the ToR and which is to be determined through the EA process.

Top and toe of the Bluffs: Generally the base of the Bluffs where it meets the beach and the upper edge of the Bluffs where it meets land at a higher elevation.

Topography: The study of the shape of the earth's surface and other surficial features.

Total Phosphorus: The sum of reactive (pure), condensed and organic phosphorus.

Total suspended solids (TSS): TSS are solid materials, including organic and inorganic, that are suspended in the water. These would include silt, plankton and industrial wastes.

Turbidity: Turbidity is the measure of relative clarity of a liquid. It is an optical characteristic of water and is an expression of the amount of light that is scattered by material in the water when a light is shined through the water sample. The higher the intensity of scattered light, the higher the turbidity. Material that causes water to be turbid include clay, silt, finely divided inorganic and organic matter, algae, soluble colored organic compounds, and plankton and other microscopic organisms.

Undertaking: An enterprise, activity or a proposal, plan or program that a proponent initiates or proposes to initiate (i.e., the Project).

Undulating shoreline: A shoreline with a non-linear, wave-like profile.

Waterfront: The terms "waterfront" and "shoreline" are used interchangeably in this EA and include both the top and toe of the Bluffs.

Water lot: Shoreline and submerged land lot.

Water's edge: The term "water's edge" refers to the area along the toe of the Bluffs only.

Watershed: The area of land that catches rain and snow that drains or seeps into a marsh, stream, river, lake or groundwater.

Windshield/walking survey: A survey method where systematic observations are made from a moving vehicle (windshield) and/or on foot (walking).

Acronyms and Abbreviations

AEM	Adaptive Environmental Management
ANSI	Area(s) of Natural and Scientific Interest
AODA	Accessibility for Ontarians with Disabilities Act
ATRIS	Aboriginal Treaty Rights Information System
BMPs	Best Management Practices
CAER	Community Awareness and Emergency Response
CEAA	*Canadian Environmental Assessment Act, 2012*
CMS	Coastal Modeling System
CSP	Corrugated Steel Pipe
DFO	Department of Fisheries and Oceans
EA	Environmental Assessment
EA Act	*Environmental Assessment Act, 1990*
EHL	Erosion Hazard Limit
ELC	Ecological Land Classification
ESA	Environmentally Significant Area(s)
GGHCA	Greater Golden Horseshoe Conservation Authorities
GHG	Greenhouse Gas
GIS	Geographic Information Systems
GTA	Greater Toronto Area
HEAT	Habitat/Ecosystem Assessment Tool
IGLD 1985	International Great Lakes Datum, 1985
ISMP	Integrated Shoreline Management Plan
LaMP	Lake Ontario Lakewide Management Plan
LCP	The Living City Policies for Planning and Development in the Watersheds of the Toronto and Region Conservation Authority
LIDAR	Light Detection and Ranging
MAA	Ministry of Aboriginal Affairs
mASL	Metres Above Sea Level
MNRF	Ministry of Natural Resources and Forestry
MOECC	Ministry of Environment and Climate Change
MP	Member of Parliament
MPP	Member of Provincial Parliament
MTCS	Ministry of Culture, Tourism and Sport
OASD	Ontario Archaeological Sites Database
PIC	Public Information Centre
PPS	Provincial Policy Statement
PSW	Provincially Significant Wetland
RER	Metrolinx Regional Express Rail
ROM	Royal Ontario Museum
SAR	Species at Risk
SARO	Species at Risk in Ontario

SWP	Scarborough Waterfront Project
TAC	Technical Advisory Committee
TIA	Traffic Impact Assessment
ToR	Terms of Reference
TRCA	Toronto and Region Conservation Authority
TSNS	Toronto Strong Neighbourhoods Strategy
TSS	Total Suspended Solids
TTC	Toronto Transit Commission
WRT	Waterfront Regeneration Trust
WT	Waterfront Toronto
WWFMP	Wet Weather Flow Master Plan
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

1. Introduction

Toronto and Region Conservation (TRCA), in partnership with the City of Toronto, are undertaking an Environmental Assessment (EA) for the Scarborough Waterfront Project (the 'Project'). The Scarborough Bluffs are an iconic feature of the Lake Ontario shoreline; however, due to limited access and existing public safety hazards, the water's edge along this section of the waterfront is not formally accessible to the public.

The Project will fulfill the strategic recommendations of previous planning processes and the City of Toronto Council direction (Resolution PW31.14 adopted on June 10, 2014) to address the existing risk to public safety and public infrastructure due to ongoing shoreline erosion and crest migration, and providing for increased public space while improving and enhancing the natural heritage system. The Scarborough Waterfront Project (SWP) supports and advances TRCA's Living City Policies, and the City of Toronto policies laid out in the Official Plan, which recognize the need to balance waterfront revitalization and public access with natural heritage and natural hazard protection and management. Public ownership of waterfront lands is a key means to managing natural hazards, while providing accessible open space integrated with opportunities for public enjoyment and aquatic and terrestrial enhancements.

In 1971, TRCA was designated the implementing authority for the 1967 Waterfront Plan, and by virtue of this, is responsible for the safe access to recreational spaces along the waterfront. In accordance with Section 28 of the *Conservation Authorities Act*, TRCA regulates development, interference and alterations in or near valleys, streams, wetlands and along the Lake Ontario shoreline. TRCA also has a delegated responsibility, as a Conservation Authority, to represent the provincial interest in natural hazards as described in Section 3.1 of the Provincial Policy Statement (PPS). TRCA provides technical advice to assist our public agency partners in implementing the natural hazard, natural heritage and water management sections of the PPS from a science-based, watershed perspective. With respect to the SWP, TRCA has a role in safeguarding terrestrial aquatic habitats, managing shoreline flood and erosion risk, and providing safe access to public recreational spaces.

The Project Vision is to create a system of greenspaces along the Lake Ontario shoreline which respect and protect the significant natural and cultural features of the Bluffs, enhance the terrestrial and aquatic habitat, and provide a safe and enjoyable waterfront experience.

The Vision of the SWP supports the strategic direction provided by the Official Plan, TRCA policies and other guiding initiatives and documents as will be described in the EA report, and summarized in Section 2 below. The study is being undertaken in accordance with the Ontario *Environmental Assessment Act*, as an Individual EA. The EA is utilizing an Objectives-based approach, where the Project Vision and Objectives were established early in the planning process through extensive public and Stakeholder consultation, and are used to describe the Project and structure the development and evaluation of Alternatives. Ultimately, the Project will identify the Alternative which best meets the Vision and Objectives (the 'Preferred Alternative').

The Project Objectives are to:

1. ***Protect and Enhance Terrestrial and Aquatic Natural Heritage Features and Linkages***
   The existing ecology in the Study Area is impacted by informal access, habitat fragmentation, and historic activities. The SWP will contribute to the better management of use and access of the shoreline, and contribute to the enhancement of the quality, size, shape and connectivity of aquatic and terrestrial habitats.

2. ***Manage Public Safety and Property Risk***
   While many areas of the shoreline are currently informally used by the public, ongoing risks to safety from shoreline erosion and crest migration exist. The creation of a system of greenspaces along the shoreline will comprehensively address existing risks to public safety and public property/infrastructure as a result of shoreline erosion and ongoing bluff crest migration, and provide the opportunity for safe, formal, public access.

3. ***Provide an Enjoyable Waterfront Experience***
   A trail along the waterfront to connect existing greenspaces is recognized as a long-term objective within a number of planning initiatives including the Official Plan and TRCA's Living City Policies. Planning and development of a comprehensive park and trail system to meet these recreational demands will work to relieve pressures on sensitive ecological areas and local communities, while managing informal access and use.

4. ***Consistency and Co-ordination with Other Initiatives***
   Significant community planning has occurred in this area, and there are a number of completed and ongoing studies and plans for this section of the Toronto waterfront. The Project will be consistent, and integrated with, these other initiatives.

5. ***Achieve Value for Cost***
   The Project aims to maximize the benefits in relation to the estimated cost (capital, operations and renewal costs).

TRCA is identified as the Project proponent, and will have responsibility for ensuring the design, construction and management of the Project in accordance with the EA, and other EA approvals as may be required, including compliance with terms and conditions of the EA approvals. As per the 1972 Waterfront Agreement, it is expected that the City of Toronto will be the responsible agency for the operations and maintenance of the future greenspace, including the operations and maintenance monitoring activities, as per the City of Toronto Parks Standards and Parks Plan. TRCA will continue to be the responsible agency for monitoring and renewal of the shoreline protection.

2. Purpose of the Undertaking

There is a long history of progressive and evolutionary planning for the Toronto waterfront. Planning started with the 1967 Waterfront Plan for the Metropolitan Toronto Planning Area, which introduced a shoreline management approach to limit shoreline erosion and creating a system of connected greenspaces and parks along the waterfront. The 1996 Integrated Shoreline Management Plan for the shoreline between Tommy Thompson Park and Frenchman's Bay provided a co-ordinated ecosystem-based approach for addressing erosion protection while providing safe public access and the creation of regional scale parkland and waterfront recreation opportunities. Planning has continued to evolve to better address both the recreational needs of the City of Toronto and the need to manage and protect significant natural spaces.

The Project is being planned using a rational comprehensive planning approach to resolve the remaining access, safety, and habitat enhancement opportunities. Planning is being undertaken in a holistic and integrated manner which is consistent with, and supports, the objectives of other City of Toronto plans and guidelines, including the Beaches Plan, Parks Plan 2013-2017, Bikeway Trails Implementation Plan, and Multi-use Trail Design Guidelines.

2.1 Study Area

Three study areas were considered: the Project Study Area, the Project Area and Regional Study Area (**Figure 1**).

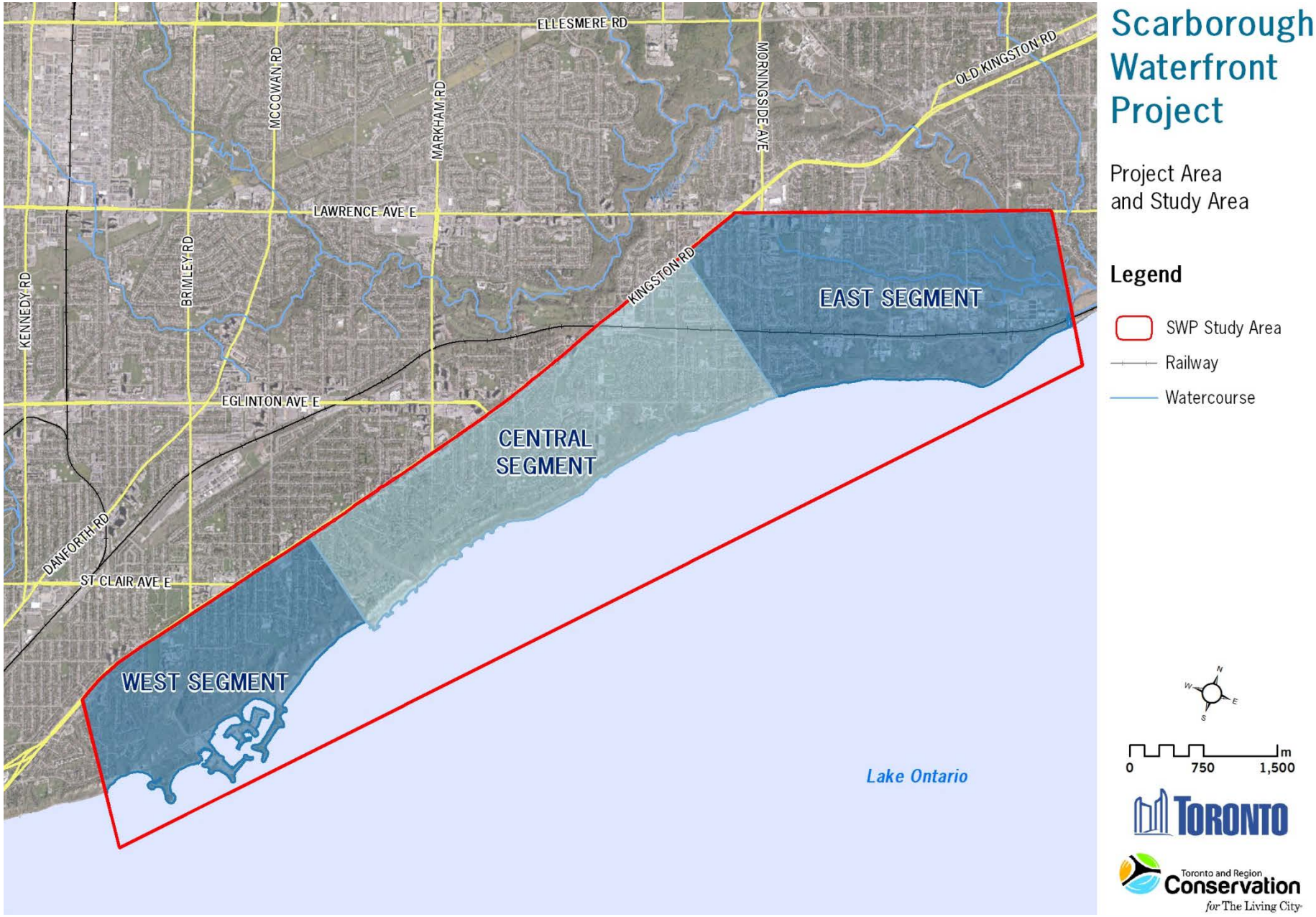
The **Project Study Area** refers to the area where potential effects were assessed, and extends approximately 11 km along the Lake Ontario shoreline from Bluffer's Park in the west to the mouth of the Highland Creek in the east, north to Kingston Road/Lawrence Avenue, and to a maximum of 1 km offshore. To help facilitate the Alternatives development and evaluation process, the Project Study Area was divided into three Shoreline Segments recognizing the distinct characteristics of each Shoreline Segment:

1. **West Segment:** Bluffer's Park to Meadowcliffe
2. **Central Segment:** Meadowcliffe to Grey Abbey
3. **East Segment:** Grey Abbey to East Point Park/Highland Creek

The **Project Area** refers to the area along the shoreline, including both the top and toe of the Bluffs, and the identified access routes, and is the area where Project works are identified.

In addition, for certain technical disciplines larger **Regional Study Areas** were identified to assess potential effects at the appropriate scale. These Regional Study Areas are described in the EA report, as appropriate.

Figure 1: Project Area and Study Area



3. Description and Evaluation of Alternatives

'Alternative Methods' are different ways carrying out the Project, that is to say, different ways of meeting the Project Objectives to address the risk from erosion, poor waterfront access, and limited habitat integrity. Given an understanding of baseline conditions and confirmation of the Problems and Opportunities within each shoreline Segment, Alternatives were developed as follows (**Figure 2**):

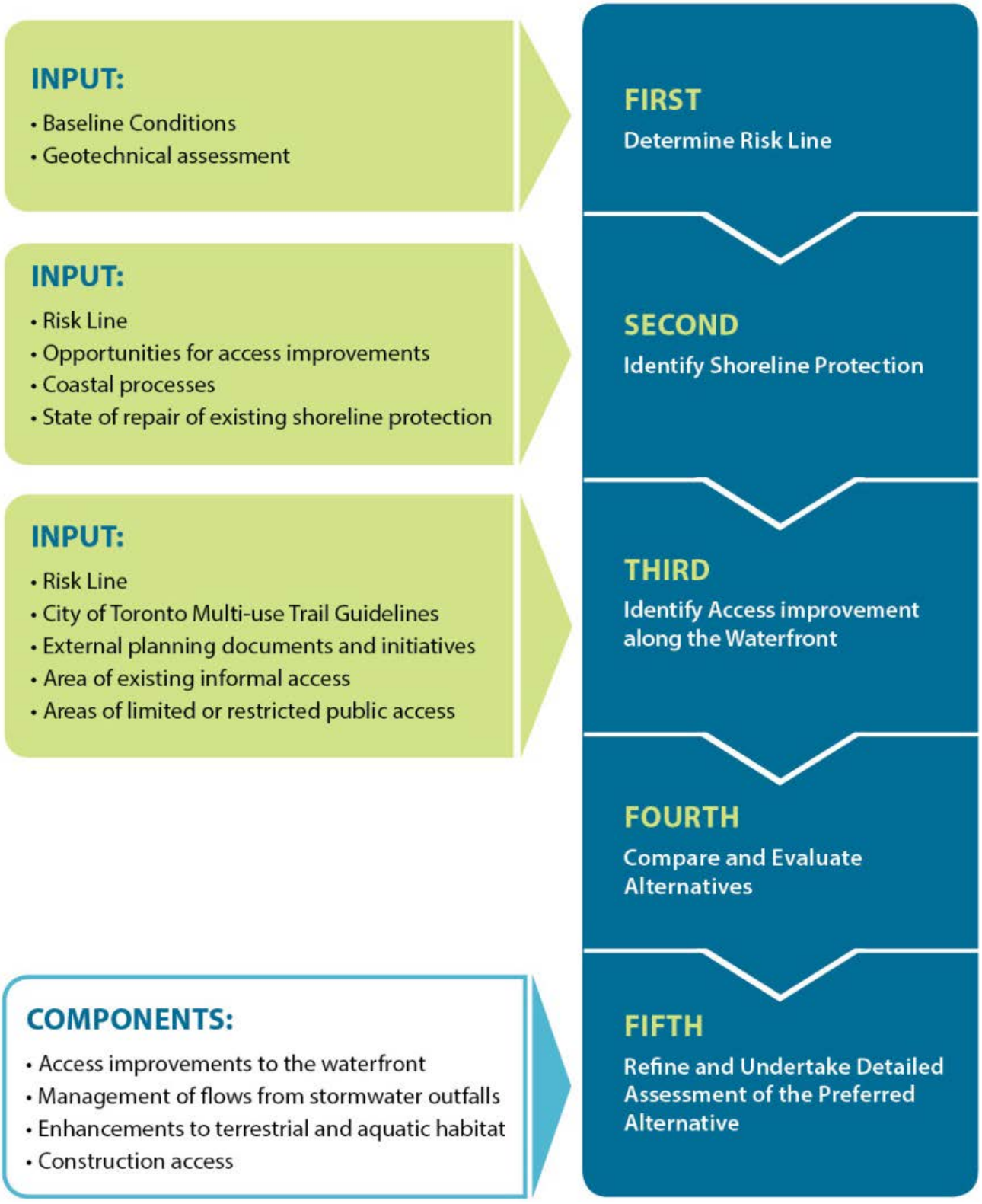
First	Determine risk line associated with slope crest migration and resulting talus accumulation.
Second	Identify shoreline protection options, considering the risk line and condition of existing shoreline protection works.
Third	Identify access improvements through trail routing.
Fourth	Identify Alternatives for each Segment to be evaluated and compared to choose the Preferred Alternative.
Fifth	Refine and undertake Detailed Assessment of the Preferred Alternative.

Through this framework, five distinct Alternatives were generated for the West Segment, two for the Central Segment, and five for the East Segment. Some Alternatives included 'sub-configurations,' which were variations of the same conceptual design (e.g., short-span bridge and long-span bridge). Each Alternative reasonably mitigated or managed risks to public safety, property, and infrastructure, and met the City of Toronto's Multi-use Trail Design Guidelines for a primary to high-capacity trail. Alternatives varied from each other based on the shoreline protection required to mitigate the risk to public safety and infrastructure, trail routing, and resulting differences in function, including habitat enhancement opportunities, arising from the shoreline protection.

For each Segment, the Alternatives were then evaluated against each other and the 'Do Nothing' Alternative, using Criteria and Indicators developed by the Project Team, with review and input from the public and other Stakeholders. The Criteria and Indicators measured the extent to which each Alternative achieved the Project Objectives through a comparison of the net effects, and were ranked relative to each other using a scale of Most Preferred, Preferred, Intermediate Preferred, and Least Preferred.

The complete description and evaluation of the Alternatives is documented in the EA, and a summary of the comparative evaluation by Objective is presented in **Section 3.1** to **Section 3.3**.

Figure 2: Four Stage Process to Develop and Evaluate Alternatives



3.1 West Segment

Bluffer's Park is a dominant physical feature in this Segment. The boat basin and headlands constructed for the Park in the 1970s have contributed to the stabilization and vegetation of the Bluffs located behind the Park and the accumulation of the sand beach to the east, which is designated as a Blue Flag Beach. The implementation of a berm and wetland along the backshore of this area in 2009 contributed to local water quality and habitat improvements, conditions which must be maintained or improved through the SWP.

The only access to Bluffer's Park is along Brimley Road, although the desire for improved access along this Segment (e.g., secondary access point) has long been identified by Emergency Services as an important consideration. In addition, there is no separated pedestrian or cyclist path along Brimley Road, which has been identified as an area with high cyclist-vehicle incidences. In the summer Bluffer's Park experiences very high use, with parking reaching capacity often early in the day. While a largely informal local trail network exists through Bluffer's Park, there is no east-west connection with the regional trail network, and the Waterfront Trail is setback from the water's edge along residential streets.

This Segment provides the only sheltered embayment habitat for aquatic species and there is limited aquatic habitat diversity along the open coast in the nearshore zone. Along the shoreline, dune vegetation exists in association with the Bluffer's Park Beach. The SWP provides the opportunity to enhance the aquatic habitat and expand the dune vegetation community.

The key geo-physical process related to Alternatives development in this Segment is the ongoing toe erosion and crest migration of the Cudia Park Bluffs. Under existing conditions, the Cudia Park Bluffs will start to self-stabilize over the next several decades, as sediment accumulates at the toe of the slope; however, crest migration would continue until a stable slope is reached. As a result of coastal conditions, the water, at times, is directly against the toe of the slope at Cudia Park Bluffs. While the public is currently using the toe of the slope in this area to connect over to the Meadowcliffe shoreline section (Central Segment), erosion from this part of the Bluff poses a risk to those walking along the shoreline, and is a consideration for any future trail along the toe of the slope. The risk mapping identified the risk line as being within 50 m of the current toe of slope location (**Figure 3**).

All Alternatives for the West Segment, with the exception of the "Do Nothing", include the provision of safe, formal, public access between Bluffer's Park and the Meadowcliffe shoreline (Central Segment) outside of this risk line. The Alternatives differ in how they provide this connection. **Table 1** provides a summary of the comparative evaluation.

Figure 3: West Segment Risk Line

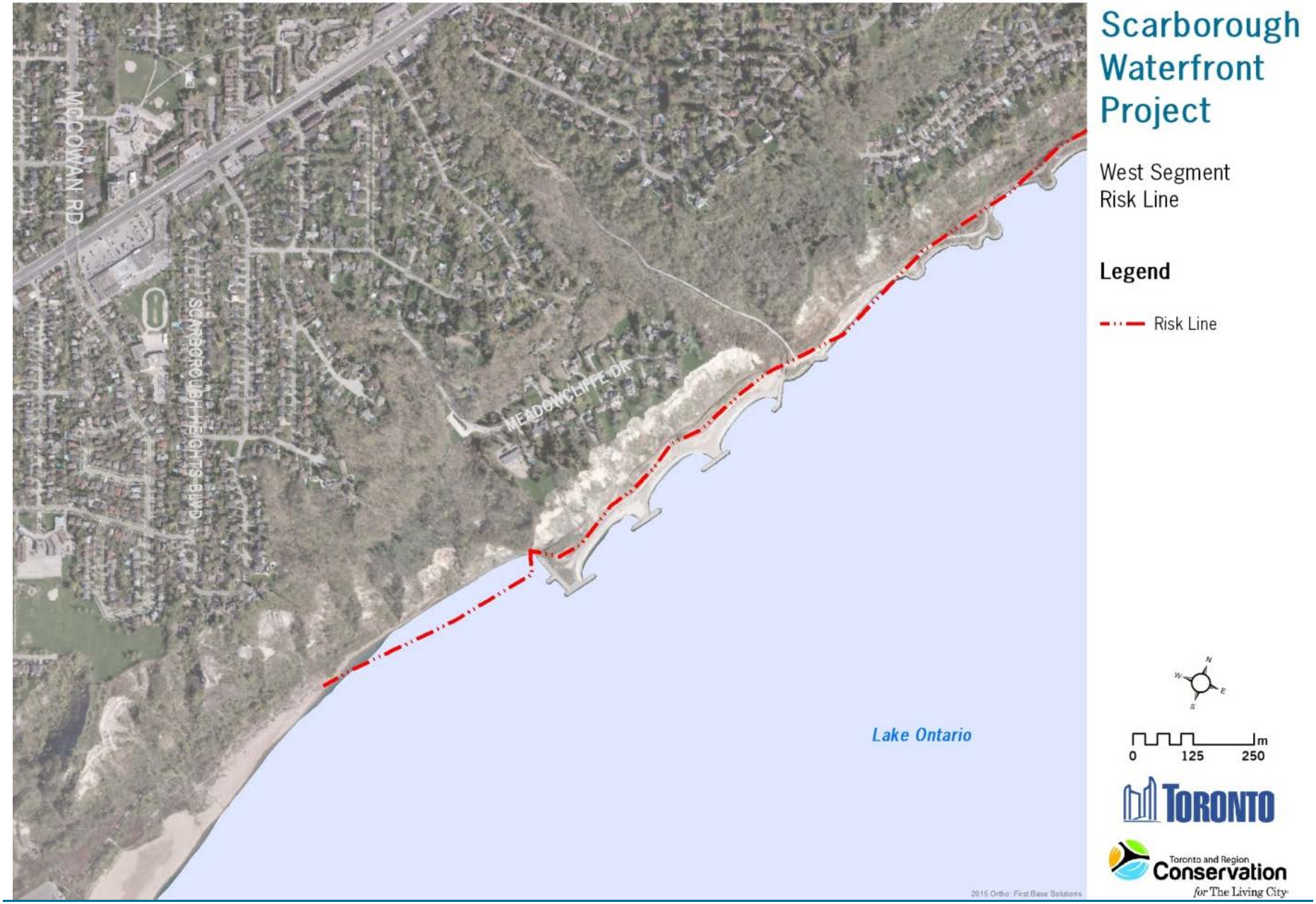


Table 1: Summary of Comparative Evaluation by Objective (West Segment)

Objective	Do Nothing[1]	Alternative 1[2]	Alternative 2A[3]	Alternative 2B[4]	Alternative 3A[5]	Alternative 3B[6]	Alternative 4[7]	Alternative 5A[8]	Alternative 5B[9]
Natural Environment	IP	P	IP	IP	IP	IP	LP	P	MP
Risk	LP	MP	MP	MP	MP	MP	MP	MP	MP
Experience	IP	P	IP	IP	IP	IP	IP	MP	MP
Co-ordination	LP	MP	MP	MP	MP	MP	MP	MP	MP
Cost	MP	P	IP	LP	P	IP	P	LP	IP
Overall	**Least Preferred**	**Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Preferred**	**Intermediate Preferred**	**Least Preferred**	**Preferred**	**Most Preferred**

Notes: 1. *Existing Conditions* 2. *Headland Beach* 3. *Short Span Bridge* 4. *Long Span Bridge* 5. *Short Span Island-Bridge* 6. *Long Span Island-Bridge* 7. *Causeway* 8. *Narrow Beach* 9 *Wide Beach*

Based on the comparative evaluation, Alternative 5B (Wide Beach) was identified as the Preferred Alternative for the West Segment (**Figure 4**).

3.2 Central Segment

The full length of the Central Segment has been subject to previous shoreline protection works and as such, the Bluffs are at varying stages of reaching their long-term stabilized slope. The existing shoreline protection between the Sylvan and Meadowcliffe shorelines, and the shoreline protection at the Guild Park and Gardens shoreline, were undertaken to provide temporary protection to tableland infrastructure until a comprehensive solution was developed.

While the more recently implemented headland beach systems at Meadowcliffe and Sylvan have improved fish habitat diversity in these areas, there remain sections of shoreline which provide limited aquatic habitat diversity (e.g., the Guildwood Parkway and South Marine Drive revetments). In addition, as the Bluffs have stabilized and vegetated, the corridor function of the area has improved, allowing terrestrial species to move along the shoreline and providing stop-over habitat for migrating bird species. The Project provides the opportunity to comprehensively improve the aquatic habitat.

Within this Segment, two stormwater outfalls discharge directly into Lake Ontario along the shoreline: at the base of Bellamy Ravine (Doris McCarthy Trail), and at the base of the Guild construction access route (which conveys stormwater and overland flows from along the ravine).

A shoreline construction access route runs along the water's edge throughout this Segment, which is used by the public as an informal trail. This informal trail is located at varying distances from the slope toe, with some sections almost directly adjacent to the slope toe. Based on the risk mapping, there are two shoreline sub-sections that do not have an adequate land base at the toe of the Bluff to provide a minimum separation distance for a trail from potential Bluff failure: the shoreline immediately west of Sylvan and the shoreline south of the Guild Park and Gardens (**Figure 5**).

All Alternatives for the Central Segment, with the exception of the "Do Nothing", involve extension of the land base immediately west of Sylvan and along the Guild Park and Gardens shoreline to provide

Figure 4: West Segment Preferred Alternative Concept



Figure 5: Central Segment Risk Line



long-term stability to the shoreline works, and safe public access along the shoreline, lakeward of the risk line. The Alternatives differ in the type shoreline protection proposed. **Table 2** provides a summary of the comparative evaluation.

Table 2: Summary of Comparative Evaluation by Objective (Central Segment)

Objective	Do Nothing[1]	Alternative 1[2]	Alternative 2[3]
Natural Environment	LP	MP	IP
Risk	LP	MP	MP
Experience	LP	MP	P
Co-ordination	LP	MP	MP
Cost	MP	IP	P
Overall	**Intermediate Preferred**	**Most Preferred**	**Preferred**

Notes: 1. Existing Conditions 2. Headland Beach 3. Revetment

Alternative 1 (Headland Beach) was ranked Most Preferred for four of the five Project Objectives, and Intermediate Preferred in terms of the *Achieve Value for Cost* Objective. It was determined by the Project Team that the additional benefits of Alternative 1 (Headland Beach) justify its additional costs; therefore it was identified as the Preferred Alternative for the Central Segment (**Figure 6**).

3.3 East Segment

The shoreline through the East Segment is generally unaltered and no shoreline protection exists, with the exception of approximately 490 m of privately owned shoreline where landowners and the City have installed private shoreline protection works in an attempt to address toe erosion. As a result, the crest will continue to migrate throughout much of this Segment (**Figure 7**).

At the western end of Grey Abbey Park, Greyabbey Trail (e.g., the road and associated infrastructure) is at risk from erosion within the planning timeframe of the Project (approximately 60 years). Erosion rates east of Grey Abbey Ravine are less and critical public infrastructure is set further back from the slope crest, therefore it will not be at risk within at least 100 years or longer (beyond the planning timeframe of the Project). This evaluation of risk to public infrastructure on the tablelands is based on the MNRF's *Understanding Natural Hazards: Great Lakes – St. Lawrence River System and Large Inland Lakes, River and Stream Systems and Hazardous Sites* technical guidelines (MNR, 2001).

In addition to the public infrastructure along the tablelands, there are two stormwater outfalls along the shoreline which discharge directly into Lake Ontario: at the base of Morningside Avenue, and at the base of the Beechgrove Drive extension. There is evidence of erosion resulting from overland flow just north of the outfall at the base of the Beechgrove Drive extension.

The shoreline from the eastern end of Guildwood Parkway to Beechgrove Drive is currently inaccessible. Approximately 540 m of this shoreline is in private ownership, which limits public access. As such, the Waterfront Trail is located on residential streets and is set well back from the water's edge. The proposed expansion of the Metrolinx Lakeshore East rail corridor, which crosses east-west through this Segment, may constrain some portions of both the off-road and on-road connections of the existing Waterfront Trail.

Figure 6: Central Segment Preferred Alternative Concept

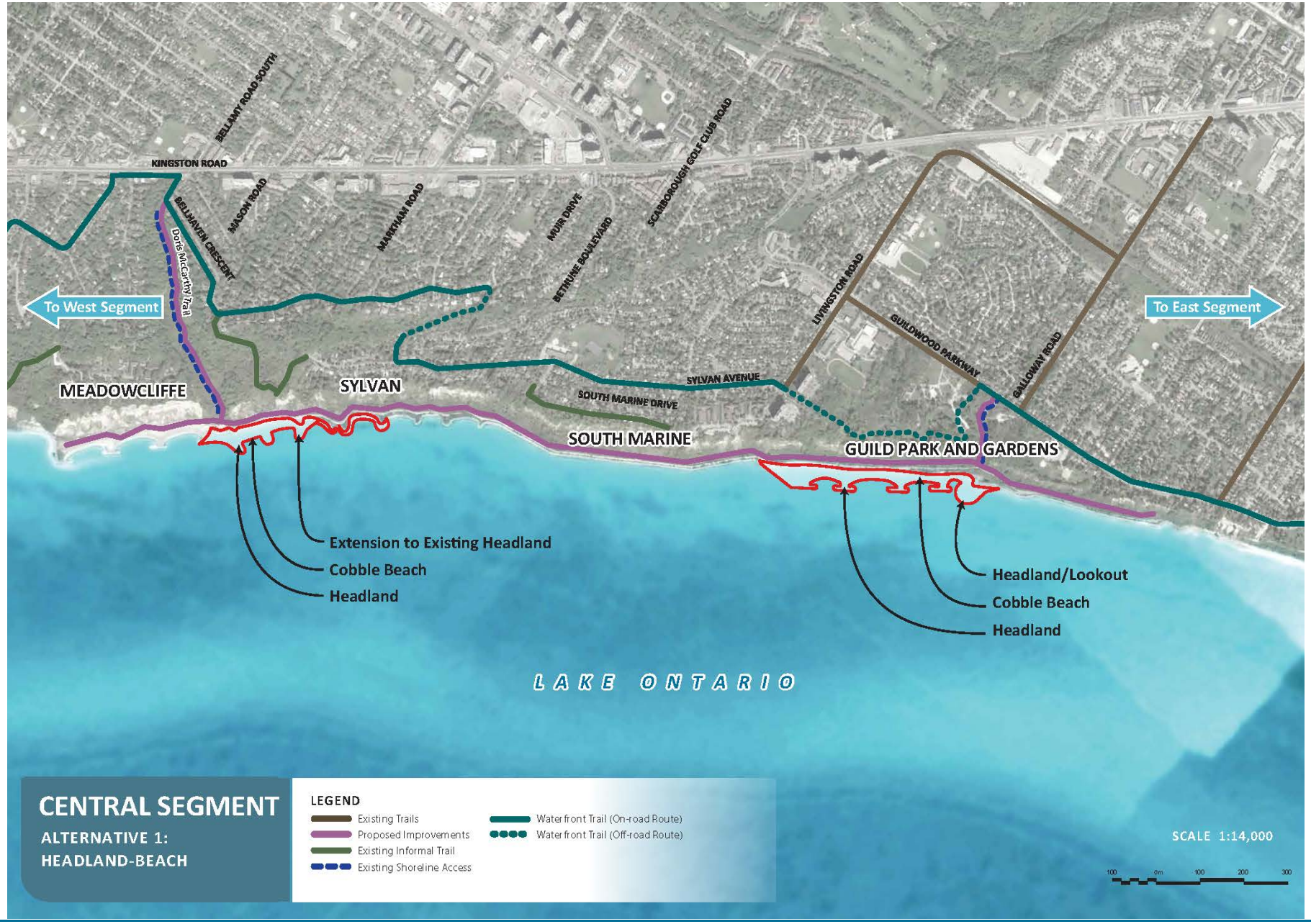
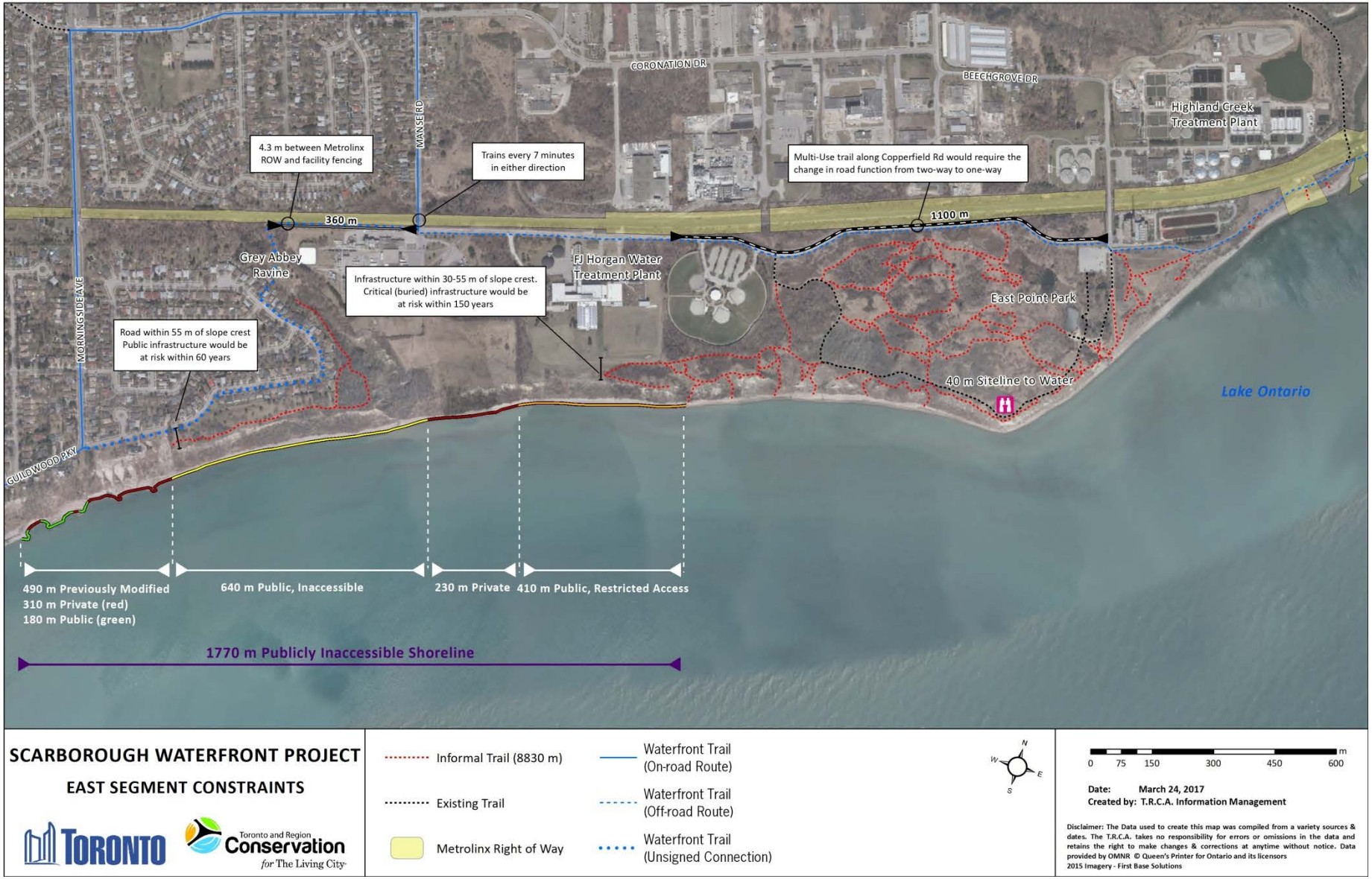


Figure 7: Constraints in the East Segment



As part of the rail corridor expansion, train traffic is expected to increase (i.e., either direction every seven minutes), further constraining the Waterfront Trail at the rail crossing on Manse Road.

The shoreline through East Segment provides limited aquatic habitat diversity as a result of historical stonehooking activities, which removed thousands of tonnes of stone and rock from the nearshore areas. There is no formal access connecting the tableland to the shoreline in the East Segment, and as a result, there are a number of informal foot trails down the bluff face throughout East Point Park, fragmenting the sensitive bluff communities, and reducing the integrity of the habitat. These pressures on the natural environment will continue to increase, as population numbers and density continue to grow.

While the shoreline through this Segment is used by the public, the available land base along the toe of the Bluffs is dependent on lake levels, with higher levels reducing or restricting the area of shoreline for walking. While the shoreline is accessed by the public, the risk mapping identifies the entire shoreline within the risk line, presenting an ongoing risk to public safety (**Figure 8**).

The Project provides the opportunity to improve public access to a currently inaccessible section of the Toronto waterfront, while addressing existing risks to public safety, and contributing to enhancements in terrestrial and aquatic habitat.

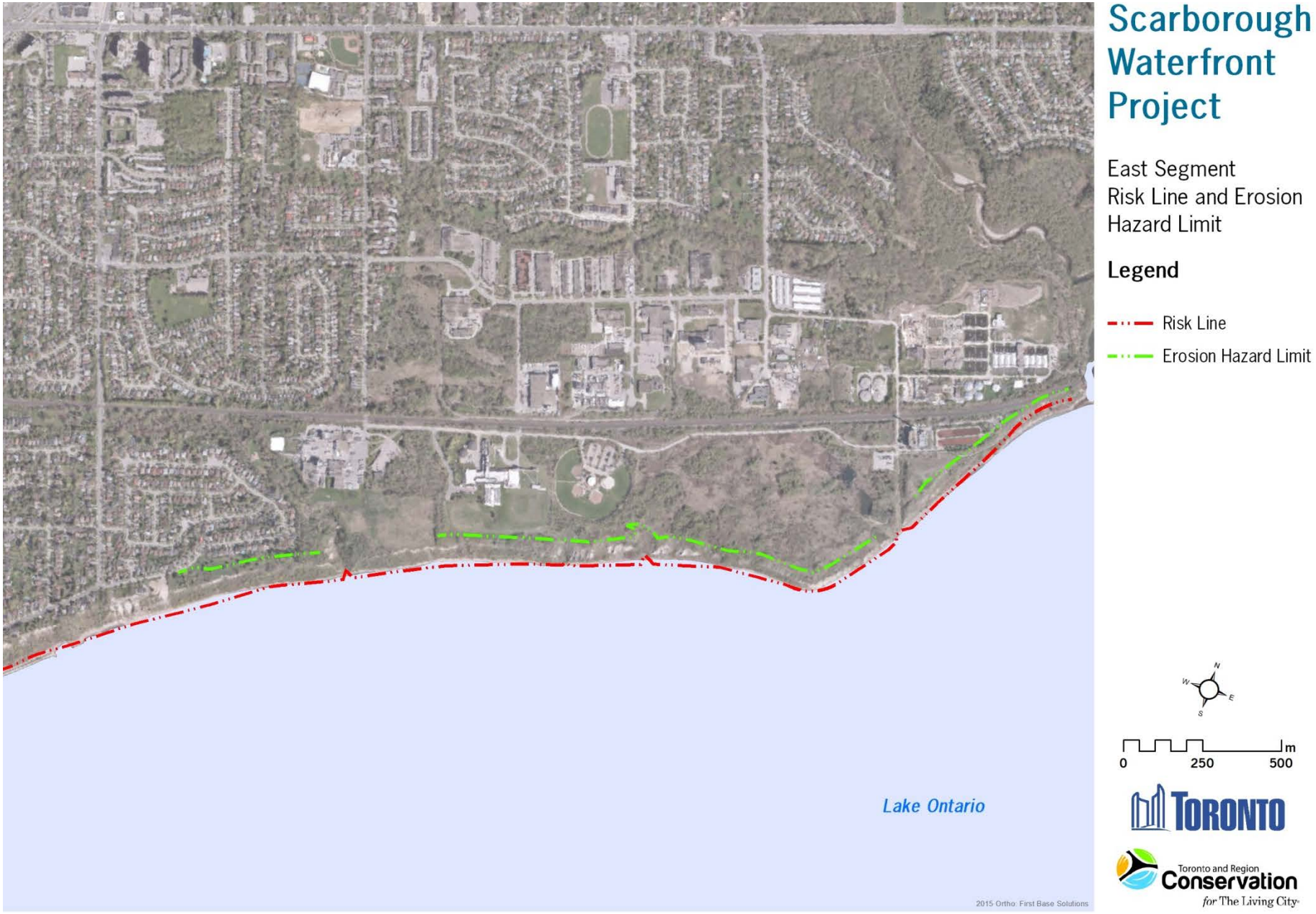
All Alternatives for the East Segment, with the exception of the "Do Nothing", provide improved public access to a currently inaccessible section of the waterfront, address existing risks to public safety, and contribute to improvements to the aquatic and/or terrestrial habitat. All Alternatives considered for East Segment, with the exception of the "Do Nothing" and Alternative 5 (Top of Bluffs Connection Over Grey Abbey Ravine), also involve an extension of the land base to comprehensively address the long-term risk to public property and infrastructure. The Alternatives differ in the type of shoreline protection proposed, and the location of the trail, which varies between the top and toe of the Bluffs. **Table 3** provides a summary of the comparative evaluation.

Table 3: Summary of Comparative Evaluation by Objective (East Segment)

Objective	Do Nothing[1]	Alternative 1A[2]	Alternative 1B[3]	Alternative 2A[4]	Alternative 2B[5]	Alternative 3A[6]	Alternative 3B[7]	Alternative 4A[8]	Alternative 4B[9]	Alternative 5[10]
Natural Environment	IP	P	LP	IP	LP	IP	LP	P	MP	IP
Risk	LP	P	MP	P	MP	P	MP	MP	MP	IP
Experience	IP	IP	IP	IP	IP	IP	IP	IP	P	P
Co-ordination	LP	P	P	P	P	P	P	MP	MP	IP
Cost	MP	P	P	IP	LP	LP	LP	P	P	P
Overall	**Intermediate Preferred**	**Preferred**	**Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Preferred**	**Most Preferred**	**Intermediate Preferred**

Notes:
1. *Existing Conditions*
2. *Headland Beach with Top of Bluffs Connection*
3. *Headland Beach with Base of Bluffs Connection*
4. *Bridge & Headlands with Top of Bluffs Connection*
5. *Bridge & Headlands with Base of Bluffs Connection*
6. *Island-Bridge & Headlands with Top of Bluffs Connection*
7. *Island-Bridge & Headlands with Base of Bluffs Connection*
8. *Headland Beach with Revetment to East Point Park*
9. *Headland Beach to East Point Park*
10. *Top of Bluffs Connection Over Grey Abbey Ravine*

Figure 8: East Segment Risk Line and Erosion Hazard Limit



Alternative 4B (Headland Beach to East Point Park) was identified as the Preferred Alternative for the East Segment, with a ranking of Most Preferred for four Objectives (**Figure 9**). While Alternative 4B (Headland Beach to East Point Park) has a relatively higher cost than half of the Alternatives proposed, it was determined by the Project Team that the additional benefits of the Alternative justify its additional cost.

4. Description of the Preferred Alternative

Following public, agency, and Stakeholder consultation on the Preferred Alternative, refinements were undertaken to the shoreline protection features and the following components were further defined:

- aquatic and terrestrial habitat features; and,
- access improvements to the shoreline.

4.1 Refinements to the Shoreline Protection

In response to public, agency, and Stakeholder consultation, refinements were undertaken to the shoreline protection which reduced the overall footprint; further enhanced the aquatic habitat; increased the length of sand shoreline maintained; and minimized the size of cobble required along the proposed cobble beaches. A summary of the key refinements to the conceptual design are summarized below, and are fully described in the EA report.

4.1.1 West Segment

Refinements to the West Segment Preferred Alternative include:

- The overall footprint of the expanded headland at Bluffer's Park was reduced, while still contributing to naturalization objectives and public access benefits, and reductions in sedimentation at the boat basin entrance (**Figure 10**).
- Addition of a cobble beach as a component of the expanded headland at Bluffer's Park to further contribute to cold water aquatic habitat.
- Interim build-out state defined through construction of a temporary groyne mid-way along the beach, in addition to a raised berm, which provides for immediate safe access to Meadowcliffe (Central Segment) and allows the remainder of the Bluffer's Park sand beach to gradually accumulate over time.

Figure 9: East Segment Preferred Alternative Concept

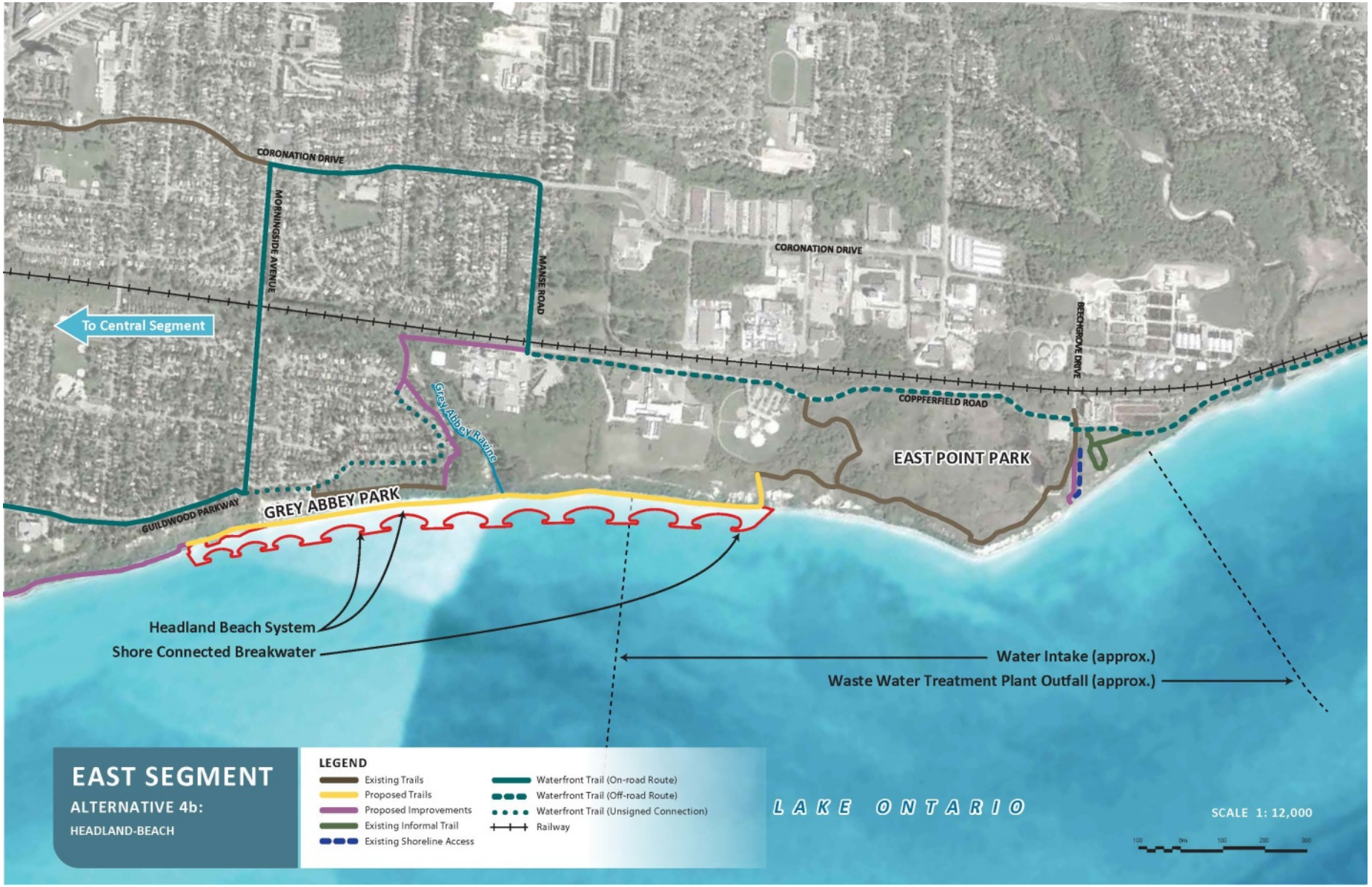


Figure 10: West Segment Refined Preferred Alternative Concept



4.1.2 Central Segment

Refinements to the Central Segment Preferred Alternative include:

- The overall footprint was minimized, while still providing safe, formal public access along the waterfront; long-term protection to the shoreline works; and further enhancing aquatic habitat (**Figure 11**).
- The eastern-most headland of the original headland beach system proposed at the base of Doris McCarthy Trail/Bellamy Ravine was found to sit within the recommended 20 m protection buffer of a marine archaeological resource. This resource is considered to have a high level of heritage value both provincially and locally. Resultantly, the eastern headland was pulled back outside the recommended 20 m protection buffer to avoid impact to the resource.
- The risk line along the Guild shoreline was produced on the basis of a conservative EA-level preliminary slope stability analysis (sections at 200 m to 300 m spacing, critical over-steepened locations only), and the existing construction access route along the shoreline in this section is within close proximity to the risk line. However, additional analysis has been done in this area to determine that a primary to high-capacity multi-use trail can be moved out of the risk line within the existing land base while still achieving aquatic habitat improvements through refinements to the revetment and enhancements to the nearshore area.
- Public gathering spaces at the base of Doris McCarthy Trail/Bellamy Ravine and the Guild construction access route.
- The addition of two small coastal wetlands on both the eastern and western sides of the public gathering space at the base of the Guild construction access route, and a shoreline wetland feature adjacent to the public gathering space at the base of the Doris McCarthy Trail/Bellamy Ravine have been identified.

4.1.3 East Segment

Refinements to the East Segment Preferred Alternative include:

- The overall footprint of the headland beach system was minimized, providing safe, formal public access along the water's edge to the east side of Grey Abbey Ravine and along the tablelands from the east side of the ravine through East Point Park. The refined headland beach system provides long-term erosion protection for the shoreline west of Grey Abbey Ravine, further enhances aquatic habitat beyond existing conditions, and maintains informal access to the sandy shoreline east of Grey Abbey Ravine (**Figure 12**).
- Refinement to the headland beach system to add diversity to the headlands, allow for vegetation of some headlands, and minimize the cobble size required.

Figure 11: Central Segment Refined Preferred Alternative Concept



Figure 12: East Segment Refined Preferred Alternative Concept



- Location of the trail transition from the shoreline to the tablelands was shifted approximately 650 m west to maintain a greater extent of sand shoreline. The tableland connection will be made by way of a corkscrew ramp with an expected ramp width of 2.4 m and grade of 7.5%.
- The trail along the tablelands will be designed to screen the adjacent industrial and infrastructure uses and to prohibit access. The trail would continue through East Point Park, connecting to the Port Union Waterfront Park to the east of the Project Study Area.

4.2 Aquatic and Terrestrial Habitat Enhancements

4.2.1 Terrestrial Habitat

Enhancements to terrestrial habitat associated with the Preferred Alternative include creating new naturalized habitat and enhancing the quality of the existing habitat. Terrestrial habitat features include meadow and successional habitats, as well as sand dune, beach, forest and wetland habitats.

Further, by contributing to the decommissioning of informal trails which currently fragment significant vegetation communities, particularly through the dune communities at Bluffer's Park and along the tablelands and bluff face at East Point Park, the functional size of these habitats will be increased. The proposed terrestrial habitat enhancements, by Segment, are presented in **Table 4**.

Table 4: Terrestrial Habitat Enhancements by Project Study Area Segment

Habitat Type	West	Central	East	Total
	Approximate ha			
Beach	6.4	--	--	6.4
Sand Dunes	1.3	--	--	1.3
Meadow	1.6	0.4	1.6	3.6
Successional	1.8	1.5	2.1	5.4
Wetlands	--	0.2	0.1	0.3
Wet Features	--	0.1	--	0.1
Forest	--	--	0.5	0.5
Manicured	--	0.3	--	0.3
Unvegetated shoreline	1.6	1.2	1.8	4.6

4.2.2 Aquatic Habitat

Enhancements to aquatic habitat associated with the Preferred Alternative include retrofitting existing shoreline structures and enhancing and/or designing the proposed structures such that their ecological value is maximized. An overview of the aquatic naturalization and habitat enhancements proposed is provided in **Table 5**, and where possible, combinations of techniques will be used. Specific locations, configuration and dimensions of the habitat enhancement features will be determined during the Detailed Design phase of the Project.

Table 5: Potential Aquatic Habitat Enhancement Techniques Overview

Naturalization/Habitat Enhancement Technique	Target/Benefit
Surcharging (Revetments and Headlands/Groynes)	▪ Improves habitat quality by diversifying habitat structure and shoreline profile
Shoreline Shoals	▪ Adds structural elements to improve nearshore habitat quality: improves foraging opportunities, increases essential habitat for cool and cold water species (open coast) and improves submergent vegetation (sheltered embayment)
Boulder Pavement Restoration	▪ Replaces coarse substrate to re-instate substrate diversity and increase habitat structural elements.

4.3 Access Improvements

Improvements to access routes to the water's edge were considered to connect the broader community to the future Waterfront Trail along the water's edge. While new opportunities for access to the shoreline were considered, constraints associated with private property, steep grades and significant vegetation communities limited access to existing routes along much of the Project Study Area. These site access routes include:

- Brimley Road South
- Doris McCarthy Trail/Bellamy Ravine
- Guild Construction Access Route
- Beechgrove Drive

4.3.1 Brimley Road

Brimley Road provides the only access to Bluffer's Park, with grades varying between 4% (upper third) to 17% (lower third), and limited safe access for pedestrians and cyclists. While a separated informal off-road path does exist on the east side of the road for the lower third of the ravine, pedestrians and cyclists need to walk along the road shoulder above this section without adequate separation from traffic. Pedestrian usage of the roadway can be significant during summer weekends when Bluffer's Park parking spaces are all occupied. Additionally, the ravine containing Brimley Road South is the site of a former landfill that limits the ability to cut into the ravine.

An at-grade path is proposed as it addresses the existing safety risks to pedestrians and cyclists, with limited cut required into the ravine. A path will extend from south of Barkdene Hills, to the entrance of Bluffer's Park, along the east side of Brimley Road.

4.3.2 Doris McCarthy Trail/Bellamy Ravine

Within the Bellamy Ravine the Doris McCarthy trail runs down to the shoreline. The grade is steep (up to 13%) along the upper and lower third sections of the trail. Bellamy Creek runs through the ravine along the west side of the trail, with sections of the existing trail bench cut into the steep side slopes.

It was determined that the impact to the natural heritage, and the overall cost, did not justify the benefit achieved in reducing the trail grade. Additionally, the lack of parking and formal trailhead infrastructure would have limited the broader regional use of the trail. As such, the Project Team recommends that the trail is not re-graded; however, other mitigation measures to improve accessibility, such as level rest areas, will be explored as part of Detailed Design.

4.3.3 Guild Construction Access Route

Adjacent to the Guild Park and Gardens, an existing construction access route provides informal access for pedestrians and cyclists to the shoreline. The grade of the construction access route is relatively steep (approximately 13%), with steep side slopes along sections.

It was determined that the impact to the natural heritage, and the overall cost, did not justify the benefit achieved by either reducing the grade of the construction access route, or creating an extensive switchback trail, as significant cut, fill and vegetation removal would be required for either option. As such, the Project Team recommends that in lieu of extensive works, other mitigation measures to improve accessibility, such as level rest areas, be explored as part of Detailed Design.

4.3.4 Beechgrove Drive

The stretch of Beechgrove Drive, south of Copperfield Road, is an unopened construction access route approximately 200 m long and terminates approximately 3 to 4 m above the sandy shoreline at an informal base node east of East Point Park. The overall grade of Beechgrove Drive is relatively uniform at 15%. As it is not possible to improve the grades along this access without having significant impacts on the adjacent areas and/or a large headland on the shore, the Project Team has recommended that improvements to the Beechgrove Drive extension are not included as part of the Project.

4.4 Operations and Maintenance

The SWP will require ongoing maintenance for a number of the design components. This includes shoreline protection features, naturalization components, recreational trails, and site access routes. A description of the maintenance activities associated with each of the design components of the SWP Preferred Alternative is detailed in the EA document.

4.5 Construction

It is anticipated that construction will proceed from west to east, and may take approximately 12 years; however, this timeframe will be refined as the construction activities are further described through refinements to the Preferred Alternative, and material and funding availability confirmed as part of Detailed Design.

4.5.1 Construction Access

Alternative construction access routes were developed by considering existing access to the shoreline. Two potential access points were identified:

- Brimley Road to Bluffer's Park
- Existing Guild Construction Access Route

It is proposed that Brimley Road be used in the off-peak season (October to April) for the construction of the West Segment and potentially Sylvan, while it is proposed that the Guild construction access route be used year-round to construct the remainder of the Central and East Segments.

A Traffic Impact Assessment (TIA) was undertaken to characterize current traffic patterns and to model future traffic patterns with the additional construction traffic along both proposed routes. The results of this analysis determined that the addition of construction traffic along Brimley Road between October and April would not have an impact on the existing conditions; however, discussions with the City of Toronto Transportation Services will continue in order to confirm the use of Brimley Road as an appropriate construction access route.

The TIA also analyzed the feasibility of various routes through Guildwood Village from Kingston Road to the Guild construction access route, including Morningside Avenue, Galloway Road and Guildwood Parkway. The results of the analysis identified a preferred inbound route along Morningside Avenue, and a preferred outbound route along Galloway Road.

Additional mitigation measures are described in the EA report, and will be comprehensively explored further as part of Detailed Design. Additional opportunities for construction access will also be explored as part of Detailed Design.

4.5.2 Construction Activities

Following acquisition of required unpatented Crown water lots and private property, and after receipt of all required permits and approvals, construction activities will commence.

It is anticipated that during the winter months materials will be stockpiled on the eastern headland in Bluffer's Park to permit construction through the summer months when access along Brimley Road is not possible. During Detailed Design the possibility of construction of the Bluffer's Park headland from the water using barges will be investigated in an attempt to minimize impacts on local residents and roadways.

The standard construction techniques to be utilized for the main Project components are further described in the EA.

5. Detailed Assessment of the Preferred Alternative

A detailed assessment of the Preferred Alternative was undertaken using the Criteria and Indicators developed for the comparative evaluation of Alternatives as a basis for identifying the net effects of construction and/or operation/establishment of the Project. It was determined that the positive benefits of the Project in providing safe public access to a section of the Toronto waterfront that is currently inaccessible, while enhancing the aquatic and terrestrial environments, exceeds any potential negative effects during construction. A summary of the results by Project Objective is provided below.

5.1 Objective 1: Protect and Enhance Terrestrial and Aquatic Natural Features and Linkages

Objective 1 is to protect and enhance terrestrial and aquatic natural features and linkages within the Project Study Area. The Project Study Area habitat will undergo changes along the Lake Ontario shoreline, tablelands and construction access routes and laydown areas both during and following construction. Approximately 2.90 ha of terrestrial habitat is anticipated to be removed to facilitate construction, while approximately 17.6 ha of new naturalized habitat is to be created as part of the Project. Approximately 20 ha of nearshore open coast aquatic habitat is to be lost and 16 ha altered, with an overall reduction in the length of sand shoreline. However, the shoreline irregularity will be increased, along with increases in the length of cobble and armourstone (boulder) shoreline, providing more diverse aquatic habitat overall, relative to existing conditions.

Overall, the Preferred Alternative for the SWP provides an improvement to the ecological conditions within the Project Study Area through the provision of functional nearshore open coast and terrestrial habitat. The loss or alteration of poorer quality habitat is offset by the creation of higher quality aquatic and terrestrial habitat, while disruptions to fish and terrestrial wildlife are offset by the implementation of appropriate mitigation measures during construction. Therefore, the Preferred Alternative meets the Objective to protect and enhance terrestrial and aquatic features and linkages.

5.2 Objective 2: Manage Public Safety and Property Risk

Objective 2 seeks to manage risks associate with natural slope crest migration at both the toe and top of slopes, public safety risk from wave uprush/overtopping, resiliency to climate change, improve access for Emergency Services, protect water quality, and manage safety risks for pedestrians and cyclists accessing the shoreline. The Criteria and Indicators assessed for this Objective are only applicable in the operation/establishment phase.

Implementation of the SWP will result in a positive change to managing public safety risk and public property risk related to slope erosion/failure, wave uprush/overtopping, resilience to climate change, access for Emergency Services, protection of water quality and management of safety risks for pedestrians and cyclists accessing the shoreline. Therefore, the Preferred Alternative for the SWP meets the Objective to manage public safety and public property risk.

5.3 Objective 3: Provide an Enjoyable Waterfront Experience

The purpose of Objective 3 is to ensure that any changes to the waterfront resulted in an enjoyable waterfront experience. A large number of Criteria and Indicators were assessed for this Objective for both construction and operation/establishment.

The construction period for the SWP is approximately 12 years; however, the actual construction activities are unlikely to be in any one location for the entire duration so the location of effects will change as construction activities occur in different places. Most nuisance effects from construction for recreational users will be short-term and localized.

Implementation of the SWP results in a positive change to the waterfront experience for recreational users. Recreational users will experience some construction nuisance effects that may detract from their experience at times but these are anticipated to be localized and short-term effects. Once operational the SWP will create a positive recreational experience when compared with existing conditions.

5.4 Objective 4: Consistency and Co-ordination with Other Initiatives

Objective 4 measures consistency and co-ordination with other initiatives; therefore, the Preferred Alternative was evaluated for alignment with plans, policies and existing land uses.

Overall, the SWP supports and integrates well with City and other agency plans and initiatives. There are three marine archaeology sites for which effects will be avoided or mitigated. The SWP is compatible with existing land uses, with the exception of the industrial facility in the vicinity of East Point Park as industrial representatives have raised concern regarding the proximity of the facility to the proposed trail. It is also recognized that the Guildwood community will experience a cumulative effect from disturbances associated with construction activities and construction traffic from multiple projects over an extended period of time. Given the nature of cumulative effects it is necessary to put in place mitigative measures that address the effects from all sources. To this end, TRCA will work with Metrolinx, the City of Toronto and the TTC to put in place a plan to co-ordinate construction traffic through the neighbourhood to minimize ongoing effects. These negative cumulative effects are relatively short-term and are outweighed by the positive long-term benefits of the SWP locally and regionally. Therefore, the SWP meets the Objective of integrating with City and other agency plans and initiatives.

5.5 Objective 5: Achieve Value for Cost

Objective 5 measures the Project's ability to achieve value for cost by maximizing the benefits in relation to the estimated capital and renewal costs. The estimated capital cost for the Project is $170 million and includes a 50% contingency and acquisition of approximately 28 ha of water lots and approximately 14 ha of private property. Renewal costs of $2,500 per linear metre of new shoreline protection works, as required, are anticipated, but not until the structures have been in place for

approximately 25 years. Based on support from the City of Toronto, the SWP achieves value for cost by managing risks to users and public infrastructure and providing a public amenity.

6. Monitoring and Adaptive Environmental Management

A comprehensive monitoring program is a critical element of the Project and provides several functions throughout the life of the SWP:

1. **Baseline conditions monitoring** during pre-design and Detailed Design will continue to provide data that will inform Detailed Design elements and identify changes to the existing environment that may affect Project outcomes.
2. **EA compliance monitoring** will ensure compliance with EA commitments and ensure that the Project is constructed according to the final design elements; and,
3. **Environmental performance monitoring** will measure if the Project functions as intended during operation/establishment phase and facilitate adaptive environmental management (AEM) of the new system.

A comprehensive AEM approach will be used to address long-term environmental change, maintain flexibility in strategies to achieve desired outcomes, and to ensure that up-to-date information is available for Detailed Design. This will ensure that the Project continues to function as designed and Project Objectives continue to be achieved through positive feedback mechanisms.

The AEM framework is a cycle of monitoring, evaluation, adaptation, and learning that will allow designers and project managers to maximize project benefits while minimizing negative effects. The details of the plan will be defined during Detailed Design as Project designs are finalized.

7. EA Amendment Process

The AEM strategy may trigger proposed modifications to the Project design and/or construction scheduling if Project effects are not anticipated or Objectives are not being achieved. A detailed method to identify the types of modifications that will trigger further environmental approval (EA amendments) will be developed for this purpose.

TRCA will be responsible for reviewing monitoring data and identifying opportunities to alter or improve the project management, design and/or construction phasing. When a need to modify the Project is identified, an internal effects assessment will be conducted to assess the impact of the modifications on environmental components (as predicted in the EA) and desired Project outcomes. Wherever possible, any proposed modifications will minimize adverse environmental effects and/or maximize Project benefits. This effects assessment will determine the need (or lack thereof) for further review by the appropriate regulatory body, such as the MOECC. If modifications to the Project do not

worsen the predicted effects and do not represent a major perceived change from the perspective of the public and/or agencies, they can be easily implemented through the existing regulatory process.

8. Consultation

All consultation activities that took place as part of the Project EA are documented in the EA report. Consultation for the Project was co-ordinated according to the MOECC's *Code of Practice: Consultation in Ontario's Environmental Assessment Process* (MOECC, 2007).

Throughout the Project, the Project Team strove to provide appropriate, flexible, and convenient opportunities for consultation, and provide clear documentation of all consultation activities. Throughout the Terms of Reference (ToR) and EA phases of the Project, various opportunities for the public, agencies and other Stakeholders to provide input into the Project were provided. Consultation initiatives brought diverse Stakeholders and community members together, and a range of interested parties were invited to, and participated in, the consultation activities undertaken in support of the Project.

In addition to the Project website (www.trca.ca/swp), and the Project Newsletter (by email subscription), the SWP has included two Public Information Centres (PICs) as part of the TToR phase, and three PICs for the EA phase of the Project. In addition to the PICs, regular Stakeholder Committee meetings were held to provide a forum for various residents, community and interest groups to provide insight and feedback to the Project Team.

The Project Team also strived to engage with the local community, including direct outreach in parks and at community events, presentations to local community groups and associations, meetings with interested residents, and regular updates with the local Councillors, MPPs and MPs.

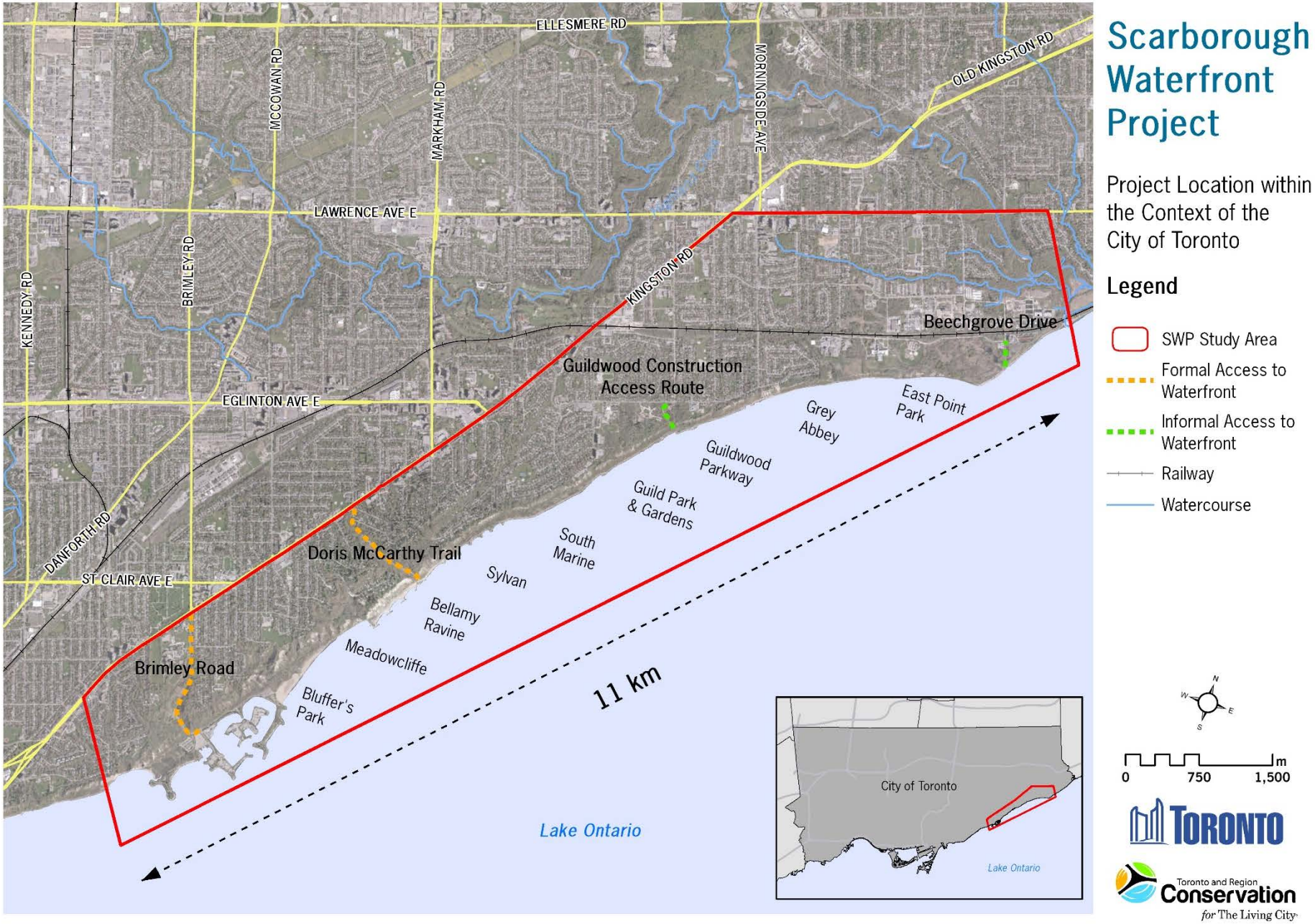
1. Introduction

Toronto and Region Conservation Authority (TRCA), in partnership with the City of Toronto, is proceeding with an ***Environmental Assessment (EA)***[1] for the Scarborough Waterfront Project (SWP), from Bluffer's Park east to East Point Park in the City of Toronto (**Figure 1-1**). This section of the Scarborough ***waterfront*** has been the subject of many studies seeking to understand stressors on the ***ecosystem***, public access issues and the nature of public safety and property risks posed by shoreline erosion. While the Scarborough ***Bluffs*** are an iconic feature of the Lake Ontario shoreline, due to limited public access and existing public safety hazards, the ***water's edge*** along this section of the waterfront (or shoreline)[2] is not formally accessible to the public. Ultimately, the SWP has the potential to create a regional destination park, which would provide formal public access along a currently inaccessible area of the Scarborough waterfront between Bluffer's Park and East Point Park, while comprehensively addressing the risks to public safety and public property and enhancing the ***natural heritage system***.

The City of Toronto Official Plan and TRCA's Living City Policies are guiding planning documents for the SWP, which recognize the need to balance waterfront revitalization and public access with natural heritage and natural hazard protection and management. There is no formal public access along the shoreline between Bluffer's Park and East Point Park (approximately 11 km), as a result of the steep grades, public safety risks due to ongoing shoreline erosion and ***crest migration***, private property, and restricted access associated with critical public infrastructure. TRCA's Living City Policies recognize that public ownership of waterfront lands is a key means of managing natural hazards while providing accessible open space integrated with opportunities for public enjoyment, and aquatic and terrestrial enhancements. The City of Toronto Official Plan recognizes that over time, lands along the water's edge should become part of a network of publicly accessible open spaces offering a range of leisure activities connected by a contiguous Waterfront Trail. Policies in the Official Plan support actions that will improve, preserve and enhance these lands by improving public access and enjoyment of lands under public ownership; maintaining and increasing public access to privately owned lands, where appropriate; and restoring, creating and protecting a variety of landscapes (Section 2.3.2 and Policy 2.3.2.1). TRCA's Living City Policies further supports this framework, and lays out a strategic direction for "*preventing, eliminating, or reducing the risk of flood and erosion hazards to life and property (Section 7.2.4, Policy a)"* and "*promoting an integrated approach to revitalization of the waterfront (Section 7.2.4, Policy b)"* through "*increased public access, recreational opportunities and continuous trail system (Section 7.2.4, Policy b.i)";* while enhancing the terrestrial and aquatic natural habitats of the ***shoreline***.

1. *All words bolded and italicized throughout the document are defined in the glossary.*
2. *Note that the terms "waterfront" and "shoreline" are used interchangeably in this report and include both the **top and toe of the Bluffs**. The term "water's edge" refers to the area along the toe of the bluff only.*

Figure 1-1: Project Location Within the Context of the City of Toronto



In 1971, TRCA was designated the implementing authority for the 1967 Waterfront Plan, and by virtue of this, is responsible for the safe access to recreational spaces along the waterfront. In accordance with Section 28 of the *Conservation Authorities Act*, TRCA regulates development, interference and alterations in or near valleys, streams, wetlands and along the Lake Ontario shoreline. TRCA also has a delegated responsibility, as a Conservation Authority, to represent the provincial interest in natural hazards as described in Section 3.1 of the Provincial Policy Statement (PPS). TRCA provides technical advice to assist public agency partners in implementing the natural hazard, natural heritage and water management sections of the PPS from a science-based, watershed perspective. With respect to the SWP, TRCA has a role in safeguarding terrestrial and aquatic habitats, managing shoreline flood and erosion risk, and providing safe access to public recreational spaces.

The SWP supports and advances the City of Toronto policies laid out in the Official Plan and TRCA's Living City Policies by addressing the existing risk to public safety and public infrastructure due to erosion along the shoreline, and providing for increased public space while improving and enhancing the natural heritage system.

The SWP is subject to the requirements of the Ontario ***Environmental Assessment Act (EA Act)*** as an Individual Environmental Assessment (EA). This document is the ***EA Report*** and was completed in accordance with the ***Terms of Reference (ToR)*** approved December 15, 2015 (**Appendix A**) and in accordance with the "Code of Practice: Preparing and Reviewing Environmental Assessments in Ontario" (MOECC, 2014). Following completion of the draft EA public review (from August 17, 2017 to October 2, 2017) this report was finalized and submitted to the Ministry of Environment and Climate Change (MOECC) for review and an approval decision.

1.1 Project Background

There is a long history of progressive and evolutionary planning for the Toronto Waterfront. The "Waterfront Plan for the Metropolitan Toronto Planning Area" (1967) introduced a shoreline management approach to limit shoreline erosion while creating a number of large parkland areas and public boat basins connected by a Waterfront Trail system. In 1970, TRCA was designated by the Province as the lead implementing agency for the Etobicoke to Ajax shoreline, with the exception of the central harbour sector, and led the creation of waterfront plans and programs based on an integrated shoreline management approach. In 1992, the Royal Commission on the Future of the Toronto Waterfront (Royal Commission) released its final report entitled "Regeneration: Toronto's Waterfront and the Sustainable City," which outlined the lack of a coordinated, ecosystem approach to shoreline regeneration. The Royal Commission recommended that a shoreline regeneration plan be prepared to protect and regenerate the Lake Ontario shoreline from the City of Burlington in the west to the community of Newcastle in the east.

To implement this recommendation, the Ontario Government established the Waterfront Regeneration Trust (WRT) in June of 1992. To fulfill its mandate, the WRT initiated the creation of a Shoreline Management Strategy for the Lake Ontario shoreline from Burlington Bay to the Trent River. The Shoreline Management Strategy became a component of the overall "Lake Ontario Greenway Strategy" released by the WRT in May 1995.

The "Lake Ontario Greenway Strategy" (WRT, 1995) recommended that Integrated Shoreline Management Plans (ISMPs) be developed to provide a framework for future development and management of the Lake Ontario shoreline. Based on the traditional shoreline hazard management activities undertaken by Conservation Authorities, in accordance with Ontario Regulation (O. Reg.) 166/06, ISMPs were intended to be more comprehensive in their scope, providing a coordinated ***ecosystem-based approach***, addressing the need to limit high rates of erosion, while enabling safe public access, and the creation of regional scale parkland and waterfront recreation opportunities.

The SWP is being planned using a rational comprehensive planning approach to resolve the access, safety and habitat integrity issues between Bluffer's Park and East Point Park in an integrated manner such that the needs of the ecosystem and the residents of the City of Toronto are met. Planning of this Project builds on past planning efforts, but is informed by the latest understanding of scientific approaches to coastal engineering, ecosystem management and park and trail planning.

1.2 Project Vision and Objectives

The development of the ***Project Vision and Objectives*** draws from the strategic direction provided by the Official Plan, TRCA policies, the ISMP and other guiding initiatives and documents, as described in **Chapter 2** of this EA Report. In addition, consultation specifically focused on the Project Vision and Objectives was undertaken as part of the development of the ToR, and feedback helped refine them. The Vision and Objectives have been used to describe the Project and structure the development and evaluation of Alternatives.

The Project Vision is a high-level, guiding purpose of the Project. The Project Objectives describe what the Project is ultimately trying to achieve if implemented.

Arising from stakeholder input received through the ToR, the Project Vision is to create a system of ***greenspaces*** along the Lake Ontario shoreline which respect and protect the significant natural and cultural features of the Bluffs, enhance the terrestrial and aquatic ***habitat***, and provide a safe and enjoyable waterfront experience.

The Project Objectives are to:

- **Protect and Enhance Terrestrial and Aquatic Natural Features and Linkages**
  Habitat type, health and sensitivity vary in the Project Study Area. While much of the Project Area lacks aquatic ***habitat integrity***, there exists potential to add to the quality of this habitat. There are opportunities to enhance and incorporate aquatic habitat within existing and proposed shoreline works. Further, increased public use of the area, including informal access trails, has affected the terrestrial ecology through ***habitat fragmentation*** and impact on sensitive communities. There is the potential to improve the ecology through the better management of public access. As the population in south Scarborough grows through denser development, these pressures and effects will increase. This Objective is consistent with broader objectives articulated in other studies such as: The Lake Ontario Fish Community Objectives, Toronto Waterfront Aquatic Habitat Restoration Strategy, and the City of Toronto Official Plan.

- **Manage Public Safety and Property Risk**

  Erosion risks within the Project Area include both ***geotechnical*** components (crest migration) and coastal components (shoreline erosion). In accordance with O. Reg. 166/06, previous TRCA initiatives along the shoreline have addressed specific areas at high risk due to erosion by providing shoreline protection. However, a comprehensive solution to managing public safety, access and public property risk has not previously been sought. The SWP is an opportunity to mitigate remaining public safety risks as they relate to access to/from and along the shoreline, and provide formal public access. Risk to public property includes public infrastructure (such as roads), and public park space located at the top of the Bluffs, which are vulnerable to ongoing shoreline erosion and crest migration. This Objective is consistent with broader objectives articulated in other studies such as the City of Toronto Official Plan and TRCA's Living City Policies.

- **Provide an Enjoyable Waterfront Experience**

  A number of factors contribute to an enjoyable waterfront experience. For example, diversity of experience, views and vistas, multi-use trail connections, and education/appreciation of the natural and cultural features of the Bluffs. The Project provides the opportunity to build on existing greenspace areas, including Bluffer's Park and East Point Park. A trail along the waterfront to connect existing greenspaces is recognized as a long-term objective within a number of planning initiatives, including the Official Plan and the TRCA's Living City Policies. Population growth and changing patterns of recreational use will create increasing pressure for access to and along the waterfront. Planning and development of a comprehensive park and trail system to meet these recreational demands will work to relieve pressures on sensitive ecological areas and local communities, while managing informal access and use.

- **Consistency and Coordination with Other Initiatives**

  Significant community planning has occurred in this area. The Project will be consistent with, and coordinated with, other initiatives, including the Lake Ontario Greenway Strategy, Urban Recreational Fisheries Strategy, Guild Park and Gardens Management Plan, the proposed Metrolinx Lakeshore East rail corridor expansion, existing land uses, and other local community initiatives. If possible, the Project needs to build on and complement these other initiatives. Furthermore, the Project needs to be sensitive to community concerns (i.e., construction traffic) and not create new or unnecessary impacts. As an example, there is the potential for increased vehicle traffic to be attracted to the local area as a result of new greenspace and trail development. The potential for such impacts on the community needs to be considered and managed. This Objective also seeks to integrate the Project with other parallel planning processes and other projects that may be ongoing adjacent to the Project Area.

- **Achieve Value for Cost**

  It is desirable to maximize the benefits achieved through the Project in relation to the estimated Project cost (capital and operations and renewal costs). The lowest cost Alternative is not necessarily preferred but there must be commensurate value for the investment to be made by TRCA and City of Toronto, and potentially other funding partners.

1.3 Proponent

TRCA is the ***proponent*** of the SWP and will have responsibility for ensuring that the design, construction and management of the SWP is pursuant to this EA and other environmental approvals. As per the 1972 Waterfront Agreement, it is expected that the City of Toronto will be the responsible agency for the operations and maintenance of the future greenspace, including the operations and maintenance monitoring activities, as per the City of Toronto Parks Standards and Parks Plan. TRCA will continue to be the responsible agency for monitoring and renewal of the shoreline protection.

TRCA was formed in the aftermath of Hurricane Hazel and has a strong history in ***watershed*** management and leadership in applying sustainability practices. In 2003, TRCA's Board endorsed the vision for The Living City, which is firmly based on the four pillars of TRCA's ongoing commitment to healthy rivers and shorelines, greenspace and ***biodiversity***, sustainable communities, and business excellence. TRCA's recently released 10-year Strategic Plan (2013-2022) reconfirms the vision for The Living City, and recognizes that large and interconnected greenspaces offer a wide range of ***active and passive recreational opportunities***, while safeguarding their natural environmental functions and providing suitable habitats for plant and animal species.

More information on TRCA is provided via the following link: www.trca.ca.

1.4 EA Framework

The EA for the SWP was completed in two stages as required by the *EA Act*. Stage one included the completion and approval of a ToR. The purpose of the ToR was to describe how the EA should be carried out and to provide the public, agencies and Aboriginal communities with an opportunity to comment prior to proceeding with the study. TRCA completed the ToR and it was approved by the MOECC on December 15, 2015. Stage two of the Project included the completion of the EA planning process and preparation of this EA Report in accordance with the approved ToR. A copy of the approved ToR can be found in **Appendix A**.

As described in Section 3 of the ToR, the EA was completed using a ***"focused" approach*** in accordance with subsections 6(2)(c) and 6.1(3) of the *EA Act* and in accordance with the "Code of Practice: Preparing and Reviewing Environmental Assessments in Ontario" (MOECC, 2014). This EA is "focused" in that the consideration of ***"Alternatives To"*** has been satisfied through previous studies, as detailed in **Chapter 2**. In all other ways, this EA reflects the comprehensive study of Alternatives and their impact on the environment.

1.4.1 EA Report

This EA Report has been submitted for review to the MOECC and contains the following:

- A description of and statement of the rationale for the ***undertaking*** as well as the ***Alternative Methods*** of carrying out the undertaking;

- A description of:
  - the ***environment*** that will be affected or that might reasonably be expected to be affected, directly or indirectly, by the undertaking and the Alternative Methods of carrying out the undertaking;
  - the ***effects*** that will be caused or that might reasonably be expected to be caused to the environment, by the undertaking and the Alternative Methods of carrying out the undertaking; and,
  - the actions necessary or that may reasonably be expected to be necessary to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment, by the undertaking and the Alternative Methods of carrying out the undertaking;
- An evaluation of the advantages and disadvantages to the environment of the undertaking and the Alternative Methods of carrying out the undertaking; and,
- A description of any consultation about the Project undertaken by the proponent and the results of the consultation.

The EA Report follows a traceable decision-making process and includes the following:

- An Executive Summary that summarizes the EA as well as a list of studies and reports, and a well-marked legible map of the location of the undertaking and the Project Study Area;
- A discussion of the purpose of the undertaking;
- A table that summarizes all commitments made in the ToR and that identifies which sections of the EA Report satisfy each commitment (**Table 1-1**);
- An overview of preliminary costs, funding, phasing and timing of the Project (as available);
- A discussion of ***net effects*** (those that remain following mitigation) and a summary of the evaluation of the advantages and disadvantages to the environment of the proposed undertaking and the Alternative Methods based on net effects;
- The consideration of climate change, cumulative effects and source water protection areas; and,
- A discussion on the rationale for the identification of the Alternative Methods that were evaluated.

Table 1-1 provides information on where each of the commitments in the ToR are addressed in the EA Report.

1.4.2 *Canadian Environmental Assessment Act* (CEAA), 2012

CEAA, 2012 does not apply to this Project as the scope of work is not included on the Canadian Environmental Assessment Agency's Regulations Designating Physical Activities List, which identifies the types of projects that may require a federal EA.

Although *CEAA, 2012* does not apply to this Project, the Project may still require federal permits and/or approvals as outlined in **Table 1-2**.

Table 1-1: Concordance with Commitments Made in the ToR

Commitment Made in ToR	Where Commitment is Addressed in the EA Report
The Project will identify areas to minimize risk to public safety and public property, while integrating new public access, recreational opportunities and benefits to natural habitat along the Scarborough Bluffs. Section 2, page 4 of the ToR.	Section 5.3
TRCA has decided that it will complete a "focused" EA in accordance with subsections 6(2)(c) and 6.1(3) of the *EA Act*. Section 3, page 10 and Section 3.1 page 11 of the ToR.	Chapter 4
The public, agencies, interest groups, and landowners have been consulted through the development of the ToR and will continue to be consulted during the preparation of the EA, as per the consultation plan provided in Section 10 of this ToR. Section 3.1, page 10 of the ToR.	Chapter 10
The EA Report will document the decision-making approach used to determine the ***Preferred Alternative*** for the Project, and to minimize potential adverse Project-related effects as well as to address any Stakeholder concerns related to the proposed work. Section 3.1, page 10 of the ToR.	Chapter 5 and Section 6.1
The EA will examine the ***"Do Nothing" Alternative*** and "Alternative Methods" (i.e., Alternative ways of carrying out the Project). Section 3.1, page 12 of the ToR.	Section 5.3 and Section 5.4
A draft EA Report will be prepared and made available for public, agency, and First Nation and Métis review. Section 3.1, page 13 of the ToR.	Section 1.6
TRCA will provide a final list of potential permits and approvals as part of the EA Report. Section 3.3, page 13 of the ToR.	Section 1.5
The description and rationale for the Project (the "Undertaking") will be further refined as part of the EA process. The description and rationale for the Project will be based on the study Vision and Objectives, recommendations from other guiding plans and initiatives described in **Section 2** of this ToR, and will reflect the advantages and disadvantages of the Preferred Alternative once the evaluation is completed in the EA. Section 4, page 16 of the ToR.	Chapters 2, 6, 7 and 11

Table 1-1: Concordance with Commitments Made in the ToR

Commitment Made in ToR	Where Commitment is Addressed in the EA Report
All Alternatives must meet the Project Vision and Objectives, and will be evaluated based on how well each Alternative meets the Vision and Objectives. Section 4.1, page 16 of the ToR.	Section 5.4
The Problems and Opportunities will be further defined by Shoreline Segment in the EA, and will provide the foundation for the development of Alternatives for each Shoreline Segment. Section 4.3, page 20 of the ToR.	Section 2.5 and Section 5.2
Final temporal boundaries will be provided in the EA. Section 4.4, page 22 of the ToR.	Section 2.4
Once identified, the Preferred Alternative (the Project) will be compared against the “Do Nothing” Alternative to confirm the recommended undertaking. Section 5.1, page 23 of the ToR.	Chapter 11
A description of existing conditions in the Project Study Area will be prepared which will provide contextual information for the formation of the Alternatives and their evaluation. Section 6.1, page 24 of the ToR.	Chapter 3
For each Shoreline Segment that has available Alternatives, these Alternatives will be assessed on the basis of the ***Evaluation Criteria*** and Indicators. Section 6.1, page 25 of the ToR.	Section 5.4
The Draft Evaluation Criteria will be refined during the course of the EA and may include additions or deletions based on new information that is obtained by the Project Team, including Stakeholder input. Section 6.1, page 25 of the ToR.	Table 5-1 and Table 5-2
This assessment will result in a final discussion of how the Preferred Alternative meets the Project Objectives, a summary of environmental effects and mitigation measures, and an assessment of Project advantages and disadvantages as compared to the “Do Nothing” Alternative (i.e., not proceeding with the Project). Section 6.1, page 26 of the ToR.	Chapters 7 and 11
Coastal analysis will be completed during the EA. Section 7.1.5, page 29 of the ToR.	Appendix C

Table 1-1: Concordance with Commitments Made in the ToR

Commitment Made in ToR	Where Commitment is Addressed in the EA Report
The EA will include a more detailed description of ***stormwater runoff*** and streamflow characteristics in the study area. Section 7.1.6, page 33 of the ToR.	Section 3.1.5
The EA will consider climate change in the development and evaluation of the Preferred Alternative. Section 7.1.8, page 34 of the ToR.	Section 7.3.2
The EA Report will provide a more detailed description of existing infrastructure, community services and recreation in the Project Study Area that could potentially be affected by the Project. Section 7.3.2, page 43 of the ToR.	Section 3.3
TRCA will consider First Nation and Métis interests during the Project planning and design phase, and will provide the results of the consultation program in the EA Report. Section 7.3.4, page 46 of the ToR.	Section 3.3.5 and Section 10.5
The EA Report will include a list of commitments to be fulfilled by TRCA following EA approval. Section 9, page 51 of the ToR.	Section 8.1.2 and Table 8-1
A monitoring plan will be developed and included in the EA Report. Section 9.2, page 51 of the ToR.	Section 8.1

Table 1-2: Potential Permits and Approvals

Level of Government	Agency	Potential Permit or Approval
Federal	Environment Canada	▪ A permit may be required under the *Species at Risk Act, 2002*, should the Project affect ***Species at Risk (SAR)*** or their habitat. ▪ A permit would be required under the *Migratory Birds Convention Act, 1994*, should the Project affect migratory birds or bird habitat listed in the *Act.*
	Fisheries & Oceans Canada (DFO)	▪ An authorization from DFO would be required under the *Fisheries Act, 1985* (amended 2013), if it is determined that removal of aquatic habitat is deemed a "serious harm to fish" under the new *Fisheries Act* Regulation, if the effects cannot be avoided or mitigated as part of the design. ▪ DFO administers the SAR for aquatic species. A permit may be required.
	Transport Canada	▪ Transport Canada will need to be notified of any work, such as new trails or other pathways that cross federally-regulated rail lines as per the *Railway Safety Act, 1985*. ▪ Any in-water works and/or shoreline alteration could require authorization under the *Navigation Protection Act* (amended 2014) and applicable regulations under this legislation (e.g., Navigable Waters Works Regulation).
Provincial	Ministry of Environment and Climate Change	▪ Filing of the dewatering rates and duration in the Environmental Activity and Sector Registry (EASR) or Permit to Take Water (PTTW) in compliance with Ontario Regulation 387/04 (as amended) and the Ontario *Water Resources Act*. A water-taking EASR is required for construction projects that involve between 50,000 and 400,000 litres of water per day under normal conditions. A PTTW is required if the taking is greater than 400,000 litres per day under normal conditions.
	Ministry of Natural Resources and Forestry	▪ The bed of Lake Ontario along some areas of the shoreline in the Study Area is owned by the Crown. Approval will be required for placement of fill in these areas. A work permit may be required from the Ministry if the Project requires the disposition (i.e., release) of Crown land, such as the Lake Ontario lakebed, under the *Public Lands Act, 1990.* ▪ Permits may be required for any works within areas identified as habitat of a Species at Risk in Ontario (SARO), under the *Endangered Species Act*. As SARO have been identified in the Study Area, a Section 17 permit may be required for the protection and recovery of a provincial SAR. An authorization may be required under the *Fish and Wildlife Conservation Act, 1997*, if the Project affects specially protected wildlife in the Project Study Area.
	Ministry of Tourism, Culture and Sport	▪ The Project will require archaeological clearance under the *Ontario Heritage Act, 1990,* as part of the regulatory process to ensure effects to features of cultural interest are minimized.
	Toronto and Region Conservation Authority	▪ Must be compliant with the requirements of the *Conservation Authorities Act* and *Regulation 166/06* for alterations to the shoreline.

Table 1-2: Potential Permits and Approvals

Level of Government	Agency	Potential Permit or Approval
Municipal	City of Toronto	▪ Efforts to provide safe pedestrian and cycling access to the shoreline, and improve habitat at East Point Park through the formalization of a primary or high-capacity multi-use trail and may require approvals from Urban Forestry under the Ravine and Natural Feature bylaw, which also considers works in the ESA. ▪ Toronto Water permits for potential extension of outfalls. ▪ Potential for access agreements for temporary implementation access and staging areas at City management areas. ▪ Potential for easements with Toronto Water for access across the F.J. Horgan Water Treatment Plant (WTP) site. ▪ Right-of-way permits and/or approvals from Transportation Services may be required for proposed improvements to Brimley Road.

1.5 Other Approvals

The Project may require municipal, provincial and federal permits and approvals prior to construction. **Table 1-2** above provides a list of potential permits and approvals.

1.6 Public and Agency Review of the Draft EA Report

The draft EA Report was made available for public, agency and Aboriginal review for a 45-day review period commencing August 17, 2017 and ending October 2, 2017 The draft EA Report was made available electronically on the Project website: trca.ca/swp, as well as in hard-copy at eight (8) review locations. Additional details of this review are provided in **Chapter 10** and a disposition table of the comments received is provided in **Appendix L**.

1.7 Overview of EA Report

The EA Report is organized into the following chapters:

Chapter 1: Introduction

This chapter provides a brief description of the proponent, background information, the Project Vision and Objectives, a summary of the regulatory framework for the EA, an overview of the public release of the draft EA Report, and concordance with the approved ToR.

Chapter 2: Purpose of the Undertaking

This chapter provides the planning context for the Project, problem/opportunity assessment, Project Study Area, and temporal boundaries.

Chapter 3: Description of the Potentially Affected Environment

This chapter describes the physical, natural and socio-economic ***baseline conditions*** in the area.

Chapter 4: Description, Evaluation and Rationale for "Alternative To"

This chapter provides a summary of the evaluation of the "Do Nothing" Alternative.

Chapter 5: Description, Evaluation and Rationale for "Alternative Methods"

This chapter describes the evaluation undertaken to select the Preferred Alternative for the Project. The Preferred Alternative is the option selected that is most likely to meet the Project Vision and Objectives.

Chapter 6: Description of the Preferred Alternative

This chapter provides a description of the Preferred Alternative selected for the Project including the shoreline configuration, safety, naturalization, recreation, operations and maintenance/renewal, construction activities and access, construction phasing and funding.

Chapter 7: Potential Effects, Effects Assessment and Mitigation Measures for the Preferred Alternative

This chapter presents the detailed assessment of the Preferred Alternative including potential effects, ***mitigation measures*** and net effects. This chapter also includes the assessment of cumulative effects.

Chapter 8: Monitoring and Adaptive Environmental Management

This chapter outlines the overall strategy and activities for baseline and EA compliance monitoring as well as adaptive management strategies and EA commitments.

Chapter 9: EA Amendment Process

This chapter describes the framework proposed to deal with any post-EA Project modifications.

Chapter 10: Consultation

This chapter describes the public, agency and Aboriginal consultation program undertaken during the EA including input received and responses provided. Chapter 10, together with **Appendix L**, represent the Record of Consultation for the EA.

Chapter 11: Advantages and Disadvantages

This chapter provides a summary of the Project's key advantage and disadvantages.

Chapter 12: References

This chapter provides the references and works cited in the EA Report.

2. Purpose of the Undertaking

Chapter 2 provides a description of the purpose of the SWP. The description is framed in terms of both the problems and the opportunities that the SWP presents. This discussion is grounded in a planning context created by past studies and decisions.

2.1 Planning Context

There is a long history of planning, public engagement and scientific studies with respect to the Scarborough waterfront. Many documents describing issues and opportunities along the Lake Ontario shoreline and ***nearshore*** areas have been developed for Toronto and Lake Ontario as a whole, and are applicable to the SWP. These documents are listed in **Table 2-1** and **Table 2-2**, and some of the key studies are discussed in **Section 2.2**.

In addition to the shoreline protection projects undertaken by TRCA (**Table 2-2**), some private shoreline protection has been implemented along the Guildwood Parkway and Greyabbey Trail shoreline.

2.2 Key Studies and Plans

The SWP is being studied as a result of recommendations of previous planning processes and City of Toronto Council direction (Resolution EX36.17, adopted on December 16, 2013, and resolution PW31.14, adopted on June 10, 2014). These resolutions prioritized TRCA's erosion control strategy and projects, including the EA for the SWP, and provided direction for considering public access in tandem with erosion control.

Key studies and plans providing relevant background information are summarized below.

2.2.1 City of Toronto Official Plan

The City of Toronto Official Plan sets out the vision for where and how Toronto will grow to the year 2031 (City of Toronto, 2002; consolidated 2015). The Official Plan is intended to ensure that the City of Toronto evolves, improves and realizes its full potential in areas such as transit, land use development and the environment. As part of the five-year review, portions of the Official Plan have been updated.

The relevant policies are presented in the order that they appear in the Official Plan:

- Section 2.3.2, Policy 3: The Green Space System will be expanded by:

    a. Acquiring linkages between existing parks and open spaces, where feasible; and

    b. Acquiring lands, or easements over lands, associated with private development which can be connected to the System for the extension of recreational trails, or which have important natural heritage value.

Table 2-1: List of Background Studies

Title	Year	Author(s)
The Waterfront Plan for the Metropolitan Toronto Planning Area	1967	Metropolitan Toronto Planning Department
The Waterfront Plan	1972	Metropolitan Toronto and Metropolitan Toronto and Region Conservation Authority
Vegetation and Erosion on Scarborough Bluffs	1978	York University, Department of Biology (Fowle, Collishaw and Lewis) for Metropolitan Toronto and Region Conservation Authority (MTRCA)
A Volumetric Analysis of Erosion	1979	Research and Development Division, Ocean and Aquatic Sciences, Central Region, Fisheries and Oceans (Weaver, R.K.)
Lake Ontario Waterfront Development Program	1980	MTRCA
Erosion Control Study, Scarborough Bluffs	1982	Geocon Inc. for MTRCA
Waterfront Erosion Control Site Report, Scarborough Sector	1987	MTRCA
Slope Stabilization Study: Greyabbey Trail, Scarborough Bluffs	1989	Terraprobe Ltd. for MTRCA
Investigation and Phase I Remediation of the Brimley Road Landslide, Scarborough, Ontario	1991	Golder Associates, for the City of Scarborough
Regeneration: Toronto's Waterfront and the Sustainable City	1992	Royal Commission on the Future of the Toronto Waterfront (Canada), David Crombie
Metropolitan Waterfront Plan	1994	Metropolitan Toronto Planning Department
Integrated Shoreline Management Plan	1996	Fenco MacLaren Inc.; Shoreplan Engineering Ltd.; EDA Collaborative Inc.; Tarandus Associates Ltd.; and Ecorp Inc. for Metropolitan Toronto and Region Conservation Authority
Understanding Natural Hazards: Great Lakes – St. Lawrence System and Large Inland Lakes, River and Steam Systems and Hazardous Sites	2001	Ministry of Natural Resources (MNR)
Wet Weather Flow Master Plan (WWFMP)	2003	City of Toronto, Toronto Water
Toronto Waterfront Aquatic Habitat Restoration Strategy	2003	Aquatic Habitat Toronto for Waterfront Toronto
City of Toronto Accessibility Design Guidelines	2004	City of Toronto
Accessibility for Ontarians with Disabilities Act (AODA), and the associated O. Reg. 191/11 (Integrated Accessibility Standards)	2005	Government of Ontario
The Beautiful Lake: A Bi-national Biodiversity Conservation Strategy for Lake Ontario	2009	Lake Ontario Biodiversity Strategy Working Group with US – Canada Lake Ontario Lakewide Management Plan
Toronto Beaches Plan	2009	City of Toronto
Review of Provincially Significant Wetlands in the City of Toronto: Highland Creek PSW Fact Sheet	2009	North-South Environmental Inc., in association with Dougan and Associates, for City of Toronto Planning
Fill Quality Guide and Good Management Practices for Shore Infilling in Ontario	2011	MOECC

Table 2-1: List of Background Studies

Title	Year	Author(s)
Environmentally Significant Areas in the City of Toronto – Volume 1	2012	North-South Environmental Inc., Dougan and Associates, Beacon Environmental Ltd. for City of Toronto Planning
Environmentally Significant Areas in the City of Toronto – Volume 2: Scarborough Bluff Sequence Fact Sheet	2012	North-South Environmental Inc., Dougan and Associates, Beacon Environmental Ltd. for City of Toronto Planning
Environmentally Significant Areas in the City of Toronto – Volume 2: Bellamy Ravine/Sylvan Park Fact Sheet	2012	North-South Environmental Inc., Dougan and Associates, Beacon Environmental Ltd. for City of Toronto Planning
Environmentally Significant Areas in the City of Toronto – Volume 2: Guild Woods Fact Sheet	2012	North-South Environmental Inc., Dougan and Associates, Beacon Environmental Ltd. for City of Toronto Planning
Environmentally Significant Areas in the City of Toronto – Volume 2: East Point Fact Sheet	2012	North-South Environmental Inc., Dougan and Associates, Beacon Environmental Ltd. for City of Toronto Planning
Bikeway Trails Implementation Plan, and the subsequent 2016 Ten Year Bike Plan	2012/ 2016	City of Toronto
Fish Community Objectives for Lake Ontario	2013	Great Lakes Fishery Commission (Stewart, T.J., Todd, A., LaPan, S.)
Parks Plan 2013-2017	2013	City of Toronto
Sustaining and Expanding the Urban Forest: Toronto's Strategic Forest Management Plan	2013	City of Toronto
Pathways to Recreation: Ontario's Accessibility Standard for the Design of Public Spaces Guidebook	2014	Parks and Recreation Ontario
Management Plan for Guild Park and Gardens	2014	City of Toronto and TRCA
Multi-use Trail Design Guidelines	2015	City of Toronto
Slope Stability Analysis and Slope Monitoring Brimley South Slope Landfill (West Slope), Toronto, Ontario	2015	LVM for the City of Toronto
Excess Soils Management Guidelines	2016	MOECC
Toronto Ravine Strategy	2017	City of Toronto

Table 2-2: List of Erosion Protection Projects Previously Undertaken by TRCA*

Title	Year
Shoreline Protection Project: South Marine Drive	1983
Environmental Study Report: Guildwood Parkway Erosion Control Project	1988
Environmental Study Report: Sylvan Avenue Shoreline Regeneration Project	1994
Environmental Study Report: The Guild Inn Shoreline Regeneration Project, City of Toronto	2004
Environmental Study Report: Guildwood Parkway Erosion Control Project – Phase 2	2004
Environmental Study Report: Meadowcliffe Drive Erosion Control Project	2010

*Note: * This does not include emergency works undertaken.*

- Section 2.3.2, Policy 6: Increased public enjoyment and use of lands along the water's edge will be promoted by ensuring that future development and actions on the part of […] and the Toronto and Region Conservation Authority, will help to achieve the following objectives:

  a. Minimize the physical and visual barriers between the City and Lake Ontario;

  b. Increase and improve public access to lands along the water's edge and between parts of the waterfront;

  c. Improve water quality and the quality of beaches;

  d. Protect, improve and where possible extend the Martin Goodman/Waterfront Trail as a continuous waterfront route for cyclists, pedestrians and people with disabilities; and

  e. Maintain and enhance the natural heritage value of lands near or along the water's edge by protecting existing habitat and, where appropriate, restoring and enhancing habitat.

- Section 3.1.1, Policy 4: The natural features of the City, such as the Lake Ontario shoreline, the Lake Iroquois escarpment, woodlots, ravines and valley lands, will be connected to the surrounding city by improving physical and visual access from adjacent public spaces and by designing these into a comprehensive open space network.

- Section 3.4, Policy 1b) (Amendment No. 262): sustaining, restoring and enhancing the health and integrity of the natural ecosystem, supporting bio-diversity in the City and targeting ecological improvements, paying particular attention to:

  i) locations of habitat for native flora and fauna, both terrestrial and aquatic;

  ii) water and sediment quality;

  iii) ground and surface water contributions to natural features;

  iv) landforms, ravines, watercourses, wetlands and the shoreline and associated biophysical processes;

  v) natural linkages between the natural heritage system and other green spaces;

vi) seasonal movements of migration species;

vii) opportunities for habitat provided by the built environment; and,

viii) the potential impacts of a changing climate on biodiversity and ecosystem health.

- Section 3.4, Policy 1e) (Amendment No. 262): reducing the risks to life, health, safety, property, and ecosystem health that are associated with flooding, unstable slopes and erosion and contaminated lands and considering the potential impacts of climate change that may increase the risk associated with natural hazards.

- Section 3.4, Policy 13 (Amendment No. 262): Areas of land or water within the natural heritage system with any of the following characteristics are particularly sensitive and require additional protection to preserve their environmentally significant qualities:

  a. habitats for vulnerable, rare, Threatened or Endangered plant and/or animal species and communities that are vulnerable, Threatened or Endangered within the City or the Greater Toronto Area; or

  b. rare, high quality or unusual landforms created by geomorphological processes within the City of the Greater Toronto Area; or

  c. habitats or communities of flora and fauna that are of a large size or have an unusually high diversity of otherwise commonly encountered biological communities and associated plans and animals; or

  d. areas where an ecological function contributes appreciably to the healthy maintenance of a natural ecosystem beyond its boundaries, such as serving as a wildlife migratory stopover or concentration point, or serving as a water storage or recharge area.

  Development or site alterations with the exception of trails, where appropriate, and conservation, flood and erosion control projects, is not permitted on lands within the natural heritage system that exhibit any of these characteristics. Activities will be limited to those that are compatible with the preservation of the natural features and ecological functions attributed to the areas. New or expanding infrastructure will avoid these areas unless there is no reasonable Alternative, adverse impacts are minimized and natural features and ecological functions are restored or enhanced where feasible. An impact study, as referred to in Policy 12, will be required for any proposed undertaking in those areas not already the subject of an Environmental Assessment under the *Environmental Assessment Act*.

- Section 3.4, Policy 14 (Amendment No. 262): Provincially significant natural heritage features will be protected by:

  a. Prohibiting development or site alteration in provincially significant wetlands;

  b. prohibiting development or site alteration in significant portions of the habitat of Threatened or Endangered species and fish habitat, except in accordance with Provincial and Federal requirements;

c. only permitting development or site alteration in the following locations if it has been demonstrated, through a study, that there will be no negative impacts on the natural features or the ecological functions for which the area is identified:

   i. lands adjacent to provincially significant wetlands, or significant portions of the habitat of Threatened or Endangered species;

   ii. lands adjacent to fish habitat; and

   iii. in or on lands adjacent to provincially significant woodlands, areas of natural and scientific interest, valleylands and wildlife habitat; and

d. avoiding new or expanding infrastructure unless there is no reasonable Alternative, negative impacts are minimized and natural features and ecological functions are restored or enhanced where feasible.

Provincially significant wetlands and areas of natural and scientific interest that have been identified by the Province are shown on Map 12B. Where development is proposed adjacent to these areas, their boundaries will be more precisely determined. The Province may identify additional areas to which these policies apply.

The SWP supports and advances the City of Toronto policies laid out in the Official Plan by addressing the existing risk to public safety and public infrastructure due to shoreline erosion along the shoreline, providing for increased public space while improving and enhancing the natural heritage system.

The following Official Plan policies may also apply:

- Section 3.1.5, Policy 42: The City may require an Archaeological Assessment for marine archaeological remains and artifacts, to be conducted by a licensed marine archaeologist, when a development is proposed in the water or along the waterfront and/ or shoreline.
- Section 3.4, Policy 16 (Amendment No. 262): ***Lakefilling*** projects in Lake Ontario will be supported only where:

  a. the land created will be used for natural habitat, public recreation or essential public works;

  b. the project has been the subject of an Environmental Assessment which ensures that water quality and quantity and terrestrial and aquatic habitats will be protected or enhanced; and

  c. the project does not create new or aggravate existing natural hazards.

- Section 3.4, Policy 17 (Amendment No. 262): Minor lakefilling activities will only be supported for the purposes of:

  a. stabilizing slope and shoreline to protect existing development and not to facilitate new development, or intensification or alteration of existing development;

  b. creating or enhancing aquatic habitat;

c. naturalizing the shoreline;

d. improving water quality; or

e. where appropriate, providing public access to the water's edge.

A key city-building principle additionally outlined in the Official Plan is that public buildings, parks and open spaces should be open and accessible to all members of the public, including people with disabilities. The new development and ongoing maintenance and improvements of public buildings and parks and open spaces should recognize this goal. However, as with all general principles, there are important exceptions which relate to the SWP Study Area:

- Some public buildings and open species perform functions that are incompatible with wide-open public access for example, water treatment plants and waste transfer stations.
- In some of our natural heritage areas, public access will damage natural features and functions.
- In other areas severe topographical features such as ravines and the Bluffs are largely inaccessible today and in the absence of benign, non-intrusive technology, making them accessible would be impractical.

2.2.2 TRCA Living City Policies

As the implementing authority for the 1967 Waterfront Plan, TRCA is responsible for the safe access to recreational spaces along the waterfront. In accordance with Section 28 of the *Conservation Authorities Act*, TRCA is also responsible for regulating development, interference and alterations in or near valleys, streams, wetlands and along the Lake Ontario shoreline. As a Conservation Authority, TRCA has been delegated the responsibility of representing the provincial interest in natural hazards as described in Section 3.1 of the PPS. TRCA also provides technical advice to assist public agency partners in implementing the natural hazard, natural heritage and water management sections of the PPS from a science-based, watershed perspective. With respect to the SWP, TRCA has a role in safeguarding terrestrial and aquatic habitats, managing shoreline flood and erosion risk, and providing safe access to public recreational spaces, as outlined in TRCA's Living City Policies.

The Living City Policies for Planning and Development in the Watersheds of the Toronto and Region Conservation Authority (LCP) is a Conservation Authority policy document that guides the implementation of TRCA's legislated and delegated roles and responsibilities in the planning and development approvals process.

Comparable to a combined municipal official plan and zoning by-law, the LCP represents a compilation of existing plan and permit review policies and practices that have evolved over time. It also contains new policies related to TRCA programs, scientific research and external planning and development initiatives. The purpose of The Living City Policies is:

1. To guide TRCA review of planning applications and Environmental Assessments.
2. To provide the basis for approving permit applications under Section 28 of the *Conservation Authorities Act.*

3. To inform TRCA's advocacy role for The Living City in the planning and development process.
4. To assist and enable our partners' and Stakeholders' contributions to building The Living City.

Specific to the SWP, the following policies have direct relevance:

- 7.2.4 It is the policy of TRCA:

    a. To prevent, eliminate or reduce the risk of flood and erosion hazards to life and property through:

        i. Appropriately planned development, site alteration, recreational use, and infrastructure;

        ii. Shoreline protection works that are undertaken on a comprehensive reach basis and naturalized to the extent possible; and,

        iii. The conveyance of hazards lands into public ownership, where feasible.

    b. To promote an integrated approach to revitalization of the waterfront that:

        i. Provides for increased public access, recreational opportunities and continuous trail system;

        ii. Preserves and enhances public views of the Lake and its shoreline features;

        iii. Improves or restores the quality of water, beaches and terrestrial and aquatic natural habitats of the shoreline; and,

        iv. Connects and links waterfront habitats and amenities to the valley and stream corridors.

TRCA recognizes the need to balance waterfront revitalization/redevelopment, public access, and an open space "aesthetic" with natural heritage and natural hazard protection and management. Public ownership of waterfront lands is a key means to managing natural hazards, while providing accessible open space integrated with opportunities for public enjoyment and aquatic and natural heritage restoration.

2.2.3 Regeneration: Toronto's Waterfront and the Sustainable City

The Royal Commission's final report, *Regeneration: Toronto's Waterfront and the Sustainable City* (1992), used the ecosystem approach to integrate environmental, economic and social concerns in developing a wide range of recommendations for waterfront communities, land use planning, watershed management, regional greenways and a continuous Lake Ontario Waterfront Trail. Within the report, the Royal Commission recommended that the Province of Ontario, the Regional Municipality of Metropolitan Toronto and the former City of Scarborough, in conjunction with appropriate authorities and agencies, should negotiate a Waterfront Partnership Agreement that

should offer comprehensive waterfront and river valley policies that take into account the environmental vulnerability of the Scarborough Bluffs. It was recommended that these policies should outline ways to acquire, maintain and provide access to land along the waterfront and up the river valleys, and could take the form of a waterfront plan that should be incorporated into the City's Official and secondary plans. As well, the Agreement should encourage continued development of a Waterfront Trail, including a two-tiered trail in Scarborough as part of the regional greenway and trail system, with one route above the Bluffs and one at their base. The system should also enhance access nodes to the waterfront, improve access to Bluffer's Park, and include facilities to educate the public on the geological processes that contributed to formation of the Bluffs.

2.2.4 Accessibility for Ontarians with Disabilities Act (AODA)

The AODA, and associated O. Reg. 191/11 (Integrated Accessibility Standards), identifies minimum technical requirements for trails [s.80.9(1)], including clear width, clearance height, and maximum running slope (ramps).

2.2.5 Understanding Natural Hazards: Great Lakes – St. Lawrence System and Large Inland Lakes, River and Stream Systems and Hazardous Sites

The MNR's *Understanding Natural Hazards: Great Lakes – St. Lawrence System and Large Inland Lakes, River and Stream Systems and Hazardous Sites* (2001) technical guide outlines the methodology for determining where a slope is at risk within the 100-year planning horizon. This includes the calculation of an erosion allowance (i.e., application of the erosion rate over 100 years), in addition to a stable slope allowance (based on geotechnical conditions and an appropriate ***Factor of Safety***). **Section 3.1.10.2** of the EA and **Appendix B** provide a more detailed description of the process.

The Technical Guide identifies minimum Factors of Safety, on the basis of land use above or below a slope, recognizing the consequences or risks to land use or life by the occurrence of a slope slide. Based on these minimums, a Factor of Safety of 1.3 (Land Use B) is identified as appropriate for a recreational park with a formal trail at the base and/or top of the Bluffs, while a Factor of Safety of 1.5 (Land Use D) is identified as appropriate for public land with infrastructure.

2.2.6 Integrated Shoreline Management Plan

The ISMP provided "an ecosystem-based framework to ensure that shoreline management activities result in a clean, green, accessible, diverse, connected, open, affordable, attractive and useable waterfront." The ISMP set out recommendations for shoreline regeneration, public access and safety, natural heritage targets, aquatic habitat restoration, and public use for the shoreline area between Tommy Thompson Park and Frenchman's Bay and provides the foundation for addressing multiple objectives along stretches of the waterfront.

2.2.7 Bikeway Trails Implementation Plan

Adopted by City of Toronto Council on July 6, 2012, the City of Toronto Bikeway Trails Implementation Plan identified 26 projects, which combined provide for 77 km of new bikeway trails. The Plan identifies the Scarborough waterfront as a long-term objective for trail development.

2.2.8 Multi-use Trail Design Guidelines

The City of Toronto Multi-use Trail Guidelines assist in the development and ongoing maintenance of multi-use trails throughout the city. The guidelines respond to the urban context of Toronto's trails and their varied locations in the city ravines, parkland, boulevards, and rail and hydro corridors. These guidelines are consistent and in some cases exceed current, relevant City and Provincial guidelines and policy documents.

The Guidelines provide guidance on trail design including trail configuration (trail and corridor width, trail surface, slopes, and radii). Minimum to exemplary configurations for secondary, primary and high-capacity trail classifications are defined and detailed.

The Guidelines identify that waterfront sites, such as the Waterfront Trail, will be subject to high seasonal use of a specific nature, and identifies that following key considerations in determining the appropriate trail classification:

a) The proportion of pedestrians can be predicted to be very high, and they can be expected to mainly use the water-side of the trail;

b) The widest range of ages and abilities should be expected; and,

c) The presence of many distractions and crossing movements along the trail can also be foreseen.

Considered together, the range of users and expected usage of a Waterfront Trail indicate the need for an appropriate space that will serve to resolve or minimize the potential conflicts that may arise.

2.2.9 Scarborough Shoreline Terrestrial Biological Inventory and Assessment

The Lake Ontario shoreline extending from Bluffer's Park to East Point Park was inventoried to characterize the terrestrial natural heritage features, both locally and within the larger regional context of TRCA's Terrestrial Natural Heritage Program. The study considered the existing conditions within the context of the terrestrial natural heritage system, and recommended a number of site-specific management strategies. The SWP revisited these recommendations within the comprehensive context of the area, including:

- Protecting and enhancing existing habitats and features;
- Managing public use through careful trail planning and strategic use of infrastructure (e.g., fences to direct trail use);

- The control of ***invasive species***; and,
- Further assessment and monitoring.

2.2.10 Fish Community Objectives for Lake Ontario

The Great Lakes Fishery Commission's Fish Community Objectives for Lake Ontario (Stewart et al., 2013) were created to advance the goals and objectives of the Lake Ontario Lakewide Management Plan (LaMP). The document identified broad targets and indicators for the fish community of Lake Ontario, including:

- Maintaining, enhancing and restoring self-sustaining Walleye (*Sander vitreus*), Yellow Perch (*Perca flavescens*), Northern Pike (*Esox lucius*), and Bass (*Micropterus* sp.) fisheries, populations and recruitment in the nearshore;
- Maintaining, restoring, and increasing the richness and diversity of native fish species in nearshore areas and ***embayments***; and,
- Maintaining or increasing populations and increasing species diversity of pelagic prey fish including introduced species (Alewife [*Alosa pseudoharengus*], Rainbow Smelt [*Osmerus mordax*]) and selected native prey fish species (Threespine Stickleback [*Gasterosteus aculeatus*], Emerald Shiner [*Notropis atherinoides*], Lake Herring [*Coregonus artedi*]).

2.2.11 Toronto Waterfront Aquatic Habitat Restoration Strategy

The Strategy strives to create a more sustainable waterfront by using an ecosystem approach to increase ecological integrity, to provide suitable conditions for the maintenance of self-sustaining aquatic communities and to improve ecological connectivity. The Strategy emphasizes conservation design based on native and naturalized species. It takes into account human uses of the shoreline and nearshore waters and it was developed using a consultative, consensus-based approach involving Stakeholders and the general public. The overall goal of the Strategy is "to develop and achieve consensus on an aquatic habitat restoration strategy that will maximize the potential ecological integrity of the Toronto waterfront." Aquatic Habitat Toronto is the implementing body for this Strategy. The geographic extent of this Strategy encompasses the SWP Study Area.

2.2.12 TRCA and City of Toronto's Management Plan for the Guild Park and Gardens

The Management Plan for Guild Park and Gardens was developed to provide TRCA and the City of Toronto with a comprehensive framework to guide the management of the Guild Park and Gardens site. Four key management themes are identified and include natural heritage, cultural heritage, horticulture, and trails.

Priority actions that may relate to the SWP include:

- Natural Heritage actions: manage impacts from ash tree mortality, improve trails; and,

- Trails actions: co-ordination of trails management, management of hazardous trails, connectivity to future Waterfront Trail, safe waterfront vista.

2.2.13 Metrolinx Lakeshore East Rail Corridor Expansion (Guildwood to Pickering) Environmental Assessment Process

To support long-term plans to introduce regional express rail services, and frequent, all-day, two-way service along GO Transit lines, Metrolinx intends to improve the Lakeshore East rail corridor. The section of the corridor between the Guildwood and Pickering GO Stations has two tracks between Galloway Road in Scarborough and Frenchman's Bay in Pickering (Durham Junction). Metrolinx is proposing to add a third track in this section of the corridor, and has conducted an EA under a streamlined process (the "Transit Project Assessment" Process) to evaluate expanding and improving the corridor between Scarborough Golf Club Road in the City of Toronto and Pickering GO Station in the Region of Durham. Changes to the corridor will constrain the off-road portion of the existing Waterfront Trail, and increases in service will constrain the on-road portion, within the eastern portion of the SWP Study Area.

2.3 Study Areas

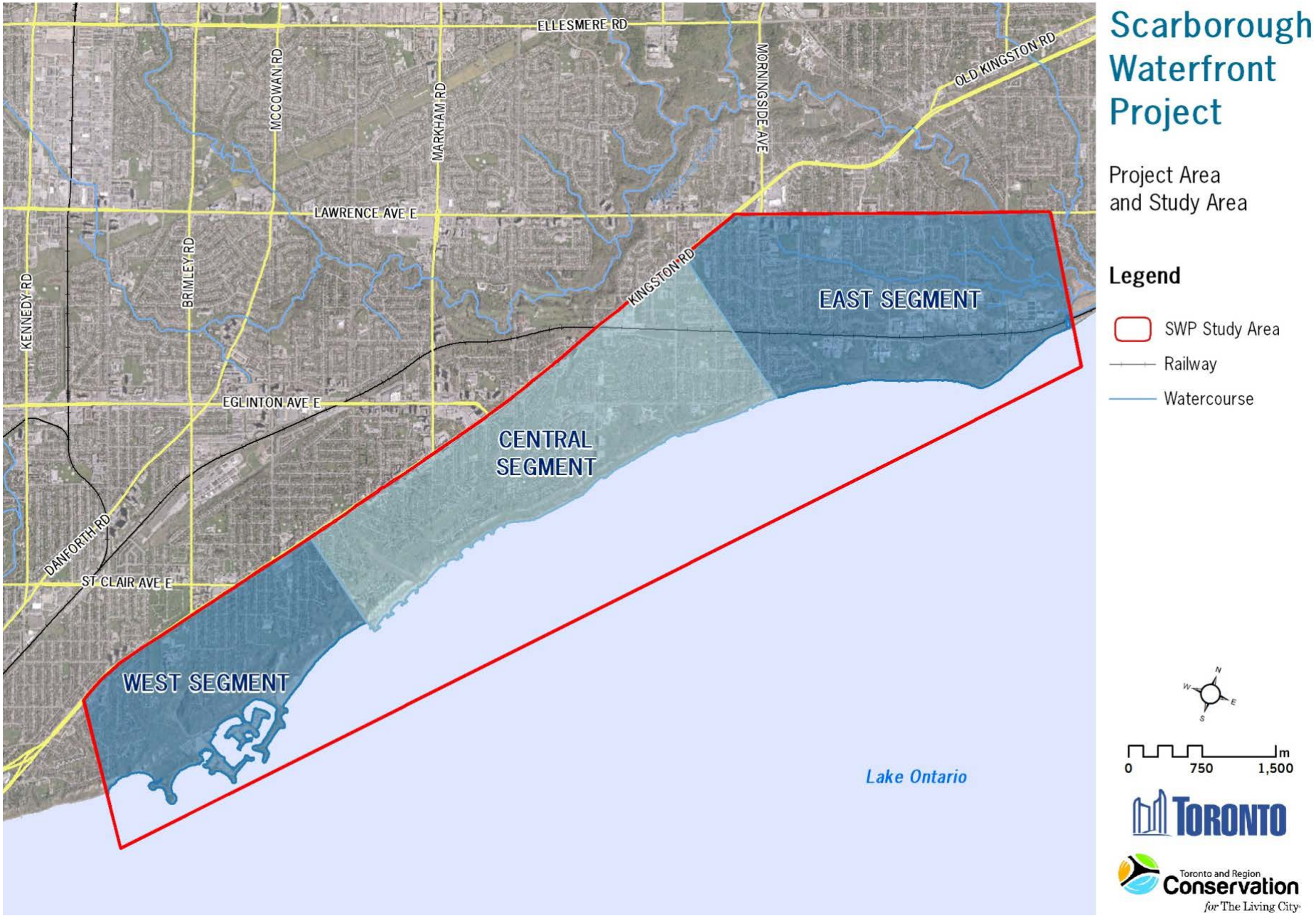
For the purposes of the Project, three study areas were considered: the Project Area; the Project Study Area; and Regional Study Areas.

2.3.1 Project Area

Project works (e.g., development of Alternatives, or physical works) will be focused along the shoreline area, including both the toe and top of the Bluffs, and will include any identified access routes. This area is referred to as the Project Area (**Figure 2-1**). To help facilitate the Alternatives development and evaluation process, the Project Area has been divided into three Shoreline Segments, recognizing the distinct characteristics along each Shoreline Segment:

1. **West Segment – Bluffer's Park to Meadowcliffe**:
   Bluffer's Park is located at the foot of Brimley Road and provides a range of active and passive recreational opportunities. A sand beach extends along the eastern portion of the Segment, but stops approximately 320 m west of the Meadowcliffe Drive Erosion Control Project to the east.
2. **Central Segment – Meadowcliffe to Grey Abbey**:
   Shoreline protection works exist along the length of this Segment. There is no formal public access along the base of the Bluffs, although it is frequently used.
3. **East Segment – Grey Abbey to East Point Park/Highland Creek**:
   While some shoreline protection works exist, the majority of the shoreline consists of a sandy shoreline, a cohesive profile overlain by a veneer of sand. East Point Park is located along the tablelands near the eastern portion of the Segment and provides a range of active and passive recreational opportunities.

Figure 2-1: Project Area and Study Area



2.3.2 Project Study Area

The Project Study Area (see **Figure 2-1** above) denotes the area where potential Project effects are assessed for many of the technical disciplines. The Project Study Area extends along the Lake Ontario shoreline from Bluffer's Park in the west to the mouth of the Highland Creek in the east (approximately 11 km in length). The northerly boundary is Kingston Road/Lawrence Avenue and the southern boundary is Lake Ontario to a maximum of 1 km ***offshore***. This Study Area includes the access routes and any potential effects to adjacent communities.

2.3.3 Regional Study Areas

For certain technical disciplines, larger "Regional Study Areas" were used to identify and assess potential effects at the appropriate scale (e.g., ***sediment*** transport and coastal processes, water quality modelling, socio-economic assessment, ***archaeology***).

Any Regional Study Areas are discussed in **Chapter 3**, as part of the relevant technical discipline.

2.4 Temporal Boundaries

Temporal boundaries (e.g., Project schedule) were used for the basis of the Effects Assessment. The temporal boundaries established for the EA include the construction and operation phases of the Project, and are explained below.

The **construction phase** of the Project is anticipated to commence following receipt of required approvals, permits and funding. The construction phase, including time for permitting and ***Detailed Design***, is expected to take approximately 12 years. It is anticipated that as sections of proposed works are completed, shoreline areas will be opened for public use (see **Chapter 7**). The anticipated EA decision date is 2019.

The **operations/establishment phase** will commence once the Project construction is complete. The new greenspace and trail system is anticipated to exist indefinitely into the future; however, monitoring and adaptive management will only occur for the first 15 years after construction.

2.5 Problem/Opportunity Assessment

The SWP is an opportunity to comprehensively plan for improvements to and management of the Scarborough waterfront between Bluffer's Park and East Point Park, given the pressures on the recreational use of the area, and the limited access to and along the waterfront, while also providing an opportunity to manage and where possible, enhance habitat integrity. Some of these problems could be solved or managed on a piecemeal or ad hoc basis but this would not permit a holistic and integrated solution.

2.5.1 Project Vision Element: Erosion and Risk to Public Safety and Property

2.5.1.1 Key Problems

The erosion processes along the Bluffs are complex and are related to the nature of the soil types in contact with the lake and both wave conditions and water levels. When water levels are high, waves attack the vertical face of the toe of the bluff, causing the toe to recede back, which in turn steepens the bluff face and leads to slope failures. When water levels are low wave action on the face of the Bluffs is less, but the vertical (downward) erosion of the sloped nearshore profile is increased. That vertical erosion process is referred to as ***downcutting***, which increases the water depth offshore of the bluff, and in turn allows higher waves to strike the bluff when water levels rise again. Long-term erosion of the Bluffs occurs when the nearshore profile is downcut. For example, shoreline erosion at Bluffer's Park has stopped as a result of the sand beach, which has accumulated since the construction of Bluffer's Park in the 1970s and has halted downcutting of the nearshore profile in front of those Bluffs.

Cobble and boulder deposits along the shore and nearshore originated from both erosion of the Bluffs and glacial outwash during formation of rivers. Slabs of limestone eroded from the regional bedrock were also found to line the nearshore lakebed environment. These deposits, when they existed, formed hard natural armouring protection against erosion and against the natural process of downcutting. They were removed by humans in a process called "***stonehooking***", and were processed into building materials to feed local development. As a result of stonehooking operations, the natural erosion protection was also removed, allowing accelerated downcutting of the nearshore which in turn led to higher recession rates along the Bluffs. Although this practice was known and identified in the past, its significance to coastal processes and shoreline development was not fully understood until recently. Records indicate that approximately 1,850,000 m^3 of stone materials were removed from the shore for construction and development purposes in Toronto between 1830 and 1930 (Royal Commission, 1992). Although details of locations where material was removed are lacking, there was a reported concentration of activity in Port Credit and along the Scarborough Bluffs. Materials removed from the beach and out to depths of 4 m ranged from gravel to boulders, with boulders of 450 mm to 600 mm in diameter preferred by trades (Fenco MacLaren Inc. et al., 1996).

It is believed that the Bluffs eroded at a slower rate prior to commencement of the practice of stonehooking, although they were still undergoing and subject to erosional processes. Recognizing the continuously eroding shoreline, located in close proximity to a highly developed urban area, shoreline protection has been implemented along portions of the Study Area. This ***shoreline treatment*** addresses the primary erosion mechanism of wave action acting on the Bluffs directly. Approximately 72% of the shoreline between Bluffer's Park and East Point Park/Highland Creek has some form of shoreline erosion protection works, which were installed between the 1970s and 2012 (about 85 ha of land area has been created). These structures can be categorized as:

- major land creation projects (Bluffer's Park, constructed in the 1970s);
- ***revetments*** constructed close to the toe of the Bluffs; and,

- ***armourstone headlands*** with naturally accreting or artificially filled sand, gravel or cobble beaches.

Shoreline protection activities and features have resulted in changes to shoreline erosion rates, as compared to post-stonehooking rates. The areas which currently contain shoreline protection measures include Bluffer's Park, and from Meadowcliffe to south of Morna Avenue (**Figure 2-2**). These shoreline protection measures have been put in place at varying times in the last 50 years. Some of these shoreline protection structures require maintenance, modifications, or repair, which has been considered as part of this Project. The unprotected sections include Cudia Park, Grey Abbey Park and East Point Park, as well as some publicly inaccessible shoreline (e.g., privately-owned or restricted public access) to the west of East Point Park.

Alleviation of, and protection against erosion processes at the slope toe (shoreline protection), permit long-term slope self-stabilization (e.g., crest migration) and subsequent natural revegetation. When properly designed, shoreline protection reduces the toe erosion recession rate to 0 m per year over at least the design life of the toe erosion protection measures (approximately 20 to 50 years). During this period of self-stabilization, landslides will continue as the crest migrates until a long-term stable slope is achieved.

With other site conditions being equal, the amount of self-stabilization observed can be correlated to the amount of time in which shoreline protection measures have been in place. In areas where the toe erosion protection measures have generally been in place for longer periods of time (decades), the slopes have a shallower inclination, are more highly vegetated, and are thus less prone to slope failures.

In the remaining areas where there is no protection along the shoreline, long-term average toe recession rates are equal to bluff crest migration rates, and can be as high as 1 m per year. The recession rates vary year to year because of the ***episodic*** nature of erosion. Short-term erosion rates at any location along the bluff vary depending on Lake Ontario wave and water level conditions, and other minor factors. Variations in bluff crest migration rates over time could be explained through more evident and frequent occurrence of extreme climatic events and weather pattern changes, such as unusually heavy rainfall, thick long-lasting snow pack, additional freeze-thaw cycles throughout the winter months, and more severe droughts.

2.5.1.2 Project Opportunities

Although shoreline protection works have been undertaken along the toe of the Bluffs for some portions of the shoreline (**Figure 2-2**), there are many areas of the Bluffs (with and without toe protection) that are prone to both toe erosion and crest migration, which poses risks to public safety and property. These risks are to users along the base and top of the Bluffs, as well as risks to public property and infrastructure located along the top of the Bluffs. The SWP provides an opportunity to reduce the risk to users. It should be noted that risk to users cannot be fully eliminated. Shoreline protection works can be implemented or retrofitted along the shoreline between Bluffer's Park and East Point Park in a manner which provides safer formal public access along the shoreline.

Figure 2-2: Existing Shoreline Protection Structures within the Project Study Area



2.5.2 Project Vision Element: Limited Access to and Along the Waterfront

2.5.2.1 Key Problems

The shoreline of the Project Study Area is characterized by steep Bluffs which create challenging access to the water's edge. While approximately 90% of the water's edge within the Project Study Area is publicly owned, there are few formal public access points to the shoreline through most of the length of the Project Study Area.

In addition, there is no continuous trail providing access along the waterfront through the SWP Area. Within the City of Toronto, the Waterfront Trail is intended to provide a recreational amenity and active transportation corridor that connects waterfront parks, destinations and communities. Throughout its length, the Waterfront Trail includes a combination of "off-road" and "on-road" routes along both residential streets and major arterial roads. Within the Project Study Area the Waterfront Trail is located inland and away from the shoreline and mainly along residential streets and some major arterials (Kingston Road).

The steep terrain (the Bluffs) and lack of shoreline continuity limit the ability to extend the Waterfront Trail along the shoreline in the Project Study Area (WRT, 2017). Provision of this access has been constrained by slope stability/public risk, lack of land base and land ownership issues. With the future implementation of the Metrolinx Lakeshore East rail corridor expansion, the existing location of off-road portions the Waterfront Trail in the vicinity of Grey Abbey Ravine and Copperfield Road will be constrained, and relocation of the trail may be desirable. In addition, the on-road portion will be further constrained as Metrolinx moves towards trains crossing Manse Road every seven minutes, which will affect both Waterfront Trail and road traffic.

Access opportunities and issues to the shoreline are largely limited to the following, described from west to east:

- Vehicular and pedestrian access in the west is limited to Brimley Road, which runs south from Kingston Road into Bluffer's Park. Brimley Road south of Barkdene Hills has no sidewalks, with a poor line of sight due to the curving nature of the road, steep slopes, and shared pedestrian and cyclist access along the road with vehicles.
- Parking at Bluffer's Park is limited, and parking may be at capacity by mid-day during peak use periods.
- Traffic congestion down Brimley Road towards Bluffer's Park is a major complaint for the local residents and for the park users during peak use periods.
- Once at Bluffer's Park, there are many trails that provide access to the water's edge.
- Doris McCarthy Trail provides some (or limited) pedestrian access to the shoreline, from just south of Kingston Road and south along Bellamy Ravine towards the water's edge. Limited nearby on-street parking is available along the ***tablelands***. The trail is steep in sections with a slope that exceeds 10% and thus limits users. The trail is mainly surfaced with soil or gravel, and not suitable for most cyclists and some users.

- The TRCA Guild construction access route starts at Guildwood Parkway and runs south towards the shoreline at the Guild Park and Gardens, and is used informally for access by the public. Access from the Guild Park and Gardens property includes an informal pedestrian trail down the ravine to connect with the Guild construction access route. The Guild construction access route contains steep grades, and while it is not a formal public access route to the shoreline, it is used by pedestrians and even cyclists to access the route along the water's edge. Anecdotal evidence indicates that there is moderate usage of this route by the public, despite the no access signs at the entrance.
- Beechgrove Drive runs south from Lawrence Avenue East and terminates at Copperfield Road and the east parking lot at East Point Park. A former construction road is currently used as an informal trail and extends from the terminus of Beechgrove Drive almost to the shoreline and contains steep grades and eroded sections near the base. Several informal trails in very poor condition extend down the steep slope from the Beechgrove Drive informal trail to the sand shoreline.
- Aside from the informal access provided by the Guild construction access route and the Beechgrove Drive extension, there is no formal access to the shoreline east of Doris McCarthy Trail within the Project Area. As a result, there are numerous informal paths down the bluff face at East Point Park. These are very steep (greater than 10% grade) and unwalkable for all but the most able users. Most cyclists are also unable to take advantage of these paths. Safety concerns here include erosion and stability of the informal paths. In addition, these informal paths are resulting in the trampling of sensitive vegetation, amongst other impacts to vegetation and wildlife.

Given the limited access to the shoreline, City of Toronto Emergency Services are called upon every year to rescue people trying to access the shoreline using informal paths down the bluff face, or trying to make their own paths. These rescues require considerable time and resources due to the difficulties Emergency Services have accessing these locations. This puts rescue crews at risk and diverts resources from tending to other emergencies. Recently, Toronto Fire reported that in 2016, they had 19 Bluffs calls with 135 units dispatched and 15 persons rescued, and, as of July 10, 2017, 7 Bluffs calls with 46 units dispatched and 3 persons rescued. Some of these events occur on private property which may create issues for the property owner.

In addition to the limited access to the shoreline, continuous public access along the shoreline is constrained by the following, described from west to east:

- East of Bluffer's Park, access along the shoreline is restricted east of the public beach area, where the Cudia Park Bluffs are steep and come down to the water line.
- While there is no formal access along the shoreline between Meadowcliffe and below Grey Abbey Park, a construction access route exists along this length to provide access for maintenance of the shoreline protection works, and is used informally by the public for access.
- The existing construction access route along the shoreline ends approximately south of Morna Road. Access along the sandy shoreline east of this point is restricted by private property and critical public infrastructure.

2.5.2.2 Project Opportunities

The SWP is an opportunity to identify and implement a comprehensive solution to access to and along the waterfront including the relocation of the Waterfront Trail closer to the water's edge. By examining opportunities for shoreline protection, access and habitat improvements in a holistic manner, solutions to meet long-term needs can be identified.

Creating and improving existing access points to the waterfront is a major opportunity. In particular:

- The City is undertaking a number of pilot studies in 2017 and 2018 that will help identify strategies to improve traffic flow and parking management at Bluffer's Park for both the local community and user groups. Formalizing access for pedestrians and cyclists at Brimley Road, in partnership with TRCA, is a step to addressing longstanding issues, and combined with other City of Toronto initiatives (e.g., off-site parking), has the potential to also contribute in a small way towards the alleviation of parking and traffic complaints.
- Enhancing pedestrian access while formalizing cyclist access at Doris McCarthy Trail could provide alternate access points to Bluffer's Park.
- Enhanced pedestrian and cyclist access to the waterfront at Guild Park and Gardens could provide formal access to the shoreline.
- Enhanced access for East Segment will address the problem of safety, while providing formal access (and the east terminus) for cyclists to access the formal portion of the Waterfront Trail.

2.5.3 Project Vision Element: Habitat Integrity

2.5.3.1 Key Problems

Certain areas of the shoreline lack habitat integrity. Prior to European settlement, it is estimated that approximately 80% to 95% of the southern Ontario landscape contained natural forest and wetland cover (Butt et al., 2005; TRCA, 2012). Following colonization in the 18th and 19th Centuries, trees and other vegetation were cleared from the landscape, and wetlands were drained, with the purpose of preparing the land for agriculture (Butt et al., 2005). With continued population growth and subsequent land development over time, approximately 20% of the original natural cover remains in southern Ontario (Butt et al., 2005), with less than 17% natural coverage remaining in the Project Study Area.

With sustained growth and urban development over time, significant portions of the ***natural environment*** have become fragmented or lost. As of 2016, the City of Toronto's total population was estimated at 2.88 million people (Ontario Ministry of Finance, 2017), with over 37, 600 people within the Project Study Area alone (Environics, 2014). Given the forecasted 24.9% population increase in Toronto over the next 30 years (from 2011 to 2041) (Hemson Consulting Ltd., 2012), it is projected that by 2041 3.4 million people will be living in Toronto (Ministry of Municipal Affairs, 2017). There are a number of proposals for developments along and in the vicinity of the Kingston Road corridor for denser residential development (**Section 3.3.1.1**). The City is moving towards mainstreeting and creating denser neighbourhoods to support the anticipated population increase.

As urban centres expand and the population continues to grow and diversify, such as in the Project Study Area, the demand for access to natural areas increases, putting pressure on both managed and unmanaged terrestrial areas that are already in limited supply (City of Toronto, 2013a). The Scarborough Bluffs are a regional destination that contains several areas designated by the City as ***Environmentally Significant Areas (ESAs)*** and by the Province as ***Areas of Natural and Scientific Interest (ANSIs)***. The Bluffs are anticipated to only increase in popularity, and increased use will continue to place pressures on the natural environment, unless this use is appropriately planned for and managed.

It has been shown that Torontonians are shifting towards informal and individualized activities, with a growing interest in the use of trails for recreation, exercise and active transportation (City of Toronto, 2013a). One pressure, resulting from increased demand and changes in natural area usage, is the development of user-created (informal) trail systems. These ad-hoc trails have been found to have a particularly negative impact on the condition of the ESAs within the Project Study Area, as identified by the City.

Informal trail systems form for a number of reasons, including but not limited to:

- Currently implemented trail systems, if present, do not accommodate or anticipate the needs and desires of park users;
- Informal trails provide increased efficiency by creating a shortcut, or providing more direct access to a natural feature (Wimpey and Marion, 2011); and,
- The existing system provides no or limited access to a desirable feature (e.g., a known viewpoint, a lake, a rock outcropping, etc.) (Dickens, Gerhardt, and Collinge, 2005; Walden-Schreiner and Leung, 2013).

The formation of informal trails occurs in stages: trampling of vegetation, loss of organic soil material, and the eventual compaction of soil. Once a discernable path has been formed, this often creates a "releaser cue" that causes others to follow the same route (Wimpey and Marion, 2011).

Within the Project Study Area, approximately 14 km of informal trails have been identified, the majority of which provide informal access to and along the waterfront, with the greatest concentration of informal trails (~8 km) dissecting the East Point ESA. The effects from informal trails on natural areas tend to be localized, but they can also exacerbate disturbances and contribute to changes at the landscape level (Kuss, 1986; Wimpey and Marion, 2011). They can result in the loss of native vegetation, habitat fragmentation, displacement of wildlife, soil compaction and resultant erosion, altered ***hydrology***, and spread of invasive species (Cole, 1995; Wimpey and Marion, 2011).

As with the terrestrial ecosystem, the aquatic ecosystem of Lake Ontario, including the Scarborough shoreline, has been impacted by human activities. The waterfront changed dramatically following the arrival of early European settlers in the late 18th Century, largely in part due to the historical practice of stonehooking.

Stone material is an important component of the physical structure of the shoreline. The movement of stone material along the shoreline forms bays, points and bars, which are critical elements of aquatic habitats providing for cover, shelter and foraging opportunities.

In addition, open coast shorelines such as those found along the waterfront in the Project Study Area, provided historical spawning and foraging habitat for cold water aquatic species such as Lake Trout (*Salvelinus namaycush*) and Lake Whitefish (*Coregonus clupeaformis*) (Dietrich et al., 2008). The self-cleansing characteristics of the open coast shoreline exposed gravels, cobbles and boulders, which provided essential conditions for over-wintering eggs and larvae (Dietrich et al., 2008). However, past modifications, particularly the removal of this coarse substrate has significantly reduced the quality and diversity of habitat available in this area.

Shoreline erosion necessitated the need for the toe protection. Early protection works in the form of basic linear revetment features were implemented in the 1980s and 1990s along the Guild and South Marine Drive portions of the Project Study Area shoreline. As the primary focus of these works was ***erosion control***, aquatic habitat enhancement features were not incorporated into their design. Extending parallel to the shoreline, these shoreline protection works have a simple linear profile and lack substrate diversity characteristic of historical Scarborough shoreline, or more modern headland beach systems.

Improved shoreline protection techniques have since been employed, such as those near Sylvan Avenue and Meadowcliffe Drive, which included ecological components in their design. The Sylvan Avenue shoreline area, completed in 2000, features an ***undulating shoreline*** that increases habitat diversity and complexity which is beneficial for a variety of fish species. Similarly, a more advanced technique was implemented at Meadowcliffe between 2011 and 2012, where a headland-retained artificial cobble beach was constructed that provides optimal cover, refuge and foraging opportunities for species utilizing the open coast areas.

2.5.3.2 Project Opportunities

Through implementation of the SWP, an opportunity exists to decommission much of the existing informal trail network with the provision of formalized access to and along the waterfront. This is consistent with the recommended management needs identified by the City of Toronto for Project Study Area ESAs. By managing the existing users and anticipated increase in user volume through a formal trail system which better meets user needs, regeneration and enhancement of the terrestrial ecosystem within the Project Study Area may be achieved, as direct disturbance to the natural environment can be reduced. Additionally, the connective shoreline protection structures that could be a part of the SWP provide a number of opportunities for aquatic habitat enhancement and/or creation, particularly in areas where less advanced techniques were previously applied (e.g., Guild Park and Gardens, and South Marine Drive) and where little to no work has yet been done (e.g., Grey Abbey Park).

The Project presents an opportunity to enhance terrestrial and aquatic natural features, while addressing erosion/risk prone areas, and improving access to and along the shoreline between Bluffer's Park and East Point Park.

3. Description of the Potentially Affected Environment

The purpose of **Chapter 3** is to present an overview of the environment potentially affected by the SWP to create familiarity with issues to be addressed and the complexity of the environment likely to be affected by the Project. All aspects of the environment within the Project Study Area (see **Figure 2-1** in **Chapter 2**) relevant to the Project and its potential effects have been described in this chapter. The chapter is divided into three sections which capture different components of the environment:

1. Physical environment: describes the coastal and geotechnical processes acting on the Project Study Area;
2. Natural environment: describes terrestrial and aquatic habitat and species; and,
3. Socio-economic environment: describes existing and planned land use, land ownership, recreation, archaeology, cultural heritage, and Aboriginal interests.

The description of the existing environment is based on the information from a number of studies, which have been referenced in the relevant sections. Additional field surveys were undertaken where appropriate. Where applicable, future environmental conditions are also discussed. For most components of the environment, existing conditions within the Project Area or Project Study Area are described. Where appropriate, conditions within the broader Regional Study Area are also described.

3.1 Physical Environment

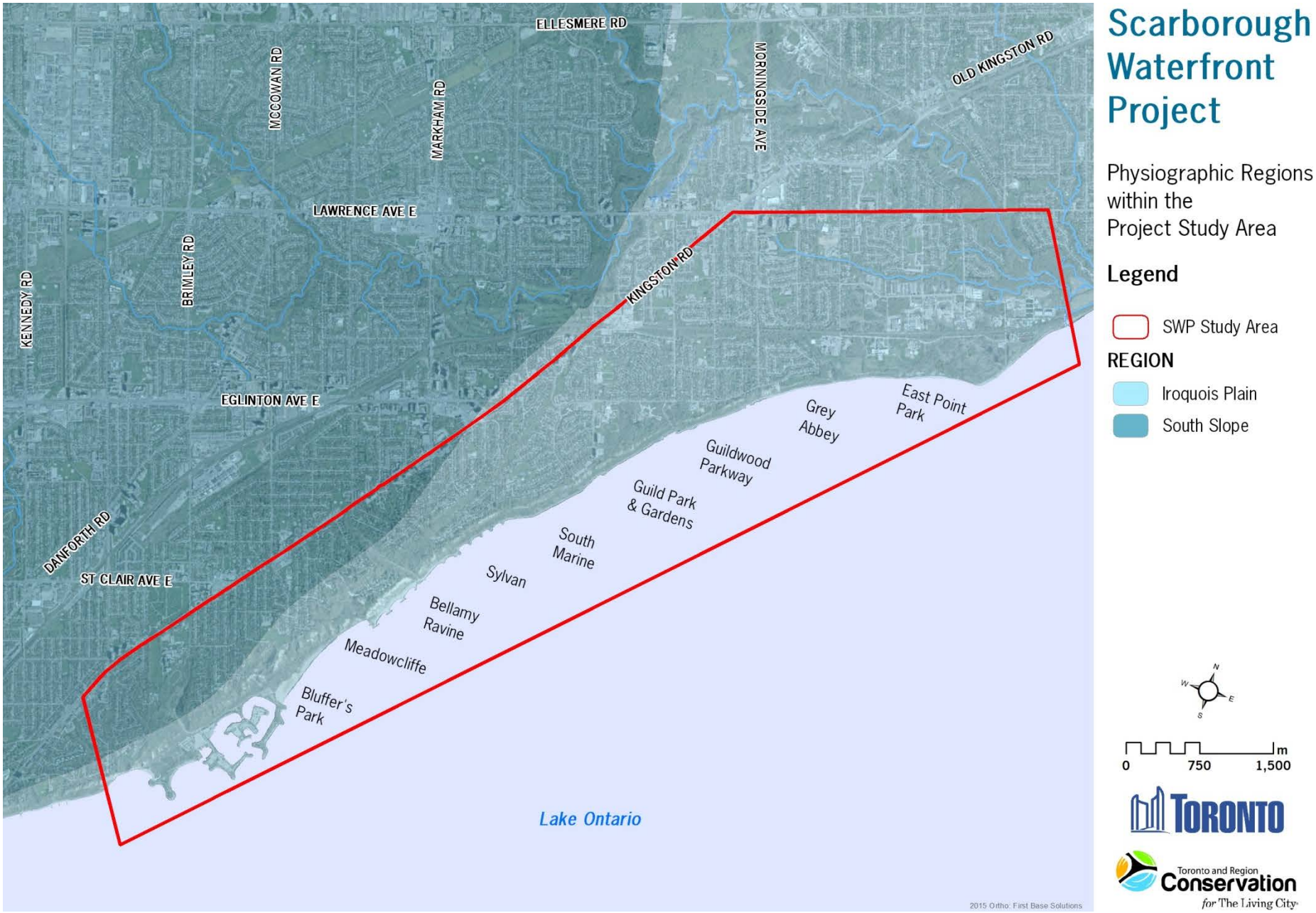
Structures and property within slopes, valleys and shorelines may be susceptible to damage from natural processes such as erosion, slope failures and dynamic beaches. These processes become natural hazards when people and property locate in areas where they normally occur (MNR, 2001). Therefore, understanding physical natural processes is vital to developing locally-appropriate Alternatives in order to meet Project Objectives.

3.1.1 Physiography

Physiography is the study of physical patterns and processes that produce and change the Earth. Geomorphology is a specialized subfield of physiography that studies why landscapes look the way they do and to understand landform history and dynamics. The geomorphological subset of physiography is applicable here.

The Project Study Area is divided into two distinct physiographic regions: the Iroquois Lake Plain region (adjacent to Lake Ontario) and the South Slope region (directly south of Kingston Road) (**Figure 3-1**).Two ancient shorelines mark the existence of former glacial lakes: the Iroquois Shoreline and Toronto Scarp. The Iroquois Shoreline is in close proximity to the existing shoreline, briefly merging with the existing shoreline at Cathedral Bluffs Park, while the Toronto Scarp runs parallel to the existing shoreline, approximately 2 km to 4 km offshore, and forms an underwater bluff.

Figure 3-1: Physiographic Regions within the Project Study Area



The Project Study Area is defined in large part by the Scarborough Bluffs, which is the most significant topographical landform in the region. The slope is south-facing, and maximum relief occurs at Cudia and Cathedral Bluffs Parks, where the Bluffs rise approximately 110± m above Lake Ontario at their maximum height. Away from the main slope face, the Lake Iroquois Terrace forms a distinct ridge generally located along the historical Lake Iroquois shoreline to the north of the Bluffs.

3.1.2 Geology and Hydrogeology

The geology and ***hydrogeology*** of the Project Study Area are fundamental to the planning of the SWP (**Figure 3-2**). The various sediment layers that comprise the Scarborough Bluffs each have unique characteristics, which in turn affect the geotechnical properties of the materials.

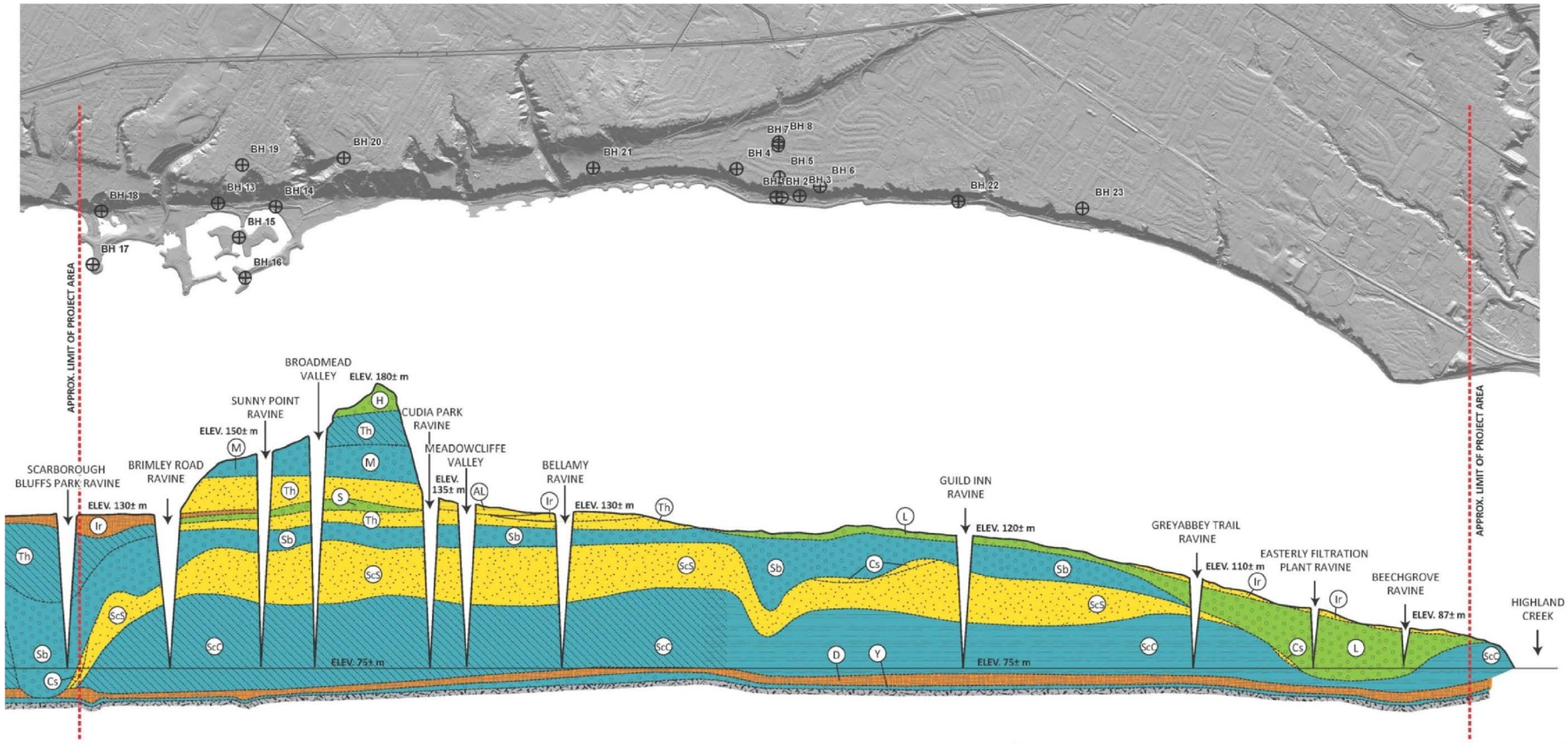
The following sediment units have been identified within the Project Study Area:

- The Scarborough Formation is the lowest exposed unit of the Bluffs, and forms the majority of the Bluffs within the Project Study Area. The lower half of this formation comprises fine silt and clay, while the upper part is sand. ***Groundwater*** in the sand flows down to the top of the silt and clay layer, then seeps slowly out the face of the Bluffs.
- The Sunnybrook Drift (also known as the Sunnybrook Till), a cohesive silty clay, overlies the Scarborough Formation, and limits downward groundwater movement.
- The Sunnybrook Drift is overlain by the Thorncliffe Formation, which contains layers of riverine sands interbedded with fine-grained glacial ***tills***. Groundwater moves readily through the sands, but more slowly through the lower permeability tills.
- The surficial deposits vary across the Project Study Area. Sandy silt tills known as the Leaside and Halton Tills are present. Lake Iroquois Sand is also present in place of or overlying the tills in several areas across the Project Study Area. All of these surficial units are relatively thin and comprise a minor section of the profile of the Bluffs.

In addition to these historic deposits, recent sediment from ***talus*** accumulation associated with slope failures, and lake deposits associated with Lake Ontario, are found at the toe of the Bluffs and in the nearshore environment. These deposits include silt, sand, gravel, cobbles and boulders. Much of the large size material (cobbles and boulders) was removed from the nearshore by stonehooking activities in the late 1800s and early 1900s (see **Section 2.5.1.1** in **Chapter 2**).

Generally, groundwater flows from the north towards the bluff face, but is locally influenced by deep ***ravines*** and gullies, which direct flow towards these low points. As a result of slope face seepage or drainage, groundwater discharge in the Project Study Area is characterized as visible zones of seepage along the exposed bluff face and along the exposed faces of the various gullies and ravines. The seepage is generally associated with the Scarborough and Thorncliffe sands, although minor seepage is associated with localized fill and Lake Iroquois sands near the top of the Bluffs, and the loose talus materials at the toe of the slope.

Figure 3-2: Project Study Area Bluff Stratigraphy



REFERENCE TO ABBREVIATIONS

- (AL) Alluvial Silt
- (Cs) Channel Sands
- (Ir) Iroquois Sands
- (H) Halton Till
- (L) Lower Leaside Till
- (S) Seminary Till
- (Th) Thorncliffe Formation
- (M) Meadowcliffe Till
- (Sb) Sunnybrook Till
- (ScS) Scarborough Formation (sands)
- (ScC) Scarborough Formation (clays)
- (Y) York Till
- (D) Don Formation

LEGEND

- Sands
- Gravelly Sand (Interbedded)
- Silts
- Clays
- Till
- Bedrock
- Borehole
- Gravels (gravels to gravelly sand)
- Silt to Sand (not till)
- Cohesionless Tills
- Cohesive Soils (clayey silt to clay, incl. tills)

REFERENCE		TORONTO AND REGION CONSERVATION AUTHORITY	Recreated by TRCA from Geocon (1982)
DWG. NO.	DESCRIPTION	EROSION CONTROL STUDY	
--	2015 LIDAR flown by Airborne Imaging	SCARBOROUGH BLUFFS – STAGE 2	DATES Original: Feb. 1, 1982 Recreated: June 1, 2017
--	Formation names after Karrow and Morgan, 1975	BOREHOLE LOCATION PLAN AND GENERLIZED STRATIGRAPHY	

Scarborough Waterfront Project

Generalized Stratigraphy Along the Project Study Area. Bluff Face Recreated from Geocon (1982)

NOTES

1. The stratigraphy shown on this drawing was originally produced using oblique photographs supplemented by field investigation data. It is not suitable for scaling, design or construction purposes.
2. For a detailed description of geological formations see Appendix A of Geocon (1982).

0 500 1,000 m

TORONTO

Toronto and Region Conservation for The Living City

The seepage rates are controlled by the thickness of the sands and their ability to transmit water. In general, however, groundwater seepage through the face of the Bluffs is generally low. Under typical conditions, estimated rates range from 0.1 L/day/m of face upwards to as high as 50 L/day/m. The lowest seepage rates essentially match evaporation, and no free water leaves the face. The higher seepage rages result in visible groundwater draining down the slope face. Visible seepage is usually observed in the upper Thorncliffe Sands or Iroquois Sands, and is associated with either significant rainfall events followed by infiltration, or snow melt in the spring (**Figure 3-3**). Vegetative cover is associated with some of the seepage zones, where the slope is not oversteepened. This vegetation strengthens and stabilizes the slope face. Groundwater seepage at these rates does not directly contribute to slope erosion, but can lead to freeze-thaw damage and a weakened slope face (see **Section 3.1.8.7**). High rainfall events can cause higher amounts of seepage in the upper sands, which can lead to localized erosion in the upper slope, which occasionally can trigger shallow failures in the upper, oversteepened Bluffs zones.

Figure 3-3: Seepage Along the Cudia Park Bluff Face



3.1.3 Source Protection Planning

The Project is located in the Toronto and Region Source Protection Area and transects two types of vulnerable areas (highly vulnerable aquifers, intake protection zones) identified under the *Clean Water Act, 2006* (see **Appendix N** for detailed mapping):

- Intake Protection Zone (IPZ)-2 for the F.J. Horgan Water Treatment Plant (WTP) is transected by the SWP Study Area. The Credit Valley – Toronto and Region – Central Lake Ontario (CTC) Source Protection Plan contains no policies to address activities which take place within IPZ-2 given that significant drinking water threats cannot be found in this area.
- Highly vulnerable aquifers are predominantly located in much of the SWP Study Area. Vulnerability and hazard scoring can only result in moderate and low drinking water threats in these areas. The CTC Source Protection Plan contains policies to address the application of road salt, as well as the handling and storage of dense non-aqueous phase liquids (DNAPLs) and organic solvents in highly vulnerable aquifers. The completion of the SWP will not require the use of such chemicals, nor are there plans to construct a roadway which will require the application of road salt. Therefore, policies SAL-10, SAL-11, SAL-12, DNAP-3, and OS-3 are not applicable to this Project.

The CTC Source Protection Committee used event-based numerical modeling to identify activities, such as spills, that could be significant threats to drinking water intakes on Lake Ontario. This information is documented in the Toronto and Region Assessment Report (CTC Source Protection Committee, 2015a) and the CTC Source Protection Plan (CTC Source Protection Committee, 2015b). The SWP Study Area transects the event-based area, which was delineated to correspond to a potential petroleum storage spill in the Don River originating in North York.

Although considerably less fuel is expected to be on-site during the construction phase of the SWP than used in the event based numerical modeling scenario run for a petroleum storage spill originating in North York, it will be appropriate to employ best management practices for the prevention and management of spills to avoid an potential impact to the water supplying the F.J. Horgan facility. Some of the best management practices that will be investigated for use will include ensuring the appropriate notification protocols are in place and up-to-date in the event of a spill, measures are in place to contain liquid fuel on site, and regular equipment inspection (**Appendix H**).

3.1.4 Surface Water Conditions and Flow Volumes

Surface water conditions and flow volumes are important considerations to determine the likelihood of slope failure and crest migration. The flow volumes from surface water features are also vital parameters in estimating the potential for habitat features.

Highland Creek approximates the eastern boundary of the Project Study Area, with about 1.5 km of the lower section of the creek found within the Project Study Area. Highland Creek drains a primarily urban watershed with a drainage area of about 102 km^2.

There are no other permanent watercourses in the Project Study Area; however, several surface water features do exist and include deep ravines and minor ravines (**Figure 3-4 to Figure 3-6**), ditches, and other ***open water channels*** and marshes. These surface water features have varying flow conditions and are fed by a combination of surface water runoff and discharge from storm sewer

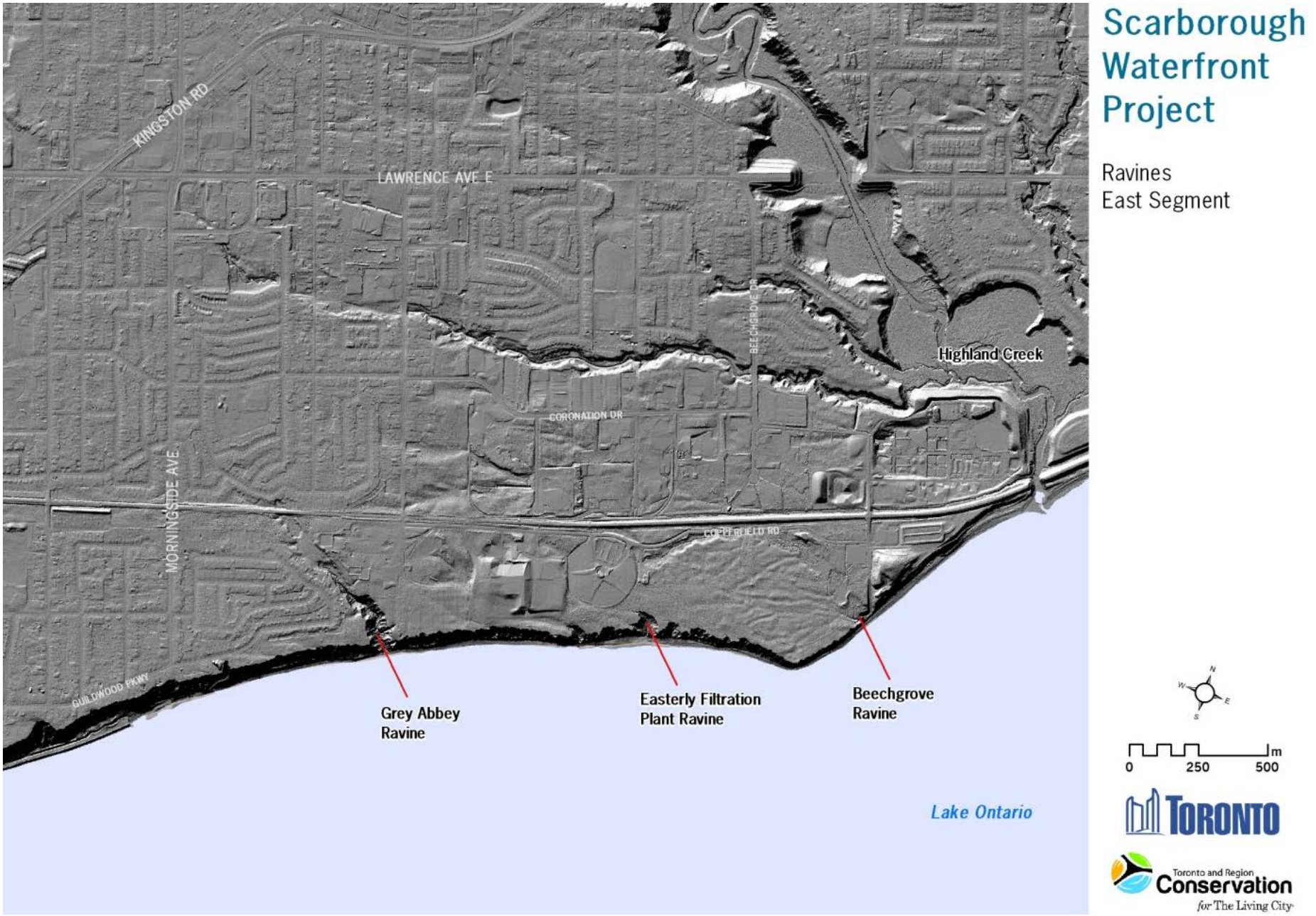
Figure 3-4: Ravines within the West Segment



Figure 3-5: Ravines within the Central Segment



Figure 3-6: Ravines within the East Segment



outfalls. There is no significant accumulation of groundwater seepage which contributes to these water features.

3.1.4.1 Deep Ravines

The water within the channels of the deep ravine systems (most prominently Bellamy Ravine and Grey Abbey Ravine) are fed primarily by stormwater discharge from outfalls (see **Figure 3-7** for outfall locations). Flow conditions within these outfall-fed channels have relatively higher flow volumes as compared to the other water features within the Project Study Area, such as open water channels or marshes, which are not directly connected to the municipal storm system. The outfall-fed watercourses in the ravines are more prone to erosion due to higher velocity of the water flow, and usually require erosion protection.

3.1.4.2 Minor Ravines

Other surface water features observed include open outfall-fed erosion features in the watercourses of the minor ravines or gullies (typically “bowl-shaped” features which were likely created by localized failures of the slope face). Minor erosion features such as these are located throughout the Project Study Area, with more notable examples located in the eastern section of Cathedral Bluffs Park, Cudia Park and the western section of East Point Park. These minor erosion features sometimes concentrate enough surface water to occasionally transmit the water to the shoreline. Depending on the ***topography*** at the base of the slope, this water either drains directly onto the shoreline, or is collected within a depression/basin at the slope toe. Flow to these gullies at the base of minor ravines is often minor and intermittent, and proportional to the local precipitation.

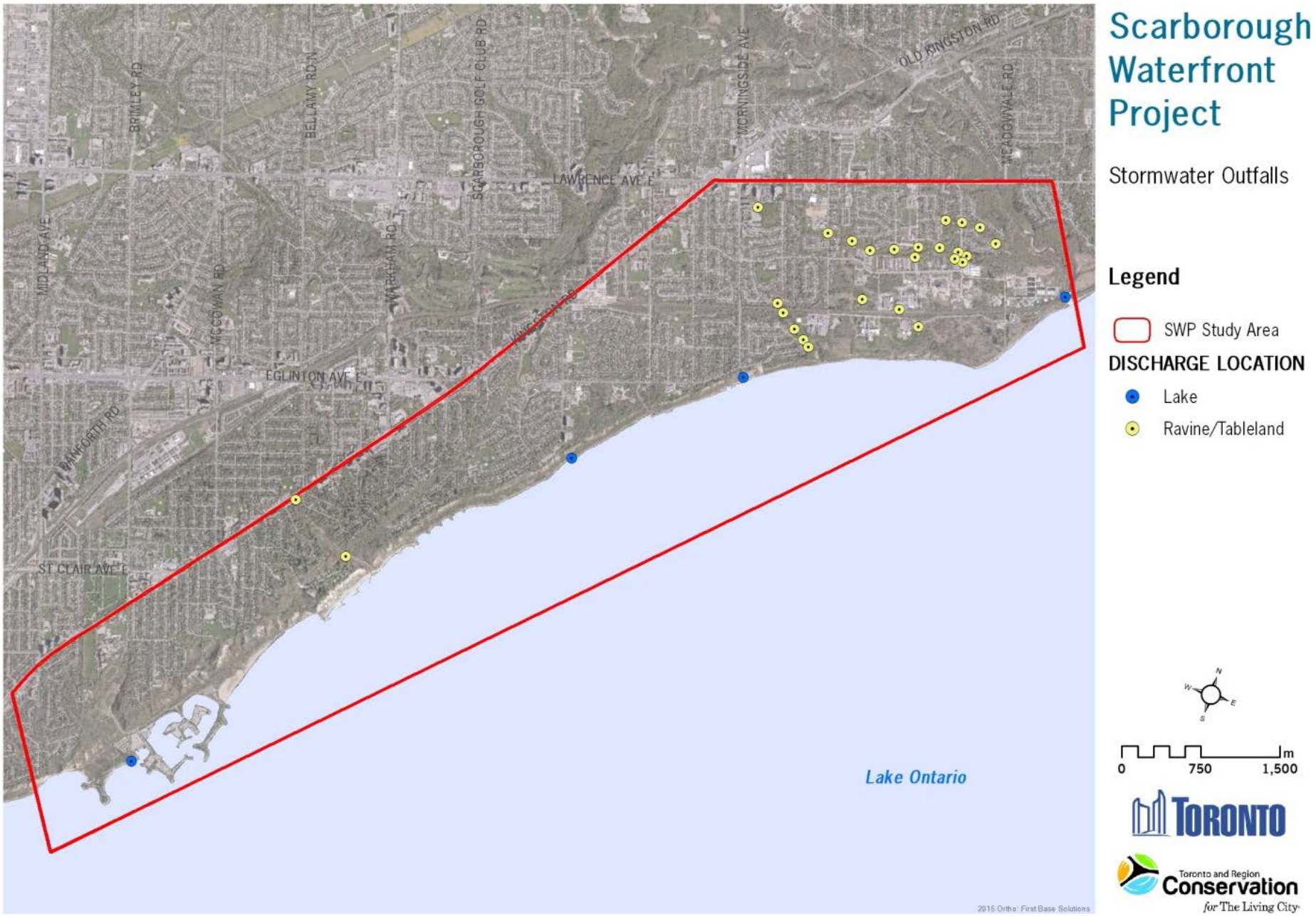
3.1.4.3 Linear Slope Sections (No Ravines)

Where there are no prominent concentrated erosion features (ravines, gullies), surface water flows as sheet drainage over the slope crest and down the slope face. Notable areas where surface water flows down the bluff face in this manner are located in Bluffer’s Park, Meadowcliffe, Sylvan, South Marine, Guild Park and Gardens, and Guildwood Parkway. In these areas, ditches are sometimes located at the base of the slope. As with the minor erosion features, flow to these channels/ditches is intermittent and proportional to the local precipitation, and does not result in significant erosion.

3.1.5 Stormwater Run-Off, Infrastructure and Hydraulics

Being a waterfront watershed that is urbanized, the majority of surface runoff is discharged to Lake Ontario via municipal storm sewers. Geographic Information System (GIS) data identifies 32 storm sewer outfalls in the Project Study Area located along the base of the Bluffs, on tablelands and within the ravines. There is also a stormwater outfall associated with the Highland Creek Wastewater Treatment Plant (WWTP) (located just west of Highland Creek at the eastern edge of the Project Study Area) which extends approximately 500 m offshore and was not considered for this study.

Figure 3-7: Stormwater Outfall Locations in the Project Study Area



Prominent stormwater outfalls are located at Bluffer's Park, at the base of Bellamy Ravine, at the Guild Park and Gardens, at Morningside Avenue, and within Grey Abbey Ravine. There are also other smaller outfalls and culverts that direct surficial or stormwater to Lake Ontario within the Project Study Area.

All stormwater outfalls near the base of the Bluffs within the Project Study Area were visually inspected to determine their existing condition. **Figure 3-7** shows the approximate location of outfalls in the Project Study Area. Detailed observations made during the inspections are presented in **Appendix B**.

3.1.6 Surface Water Quality and Sediment Quality

Historical water quality problems in the Project Study Area included high nutrient, trace metals and bacteria levels; however, water quality conditions have been improving (Aquafor Beech, 2010). Point sources of contamination are the primary source of bacteria, nutrients and ***total suspended solids*** ("siltiness") in the Project Study Area. These point sources include:

- storm and ***combined sewer outfalls (CSO)*** which drain areas significantly larger than the Project Study Area itself;
- Highland Creek which receives urban stormwater runoff over an area of approximately 102 km^2; and,
- the Highland Creek WWTP.

A total of 32 storm sewer outfalls have been identified within the Project Study Area (see **Section 3.1.5**). One CSO discharges directly into the Project Study Area at the Dunkers Flow Balancing Facility, located at the western end of Bluffer's Park, which reduces loadings to the lake by approximately 80% (Aquafor Beech, 2010).

Bluffer's Park Beach meets water quality criteria for ***Blue Flag Beach*** status. Water quality was once considered quite poor along this beach, but after microbial source tracking studies identified wildlife as the primary source of bacterial pollution, intermittent streams draining across the beach were intercepted in 2008 using a TRCA-constructed dune and wetland system.

The Highland Creek watershed empties into Lake Ontario at the eastern-most end of the Project Study Area. The entire watershed is urbanized; approximately 6% of the area is forested, and only 9% has some form of stormwater management control (TRCA, 2013b). Water quality within Highland Creek is generally considered poor, based on high *Escherichia coli* (*E. coli*) and ***Total Phosphorus*** inputs (TRCA, 2013b).

3.1.7 Lake Ontario Bathymetry

Bathymetry refers to the underwater depth or topography of a lake, ocean or river. Baseline bathymetry is a critical component of the EA as it is considered in every aspect of coastal modelling, design, and constructability assessment.

Bottom contours close to shore are uniform and parallel in front of the Bluffer's Park Beach and for a section offshore of Morningside Avenue, but irregular over most of the remainder of the Project Study Area (**Figure 3-8**). The uniform contours offshore of Morningside Avenue may be an indication of a localized sand deposit. There is a shelf-like feature extending offshore of East Point Park, which is an indication of greater resistance to erosion. That is due to a greater concentration of boulders and cobbles in the lakebed till off the point, making the till at East Point Park more erosion resistant as well as providing a protective pavement as the finer material is eroded away. These conditions have resulted in slower erosion, relative to the Bluffs to the east and west, thereby allowing the formation of East Point.

3.1.8 Coastal Processes, Engineering and Geomorphology

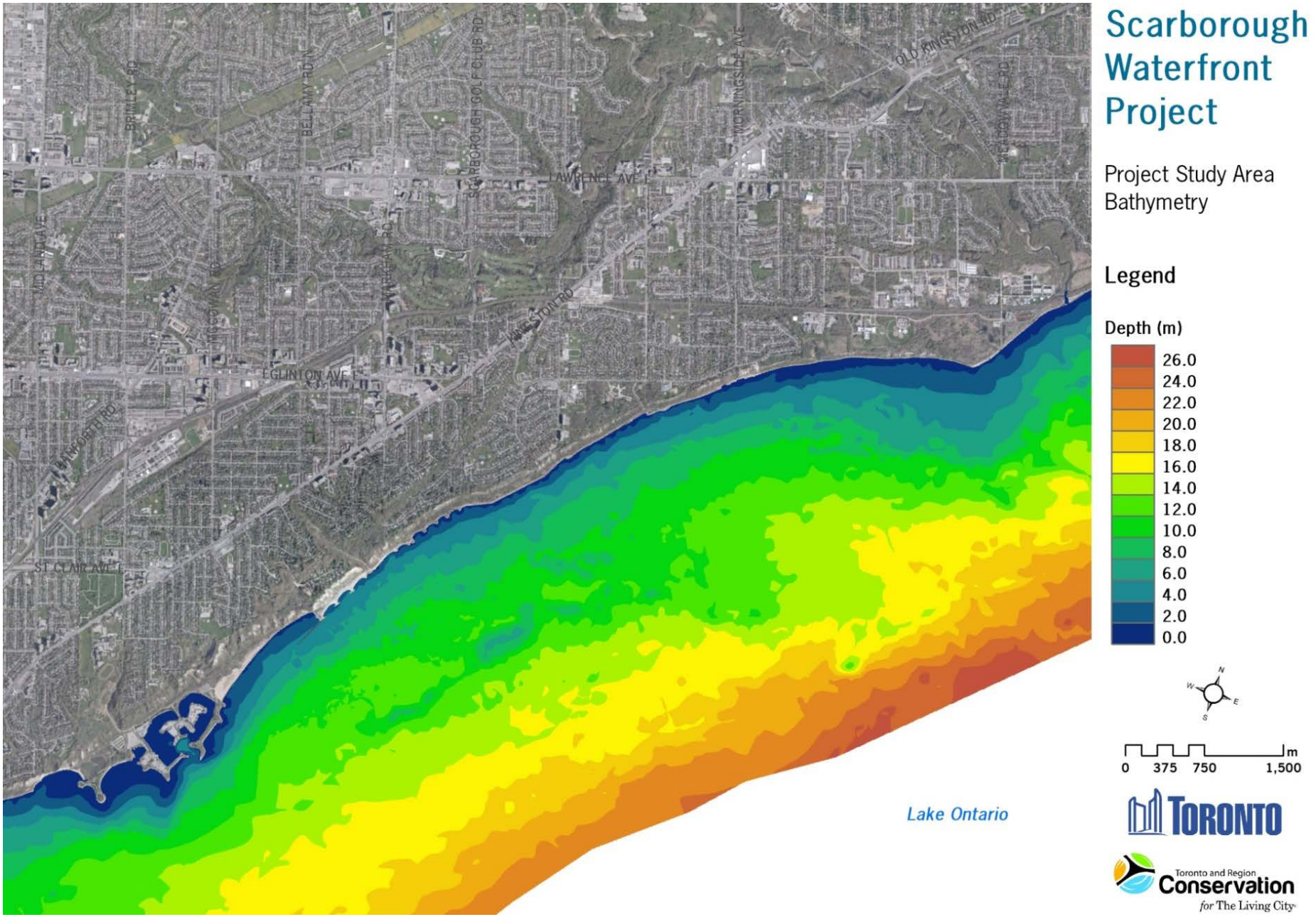
Coastal processes, engineering and geomorphology are described for the Project Study Area. A coastal analysis was completed as part of the EA (**Appendix C**). The analysis used water level, wave, wind, sediment transport, and nearshore and offshore bathymetric and sediment size data.

3.1.8.1 Water Levels

Water levels play an important role in both nearshore wave conditions and alongshore sediment transport. An understanding of water level fluctuations is important to ensure the long-term stability of proposed shoreline protection structures. Water level fluctuations have been taken into consideration in the development of the Alternative Methods.

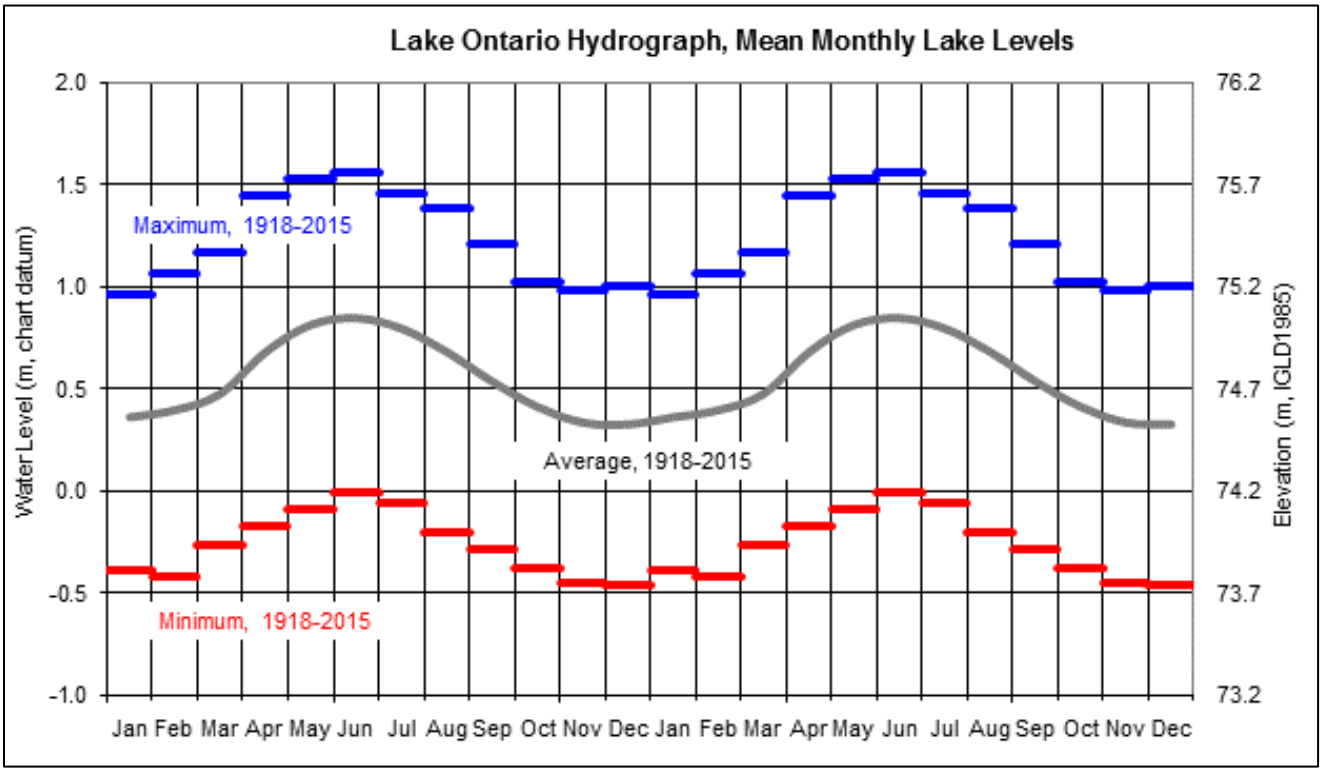
Water levels on Lake Ontario fluctuate on a short-term, seasonal and long-term basis. Short-term fluctuations last from less than an hour up to several days and are caused by local meteorological conditions such as wind speed and direction. These fluctuations are most noticeable during storm events when barometric pressure differences and surface wind stresses cause temporary imbalances in water levels at different locations on the lake. These ***storm surges***, or wind-setup, are most noticeable at the ends of Lake Ontario, particularly when the wind blows down the length of the lake.

Figure 3-8: Project Study Area Bathymetry



Seasonal fluctuations reflect the annual hydrologic cycle which is characterized by higher net basin supplies during the spring and early part of summer with lower supplies during the remainder of the year. **Figure 3-9** is a hydrograph for Lake Ontario showing long-term mean monthly water levels with respect to ***chart datum***. Water levels generally peak in the summer (June) with the lowest water levels generally occurring in the winter (December). The average annual water level fluctuation is approximately 0.5 m. Although water levels below chart datum are rare, the lowest monthly mean on record is approximately 0.4 m below chart datum.

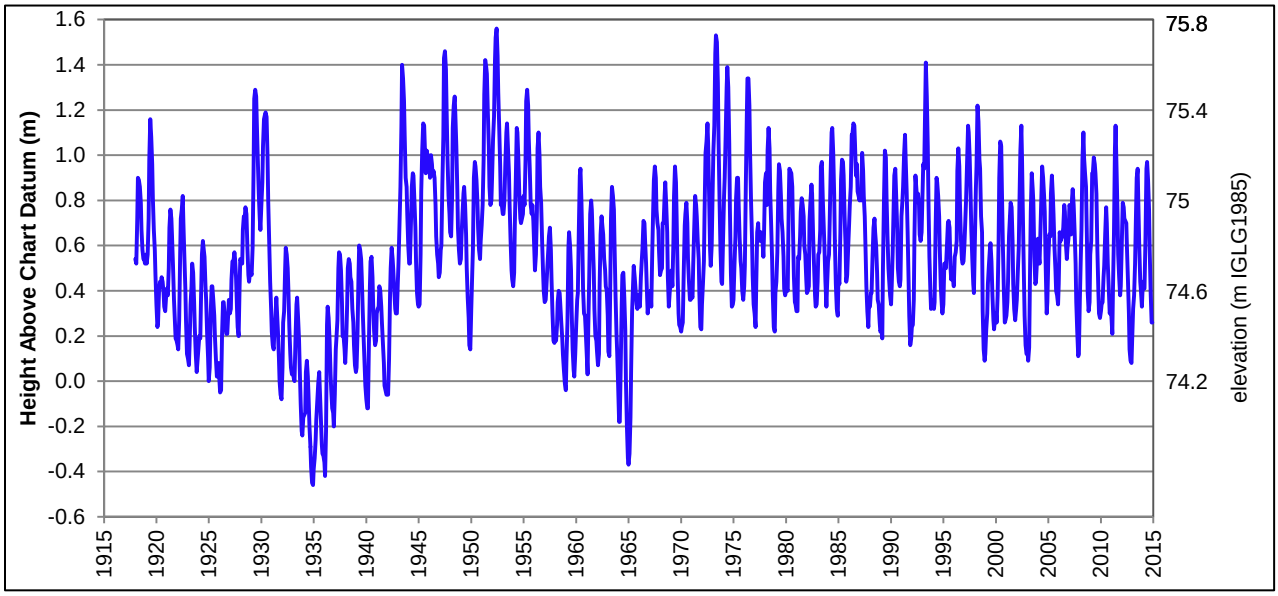
Figure 3-9: Lake Ontario Hydrograph*



*Note: * The data presented is the latest available from IJC at the time of publication of this report.*

Long-term water level fluctuations on the Great Lakes are the result of persistently high or low net basin supplies. More than a century of water level records show that there is no consistent or predictable cycle to the long-term water level fluctuations. **Figure 3-10** shows Lake Ontario's mean monthly water levels from 1918 to 2015. Both long-term and seasonal fluctuations can be seen. It should be noted that in 2012 we experienced low water levels, and in Spring 2017 we experienced levels that exceeded the 100-year high.

Figure 3-10: Lake Ontario Mean Water Levels from 1918 to 2015*



*Note: * The data presented is the latest available from IJC at the time of publication of this report.*

Climate change studies that examined the impact of global warming have suggested that long-term water levels on the Great Lakes will be lower than they are today. Those changes, however, are expected to have a lesser impact on Lake Ontario than on the upper lakes because the Lake Ontario water levels are regulated. Within the current regulation scheme, however, water levels can fluctuate by over 1 m.

Currently, most approving agencies, including TRCA, require that the 100-year instantaneous water level be used for the design and assessment of shoreline protection structures. The most common source for the 100-year water levels within Ontario is the study completed by MNR (1989). Within the Project Study Area, the MNR (1989) 100-year instantaneous water level elevation is 75.7 m. Based on the water level fluctuations experienced in Spring 2017, Detailed Design will further explore resiliency of shoreline structures given higher water levels.

The ***International Joint Commission*** recently adopted a new plan for regulating Lake Ontario water levels. Lake Ontario – St. Lawrence Plan 2014 is intended to enhance the environment on Lake Ontario and the upper reaches of the St. Lawrence River while maintaining the equivalent to existing conditions on the lower river reaches. Plan 2014 may be generalized as bringing water level fluctuations closer to natural conditions than what occurs under the current regulations. The highest allowable monthly mean water level permitted under Plan 2014 is 0.09 m higher than the 100-year monthly mean water level calculated by MNR (1989). Data has not been provided to allow a statistical analysis of the instantaneous water levels expected under Plan 2014, but a similar 0.09 m increase in the 100-year instantaneous water level would be taken into account when developing Alternatives.

3.1.8.2 Wave Climate

An assessment of wave conditions is required to understand ***littoral sediment*** transport coastal erosion and deposition processes, and water movement. Wave information is also required for the design of shore protection structures related to sizing of materials, shoreline orientation and maximum elevations required.

Measured wave data on Lake Ontario, as on most bodies of water, is very limited and generally covers only short periods of time. For this reason, a procedure called hindcasting is used to produce long-term wave climates based on measured wind data. Long-term records of wind data are readily available for most locations. The hindcasting procedure uses well established formulations to create wave climate sets. The hindcasting models have been calibrated for use on Lake Ontario on previous projects.

A 40-year wave ***hindcast*** was completed by using Toronto Island wind data to produce deep water wave conditions offshore of the site. Wind data recorded from January 1, 1973 to December 31, 2012 was used to produce hourly estimates of the deep-water significant wave height, peak wave period and mean wave direction. Wind data prior to 1973 was not used due to the relatively high occurrence of missing data.

The deep-water wave climate offshore of Scarborough has a ***bi-nodal distribution*** of the total wave power with predominant easterly and southwesterly peaks. **Figure 3-11** shows the directional distribution of the highest hindcast wave heights and the total offshore wave power from the 40-year hindcast. Approximately 60% of the total power comes from the east and approximately 40% comes from the southwest. There is a greater frequency of south westerly waves, but the longer fetches to the east allow the generation of higher wave heights, which contain more wave energy.

Figure 3-11: Distribution of Highest Hindcast Wave Heights and Total Wave Power

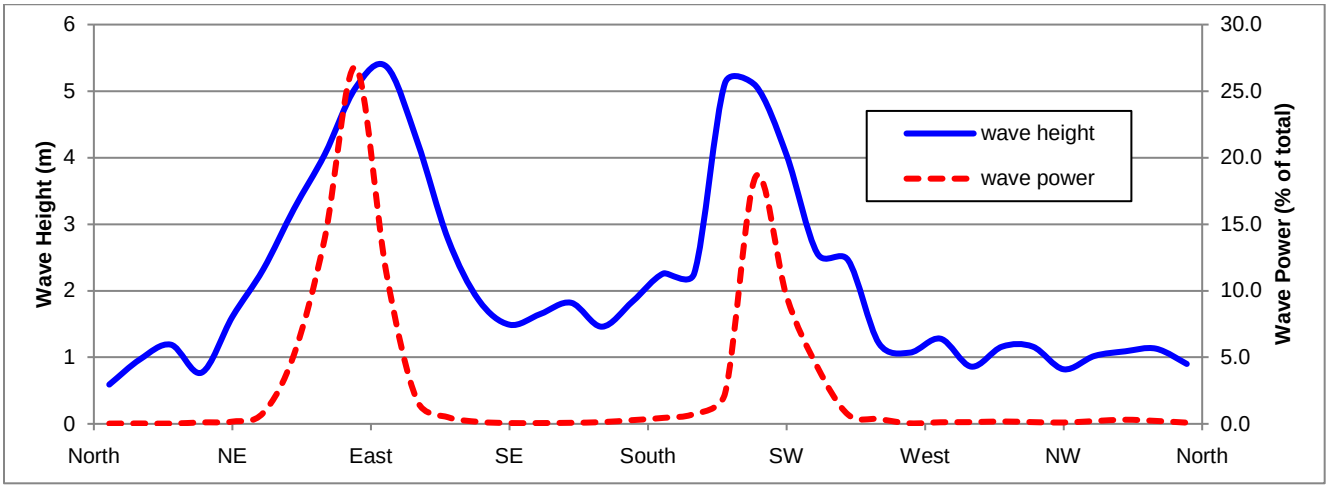


Figure 3-12 presents “all-directions” wave height and period exceedance curves which show the percentage of time a given wave height or period is exceeded.

Figure 3-12: Wave Height and Period Exceedance Curves

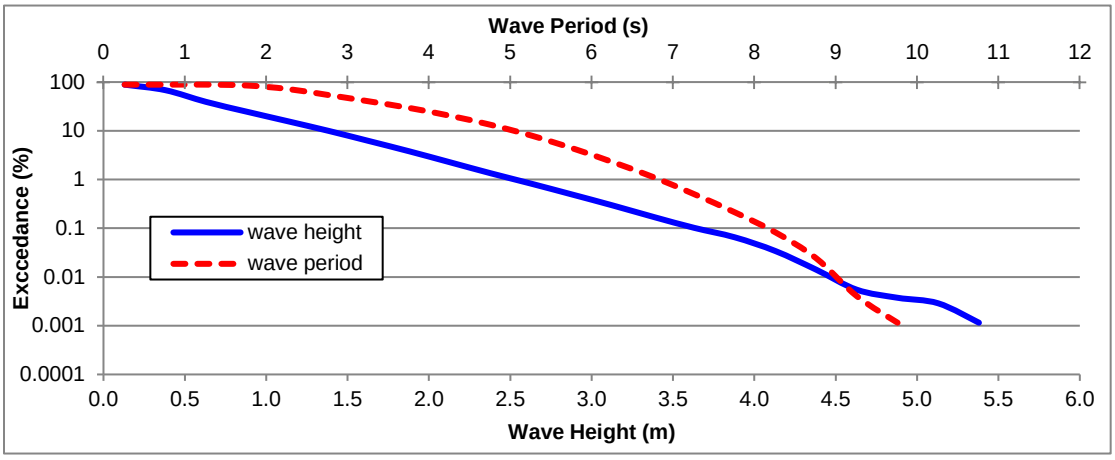


Figure 3-13 and **Figure 3-14**, respectively, show the annual and monthly variation of the total offshore wave power from the 40-year hindcast. The strongest waves are experienced in the winter, from both the southwest and the east.

Figure 3-13: Annual Distribution of Total Wave Power

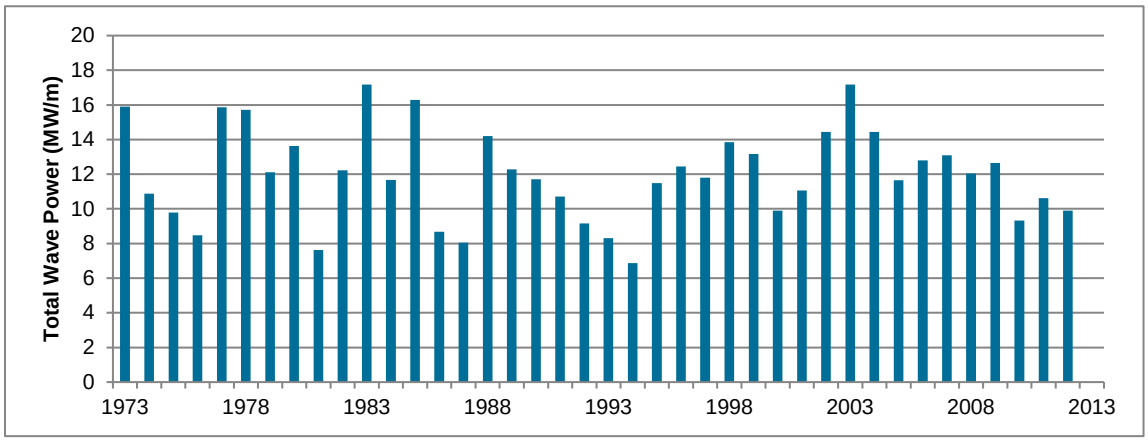


Figure 3-14: Monthly Distribution of Total Wave Power

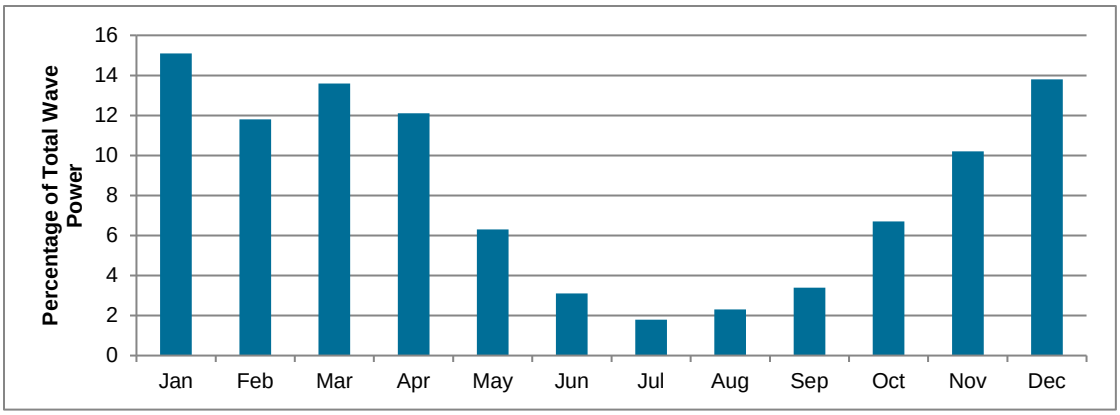


Figure 3-15 shows the results of a peak-over-threshold ***extreme value analysis*** of easterly storm event wave heights. The 100-year return period wave condition at the 90% upper confidence interval has a significant wave height of 5.6 m with a peak spectral period of 10 seconds. A similar analysis of southwesterly storms (**Figure 3-16**) yields a 100-year return period wave with a 5.5 m significant wave height and a 9.5 second peak spectral period for waves coming from that sector.

Figure 3-15: Extreme Value Analysis of Easterly Wave Heights

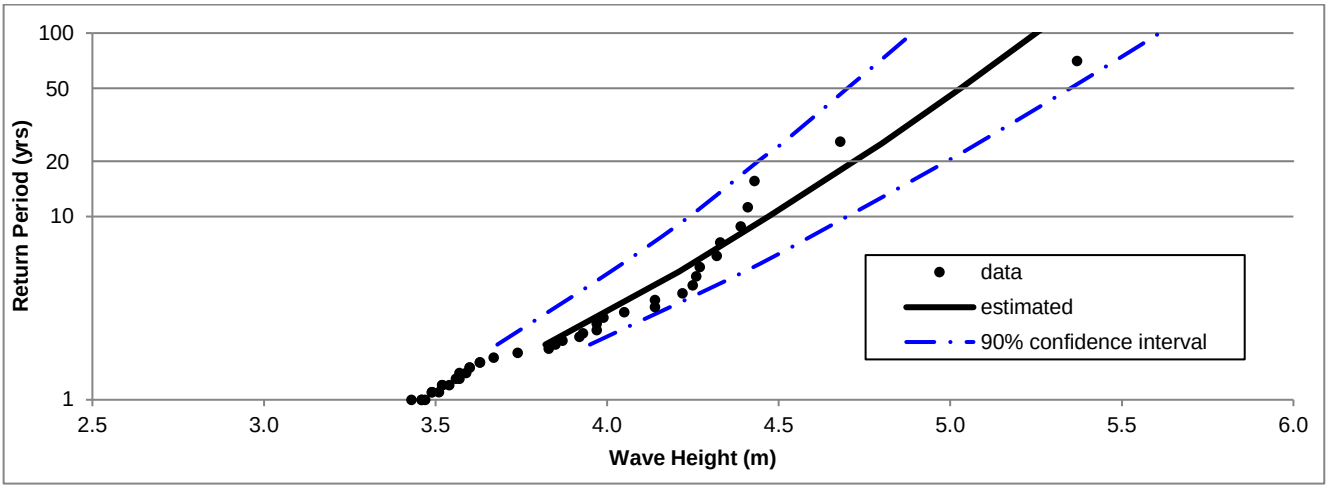
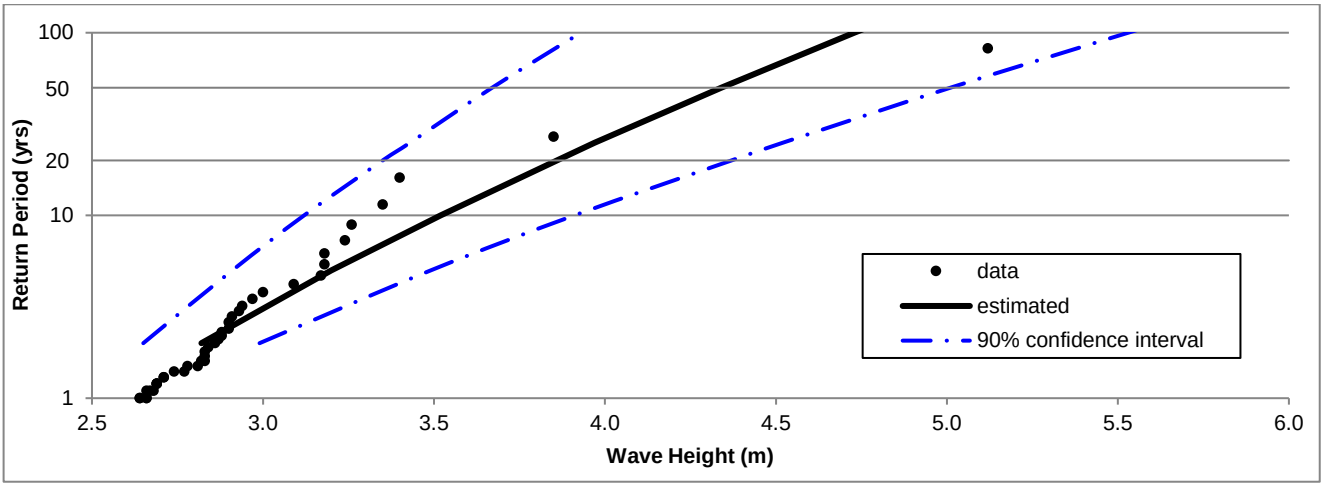


Figure 3-16: Extreme Value Analysis of Southwesterly Wave Heights



Nearshore design wave heights and wave climates were determined by transferring the offshore wave conditions in to the site using the Coastal Modelling System (CMS-Wave) numerical model developed by the U.S. Army Corps of Engineers (Lin et al, 2008). CMS-Wave is a two-dimensional spectral wave model with energy dissipation and diffraction terms. It simulates a steady-state spectral transformation of directional random waves co-existing with ambient currents in the coastal zone. It includes features such as wave generation, wave reflection, wave diffraction, and bottom frictional dissipation.

Design nearshore waves were determined by transferring the easterly and southwesterly 100-year offshore wave conditions at the 100-year instantaneous water level of 75.7 m (described above). **Figure 3-17** and **Figure 3-18** are wave height and contour plots showing the easterly and westerly design wave heights for the full Project Study Area. This information is used to design the Project.

3.1.8.3 Wave Uprush and Overtopping Levels

Wave uprush, which is also called wave runup, is the vertical extent of swash above the still water line. Swash is the turbulent layer of water that washes up on a beach or structure after an incoming wave breaks. When swash passes beyond the crest of the beach or structure it is said to have overtopped the crest. Uprush and overtopping play important roles in coastal processes as they may contribute directly to bluff erosion by impacting the bluff, or they can carry away material that eroded from the bluff due to other failure mechanisms. High overtopping volumes can cause significant damage to backshore lands and may also pose a safety threat to pedestrians, vehicles, or structures that are too close to a structure crest. Wave uprush and overtopping levels are important considerations in the development of shoreline protection features and the provision of safe public access.

In **Section 3.1.8.4** it is noted that during even minor wave action it is not possible to walk along the toe of the bluff at Cudia Park without getting wet because waves overtop the narrow beach and reach the exposed bluff (**Figure 3-19**). Further to the east, the wider sand shoreline along the unprotected shore east of Morningside Avenue is not overtopped during minor wave action, but it will be overtopped at high water levels, particularly if there are severe storms. There will be times when the subaerial shoreline (above water portion) is fully overtopped and waves will reach the bluff toe. The crest of Bluffer's Park Beach will also be overtopped during severe storm events, but that beach is wide enough that the overtopping swash does not reach the bluff.

Locations where overtopping occurs on the existing shoreline protection structures are identified in **Appendix C**, which describes the shoreline windshield/walking survey. There was evidence of overtopping in the revetment bay and behind the double headland structure of the Sylvan Drive protection in the Central Segment. Overtopping also occurs along the concrete rubble slope fronting the Guild Parks and Gardens shoreline. Brick and concrete rubble has been thrown onto the roadway, suggesting that dangerous overtopping volumes can occur in this area. Washed up timber among the rip-rap on the Guildwood Parkway revetment shows that some overtopping also occurs there.

3.1.8.4 Shoreline Classification

Erosion from wind, waves and water level fluctuations formed the shoreline zone that exists today. Erosion protection structures have protected much of the lake shoreline within the SWP Study Area (see **Section 3.1.8.5**) so coastal processes are generally restricted to the unprotected reaches of shore and the nearshore lakebed fronting the structures.

Figure 3-17: CMS Wave Model Results, 100-year Easterly Wave Condition

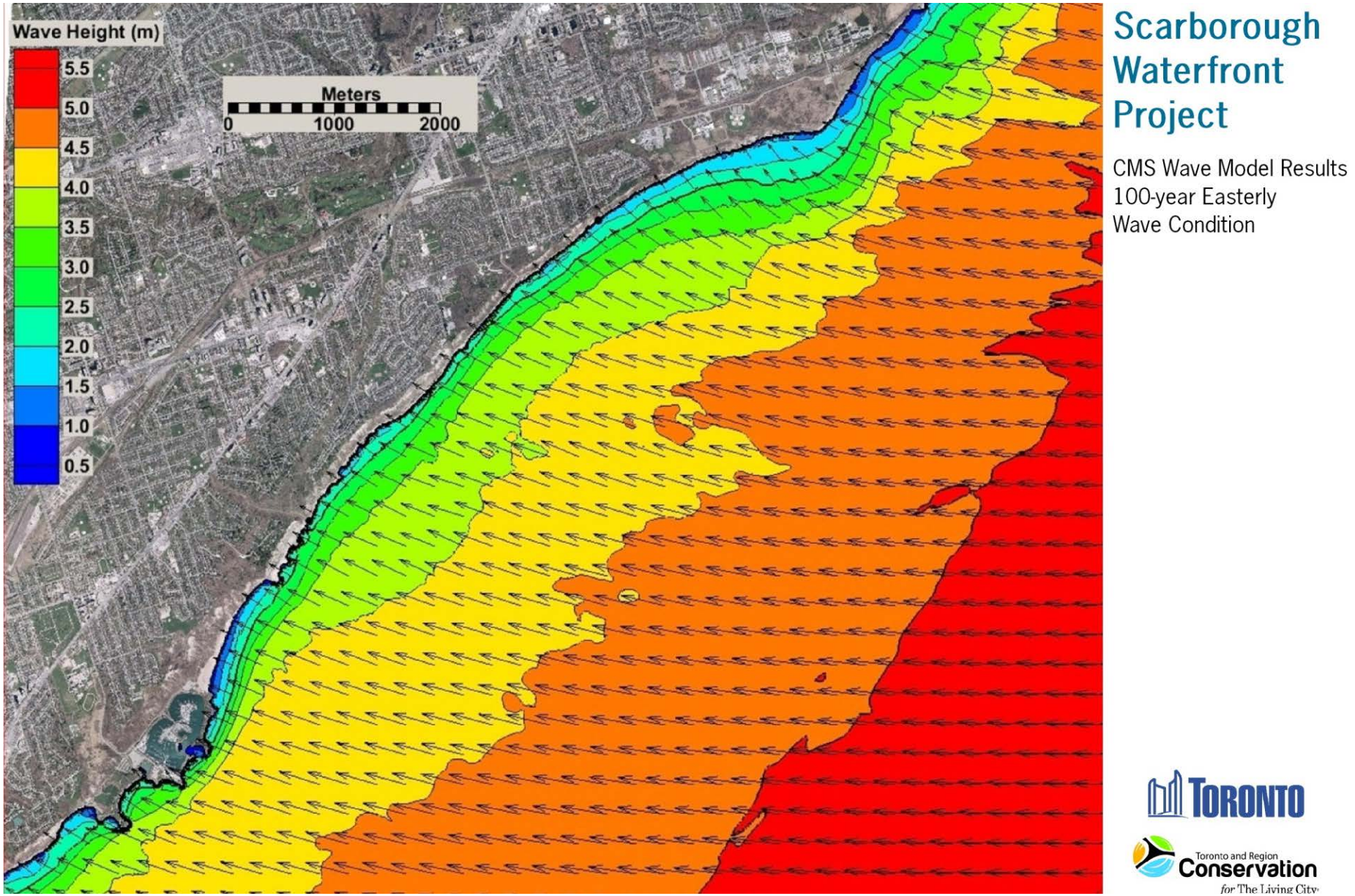


Figure 3-18: CMS Wave Model, 100-year Southwesterly Wave Condition

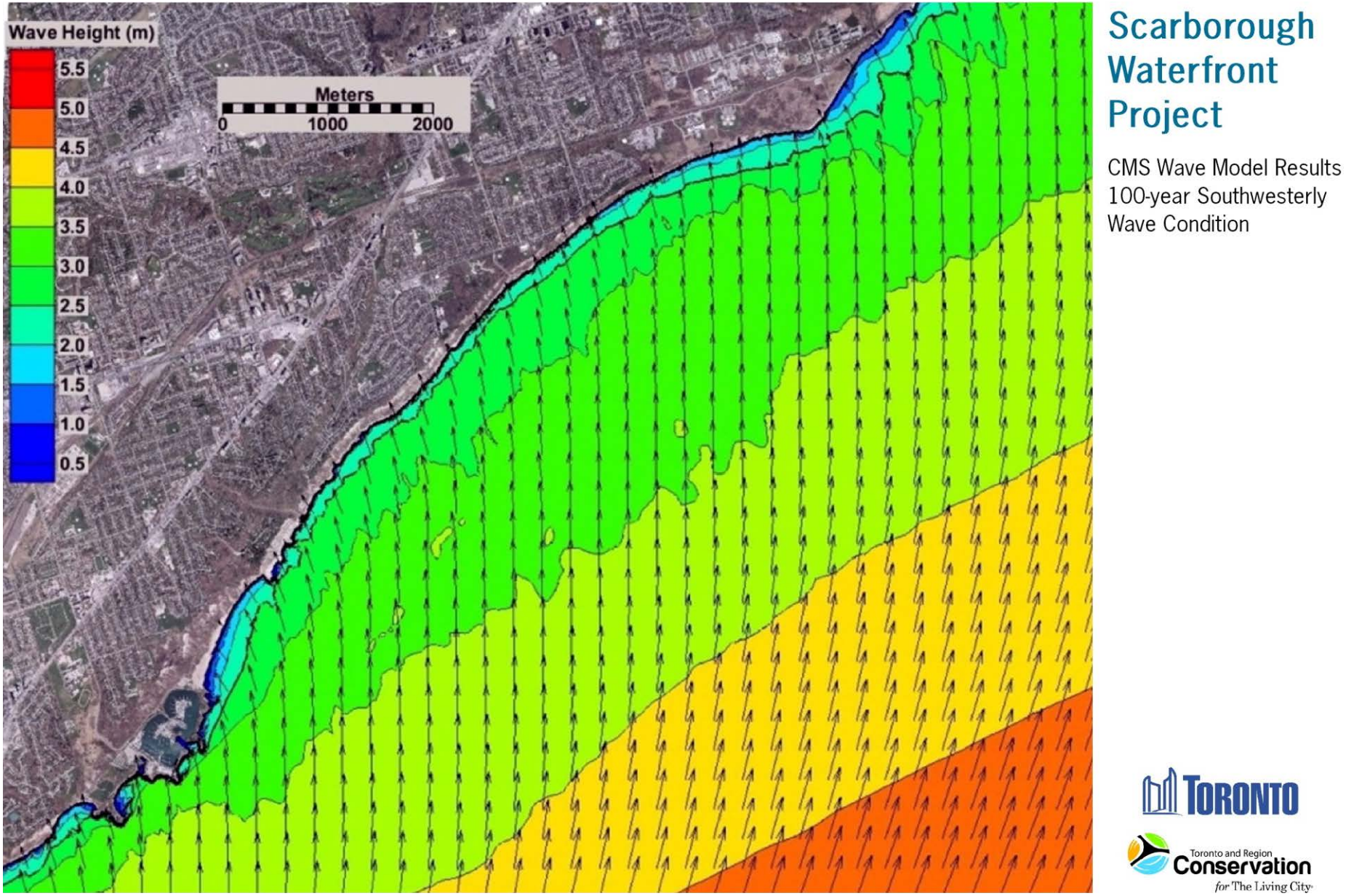
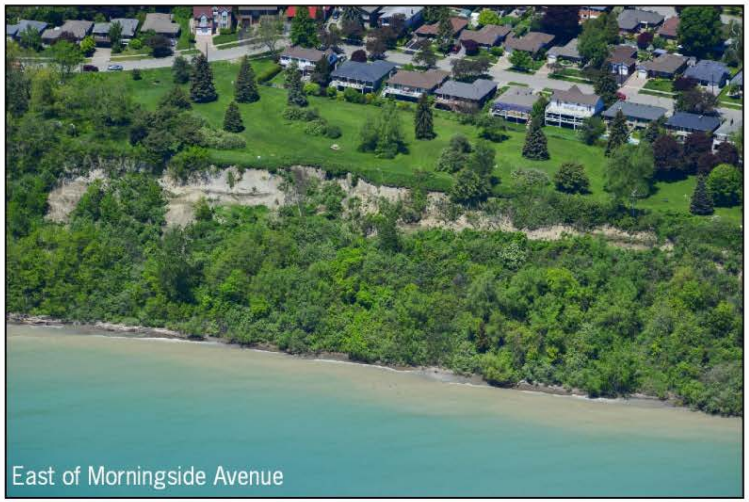


Figure 3-19: SWP Study Area Shoreline Conditions – June 7, 2017







Scarborough Waterfront Project

SWP Study Area
Shoreline Conditions
June 7, 2017

TORONTO

Toronto and Region Conservation
for The Living City

One of the first and most important steps in assessing a shoreline is identifying the controlling substrate, as it directly controls the way that natural forces and processes impact that shore. MNR (2001) notes:

- that shorelines are normally considered to be bedrock, cohesive, or "dynamic beaches", based on the "controlling" substrate in the nearshore;
- the majority of shoreline areas with small beach deposits (i.e., surficial deposits) should not be classified as "dynamic beaches", they should be first classified according to the controlling nearshore substrate (i.e., predominant underlying material) followed by sub-classifications according to "surficial" nearshore substrate and the general onshore/backshore shoreline type; and,
- "dynamic beaches" are only those shorelines having beach/dune deposits that are a minimum of 0.3 metres thick, 100 metres long and 10 metres wide […….] given the significant amount of beach/dune sediment materials involved in these areas, the sediment then becomes the "controlling nearshore substrate."

The sand beach at Bluffer's Park meets the MNRF definition of a dynamic beach. It is also referred to as a fully developed beach. A fully developed sand beach is one where the sand across the profile is deep enough that it is not all fully mobilized during storm conditions, and there is no erosion of the substrate below the sand. The Bluffer's Park Beach is the only fully developed sand beach within the SWP Study Area.

The remainder of the shoreline within the SWP Study Area is classified as a cohesive shore. While sandy shorelines exist elsewhere within the Project Study Area, they are not wide enough or deep enough to eliminate erosion of the underlying cohesive substrate or the bluff behind the sandy shoreline. However, depending upon the size of the sand deposit, it can reduce the erosion rate of the bluff toe and the underlying cohesive profile. This happens with a thicker deposit that is only fully mobilized by severe storms or with a wider sandy shoreline that is only overtopped at high water levels.

For example, the sand shoreline deposits in the vicinity of the Grey Abbey Ravine are thicker and wider than those at the east end of Cudia Park, and there is a corresponding lower bluff toe erosion rate below Grey Abbey Park than at Cudia Park. The subaerial shoreline (above water portion) at the end of Cudia Park is only visible at low water levels and during calm conditions. During even minor action it is not possible to walk along the toe of the bluff at Cudia Park without getting wet. Waves overtop the narrow sandy shoreline and reach the exposed bluff.

There is wider sand shoreline along the unprotected shore east of Morningside Avenue. That shoreline is not overtopped during minor wave action, but it will be overtopped at high water levels, particularly if there are severe storms. There will be times when the subaerial shoreline is fully overtopped and waves will reach the bluff toe. While the sand shoreline in this area is fairly substantial it is still not wide enough to halt bluff erosion.

3.1.8.5 Shoreline Condition

Stone gravel and sand along the shore originated from both erosion of the Bluffs and ***glacial outwash*** during the formation of rivers. When stone and gravel material was removed from the shoreline and nearshore during stonehooking operations (see **Section 2.5.1.1** in **Chapter 2**), it allowed accelerated downcutting of the nearshore, which in turn led to higher erosion rates along the Bluffs. That problem was exacerbated by higher water level fluctuations than which occur today because water levels on Lake Ontario were not regulated before the 1960s.

The erosion process along the Bluffs is complex and is related to both wave conditions and water levels. When water levels are high, waves attack the vertical face of the toe of the bluff, causing the toe to recede horizontally, which in turn steepens the bluff face and leads to slope failures and subsequent crest migration. When water levels are low, wave action on the face of the bluff is less, but the vertical (downward) erosion of the sloped nearshore profile is increased. That vertical erosion process is referred to as downcutting. Downcutting increases the water depth offshore of the bluff, which in turn allows higher waves to strike the bluff when water levels rise again. Long-term erosion of the bluff can only occur if the nearshore profile is downcut. For example, bluff erosion at Bluffer's Park has stopped because the sand beach retained by the armourstone headlands has halted downcutting of the nearshore profile in front of those Bluffs.

Recognizing the continuously eroding shoreline which is located in close proximity to a highly developed urban area, shoreline treatment is common within the Project Study Area. Approximately 72% of the shoreline between Bluffer's Park and East Point Park/Highland Creek has some form of shoreline erosion protection works, which were installed between the 1970s and 2012 (about 85 ha of land area has been created). These structures can be categorized as:

- **Major Land Creation Projects (Bluffer's Park, constructed in the 1970s):**
  The project incorporated a series of headlands in the creation of the boat basin which extend approximately 585 m into Lake Ontario, and allowed for the accumulation of the sand beach over the last 45+ years.

- **Revetments Constructed At or Very Close to the Toe of the Bluff:**
  Revetments are sloping structures, often formed out of ***rip-rap***, armourstone or concrete, which are placed along the shoreline to absorb the energy of incoming waves and reduce erosion. Early forms of this treatment technique were linear in nature and used extensively throughout the 1970s and 1980s, but grew out of favour as its linear profile is considered to be less aesthetic than other Alternatives. As well, these engineered structures do not incorporate fish habitat into their design. However, they are often still evaluated as they are one of the most cost-effective shoreline protection techniques, and limited aquatic habitat can be incorporated along the toe of the structure. Later forms of this treatment technique incorporated undulations in the design, which increases habitat diversity and complexity.

- **Armourstone Headlands with Naturally Accreting or Artificially Filled Sand, Gravel or Cobble Beaches:**
  The more recent shoreline protection designs further incorporate ecological components in their design, such as the headland beach system found along the Meadowcliffe shoreline. Artificial headlands are promontories composed of large material, such as armourstone, which extend out into a large body of water. The headlands can be a variety of shapes (e.g., rounded, T-shaped, L-shaped) depending on their position and the needs of a given project. Artificial headlands reduce alongshore currents, but their design provides a backwater refuge area for aquatic organisms during times of inclement open coast conditions. The extent of the headland projection in the lake, in combination with littoral transport processes, is one of the main factors that determine the size of material that will remain stable within the beach area. The introduction of cobble and/or gravel within the beach area may be included in the design to increase its protective properties while adding to the complexity of the aquatic habitat. Features such as shoals may be incorporated around and between the headlands out of necessity for stability, though they can also provide the added benefit of creating a diverse habitat that is suitable for fish spawning and foraging activity. These more recent shoreline protection designs have a higher capacity to incorporate ecological components in their design (e.g., the headland beach system found along the Meadowcliffe shoreline).

The unprotected sections include Cudia Park, Grey Abbey Park and East Point Park, as well as some publicly inaccessible shoreline (e.g., privately-owned or restricted access) to the west of East Point Park. For the unprotected sections of the shoreline, the character of the nearshore substrate determines the rate of downcutting of the nearshore bottom that then influences the shoreline erosion rate. The wide sand beach updrift of Bluffer's Park has stopped downcutting, and therefore there is no shoreline recession, close to the east headland structure. Further to the east, where the sandy shoreline is narrow, it has reduced but not eliminated downcutting and bluff erosion. A greater concentration of boulders and cobbles in the till at East Point Park produced a nearshore pavement that reduced erosion to the extent that the point formed.

A combined ***windshield and walking survey*** was completed to document the current condition of the shoreline within the Project Study Area. **Figure 3-20** to **Figure 3-22** illustrates the shoreline reaches surveyed.

- Only one (1) reach was considered in the West Segment. Cudia Park is unprotected shoreline and continues to erode.
- Central Segment was divided into five (5) reaches; Meadowcliffe, Sylvan Avenue, South Marine Drive, Guild Park and Gardens, and Guildwood Parkway.
  - Meadowcliffe is a mostly new headland beach shore protection system with no concerns, although there is a short length of an older informal revetment located at the eastern extent of the reach that should be improved. The Meadowcliffe headland beach structure functioned well under Spring 2017 conditions.

Figure 3-20: Windshield/Walking Survey Reaches in West Segment



Figure 3-21: Windshield/Walking Survey Reaches in Central Segment



Figure 3-22: Windshield/Walking Survey Reaches in East Segment



- The Sylvan shoreline is protected with a mix of structures including a ***groyne***, a concrete rubble beach, armourstone headlands, revetments, and cobble beaches. They were generally in acceptable shape although some areas were noted where repairs are recommended. Spring 2017 conditions undermined the construction route at the base of Bellamy Ravine requiring emergency repairs.
- The South Marine Drive reach consists of an armourstone revetment with sections of specially placed armour and sections of informally placed armour. The revetment is considered to be in good shape.
- The Guild Park and Gardens reach consists of an informal concrete rubble berm that was used to provide construction access to the shores to the west. It is providing effective erosion protection but should be upgraded into a more formal structure for long-term protection. Spring 2017 conditions undermined the construction access route in a number of locations, requiring emergency repairs.
- The Guildwood Parkway shoreline has an armourstone revetment. The connection to the shore at the west end of the revetment is considered to be temporary and part of the revetment crest appears to have not been completed. No major issues were identified with the revetment, but some maintenance is recommended.

- East Segment was divided into two (2) reaches; Grey Abbey Park and East Point.
  - The shore protection along the Grey Abbey Park reach consists of a system of beach cells, headlands and groynes that is functioning well, along with a length of unprotected sand shoreline to the east of the protection works. Under Spring 2017 conditions, the structures were nearly submerged, and waves reached the unprotected toe of the Bluffs.
  - East Point Park is an unprotected sand shoreline, with a narrow subaerial stretch of sand that exists along the toe of the bluff at average water levels.

3.1.8.6 Sediment Loadings

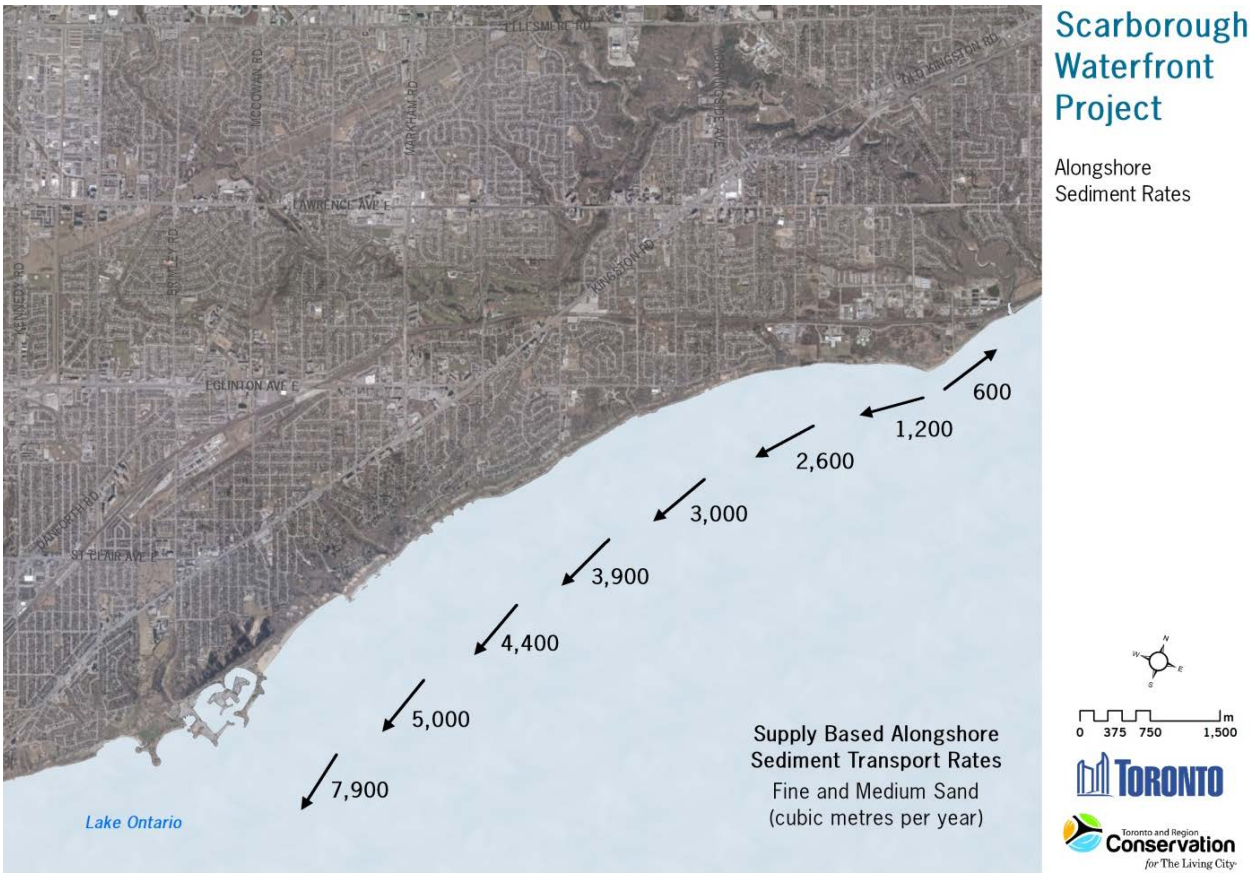
Littoral sediments are the sands and gravels found at the water's edge which are transported along the shore by waves and currents. They are important to the coastal zone as they form the material for beach deposits and, if a sufficient volume is present, they can reduce the erosion rate of the backshore Bluffs as discussed above. Sub-littoral sediments which are smaller, finer grained material tend to be washed offshore and do not play an important role in coastal processes.

Littoral and sub-littoral sediments are typically introduced to the nearshore zone (see **Section 3.2.2.1**) through erosion of both shoreline bluffs and the lakebed close to shore. The Bluffs and nearshore bottom are composed of a mix of clay, sand, gravel and cobble. The majority of sediment introduced via the watercourses that discharge into Lake Ontario is typically fine grained (sub-littoral) and tends to deposit in deeper water offshore of the ***littoral zone***. Some of the sand at the beach at the mouth of Highland Creek may have come down the creek, but most of it is littoral sand originating from bluff erosion.

The volume of littoral sediment supplied through erosion and the resulting ***alongshore transport*** rates are determined through a process known as a sediment budget. In a sediment budget the shoreline is typically divided into reaches with similar shoreline composition and shoreline protection characteristics. The volume of littoral sediment eroded from each reach is considered to be available for transport in the direction of the net wave energy. Alongshore transport rates are determined by summing the sediment supply rates from adjacent reaches.

The percentage of shoreline protected within each reach was estimated and the volume of eroded bluff material was revised to consider that protection. As well, the volume of littoral sediment introduced through downcutting of the cohesive nearshore bottom was calculated, although that volume was relatively small. The downcutting volumes from the cohesive nearshore bottom are proportional to the natural bluff recession rates, but do not account for the presence of sand deposits further out on the nearshore profiles. Atria (1993) noted that there is a substantial deposit of sand in the nearshore between Bluffer's Park and the Eastern Beaches, but the eastern limit of those deposit is not clearly defined. **Figure 3-23** shows the cumulative annual volume of fine and coarse sand introduced though bluff and cohesive nearshore bottom erosion, summed over the shoreline reaches from East Point to Bluffer's Park.

Figure 3-23: Alongshore Sediment Transport Rates



Representative sediment transport pathways along the Project Study Area were established using the CMS sediment transport numerical model.

Potential sediment transport rates were calculated for a constant easterly wave condition with a deep-water significant wave height of 3.0 m and a peak wave period of 7 seconds. That is a moderately high wave height, but it is not severe. The extreme value analysis described above shows an annual occurring wave with a significant wave height of 3.5 m (see **Figure 3-12**). The model was run at a water level of 75.0 m ***International Great Lakes Datum, 1985*** (IGLD 1985), which is representative of the long-term average peak annual mean water level The lakebed was assumed to be covered with fine sand with a mean grain diameter of 0.2 mm. That diameter was selected on the basis of grain size analyses of sediments collected within the Regional Study Area by TRCA in 1997, 1998, 2010, and 2012 (Shoreplan, 2014).

The CMS model predicts potential sediment transport rates, which is the rate of transport that will occur if there is a sufficient supply of sand. As noted above, the supply of littoral sediment is limited along this shoreline, so the calculated potential transport rates are expected to be conservative. They can be used, however, to show the nearshore pathways where sand will be transported and to determine the potential impacts of any changes to the shoreline shape.

Figure 3-24 shows wave height contours and vectors for the wave condition modelled. **Figure 3-25** and **Figure 3-26**, respectively, show the nearshore currents and potential sediment transport rates predicted to occur during that wave condition for the Project Study Area.

The CMS model results presented are for a single wave condition only and are included to show how conditions vary along the shoreline. As they are for a representative wave condition only, they provide a qualitative rather than a quantitative description of the wave, nearshore current, and sediment transport characteristics at this site.

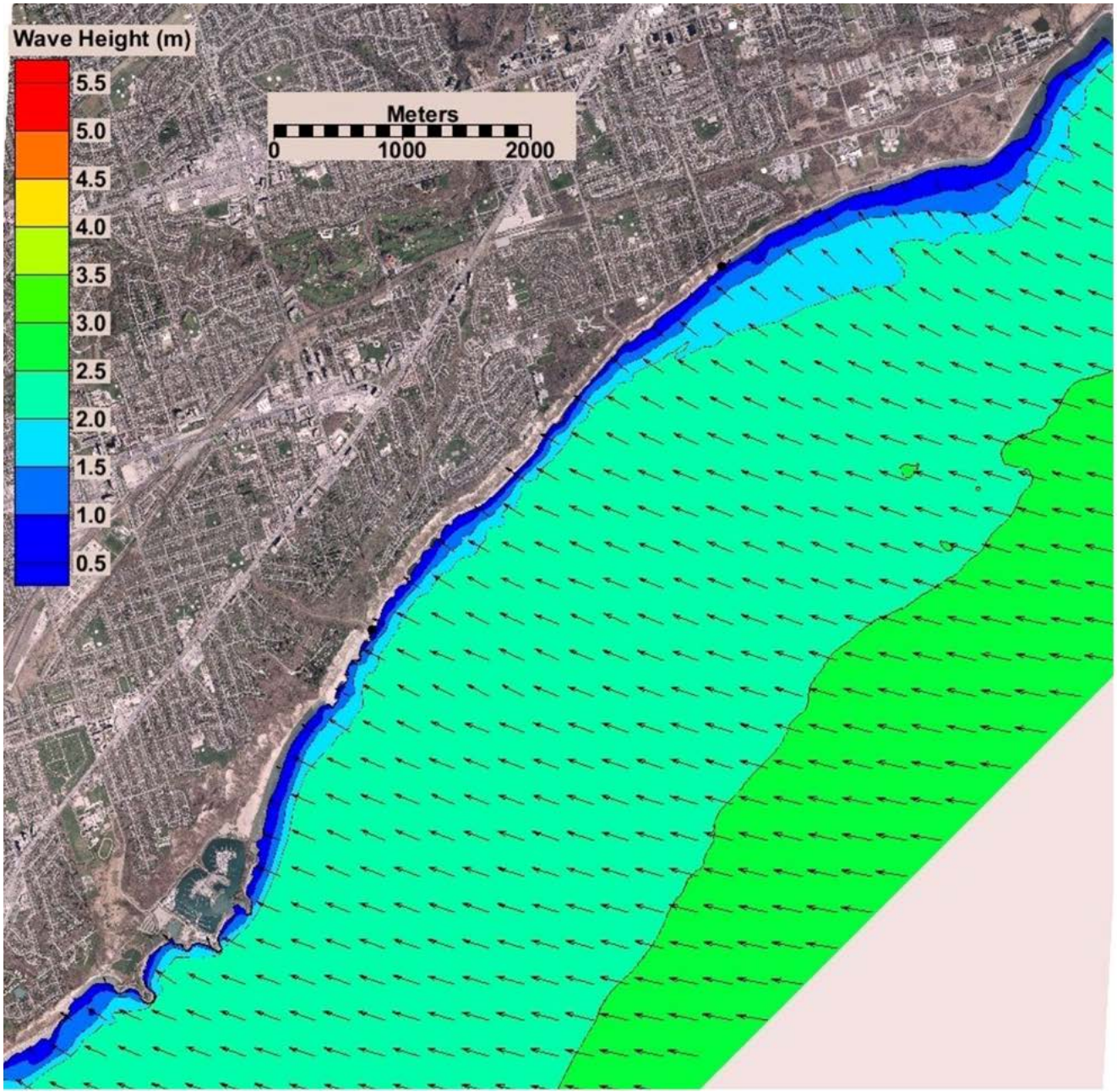
3.1.8.7 Ice and Debris

Under typical conditions Lake Ontario is considered to remain ice free overall, allowing wave generation throughout the year. Shore ice, which is ice that forms around the perimeter of the lake, can both protect and damage shorelines, depending upon local conditions. Development of shore ice varies annually depending on the local climate conditions and storm events.

Debris from various watercourses and sewer systems are typically made up of urban refuse such as plastic bags, water bottles and take-out containers, as well as woody debris such as sticks and logs. Debris is widely scattered across beach shorelines during storm events and tends to collect against structures that extend out into the lake.

The most likely source of shoreline debris within the Project Study Area is Highland Creek. Debris will also originate from the various stormwater sewers, but there will be less of that material due to the lower flows (compared to Highland Creek) and it can be expected to consist of mostly smaller material as large debris should be trapped before it enters the stormwater system. Where that material goes once it enters the nearshore will depend upon both wind and wave directions occurring at that time. Debris from sources outside the Study Area could also drift alongshore into the Study Area again depending upon wind and wave conditions.

Figure 3-24: 3.0 m 7s East Wave Used for Sediment Transport Pathway Example



Scarborough Waterfront Project

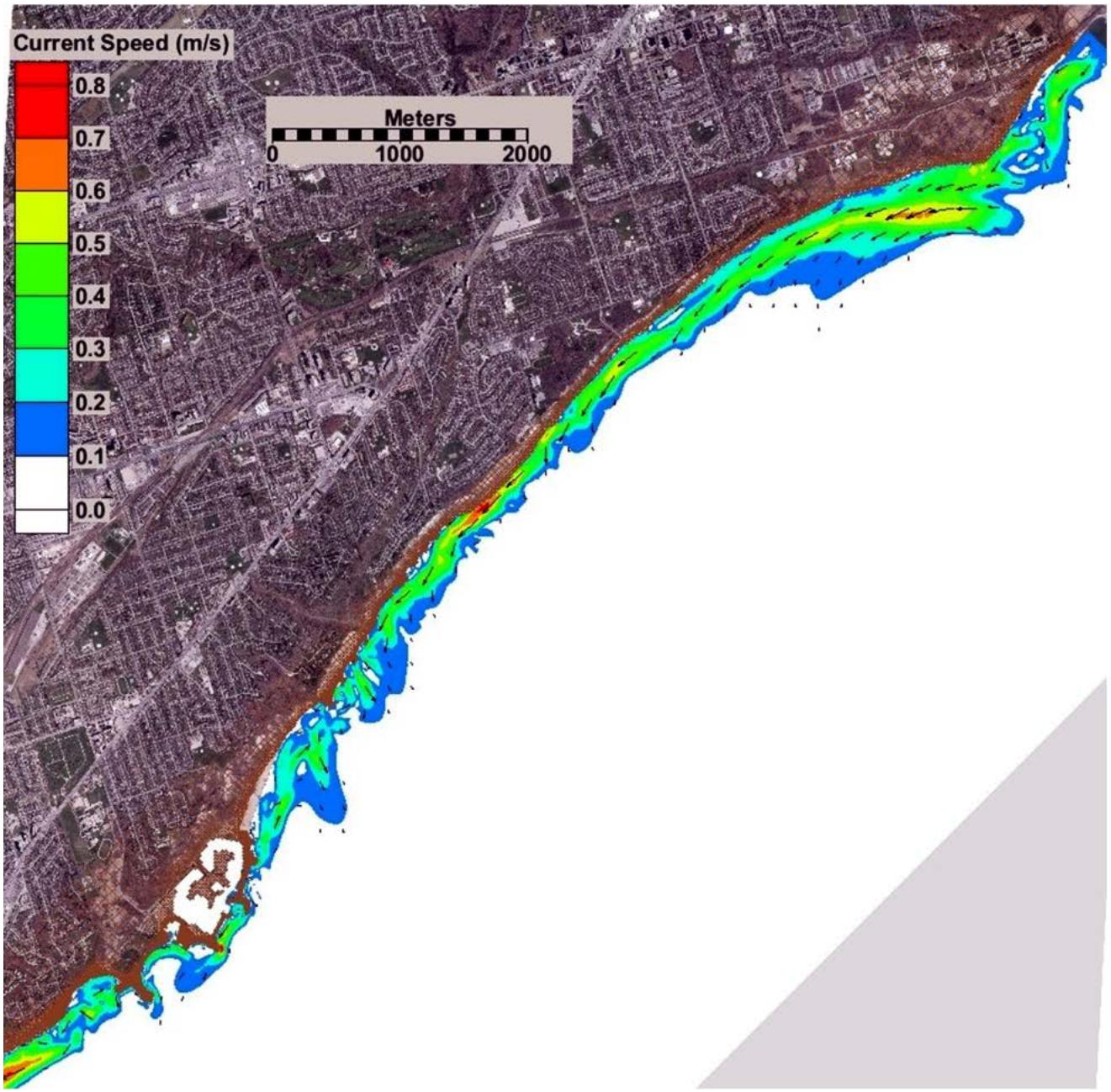
3.0 m 7s East Wave Used for Sediment Transport Pathways Example

N
W
E
S

TORONTO

Toronto and Region Conservation
for The Living City

Figure 3-25: Alongshore Current from 3.0 m 7s East Wave for the Project Study Area



Scarborough Waterfront Project

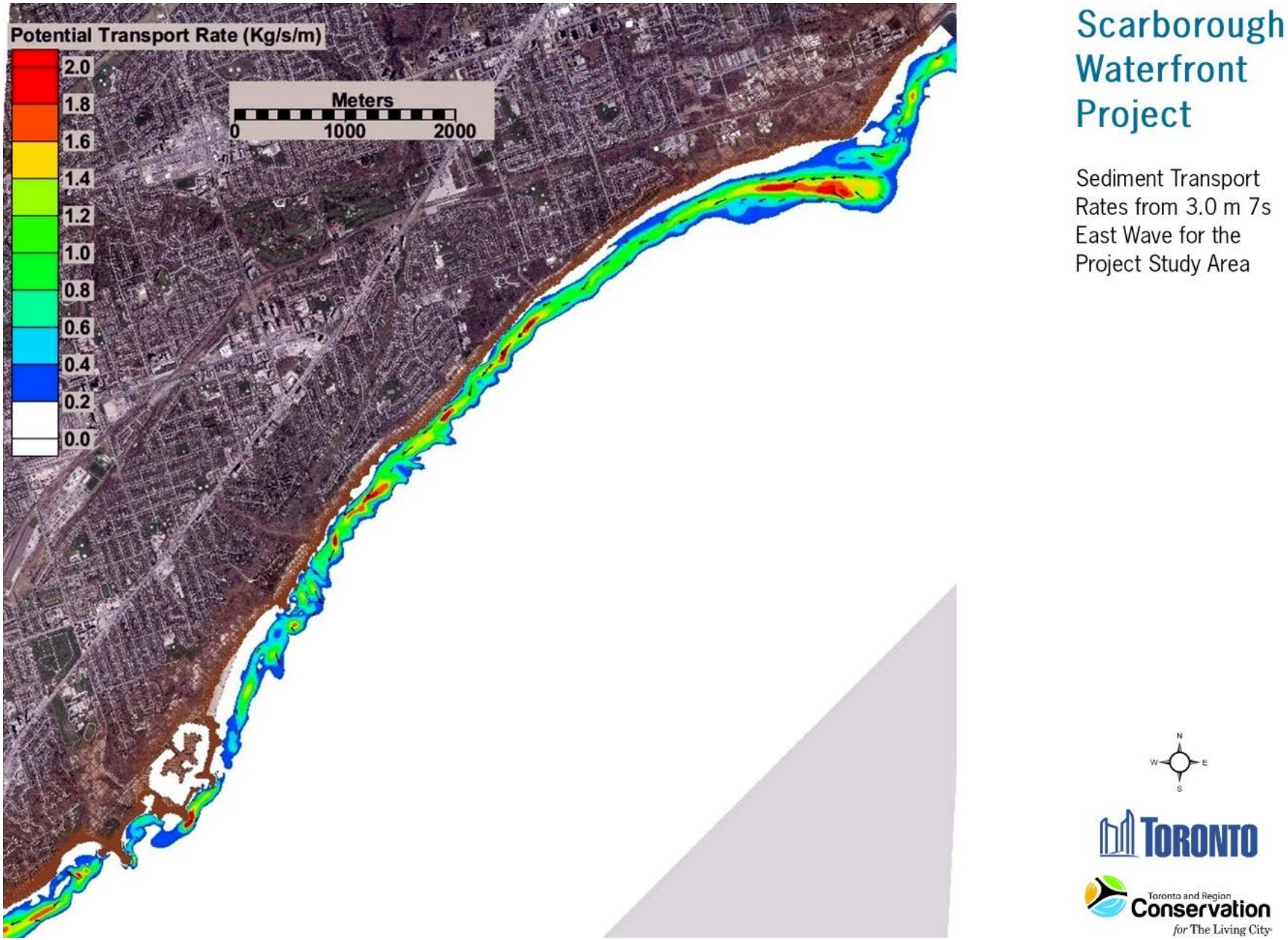
Alongshore Current from 3.0 m 7s East Wave for the Project Study Area

N
W
E
S

TORONTO

Toronto and Region Conservation
for The Living City

Figure 3-26: Sediment Transport Rates from 3.0 m 7s East Wave for the Project Study Area



3.1.9 Climate Change

Climate affects water levels (through precipitation, evaporation, ice and wind) and storm activity which may result in increased flooding and erosion. A significant amount of research has been done on climate change and its expected effects on the Great Lakes. While results vary, there is general consensus on a few key points. Overall, water levels are expected to fall and severe storm frequency and intensity are both expected to increase.

Climate change impacts on Lake Ontario water levels are expected to be less than on the other Great Lakes because its water levels are regulated (see **Section 3.1.8.1**). Lofgren et al. (2002) found Lake Ontario to be the only lake that would experience water level drops that were less than the natural variations that occur. Lower water levels can be a concern for shoreline protection structures. Under certain circumstances downcutting of the nearshore bottom could be increased due to more intense wave breaking across that part of the profile. The extent to which that is an issue depends upon the design and construction of the structure toe.

Wave conditions within the Project Study Area are depth limited; meaning the design wave hitting the structures is controlled by the water depth, not the offshore wave height. More intense storms will not produce higher design wave heights at the site. An increase in storm frequency could impact renewal requirements for both new and existing protection structures.

The anticipated future conditions outlined above, including extreme weather events have been considered in the development of Alternatives. Extreme weather events will result in higher waves on the lake, with the potential for more significant shifts in water levels and increases in the intensity and amount of stormwater to be managed. The SWP will not contribute to climate change during the operation/establishment phase as there is no production or emission of greenhouse gases (GHG) associated with the Project. Some GHG emissions will be associated with construction vehicles; however, these emissions will be minimized through the application of best practices for construction vehicles including ensuring they are in good repair and no idling.

3.1.10 Shoreline and Bluff Erosion

3.1.10.1 Slope Stability Considerations and Hazard Setback Delineation

The loss of land at the top of the Bluffs is a risk that defines one of the main considerations of the Project. The loss of land implies a hazard to users near the top of Bluffs, and of soil falling towards the base of the slope, which in turn puts users along the waterfront at risk. There are opportunities for the SWP to address these risks.

Slope stability failures along the Scarborough Bluffs, and the ensuing loss of ground and risk that this poses, are due to the combined result of several natural processes:

- Wave action from Lake Ontario erodes and over-steepens the slope toe (the action of “slope toe erosion”). Toe erosion eventually creates steep and unstable slope faces;

- Surface water runoff at the top of slope including some additional groundwater flow (only in the upper Thorncliffe or Iroquois sand layers), generated by storm events, results in surficial soil erosion which in turn cause the slope crest to recede back incrementally (an action producing “crest migration”). Surface water runoff and drainage has caused development of the numerous gullies and ravines present along the slope profile, and;
- Oversteepened slope faces (formed through the natural processes of toe erosion and shallow surficial failures due to weathering, freeze-thaw cycles, precipitation, wind, etc.) are unstable in the long-term, and eventually the weight of these slope faces (and sometimes triggered by higher infiltration and groundwater flow in the upper sand layers only) overwhelms their ability to stand up. Slope failures generated by oversteepened slope faces push the slope crest further landward and therefore contribute to the natural process of “crest migration”.

In consideration of the current state of the Bluffs, the primary factor in ongoing slope crest migration is toe erosion caused by wave action, which has created the oversteepened landform and slope that exists today. Toe erosion continues in areas where the slope toe is unprotected from wave action (see examples illustrated in **Figure 3-27**). Where no toe erosion protection exists, this process is ongoing and a constantly oversteepened state is maintained, whether or not vegetation has established on the slope face. This condition is observed, for example, in the numerous erosion features and failures observed at East Point Park, where the slope toe is unprotected, the slope face supports vegetation in many places, but failures are ongoing since slope conditions are only marginally stable in this area.

The Bluffs, now oversteepened primarily through the process of toe erosion as described above, are eroding naturally as a result of both surficial runoff and slope instability acting on the oversteepened slope. These processes drive crest migration, which is the continuous landward movement of the crest position due to slope instability. The soil that erodes off the slope face as a result of these natural processes, then falls to the base of the slope in a loose and highly disturbed state where it accumulates, is referred to as talus. Talus accumulation at the base of the Bluffs builds up over time, and gradually buttresses and flattens the slope until it reaches equilibrium at a stable inclination, at which point permanent vegetation takes hold.

Without toe erosion protection, talus is removed from the base of slope by wave action, as is the case with much of East Segment. Through the use of toe erosion protection, the talus is allowed to accumulate and the oversteepened slope eventually reaches a stable inclination, and revegetates naturally. Such is the case for much of the Bluffer’s Park slope face, which has toe protection and is now self-stabilized and fully revegetated as a result.

Freeze-thaw cycles contribute significantly to surficial instabilities across much of the Bluffs. This has been reported extensively by Geocon and by Terraprobe at various oversteepened locations across the Project Study Area. Loss of ground (i.e., slope failure) is frequently observed during spring thaw periods, when typical spring-time melt water and rain water seep into the ground and elevate the groundwater table in the upper sands units. As the slope face remains frozen during these melt periods, excess water pressure from the elevated seasonal seepage may build up behind the still-

Figure 3-27: Existing Shoreline Conditions through East Segment – April 5, 2017



frozen slope face. This extra “freeze-thaw” water pressure, in combination with an already oversteepened slope profile, produces failures in the forms of blocks and wedges calving off the slope face during these melt periods. When this type of failure occurs, up to 3 m of tableland can be lost in a single event. These failures typically stop once a long-term stable slope has been reached, as the flatter slope has dead weight to resist these pressures.

Based on historical data, when toe protection is provided, the eventual natural self-stabilization of the Bluffs occurs over the course of decades. In general, the majority of the self-stabilization occurs over the first couple of decades, and starts to slow once the inclination of the Bluffs has reached an approximately 1.2 Horizontal to 1 Vertical slope inclination (1.2H:1V; around 40 degrees). The final inclination of an approximately 1.3-1.5H:1V slope inclination (around 33 to 38 degrees) occurs over the subsequent decades. Once the slope has self-stabilized (i.e., after toe protection has existed for decades), slope failures are less likely to occur (although they are not impossible) and the crest migration rate is effectively reduced to zero, provided the slope establishes and maintains a vegetative cover and erosive conditions do not significantly affect the slope. States of stabilization are further discussed in the Geotechnical Report (**Appendix B**). Where toe protection is relatively new (e.g., 10 to 30 years old), some further crest migration (landslides) is expected while the slope self-stabilizes (**Figure 3-28**).

Where no toe protection exists, further toe erosion and crest migration is expected to be ongoing and relatively constant. In these areas (e.g., East Point Park), the amount of crest migration anticipated is approximately the same as the amount of toe erosion expected. Toe erosion rates are themselves variable and depend on coastal processes. These are discussed in the Coastal Engineering Report (**Appendix C**).

In some areas, there have been slope remediation measures constructed to mitigate the safety risk associated with crest migration and the loss of tableland, after toe erosion protection measures have been put in place. Slope remediation measures that have been constructed include buttressing at the toe of the slope (Meadowcliffe). This buttress was designed to assist with the build-up of talus accumulation at the base of slope, for earlier self-stabilization of the slope such that the future crest position is further lakeward. Remediation efforts are considered on the basis of site-specific factors and conditions (e.g., property ownership, extent and cost of remediation, amount of loss of tableland, risk, and other factors).

3.1.10.2 Risk Lines

Risk lines were developed at the toe of slope and erosion hazard limits (EHL) were identified for the tableland where opportunities exist to address the Objectives of the Project, and where potential improvements are being contemplated (**Figure 3-29** to **Figure 3-31**).

In order to calculate the EHL, an estimated erosion rate is applied for 100 years at the toe of the slope, assuming no toe protection is in place. The resultant line is called the erosion allowance line. From the erosion allowance line, a stable slope allowance is calculated based on the geotechnical conditions of the slope (e.g., soil and groundwater conditions, topography, etc.). The stable slope

Figure 3-28: SWP Study Area Landslides in 2017



Figure 3-29: West Segment Risk Line



Figure 3-30: Central Segment Risk Line

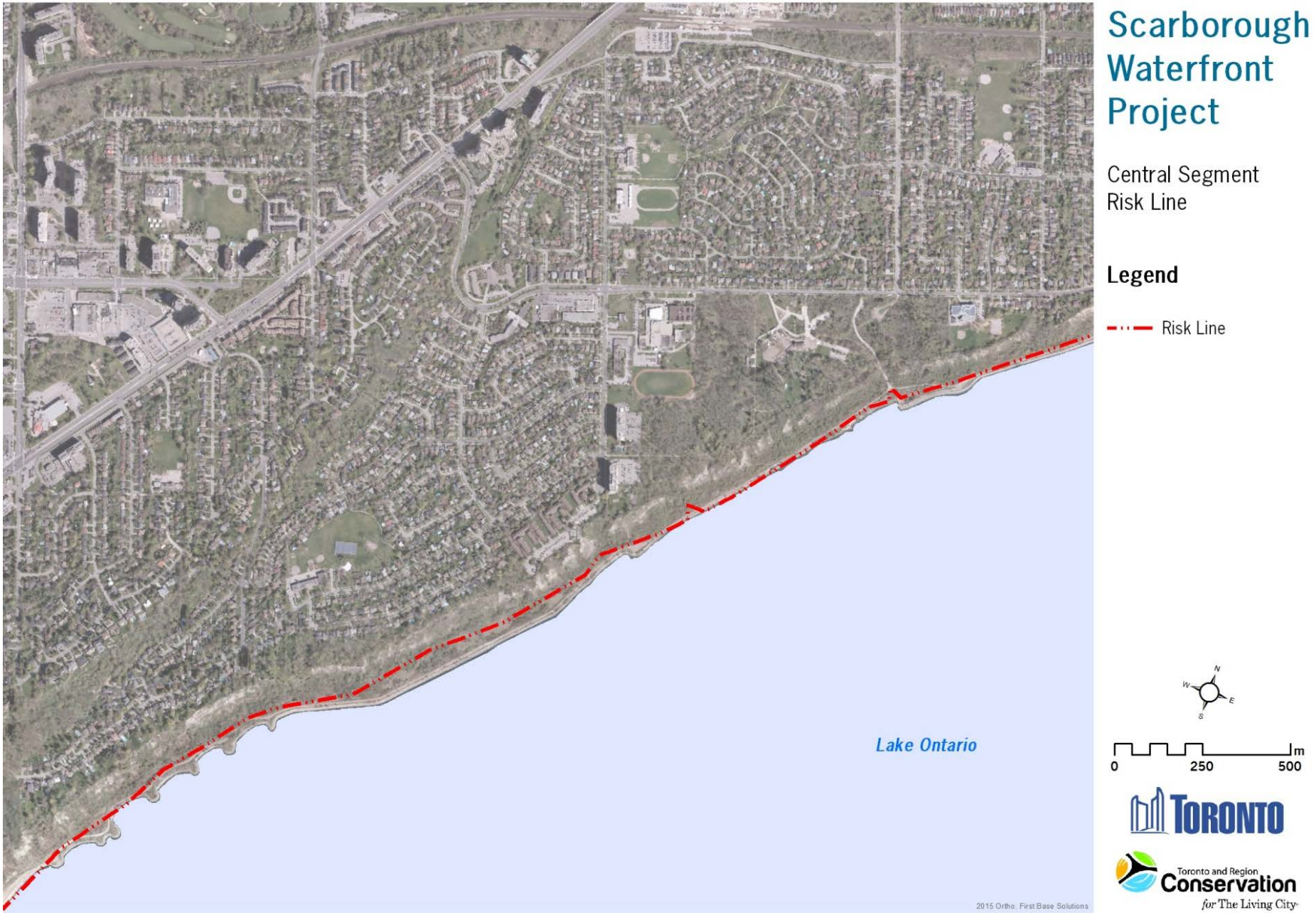
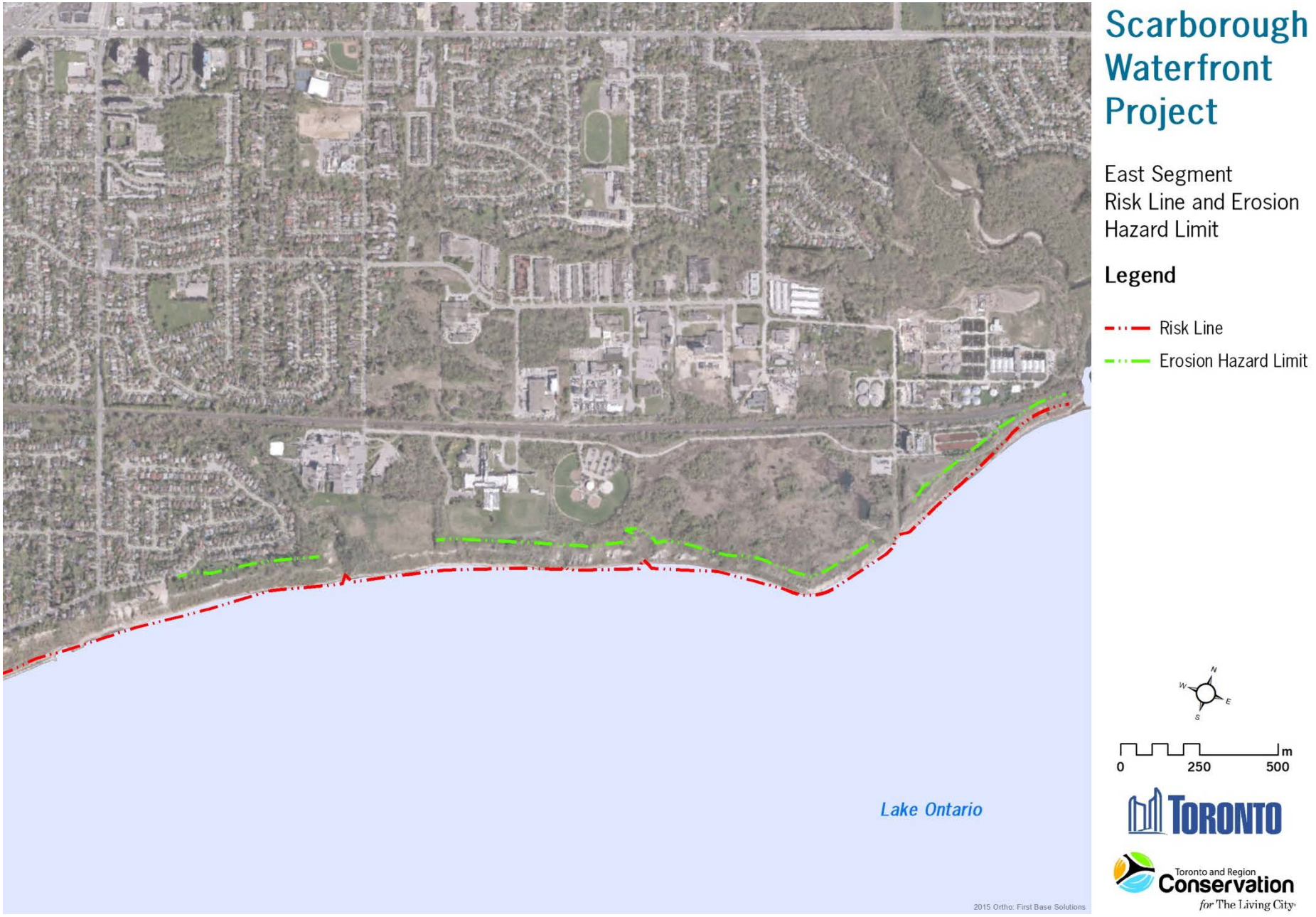


Figure 3-31: East Segment Risk Line and Erosion Hazard Limit



allowance also considers the Factor of Safety, which is driven by the dominant land use of an area (MNR, 2001). Finally, a 10 m allowance is applied as per the TRCA's *The Living City Policies for Planning and Development in the Watersheds of the Toronto and Region Conservation Authority* (2014). These factors taken together determine what public infrastructure is at risk within the planning horizon.

Similarly, the toe-of-slope risk line is derived with consideration of the Factor of Safety (MNR, 2001). The stable slope inclination needed to achieve the required Factor of Safety is modelled and used to identify where the existing slope is oversteepened (i.e., the existing stable slope inclination achieves a lower Factor of Safety than prescribed for the existing land use). In areas where the slope is oversteepened, the slope is "flattened" through a modelling process to the slope profile required to meet the specified Factor of Safety. The volume of soil that would be displaced to achieve the stable slope inclination is positioned at the toe of the slope as talus accumulation in order to reasonably estimate the furthest extent that talus would slide beyond the slope toe. It should be noted that additional factors, such as changes in soil volume for disturbed soil and soil moisture content, are also considered when determining the extent of talus runout and accumulation. The extent of talus runout and accumulation creates the risk line at the toe of the slope.

More detailed information regarding the derivation of the EHL and toe-of-slope risk lines (e.g., specific Factors of Safety, resultant stable slope inclinations, etc.) is provided in **Appendix B**.

The EHL line at the top and the risk line at the bottom of the Bluffs slope estimate the area where there is an unacceptable risk to public safety due to slope failure (and talus accumulation) and crest migration within the planning horizon of the Project. There is still some risk to users beyond the risk lines (i.e., the risk line is meant to mitigate, not eliminate risk to the public). There may be increased risk to users during periods of intense rainfall which could cause longer runouts of talus from crest migration events. The only area in the Study Area where public infrastructure is at risk within the timeframe of the Project is at the western end of Grey Abbey Park (i.e., the road and associated infrastructure).

It should be noted that for the purposes of the comparative evaluation of Alternatives presented in **Chapter 5**, both the EHL and toe-of-slope risk line are collectively referred to as the risk line.

3.1.10.3 Shoreline Erosion

Alleviation of erosion processes at the slope toe permit slope self-stabilization and natural revegetation, and when properly designed, reduces the toe erosion recession rate to 0 m per year over at least the design life of the toe erosion protection measures. The amount of self-stabilization observed can be correlated to the amount of time in which toe erosion protection measures have been in place. The slopes that are shallower, more highly vegetated, and are less prone to slope failures are in areas where the toe erosion protection measures have generally been in place for longer periods of time (decades).

In the remaining areas where there is no toe erosion protection along the slope toe or the shoreline, average toe recession rates can be as high as 0.3 m per year. These recession rates vary depending

on Lake Ontario wave and ***sedimentation*** processes, the exact location along the Scarborough Bluffs, and numerous other minor factors.

3.1.10.4 Stages of Bluff Stabilization

The Bluffs within the Project Study Area are in various stages of stabilization. Depending on the local conditions (e.g., presence and age of toe protection structures, etc.), some areas are actively eroding, others are stable, while others are still stabilizing. Stabilization stages are a major driver behind developing SWP Alternatives, and are thus important to characterize.

There are three stages of bluff stabilization within the Project Study Area: continuing erosion, early to middle stages of stabilization, and late stages of stabilization or fully stabilized. These states are described below.

- **Continuing Erosion**
  Where no toe erosion protection is in place, there is continuing toe erosion, slope failure, and crest migration. Areas with these features are characterized as being in a stage of "no toe erosion protection". These areas include Cudia Park, Grey Abbey Park, and East Point Park. Note that, in the coming decades, Cudia Park Buffs will start to self-stabilize due to the degree of the Bluffer's Park headland extension into the lake that will allow for sand accumulation along the base of Cudia Park. Grey Abbey Park and East Point Park will continue to erode without some form of toe protection. Grey Abbey Park and Greyabbey Trail (e.g., the roadway and underground infrastructure) are at risk for damage within the design life of the Project (approximately 60 years). Erosion rates east of Grey Abbey Ravine are less and public infrastructure is set further back from the slope crest, therefore it will not be at risk within at least 100 years or longer.
- **Early to Middle Stages of Stabilization**
  Where toe erosion protection has been in place for less than 10 to 35 years, the Bluffs are generally in the "early" or "middle" stages of self-stabilizing through continuing crest migration and talus accumulation. The early stage of stabilization is characterized by some accumulation of talus and vegetation. Slopes in the middle stages have more talus and more vegetation, and are slightly less steep with fewer vertical scarps and near-vertical slopes occur typically only in the upper slope areas. These areas include Meadowcliffe, Sylvan, South Marine, Guild Park and Gardens, Guildwood Parkway, and at the base of Morna Avenue. In these areas, there is no further toe erosion, but slope failure and crest migration will continue in varying degrees over the long-term.
- **Late Stages of Stabilization or Fully Stabilized**
  Where toe erosion protection and other stabilization measures have been in place for about 35 to 40 years, the Bluffs are typically in the late stages of stabilization or have fully stabilized (whether naturally, or through slope stabilization measures). These areas include Bluffer's Park. In these areas, there is no further toe erosion; slope failures are less likely to occur (although they are not impossible) and the crest migration rate is effectively reduced to zero, provided the slope establishes and maintains a vegetative cover and erosion conditions do not substantially change.

The difference between early, middle and late stages is based on interpretation. The main criterion for assessing the current stage of stabilization is the slope condition relative to other areas in the Project Study Area. A detailed description of the stages of bluff stabilization across the Project Study Area is found in **Appendix B**.

3.1.11 Landfills and Brownfield Sites

3.1.11.1 Landfills

Documented landfills are located within the West Segment. The Brimley Road landfill is located on the east and west side of Brimley Road, just north of Bluffer's Park. Only approximate locations of the landfill are known as no geotechnical investigations have been conducted to accurately map the area. The landfill was built between 1960 and 1968 with alternating layers of soil cover and household waste, and is within a former natural ravine that was filled in. The natural ravine, prior to filling, ranged in depth from 5 to 75 m. This landfill is closed, and has a vegetative cover. Currently, there is leachate collection and annual slope monitoring that is overseen by the City of Toronto and the MOECC.

A landslide occurred within the Brimley Road Landfill on April 15, 1991, resulting from a temporary high groundwater table and the continual degradation of the waste fill over time (Golder, 1991). Subsequent remediation of the failure area occurred with construction of a 2.5H:1V slope, with adequate basal drains, finger drains and surficial water drains which directed leachate, groundwater and surface water to a pumping station. A 2014 visual assessment of the Brimley Road Landfill was conducted (LVM, 2014) and concluded that the drainage system is in an adequate condition, and there are no signs of water seepage or tension cracks. Stability of the slope in its current configuration has been determined to be safe from deep-seated global failures. The results of a supplementary assessment completed in summer 2016 indicated that there are no signs of water seepage.

3.1.11.2 Brownfield Sites

Brownfield sites are located within the East Segment of the Project Study Area. In the East Point Park area a number of historical industrial uses have been recorded. These have previously included chemical storage, processing and manufacturing operations, as well as water/sewage treatment plants. This area is characterized by surficial deposits of higher permeability soils (Scarborough sand) which may allow the transport of contaminants through the groundwater system. However, it should be noted that remediation efforts have addressed the known contamination associated with these past industrial uses along the northern portion of the park.

With the exception of the East Point Park area noted above, it is unlikely that there is any significant impact as a result of brownfield properties or anthropogenic contamination which will affect the Project.

3.1.12 Air Quality

Air quality in the Project Study Area is generally influenced by local sources from the City of Toronto as well as long range transport of contaminants from other regions. Potential air emission sources in the Project Study Area include industrial/commercial operations, as well as vehicular/boating traffic. At

a local scale, no significant sources of air pollution exist within the immediate and surrounding Project Study Area. No component of this Project is anticipated to degrade air quality or be influenced by local or regional sources of air pollution (TRCA, 2010).

The closest air quality station to the Project Study Area is the Toronto East Ambient Air Monitoring Station located in the vicinity of Kennedy Road and Lawrence Avenue East, approximately 4 km west of the Project Study Area. The station monitors ozone (O_3), fine particulate matter ($PM_{2.5}$), and nitrogen dioxide (NO_2). A review was completed of the Air Quality Health Index 2015 readings associated with the monitoring station and revealed that the majority of daily readings were low risk (i.e., 1 to 3 on a scale of 1 to 10 with 1 being low risk and 10 being very high risk). There were also a few occasions of moderate risk (4 to 6) as well as one day with high risk in 2015 (7) (MOECC, 2015).

Construction and operation/establishment of the SWP is not anticipated to have an impact on air quality in the Project Study Area.

3.2 Natural Environment

3.2.1 Terrestrial Habitat

This section focuses on characterization of the terrestrial habitat in the Project Area. Terrestrial habitat found within a few kilometres of the Lake Ontario shoreline serves an important role in supporting both resident and migratory species. With the limited natural cover that exists along the Lake Ontario shoreline, even small ***habitat patches*** in urban and urbanizing areas are of value and associated losses and/or gains have a much greater relative impact to overall ecosystem functions. Overall habitat quality within the Project Area is considered to be “fair” to “poor” (TRCA, 2012).

3.2.1.1 Terrestrial Habitat Types

Five broad groupings of natural terrestrial habitat types have been identified within the Project Area, and include: forests, wetlands, successional, meadows and beach/bluff. Forest communities dominate the Project Area. Successional and beach/bluff communities are well represented, while wetland and meadow are present, but are not as common as the other types.

3.2.1.2 Vegetation Communities

Vegetation communities are identified and delineated according to a modified version of the ***Ecological Land Classification (ELC) for Southern Ontario*** (Lee et al., 1998). TRCA’s Terrestrial Natural Heritage System Strategy provides a ranking system consisting of five ranks – L1 to L5 – where each rank reflects a level of ***conservation concern*** and status of a given vegetation community, flora or fauna species in TRCA’s jurisdiction (**Appendix D**). Vegetation communities and species ranked L1 to L3 are considered to be of regional conservation concern and, if present, are noted below. Vegetation communities and species that are ranked L4 are considered to be of urban concern, while vegetation communities and species that are ranked L5 are considered to be generally secure. A sixth rank exists – L+ – which denotes vegetation communities dominated by ***non-native species***, or indicates a species non-native in origin. The distribution of L+ vegetation communities is

indicated in **Figure 3-33**, **Figure 3-35** and **Figure 3-37**, but is not included the summary table (**Table 3-1**) or discussion below.

Table 3-1: Summary of Vegetation Communities, Ranked L1 to L5, within the Project Area Segments

Vegetation Community Class	West Segment		Central Segment		East Segment	
	Number of Types	Area (ha)	Number of Types	Area (ha)	Number of Types	Area (ha)
Forest	26	46.5	25	41.5	9	17.2
Wetlands	4	6.0	7	10.8	14	4.8
Successional	6	11.1	11	19.0	10	14.5
Meadow	3	1.6	2	1.6	8	15.8
Beach/Bluff	11	31.3	8	22.5	10	14.5
Total	**50**	**96.5**	**53**	**95.4**	**51**	**66.8**

3.2.1.2.1 Project Area

A total of 98 distinct vegetation communities have been recorded in the Project Area as of 2011. **Figure 3-32** to **Figure 3-37** illustrate their distribution across the Project Area and into the Project Study Area. This is considered to be a fairly high number for an urban area; however, approximately 30% of these communities are dominated by invasive and/or exotic (non-native) species that are anthropogenic in origin. All land receives an ELC classification, therefore land-units, such as manicured lawns and hedgerows, can also be included as part of the overall vegetation community count.

Broad community types recorded include forest (including plantations), wetland, successional (savannahs, thickets, woodlands, and hedgerows), meadow (including prairies and barren) and dynamic (bluff, beach and dune).

3.2.1.2.2 Forest Communities

Forest ELC community types are the most dominant vegetation type within the Project Area occupying a total area of approximately 105.2 ha. Forest cover here is connected along an often very narrow corridor via the Lake Ontario shoreline. The forests in the Project Area are similar to those in other urbanized areas in that they contain a significant component of non-native vegetation. Exotic species are extremely abundant in the Project Study Area as a whole, comprising up to 45% of recorded plant species (TRCA, 2012). Vegetation communities that are dominated by ash trees (*Fraxinus* sp.) are notably in decline due to the invasion of the Emerald Ash Borer (*Agrilus planipennis*), which kills all species of this genus.

Figure 3-32: Vegetation Community Types within the West Segment



Figure 3-33: Vegetation Community by L-Rank within the West Segment

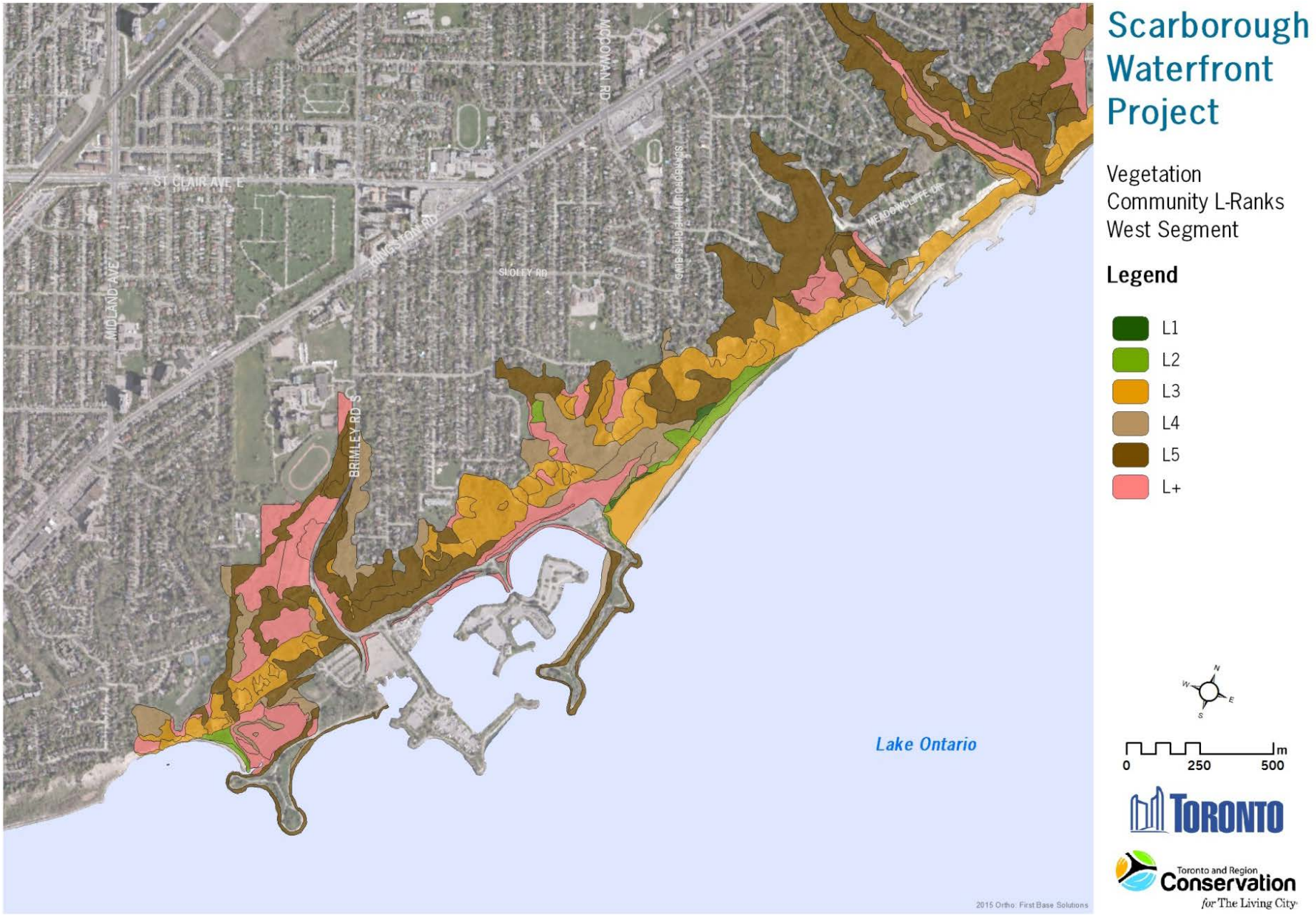


Figure 3-34: Vegetation Community Types within the Central Segment

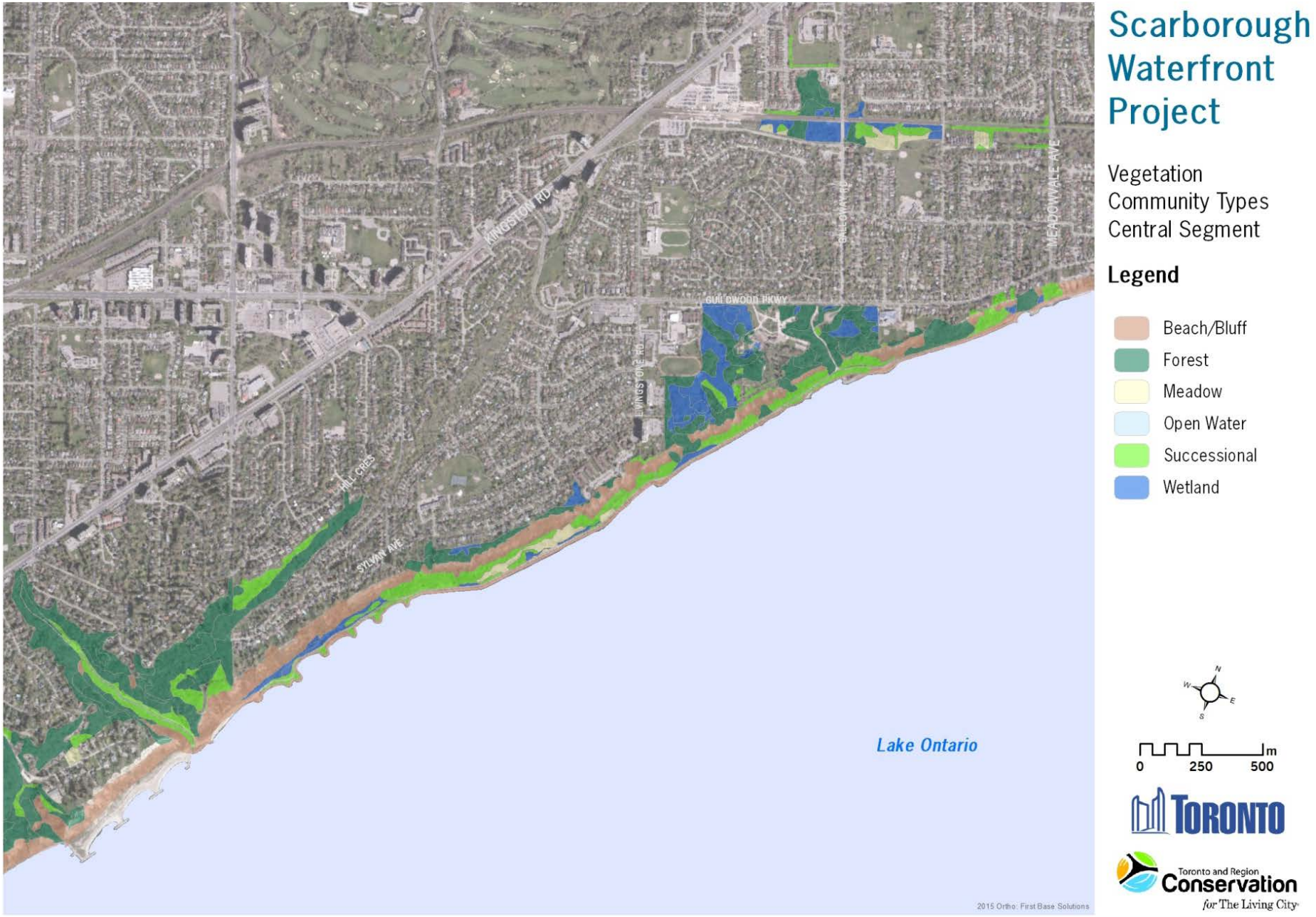


Figure 3-35: Vegetation Community by L-Rank within the Central Segment

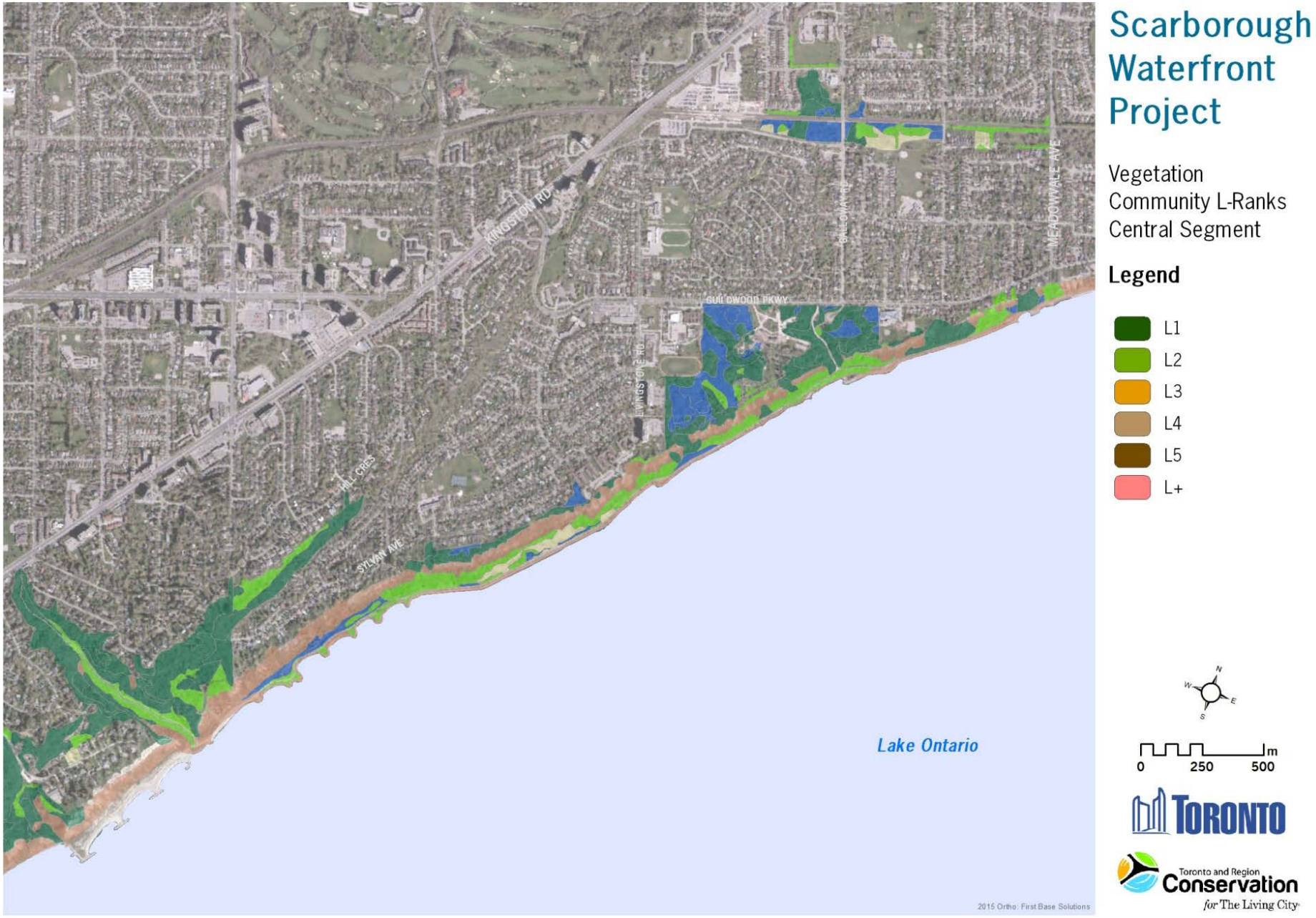


Figure 3-36: Vegetation Community Types within the East Segment

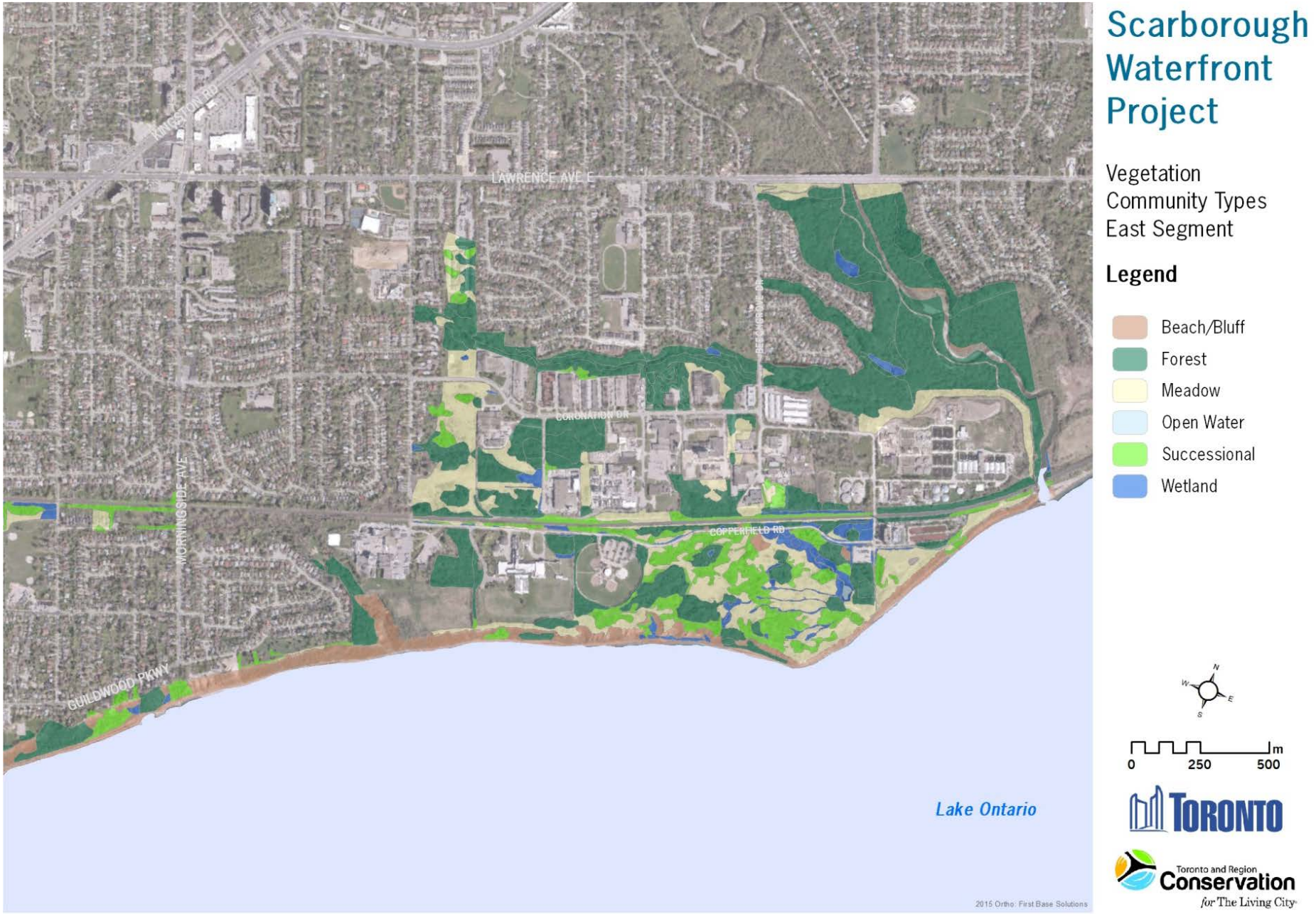
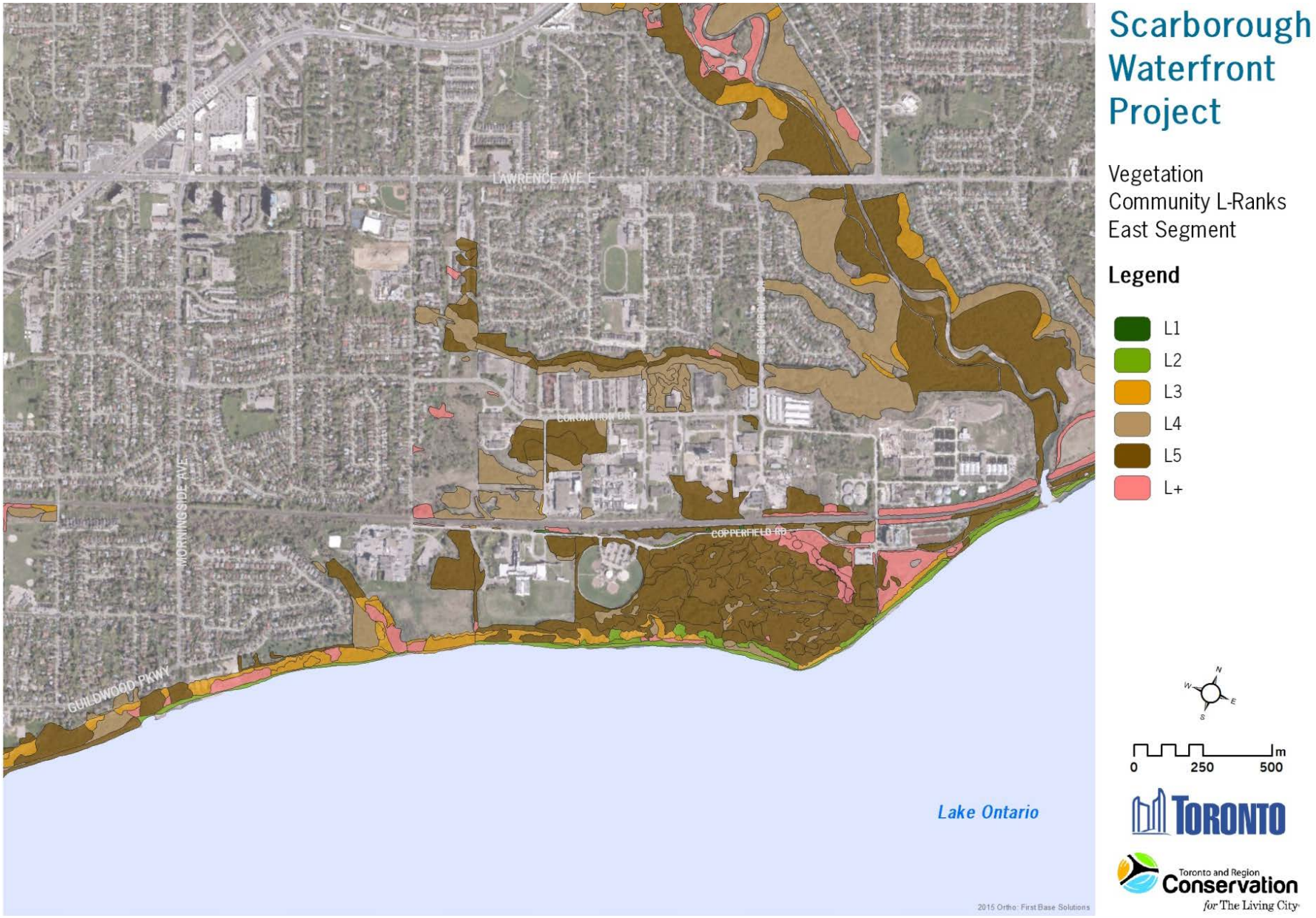


Figure 3-37: Vegetation Community by L-Rank within the East Segment



Human disturbances related to off-trail uses are evident where there is reduced regeneration and forest understory structure. Informal trails lead to vegetation trampling, increase native communities' susceptibility to invasive species spread, and damage sensitive soils through compaction and erosion. Soil compaction and erosion is especially pronounced in those areas along the Bluffs which are informally used by the public to access the base of the Bluffs/shoreline from the tablelands and vice versa. Bluffer's Park and East Point Park exhibit the highest levels of trampling, while areas with access limitations such as fencing (e.g., at Guild Park and Gardens) have no to low levels of trampling.

West Segment

The West Segment is dominated by forest ELC community types, of which the most prevalent type is Dry-Fresh Sugar Maple-Beech Deciduous Forest (FOD5-2) (L5), a secure community type in terms of conservation concern. This mature forest is associated with stable slopes and in the ravines of Cudia Park and Brimley Road at approximately 18 ha. In addition to this community, a combined total of 25 other forest communities are present in the West Segment including the regionally significant Dry-Fresh Hickory Deciduous Forest (FOD2-3) (L3) at approximately 0.29 ha and the provincially notable Dry-Fresh Oak-Hardwood Deciduous Forest (FOD2-4) (L4) at approximately 0.43 ha, present at Cudia Park and Sylvan Park.

Central Segment

The Central Segment is also dominated by Dry-Fresh Sugar Maple-Beech Deciduous Forest (FOD5-2) (L5) at approximately 6.7 ha. A total of 24 other forest ELC community types are present in the Central Segment including one community of regional conservation concern, Fresh-Moist Ash Mixed Forest (FOM8-B) (L3) at approximately 0.44 ha, which is located within the Guild Park and Gardens area and is in decline due to the Emerald Ash Borer invasion.

East Segment

In contrast to the other Segments, the East Segment only contains nine forest ELC community types occupying a total of 17.2 ha. The Fresh-Moist Poplar Deciduous Forest (FOD8-1) (L5) is the largest community type with a total of 12.1 ha. Three L4 communities are present within this Segment and include Dry-Fresh Oak-Hardwood Deciduous Forest (FOD2-4) (L4), Fresh-Moist Paper Birch Deciduous Forest (FOD8-B) and Silver Maple-Conifer Mixed Plantation, occupying a combined total of 2.7 ha. No other forest communities of regional conservation concern are located within this Segment.

3.2.1.2.3 Wetland Communities

Wetland communities occupy a total area of 21.6 ha within the Project Area and are dominated by swamps and marshes. Wetlands in the Project Area are typical of those in urban areas, threatened by invasive species such as common reed (*Phragmites australis*) and fragmentation due to human disturbance.

West Segment

The dominant wetland ELC community type within the West Segment is the Common Reed Mineral Meadow Marsh (MAM2-a) (L4), an exotic community occupying 2.7 ha. Three other wetland communities are also found within this Segment, and are primarily situated along the backshore area of Bluffer's Park Beach totalling an area of 3.3 ha. These communities were restored by TRCA between 2008 and 2009, and contribute in part to the improvement in water quality at the Bluffer's Park Blue Flag Beach. No wetlands in this Segment are of regional conservation concern.

Heavy informal use has been observed through this backshore area, subjecting the flora within these communities to trampling. This may ultimately result in the loss of sensitive wetland flora species or in the reduction of overall wetland vegetation community quality.

Central Segment

The Central Segment contains seven wetland ELC community types that occupy 10.8 ha and includes tableland swamps that are rare in the City of Toronto. The dominant community within this category is the rare tableland Red (Green) Ash Mineral Deciduous Swamp (SWD2-2) (L4), a community of urban conservation concern that is found in several locations, including the Guild Park and Gardens area, and occupies a total of 6.0 ha. This community includes the only known example of Red Ash-Hemlock Mineral Mixed Swamp in TRCA jurisdiction. Unfortunately, it is rapidly declining due to the Emerald Ash Borer invasion. An artificially-created wetland at the base of the Guild construction access route was present at the time of the biological inventory, in association with previous shoreline works. In subsequent years, wetland vegetation began to colonize the feature. No wetland communities of regional conservation concern are located within the Central Segment.

East Segment

A total of 14 wetland ELC community types occupying a total area of 4.8 ha have been recorded in the East Segment on the tablelands. The wetland community is dominated by Narrow-leaved Cattail Mineral Shallow Marsh (MAS2-1b) (L5), an exotic community composing a total land area of 1.2 ha. Two fen and two marsh communities of regional concern are found here, and include Willow Shrub Mineral Fen (FES2-A) (L2), Mineral Fen Meadow Marsh (MAM5-1) (L2), Horsetail Mineral Meadow Marsh (MAM2-7) (L3), and Bur-reed Mineral Shallow Marsh (MAS2-7) (L3).

3.2.1.2.4 Successional Communities

Successional communities within the Project Area are the second most dominant type of vegetation cover (44.6 ha) and include thicket, woodland, savannah, and hedgerow community types. Similar to forest and wetland ELC community types within the Project Area, successional communities are threatened by unmanaged public use that fragments habitats and exacerbates invasive species problems.

West Segment

In the West Segment successional ELC community types are represented by a total of six communities ranging from savannah communities (1.3 ha) to thickets (5.8 ha) and woodlands (4.0 ha). The most dominant community within this broader category is the Native Deciduous Successional Woodland (CUW1-A3) (L5), occupying 4.0 ha. No successional communities of regional concern are present in this Segment.

Central Segment

A total of 11 successional ELC community types are present in the Central Segment, dominated by woodland communities (9.1 ha), followed by thicket (7.5 ha) and savannah communities (2.2 ha), as well as a small hedgerow community (0.1 ha). The Native Deciduous Successional Woodland (CUW1-A3) is the largest of these communities, totalling 4.8 ha. No successional communities of regional concern are present in this Segment.

East Segment

Six thicket communities occupy the largest area (11.7 ha) of successional ELC community types in the East Segment, including a small 0.05 ha community of regional conservation concern, Ninebark Planted Deciduous Thicket (CUT1-H) (L3). The dominant community is the Red Osier Dogwood Deciduous Thicket (CUT1-E) (L5), a generally secure community, which is found in multiple locations and totals 9.8 ha. The balance of successional vegetation communities are woodland (1.3 ha), savannah (1.0 ha) and hedgerow (0.4 ha).

3.2.1.2.5 Meadow Communities

Meadow ELC community types within the Project Area occupy the least amount of area at 18.8 ha. Since most of the Project Area has had several decades of natural succession since urbanization eliminated agriculture, meadow communities are decreasing as woody species take hold. Most meadow communities in the Project Area have a high proportion of native species; however, these communities are threatened by non-native species invasion.

West Segment

Three meadow ELC community types are present in the West Segment, totalling 1.6 ha. The Exotic Forb Meadow (CUM1-c) (L5) dominates this category at 0.7 ha. There are no meadow communities of regional conservation concern located in this Segment.

Central Segment

Two generally secure meadow ELC community types are present within this Segment: a Native Forb Meadow (CUM1-A) (L5) occupies 1.4 ha, while an Exotic Cool-season Grass Graminoid Meadow (CUM1-b) (L5) totals 0.2 ha.

East Segment

Meadow communities are the second most dominant ELC community type in the East Segment representing a total area of 15.8 ha and being composed of eight communities, including barren communities. The Native Forb Meadow (CUM1-A) (L5) occupies the largest area within the East Segment and is found in numerous locations throughout the Segment, with a total area of 12.1 ha. Local meadow and prairie communities, particularly one jurisdictionally rare prairie community, Fresh-Moist Tallgrass Prairie (TPO2-1) (L1) (found north of Copperfield Road), support a small number of prairie species that are unusual for TRCA jurisdiction. Many of the meadow communities in the East Segment are fragmented by a network of informal trails, resulting in the degradation of the vegetation quality.

East Point Park contains the only barren ELC community types found within the Project Area; the three barren communities make up a total land area of 0.3 ha. Two of the barren communities are considered of regional conservation concern: Shrub Clay Barren (CBS1) (L2) and White Cedar Low Treed Clay Barren (CBT1-A) (L2).

3.2.1.2.6 Beach/Bluff Communities

The beach, shoreline and bluff ELC community types are among the most notable within the Project Area. Communities range from actively eroding and/or influenced by coastal processes with sparse vegetation, to partly stabilized with varying amounts of native and exotic vegetation.

It should be noted that both dynamic sand beaches and cohesive shorelines, as defined in **Section 3.1.8.4**, are encompassed within the broader beach/bar (BBO) ELC community land-unit. Using the ELC system, community types are defined by a variety of characteristics, including ***surficial geology*** and soil depth, texture, moisture regime, nutrient regime, and drainage patterns, along with the structure (e.g., degree of cover) and species composition of the vegetation community (Lee et al., 1998).

West Segment

Within the West Segment, bluff ELC community types are the second most dominant vegetation community type overall, totalling 24.5 ha. Four of the five bluff communities are considered of regional conservation concern. Sumac-Willow-Cherry Shrub Bluff (BLS1-A) (L3) is the largest bluff ELC community type found, totalling 10.2 ha. The greatest proportion of this community has been observed along the vegetated section of the Bluffs protected by Bluffer's Park Beach, with smaller patches situated on the Bluffs below Cudia Park. The other communities of regional conservation concern are Deciduous Treed Bluff (BLT1-B) (L3), Mineral Shrub Bluff (BLS1) (L3) and Serviceberry-Buffaloberry Shrub Bluff (BLS1-B) (L2). One bluff community of urban conservation concern also exists in this Segment – Mineral Open Bluff (L4).

A total of six beach and dune ELC community types occupy an area of 6.8 ha within this Segment, largely at or near the shoreline at Bluffer's Park. As noted in **Section 3.1.8.4**, the Bluffer's Park Beach is the only fully developed dynamic sand beach along the shoreline within the Project Area. This is

due to a deep enough sand profile that is not all fully mobilized during storm conditions, and there is no erosion of the substrate below the overlying sand. Bluffer's Park Beach consists of several beach and dune ELC community types, the largest being the Mineral Open Beach (BBO-1) (L3), a community of regional concern at 3.0 ha. The Switchgrass-Beachgrass-(Little Bluestem) Open Sand Dune (SDO1-1) (L1) and Sea Rocket Open Sand Beach (BBO1-1) (L2) are considered provincially rare and of regional conservation concern, and were established as part of TRCA's restoration efforts in 2009 to 2010. Willow Shrub Beach (BBS1-2A) (L2) and Willow Shrub Sand Dune (SDS1-A) (L3) are also considered of regional conservation concern. The dune habitats on the east side of Bluffer's Park Beach, in particular, have been bisected by informal trails resulting from unmanaged public use.

Central Segment

The Central Segment contains four bluff ELC community types, including the Sumac-Willow-Cherry Shrub Bluff (BLS1-A) (L3), a community of regional conservation concern, which dominates this Segment at 10.9 ha. Two other bluff communities of regional conservation concern are present, Deciduous Treed Bluff (BLT1-B) (L3) and Exotic Treed Bluff (BLT1-c) (L3), along with one community of urban conservation concern, Mineral Open Bluff (L4).

Four beach ELC community types are present, totalling 5.8 ha. Rubble Open Shoreline (BBO2-A) (L4), created as a result of the past shoreline erosion control efforts, occupies the largest area (4.0 ha) along the existing South Marine Drive, Guild Park and Gardens and Guildwood Parkway shoreline in the form of an armourstone revetment. Willow Shrub Beach (BBS1-2A) (L2) and Mineral Treed Beach (BBT1-A) (L3) are two communities of regional conservation concern found near the south-western end of the Segment.

East Segment

Five bluff ELC community types occupy a total land area of 10.0 ha in East Segment; the regionally rare Sumac-Willow-Cherry Shrub Bluff community remains the most dominant, although in much smaller proportions relative to the West and Central Segments at 4.4 ha. Three other bluff communities of regional concern are also found in the East Segment – Serviceberry-Buffaloberry Shrub Bluff (BLS1-B) (L2), Deciduous Treed Bluff (BLT1-B) (L3), and Exotic Treed Bluff (BLT1-C) (L3) – as well as one bluff community of urban conservation concern, Mineral Open Bluff (L4).

Five beach and dune ELC community types are present, totalling 4.5 ha along the existing cohesive sand shoreline in the East Segment. The greatest proportion (3.3 ha) of the provincially rare community of regional conservation concern, Sea Rocket Open Sand Beach (BBO1-1) (L2) community, is found between Grey Abbey Park and East Point. Balsam Poplar Treed Sand Dune (SDT1-2) (L2) is another provincially rare community of regional conservation concern occupying approximately 0.5 ha located at the mouth of Highland Creek. Mineral Open Beach (BBO1) (L3) and Willow Shrub Beach (BBS1-2A) (L2) are communities of regional conservation concern located within the coastal zone of Lake Ontario, while a small (0.09 ha) Rubble Open Shoreline (BBO2-A) (L4) community is located at the west end of the Segment where past shoreline erosion control efforts have been implemented.

3.2.1.3 Vascular Plants

A total of 256 vascular plant species have been recorded in the Project Area. The vast majority of species are either considered secure or are invasive species that are ubiquitous and abundant throughout the Project Area; therefore, they have been excluded from the plant dataset presented in order to more clearly evaluate the presence of more sensitive species. A complete list of the flora species detected can be found in **Appendix D**. Quantities of individual plant species of conservation concern, based on regional or urban concern levels, per Segment, are provided in **Table 3-2**.

Table 3-2: Individual Species of Vascular Plants Observed in the Project Area Based on Level of Conservation Concern*

Level of Conservation Concern	Project Area Segment		
	West	Central	East
Regional Conservation Concern (L1-L3)	33	38	53
Concern in an Urban Environment (L4)	63	71	66

*Note: * Generally secure species are not included.*

The relatively high number of plant species found in the Project Area can be attributed to a range of habitats and regimes, diverse topography and variety of soil conditions. At the same time, up to 45% of the vegetated area contains non-native or invasive species (TRCA, 2012). Plant species of conservation concern within the Project Area are currently threatened by exotic invasive species, White-Tailed Deer (*Odocoileus virginianus*) browse (especially spring ephemeral species) and public use through trampling and removal, enabled by a network of informal trails through many sensitive areas, such as several ravines and East Point Park.

Two vascular plant Species at Risk (SAR) have been located within the Project Area. Butternut (*Juglans cinerea*) (L3), which has been listed as Endangered in Ontario, has been encountered in all three Segments in the forested tablelands, while the provincially Threatened spike blazing-star (*Liatris spicata*) (L2), has only been observed on the tablelands in the East Segment. Spike blazing-star populations are particularly susceptible to habitat loss and/or alteration through activities such as fragmentation, which reduce habitat patch size and enable the establishment of invasive species, as well as natural succession.

West Segment

In the West Segment, 33 species of regional concern and 63 species of concern in urban environments were recorded.

Notable observations include presence of jurisdictionally rare Oakes' evening-primrose (*Oenothera oakesiana*) (L3) in the Bluffer's Park area. As well, five of the 38 regionally rare species in this Segment are associated with the beach (Bluffer's Park Beach northern extent, in particular) and wetland communities, and include: russet buffalo-berry (*Shepherdia canadensis*) (L3), sea-rocket (*Cakile edentula*) (L2), seaside spurge (*Euphorbia polygonifolia)* (L2), Schweinitz's umbrella-sedge (*Cyperus schweinitzii*) (L2), and marram grass (*Ammophila breviligulata*) (L2).

Central Segment

In Central Segment, 38 species of regional conservation concern were observed, in addition to 71 species of urban conservation concern.

One of the two most jurisdictionally rare species found within the Project Area is found in this Segment: wood betony (*Pedicularis canadensis*) (L1), an upland forest species associated with forested tablelands. Many regionally rare species appear to be concentrated near Guild Park and Gardens, an area often frequented by informal trail users. Notable species within the Central Segment also include the spring ephemerals wild leek (*Allium tricoccum*) (L4) and broad-leaved spring beauty (*Claytonia caroliniana*) (L3).

One SAR, butternut, has been observed in this Segment, but not in proximity to proposed Project works.

East Segment

The East Segment contains the greatest proportion of species of regional conservation concern at 53 species, with another 66 species of conservation concern in urban environments.

The second most jurisdictionally rare species within the Project Area, the ragged fringed orchis (*Platanthera lacera*) (L1), has been detected here. Other rare species include pasture thistle (*Cirsium discolor*) (L2), and the white form of bottle gentian (*Gentiana andrewsii f. alba*) (L2), as well as golden Alexanders (*Zizia aurea*) (L3).

Butternut has also been observed in this Segment, but is not in proximity to proposed Project works.

3.2.1.4 Wildlife and Wildlife Habitat

In general, the number of terrestrial vertebrate species potentially breeding in the Project Area is considered high for an urban area. However, it is important to note that a list of potential species does not indicate the significance of a site. The presence and representation of species associated with specific habitats is a better indicator of significance. Under-representation of habitat dependent species within the Project Area indicates that the quality of local habitat is not high enough to support a large number of species with specific habitat requirements. For example, the majority of well-represented breeding birds in the area nest at levels considerably higher than ground-level, indicating persistent disturbance likely resulting from informal trails and frequent public use, as well as other factors associated with urbanized environment.

3.2.1.4.1 Wildlife Corridors

Wildlife corridors are areas that are functionally or ecologically connected and provide important habitat while allowing wildlife movement. Corridors can help to preserve populations of wildlife over the long-term within a heavily urbanized landscape where natural communities are fragmented and dispersed, as within the Project Area.

Generally, wildlife movement corridors within the Project Area are limited to the shoreline, ravines and naturalized tableland areas. The matrix of residential and commercial/industrial land between natural areas also contributes to the natural ecology of the area, but is not characterized here.

Ravines and valley lands provide important habitat for the movement of songbirds which rely on vegetated areas when in need of rest, food or shelter from adverse weather conditions during migration. These areas also offer important cover for the movement of mammalian species such as White-Tailed Deer. Additionally, ravines and valley lands provide a connection between the shoreline lands and natural areas within the watersheds of various streams draining into Lake Ontario (Highland Creek within the Project Study Area).

The Lake Ontario shoreline provides an important east-west corridor linkage for urban wildlife movement, as well as a connection between the lake and terrestrial habitats at the ***land-water interface***. It also serves as stopover and staging habitat for migratory wildlife. Though some areas along the shoreline offer a limited east-west connection and a limited land-water interface (e.g., narrow, easily overtopped sections of the sand deposits adjacent to Cudia Park in the West Segment), others (e.g., well-vegetated backshore areas along the Sylvan Avenue shoreline and the cobble beaches at Meadowcliffe) can easily serve as movement corridors and land-water interface connections for multiple species.

Tableland corridor connections are poor to fair given that they are often very narrow, or are interrupted by residential properties. The naturalized areas within the Project Area provide a measure of connectivity east-west, as well as north-south via the ravines.

Unfortunately, many corridors within the Project Area experience direct and indirect impacts from human use. Ravines are impacted by increased overland flow and storm sewer discharges associated with extensive urbanization. In combination with trampling from informal public use, ravine ecosystems are becoming degraded through vegetation loss and subsequent slope erosion. Informal public use also impacts the shoreline corridors and tablelands.

3.2.1.4.2 Birds

To date, wildlife observations for the Project Area include 69 bird species (**Appendix D**).

Most of the existing breeding bird community utilize sheltered forest habitat as opposed to open shoreline habitat. Many others rely on woodland habitats and several have specific habitat requirements within the woodland habitat such as coniferous trees, cavity trees and tall trees for roosting.

It has been noted that habitat loss is the single biggest threat to bird populations worldwide (City of Toronto, 2011). Habitat loss can occur for a variety of reasons, but the majority results from human activities, such as habitat removal for development or fragmentation through continued informal use. Constant habitat disturbance and/or degradation has the potential to reduce bird populations or result in local Extirpation, particularly for bird species that have specific habitat requirements.

West Segment

Twenty-nine bird species have been observed in this Segment.

Significant wildlife habitat within this Segment includes the bluff formations that support Bank Swallow (*Riparia riparia*) colonies, a provincially Threatened species. As a Threatened species under the *Endangered Species Act*, both the swallows and their habitat are protected. Approximately 800 cavities have been observed within this Study Segment; however, occupancy may be much lower (TRCA, 2012). Nevertheless, the apparent size, as well as the current condition of most of the bluff face, makes this a regionally significant colony. Slope failures and erosion may help to maintain the current colony, but over time a stable slope will form naturally, which may allow vegetation to grow and provide easier access for predators, thereby making it potentially less suitable for nesting Bank Swallows. However, based on the evidence of the Bluffer's Park Bank Swallow colony, the colonies that occupy areas with silt to sand substrate (not till), such as in this area, are likely to persist over the long-term.

Habitat within this Segment also supports nesting raptors, such as the Eastern Screech-Owl (*Otus asio*; a confirmed breeder), American Kestrel (*Falco sparverius*; a possible nester), and a number of cavity nesters, such as Hairy Woodpecker (*Picoides villosus*), Northern Flicker (*Picoides villosus*), White-breasted Nuthatch (*Sitta carolinensis*), and Carolina Wren (*Thryothorus ludovicianus*).

Central Segment

Thirty-two bird species have been observed in the Central Segment. More than 140 Bank Swallow cavities were counted within the Segment; however, occupancy may be much lower. The Bluffs in this Segment provide significant nesting opportunities for this species, although vegetation that is slowly colonizing the slopes has reduced nesting opportunities over time. Areas farther east within this Segment where Bank Swallows occupy cohesive soils may become unsuitable for Bank Swallow nesting in approximately 5 to 20 years, depending on how quickly natural succession occurs.

Habitat within this Segment also supports raptor species such as Great Horned Owl (*Bubo virginianus*), Eastern Screech-Owl and Sharp-shinned Hawk (*Accipiter striatus*), and cavity nesting species such as White-breasted Nuthatch, Red-breasted Nuthatch (*Sitta canadensis*), Great Crested Flycatcher (*Myiarchus crinitus*), Carolina Wren, and Hairy Woodpecker.

East Segment

Forty-three bird species have been recorded in East Segment, including the provincially Threatened Bank Swallow. However, limited suitable bluff habitat likely restricts the number of Bank Swallow nests, as the dominant substrate in this area lacks cohesion, which is required for burrowing.

No raptor species were recorded within East Segment. Several cavity nesting species recorded include American Redstart (*Setophaga ruticilla*), Black-billed Cuckoo (*Coccyzus erythropthalmus*), Blue-gray Gnatcatcher (*Polioptila caerulea*), Great Crested Flycatcher, Hairy Woodpecker, Red-breasted Nuthatch, Winter Wren (*Troglodytes hiemalis*), and Wood Duck (*Aix sponsa*).

A number of regional conservation concern species were also detected in this Segment: Winter Wren, Brown Thrasher (*Toxostoma rufum*), Black-billed Cuckoo, Mourning Warbler (*Geothlypis philadelphia*), and Wild Turkey (*Meleagris gallopavo*).

East Point Park is known to be locally significant as a migratory bird stopover location, and its significance for migrating birds has been acknowledged by citizen science data collected from eBird (eBird, 2015).

3.2.1.4.3 Mammals

A total of 16 mammal species have been recorded within the Project Area. All species observations, except bats, are incidental and were made as part of breeding bird and vegetation surveys.

This relatively small number of mammals is typical of urban areas and includes species commonly encountered in the urban landscape, such as Grey Squirrel (*Sciurus carolinensis*), Red Squirrel (*Tamiasciurus hudsonicus*), Eastern Cottontail (*Sylvilagus floridanus*), and Eastern Chipmunk (*Tamias striatus*).

Most mammal species encountered are relatively ubiquitous throughout the Project Area. All of the species, with the possible exception of some bat species, are considered quite adaptable to urban situations.

Notable mammals include the six bat species detected, as only eight species of bats are known in all of Ontario. Two of the bat species detected, Little Brown Bat (*Myotis lucifugus*) and Tri-Colored Bat (*Perimyotis subflavus*), are currently considered both provincially and federally Endangered. Residency and roosting activity was not assessed for any bat species in the Project Area; however, based on their habitat preferences it is unlikely that any of the species use the Bluffs for roosting or nesting activity, and instead are likely using the surrounding forest habitats, or even residential properties (e.g., attics) (B. Lim to K. McDonald, personal communication, May 17, 2016). Maintaining and expanding the amount of suitable habitat within existing natural areas, such as leaving cavity trees standing and planting species that will result in cavities and/or loose bark once mature, would help to preserve and promote opportunities for bats.

3.2.1.4.4 Herpetofauna

Six reptile and five amphibian species have been detected within the Project Area (**Table 3-3**).

Table 3-3: Herpetofauna Species Detected within the Project Area

Reptiles	
Snakes	**Turtles**
▪ Eastern Gartersnake (*Thamnophis sirtalis sirtalis*) ▪ Dekay's Brownsnake (*Storeria dekayi*)	▪ Common Musk Turtle (*Sternotherus odoratus*)* ▪ Midland Painted Turtle (*Chrysemys picta marginata*) ▪ Red-Eared Slider (*Trachemys scripta elegans*)** ▪ Snapping Turtle (*Chelydra serpentina*)

Table 3-3: Herpetofauna Species Detected within the Project Area

Amphibians	
Frogs and Toads	**Salamanders**
▪ Northern Leopard Frog (*Lithobates pipiens*) ▪ American Toad (*Bufo americanus*) ▪ Green Frog (*Rana clamitans*)	▪ Spotted Salamander (*Ambystoma maculatum*) ▪ Eastern Red-Backed Salamander (*Plethodon cinereus*)

Notes: * *SAR*
** *Non-native species*

Amphibians in particular are key ecological indicators as most spend a portion of their life in both aquatic and terrestrial habitats. Human disturbance, pollution, and climate change can have an impact on population size and health. Some amphibian species, such as the two frog species and one toad species found in the Project Area, are more resilient than others when faced with urban stresses. American Toad has been detected within all three Segments of the Project Area. Green Frogs were detected in the Central and East Segments, and Northern Leopard Frog was only observed within the East Segment.

Populations of Eastern Red-Backed Salamanders, an important forest Indicator (TRCA, 2012), were discovered in the Central Segment and were present in the Highland Creek ravine system. Spotted Salamander were also observed in the East Segment within the Highland Creek ravine system.

Eastern Gartersnake is one of the most widely distributed snakes in Ontario and has been observed in all Segments of the Project Area. In contrast, Dekay's Brownsnake was only observed within the East Segment. This species is fairly common and abundant throughout Ontario, and is often found in or near human habitat in suburban and urban areas (MacCulloch, 2002). However, they are not often seen due to their elusive habits and small size.

Four turtle species have been observed within the Project Area, three of which have been encountered in the West Segment, including the Common Musk Turtle, a provincially Threatened SAR. However, due to the isolated nature of this observation (one individual was captured in 2003 and the species has not been detected in subsequent years), its current status in the Project Area is uncertain. Citizen science has reported a Snapping Turtle observation within the Central Segment.

3.2.1.5 Significant Natural Areas

This section describes the significant natural areas found in the Project Study Area and individual Segments. Significant natural areas considered include Areas of Natural and Scientific Interest (ANSIs), Environmentally Significant Areas (ESAs) and ***Provincially Significant Wetlands (PSWs)***. Although ANSIs and ESAs are a conservation designation, proposed works can occur within them, if the appropriate studies have been undertaken.

3.2.1.5.1 Areas of Natural and Scientific Interest (ANSIs)

ANSIs are areas of land and water containing unique natural landscapes or features. These features have been scientifically identified as having life or earth science values related to protection, scientific

study or education. ANSIs complement provincial parks and conservation reserves by conserving significant features through means other than regulation (Government of Ontario, 2014).

ANSIs include Life Science ANSIs and Earth Science ANSIs. The Project Study Area contains two Life Science ANSIs and one Earth Science ANSI.

Life Science ANSIs are significant representative segments of Ontario's biodiversity and natural landscapes including specific types of forests, valleys, prairies and wetlands, their native plants and animals, and their supportive environments (Government of Ontario, 2014).

Earth Science ANSIs are geological in nature and consist of some of the most significant representative examples of the bedrock, fossil and landforms in Ontario and include examples of ongoing geological processes (Government of Ontario, 2014).

ANSIs are categorized as Provincially Significant, Regionally Significant or Locally Significant by the MNRF.

The significant natural features which led to these areas being designated as ANSIs are currently under pressure from a variety of factors. In particular, unmanaged public use (an approximately 14 km long network of informal trails measured along the top and bottom of the Bluffs via orthophotography interpretation and ground-truthing using GPS technology) results in habitat fragmentation, trampling of plants, spread of invasive species, and disturbance of wildlife.

Three ANSIs are located in the Project Study Area:

1. **Scarborough Bluffs Provincially Significant Life Science ANSI** (155.4 ha):
   At the time of evaluation in 1980, the major features included a variety of vegetation communities associated with the Bluffs and ravine systems, particularly the regionally rare Sumac-Willow-Cherry Shrub Bluff community and a number of remnant forest communities classified as either regionally rare or of urban concern. Informal trails fragment several sections of this ANSI, particularly within Bellamy Ravine and Sylvan Park.
2. **Scarborough Bluffs Provincially Significant Earth Science ANSI** (93.3 ha):
   The Bluffs were identified as the major feature at the time of evaluation in 1980. This particular 93.3 ha section exhibits the most complete record of Pleistocene geology in North America, and contains a number of notable sections to the west of the Project Study Area (e.g., the Dutch Church Section [including the Needles] and Seminary Section) and within the Project Study Area (e.g., Cathedral Bluffs, Cudia Park Section, and portions of the Iroquois Section). At present, the Cathedral Bluffs section of Bluffs are considered to be in the middle to late stages of stabilization and are well vegetated due to the creation of Bluffer's Park Beach, which protects the slope toe from wave action (**Appendix B**).
3. **East Point Bluffs Regionally Significant Life Science ANSI** (71.7 ha):
   The major features at the time of evaluation in 1980 included a unique grassland meadow that is interspersed with small woodlots, wetlands and small ravines. A small

remnant prairie community still exists within this ANSI, and contains a number of rare prairie plant species, including the largest and healthiest spiked blazing-star population in Ontario, along with significant prairie grasses (e.g., bluestem [*Anthropogon gerardii*], little bluestem [*Schizachyrium scoparium*], dropseed grass [*Sporobolus heterolepis*]) and wildflowers (e.g., white bottled gentian, fringed gentian [*Gentiana crinita*]). The largest network of informal trails in the Project Study Area is also located within this ANSI through East Point Park (approximately 8 km in length), fragmenting and threatening the aforementioned vegetation communities.

Scarborough Bluffs Life Science and Earth Science ANSIs overlap with West and Central Segments, and East Point Life Science ANSI overlaps with East Segment (**Figure 3-38** to **Figure 3-40**).

3.2.1.5.2 Environmentally Significant Areas (ESAs)

City of Toronto designated ESAs are natural areas within the City of Toronto's natural heritage system that, at the time of designation, have been found to be particularly significant or sensitive and require protection to preserve the unique or rare flora and fauna features within (North-South Environmental Inc., 2012a). ESAs are protected under the City of Toronto Official Plan Policy 3.4.13 (City of Toronto, 2015a; Amendment No. 262), which states that "*development or site alterations with the exception of trails, where appropriate, and conservation, flood and erosion control projects is not permitted on lands within the natural heritage system that exhibit any of these characteristics. Activities will be limited to those that are compatible with the preservation of the natural features and ecological functions attributed to the areas."* Similar to the designated ANSIs discussed above, each ESA identified within the Project Study Area is currently under pressure from unmanaged increases in public use, with networks of informal trails observed to bisect portions of each.

Five ESAs overlap with/are located within the Project Study Area:

1. **Scarborough Bluffs Sequence** (**Figure 3-38**):
   This ESA overlaps with the West Segment and occupies an area of 73.6 ha. It was designated as environmentally significant due to biologically and geologically significant areas surrounded by deciduous forest, successional and beach communities found at the time of evaluation (North-South Environmental Inc., 2012a). A total of 30 significant flora species and nine significant vegetation communities were detected amongst a total of 43 vegetation communities. A total of 68 flora and 11 fauna species ranked L1 to L4 also contribute to the designation. Over 100 Bank Swallow colony nesting holes were recorded, and swamps and marshes provide upwards of 4.5 ha of water storage (North-South Environmental Inc., 2012b). The City of Toronto has identified the protection of the landform and vegetation within this area as a management need for this ESA. Many areas of the existing vegetation are dominated by patches of non-native flora species (e.g., dog strangling vine, Norway maple, giant reed grass, cow vetch), and evidence of considerable human disturbance has been observed, including camping, informal trails and yard waste dumping (North-South Environmental Inc., 2012b). Intensive residential development along the landward edge of the Bluffs in this area is also heavily impacting the landform along these edges (North-South Environmental Inc., 2012b).

Figure 3-38: ANSIs and ESAs Overlapping West Segment with the Locations of Existing Formal and Informal Trails Identified

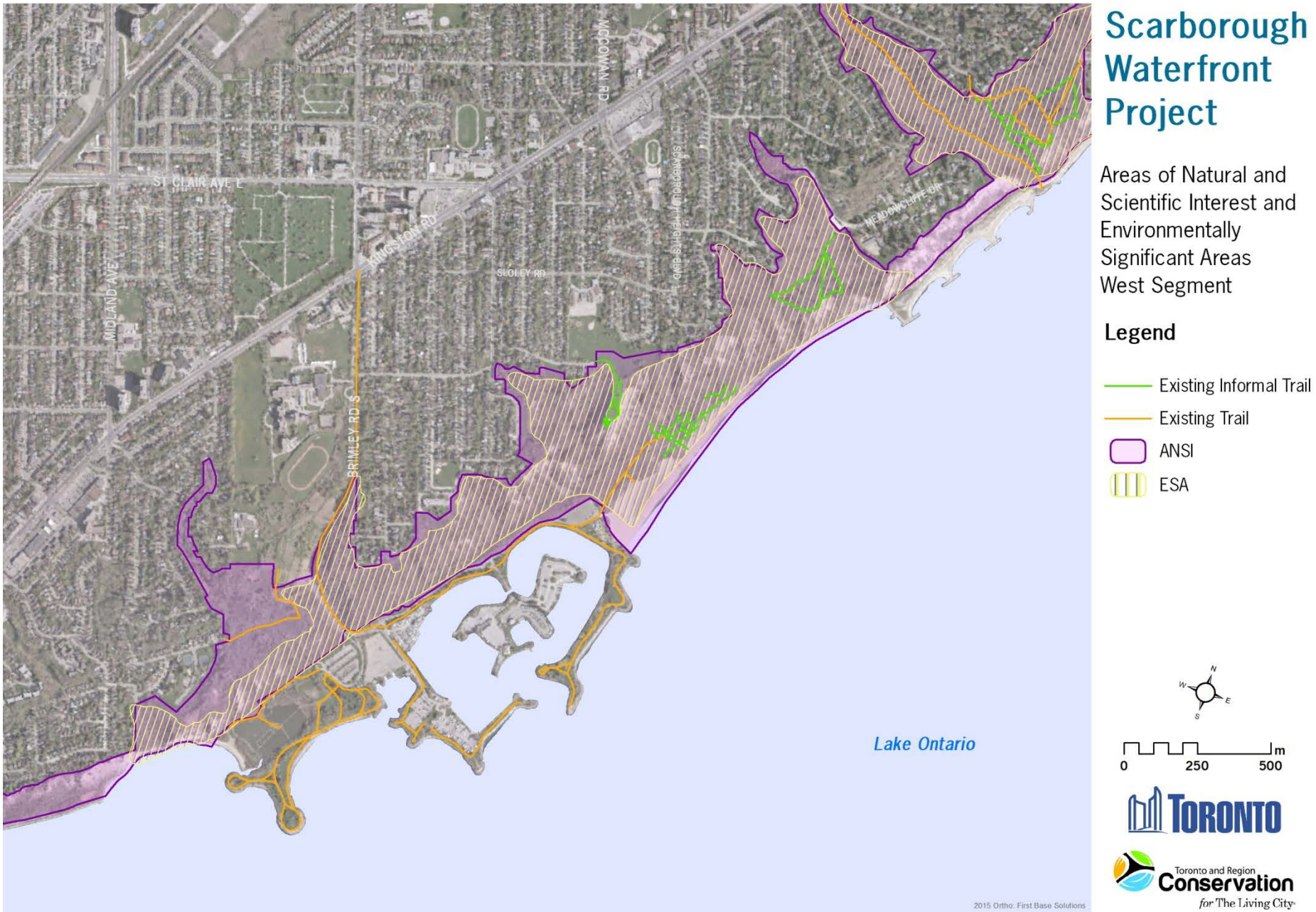


Figure 3-39: ANSIs and ESAs Overlapping Central Segment with the Locations of Existing Formal and Informal Trails Identified

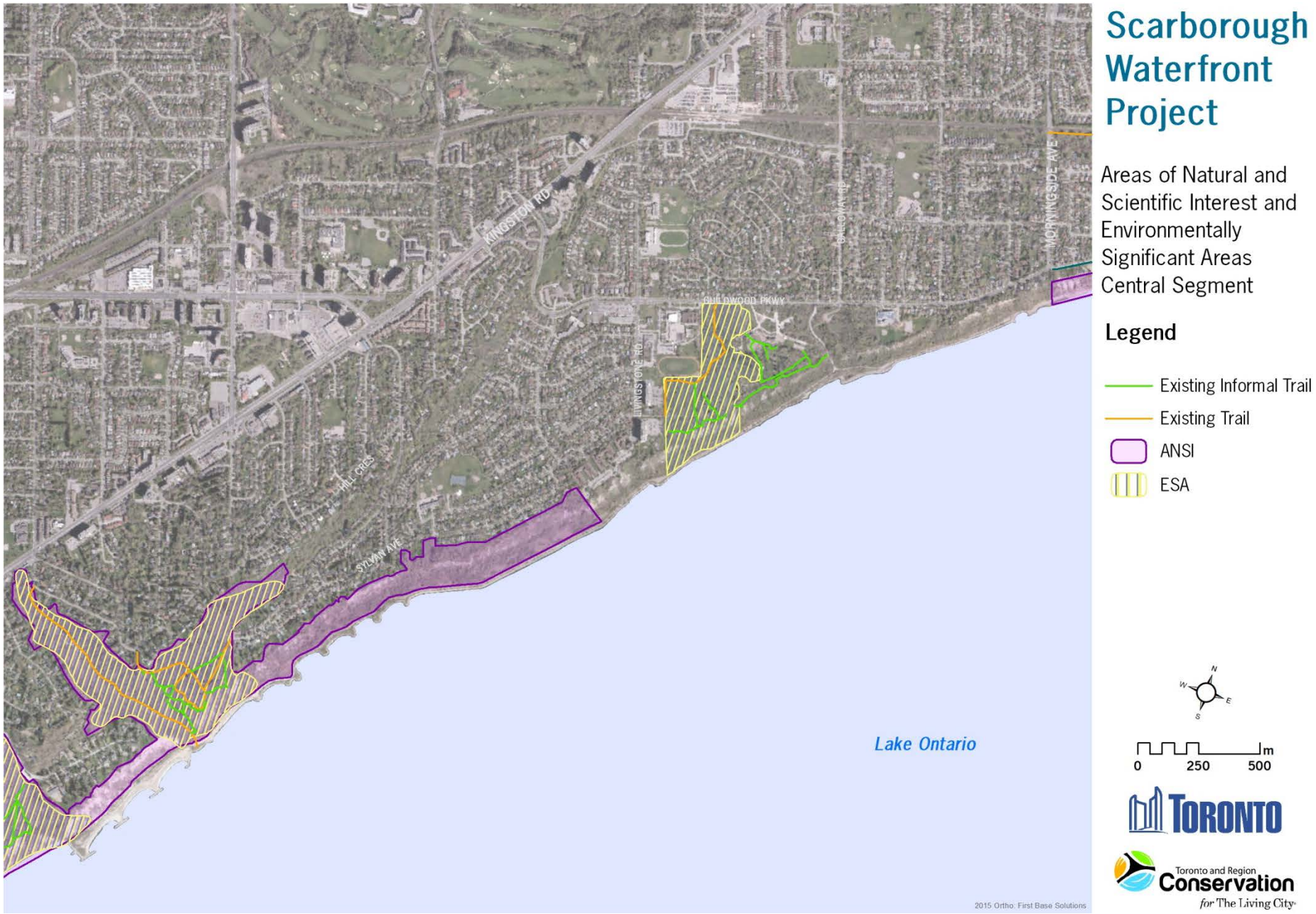
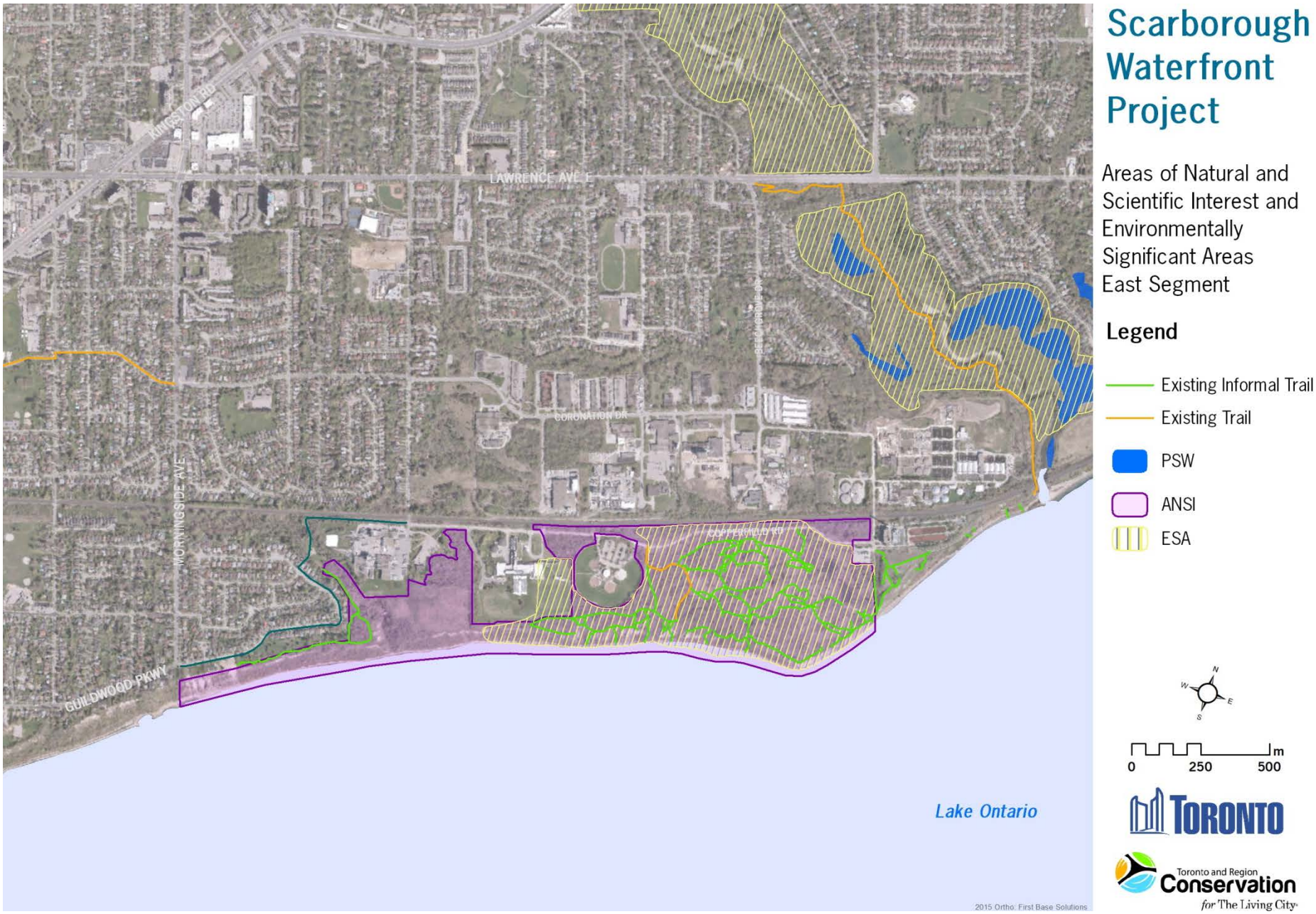


Figure 3-40: ANSIs and ESAs Overlapping East Segment with the Locations of Existing Formal and Informal Trails Identified



2. **Bellamy Ravine/Sylvan Park** (**Figure 3-39**):
   This ESA overlaps with the Central Segment and occupies an area of 28 ha. When evaluated, it was found to include nine significant flora species and three significant vegetation communities across a total of 17 vegetation communities, and supported over 300 Bank Swallow nests (North-South Environmental Inc., 2012c). A total of 31 flora and 14 fauna species ranked L1 to L4 were also recorded. A number of informal trails has been observed to intersect this ESA and provide shortcuts between stretches of the existing trail, increasing the potential for habitat fragmentation and human disturbance along the east side of Bellamy Ravine and Sylvan Park, in particular. Protection and enhancement of the vegetation along the ravine slopes and on the tableland has been identified as a management need by the City as these communities are affected by high proportions of non-native flora species (e.g., dog strangling vine and black locust) along with informal trails primarily at the bottom of the ravine (North-South Environmental Inc., 2012c).

3. **Guild Woods** (**Figure 3-39**):
   This ESA also overlaps with the Central Segment. It covers an area of 14.8 ha, and, at the time of designation, was characterized by the presence of rare flora or vegetation communities, including 11 significant flora species and four significant vegetation communities across a total of 18 vegetation communities, along with 3.9 ha of water storage area provided by marsh and swamp communities (North-South Environmental, 2012d). This site was found to contain many areas of high quality vegetation; however, similar to the Bellamy Ravine/Sylvan Park ESA (but to a lesser extent), a series of informal trails has been observed, intersecting the natural area to provide shortcuts from the existing trail to the edge of the Bluffs (North-South Environmental Inc., 2012d). Resultantly, protection of the landform and vegetation from informal trails within this area has been recommended as a management need by the City, along with removal/control of invasive flora species, such as garlic mustard, which has been found in high concentrations in several areas (North-South Environmental Inc., 2012d).

4. **East Point** (**Figure 3-40**):
   This ESA overlaps with the East Segment, and covers an area of 46.6 ha. At the time of evaluation, it was found to contain 37 significant flora species, nine significant vegetation communities and two significant fauna species, amongst a total of 30 vegetation communities (North-South Environmental Inc., 2012e). It was also found to contain 53 flora and 21 fauna species ranked L1 to L4. It represented an excellent example of bluff formation and maintenance, and contained a water storage area of approximately 7.2 ha through marsh and swamp communities (North-South Environmental Inc., 2012e). This area has a high diversity of successional vegetation, which supports a high diversity of wildlife species. However, East Point has also been found to contain the greatest concentration of informal trails within the Project Study Area (approximately 8 km). These include trails fragmenting the sensitive vegetation communities directly within and just west of the park, as well as those along the bluff face (informal trails between the tablelands and shoreline have been noted within steep erosion gullies).

Management needs identified by the City include maintenance of the landform and successional processes at this site, and maintenance of the connections with other natural areas (North-South Environmental Inc., 2012e). The trail system through the park needs to be managed with consideration of constructing paved trails in order to prevent erosion and the formation of more informal trails (North-South Environmental Inc., 2012e). Invasive species management should also be considered for the large patches of dog strangling vine observed (North-South Environmental Inc., 2012e).

5. **Stephenson's Swamp/Highland Creek East** (**Figure 3-40**):
   This ESA also overlaps with the East Segment and occupies an area of 44.8 ha. It was found to include steep valley slopes with mixed deciduous and coniferous forests that descend abruptly to a broad floodplain with lowland forest swamp, meadow marsh and riparian bars (North-South Environmental Inc., 2012a). A total of 56 significant flora species, four significant fauna species and one significant vegetation community were detected across 14 vegetation communities (North-South Environmental Inc., 2012f). A total of 136 flora and 34 fauna species ranked L1 to L4 also contribute to this areas ESA designation. This area was also identified as a major node in the Highland Creek corridor, providing linkage between foraging and breeding habitat for frogs, along with 6.4 ha of water storage provided by marsh and swamp communities (North-South Environmental Inc., 2012f). Similarly to the ESAs discussed above, the City has identified protection of the landform and vegetation in this area. Although the site has many areas of high-quality vegetation, high concentrations of non-native flora, specifically Norway maple, dog strangling vine and giant reed grass, have been found in certain areas (North-South Environmental Inc., 2012f). Additionally, informal paths have been frequently encountered and have been found to impact sites along the edge of Highland Creek (North-South Environmental Inc., 2012f).

3.2.1.5.3 Provincially Significant Wetlands (PSWs)

PSWs are identified by the MNRF as being the most ecologically valuable wetlands in Ontario based on four broad categories: biological, social, hydrological, and special features.

The Highland Creek Wetland complex, located in the north-east corner of the Study Area and away from the waterfront, is the only PSW and is composed of four individual wetlands totalling approximately 12.9 ha (**Figure 3-40**).

3.2.2 Aquatic Habitat and Fish Community

This section focuses on characterization of the aquatic habitat and fish community in the Project Area. Various aquatic habitat types present along the shoreline between Bluffer's Park and Highland Creek and their current state are described. The fish community is described using species richness, fish abundance and community structure trends over the last decade (2006-2016). In addition, the connection between the local habitat, fish community and the lake-wide ecosystem is examined.

3.2.2.1 Connected Lake Ontario Ecosystem Zones

It is important to recognize that the Project Area is a component of the Lake Ontario ecosystem, which, in turn, is comprised of interacting physical, chemical and biological components. This interaction takes place within and between the watershed, nearshore and offshore zones. The nearshore zone includes the shallower exposed coastal zone and sheltered embayments, and the offshore zone is the main body of the Lake (Stewart et al., 2013).

3.2.2.1.1 Nearshore Zone

The lake nearshore zone is located parallel to the shoreline and is approximately <15 m deep (Stewart et al, 2013). All aquatic habitat types present within the Project Area and discussed below (**Section 3.2.2.2**) – sheltered embayment and open coast – are associated with the nearshore zone.

Many fish species (predominantly cool water) utilize the nearshore zone as a spawning area and to support various life stages. Spawning is subject to individual species' requirements with respect to substrate type, depth and availability of aquatic vegetation.

3.2.2.1.2 Offshore Zone

The offshore zone contains most of the water and living components of the Lake Ontario ecosystem (Stewart et al., 2013). It serves as habitat for the majority of native and stocked salmonids, prey fish such as Alewife (*Alosa pseudoharengus*) and other cold water species.

The offshore zone is used to support adult life stages of many fish species that spawn in the nearshore (e.g., Alewife, Lake Whitefish and Lake Trout) (Lane et al., 1996). As well, it supports species residing exclusively offshore.

3.2.2.2 Aquatic Habitat Types

Four major aquatic habitat types occur along the north shore of Lake Ontario: estuaries, sheltered embayments, coastal wetlands, and open coast. Sheltered embayment and open coast habitat is found within the Project Area.

1. **Sheltered Embayment**
   Sheltered embayment habitat is located at the Bluffer's Park boat basin at the western end of the Project Area. Sheltered embayments such as Bluffer's Park provide calm waters and ***thermal refuge*** to fish. The water in this habitat type can be significantly warmer than the open coast. As such, cool or warm water fish species typically dominate the fish community. These areas are best described as having a variety of shoreline configurations where the substrates tend to be softer sediments that sustain significant amounts of aquatic vegetation. Sheltered embayments provide habitat for all life stages of fish species, including foraging and nursery habitat.
2. **Open Coast**
   Open coast habitat occurs across the rest of the Project Area. In sharp contrast to

sheltered embayments (and coastal wetlands and estuaries), the open coast has much colder water, and is exposed to extensive wind and wave action, resulting in a relatively hostile environment for aquatic plants and animals. ***Upwellings*** of cold sub-surface waters are common, resulting in large temperature fluctuations that reduce survival of cool and warm water fish in these areas. However, while most of the shoreline within the Project Area is classified as cold water open coast habitat, it frequently functions as a warm/cool water corridor between warm water habitat areas such as estuaries and coastal marshes.

Within the Project Area, three types of open coast habitat exist, and are defined by the degree and type of protection work implemented along the shoreline in response to toe erosion along the Scarborough Bluffs:

- **Non-engineered Open Coast**
  These are areas where no shoreline protection works have been previously implemented (below Cudia Park Bluffs in the west, and between Grey Abbey Ravine and Highland Creek in the east; see **Figure 3-41** and **Figure 3-43**), or areas of soft shoreline whose development and continued existence are dependent on adjacent existing shoreline protection works (i.e., Bluffer's Park Beach). The non-engineered open coast habitat in the Project Study Area is characterized by relatively linear shoreline profiles and primarily small-sized aggregate substrate. While these areas are primarily used as movement corridors, they can also be used for spawning under appropriate conditions by fish species that have a high affinity to small-sized aggregate as spawning substrate.

- **Open Coast with Revetment Features**
  These are areas where a linear revetment (see **Section 3.1.8.5**) has been placed along the shoreline for erosion protection (South Marine Drive, Guild Park and Gardens) (**Figure 3-42**). These engineered structures typically did not incorporate aquatic habitat into their design. The linear shoreline profile and lack of diverse substrate typically associated with these features result in lack of cover, shelter and foraging opportunities for fish. Therefore, they are primarily used as movement corridors. Though revetments can be designed or retrofitted to incorporate aquatic habitat enhancements, the benefits to aquatic habitat quality afforded by these structures are less than those provided by headland beach systems.

- **Open Coast with Headland Features**
  These are areas where headland, headland beach and groyne features have been installed for shoreline protection and are found in all three Project Area Segments (see **Section 3.1.8.5**). While the main property of these features is to address shoreline erosion, incorporating aquatic habitat enhancements into their design benefits aquatic habitat and organisms, where the benefits provided are typically higher than those provided by enhanced linear revetments. As demonstrated by the Project Area fish community survey results, more structurally complex open coast habitat – headland beach systems with diverse substrates, irregular shoreline and complex vertical profile of the shoreline – is able to support a higher number of fish species and higher abundance of fish (see **Section 3.2.2.3.1**).

Figure 3-41: Open Coast Aquatic Habitat in West Segment

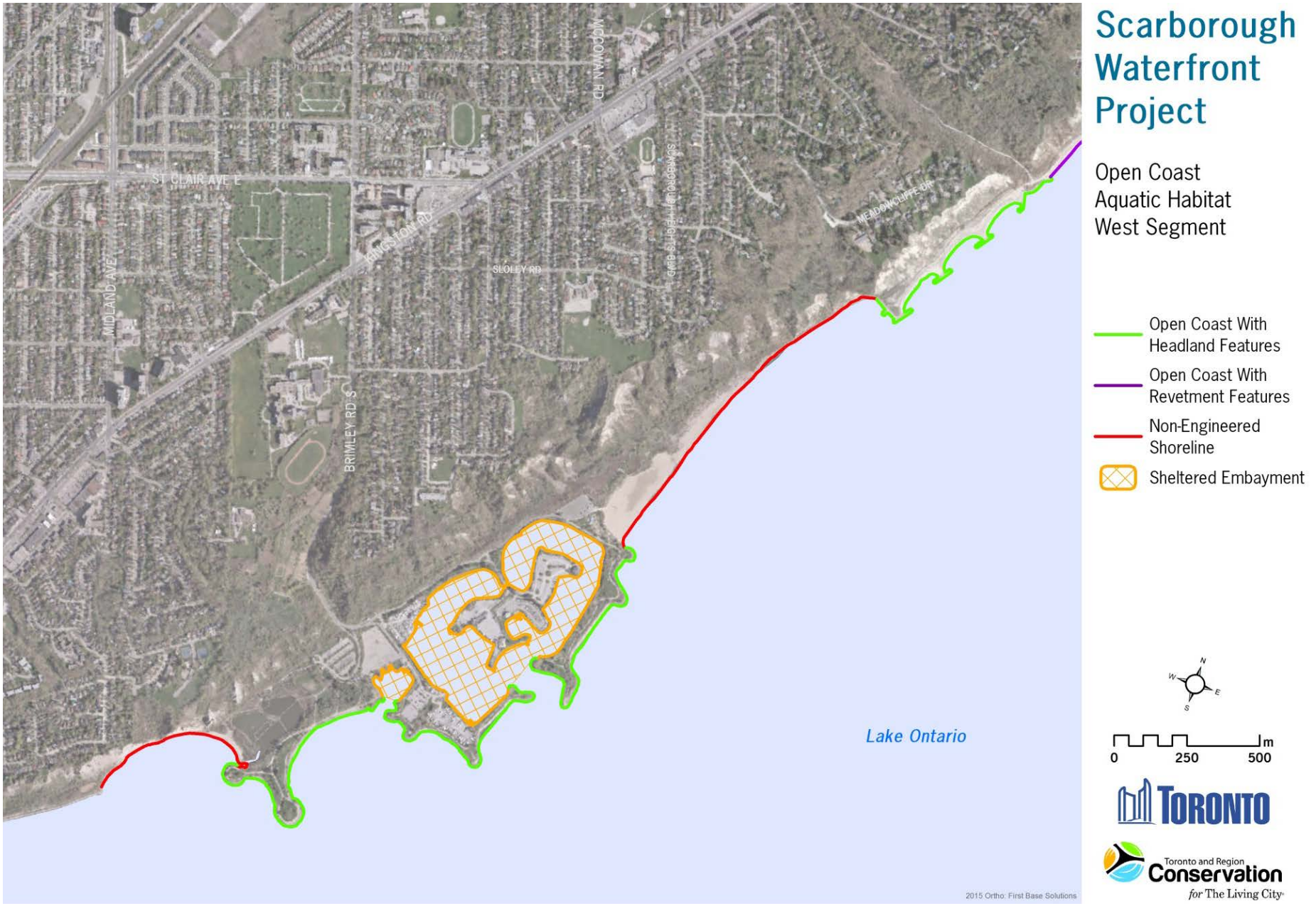


Figure 3-42: Open Coast Aquatic Habitat in Central Segment

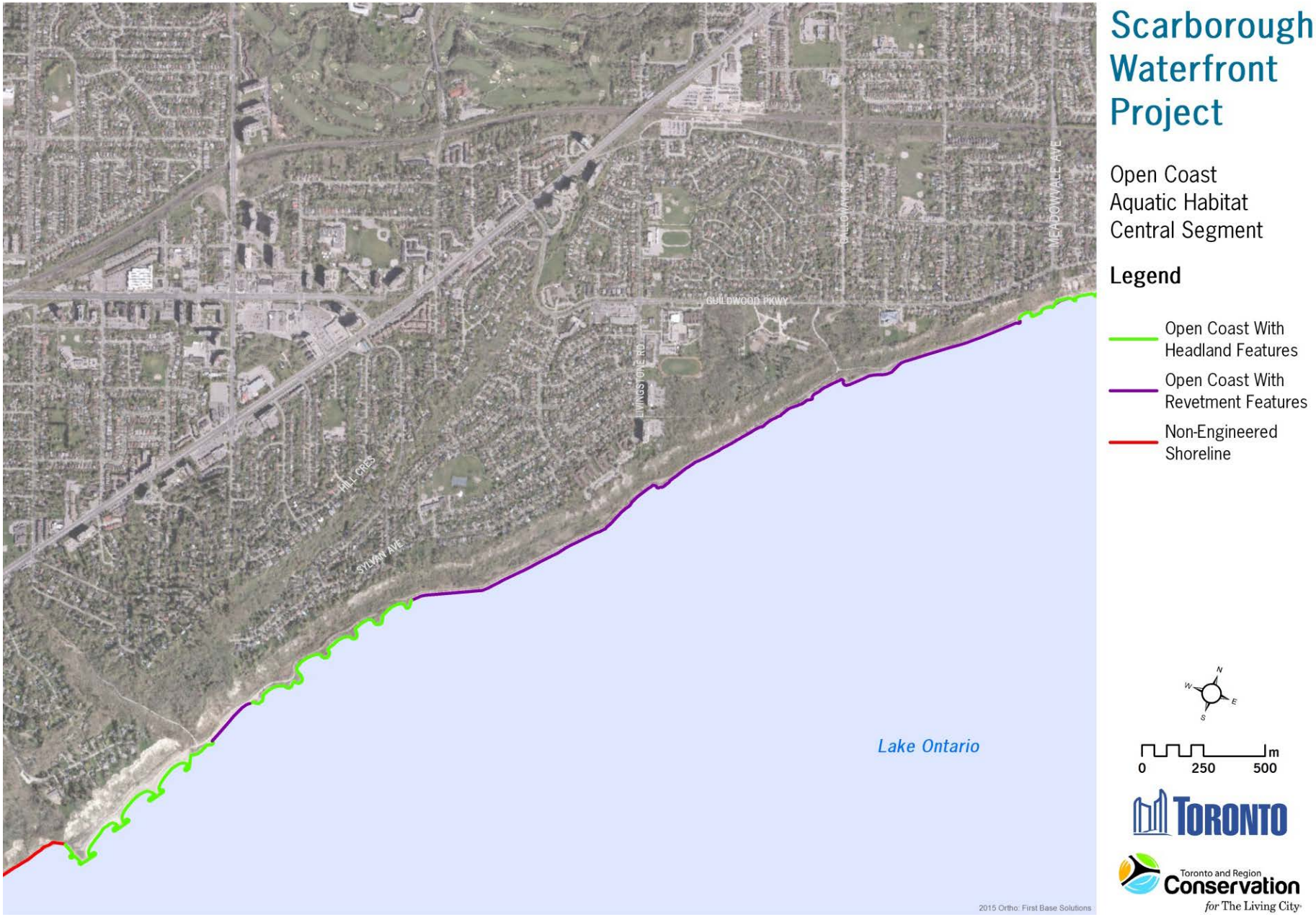
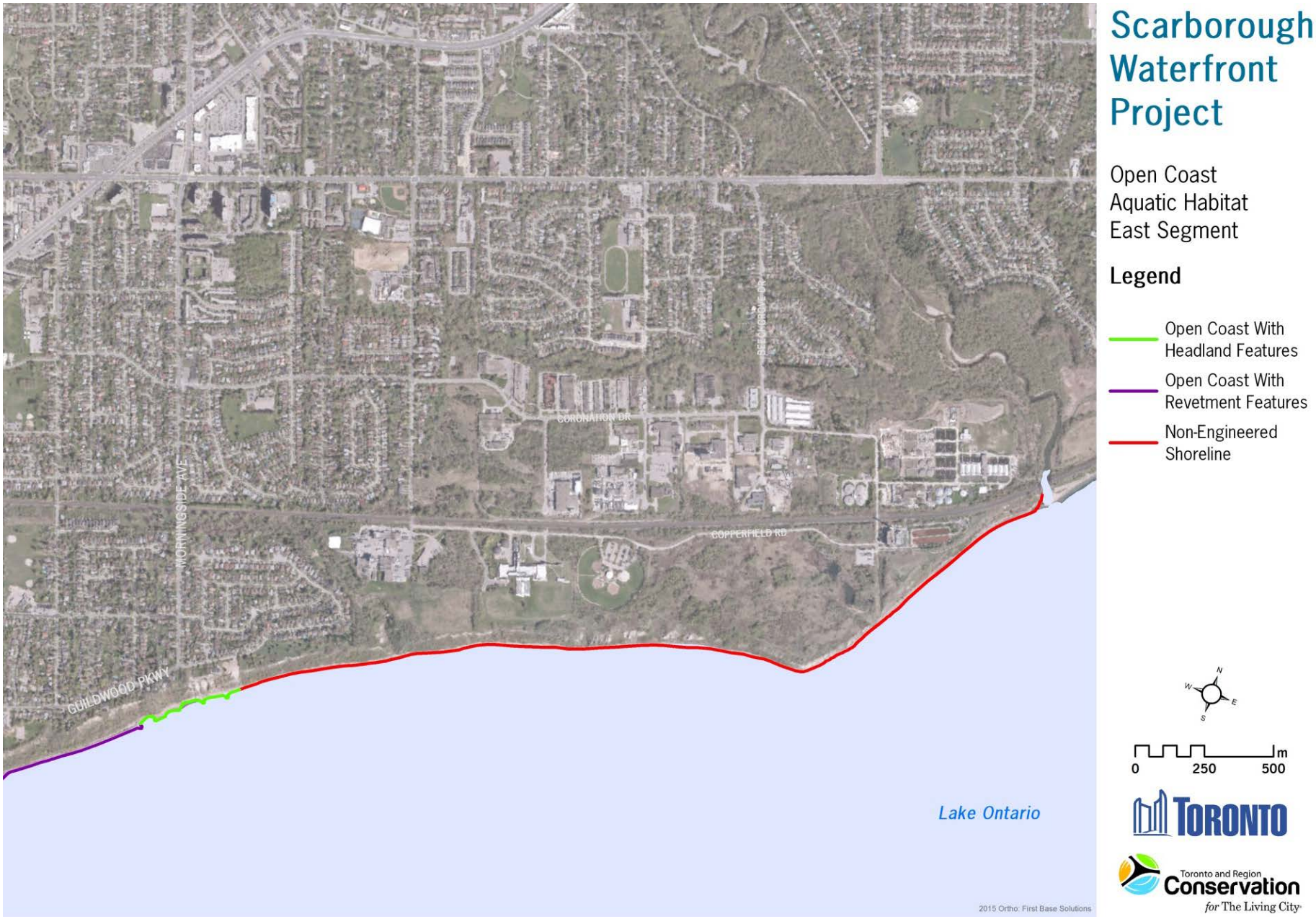


Figure 3-43: Open Coast Aquatic Habitat in East Segment



3.2.2.3 Fish Community

As previously stated, it is important to recognize that the Project Area is a component of the Lake Ontario ecosystem. Therefore, variables affecting the lake-wide fish community impact the local fish community.

The structure and overall health of the Lake Ontario fish community has undergone substantial changes through time in response to a variety of factors, such as habitat loss and/or degradation, overfishing, and interactions with invasive species (e.g., Alewife, Rainbow Smelt, Sea Lamprey [*Petromyzon marinus*]).

A fish community that was once dominated by native predatory ***pelagic*** fish (Atlantic Salmon [*Salmo salar*] and Lake Trout) and forage fish (Emerald Shiners and Spottail Shiners [*Notropus hudsonius*]) is now a mixture of both native and non-native. Currently, the most prevalent offshore predators include introduced Pacific and European salmonids (Chinook [*Oncorhynchus tshawytscha*] and Coho Salmon [*Oncorhynchus kisutch*], and Brown Trout [*Salmo trutta*] and Rainbow Trout [*Oncorhynchus mykiss*]), while the forage fish community is dominated by the non-native, invasive Alewife.

Efforts to rehabilitate the fish community have been ongoing since the 1970s. Although increased management efforts targeting both the fish community and the overall quality of Lake Ontario have been implemented and improvements have been observed, a number of natural and human-induced factors, such as those previously discussed, still exist that continue to impact the fish community.

The Great Lakes Fishery Commission's Lake Ontario Committee believes that maintaining a modest approach to stocking a diversity of trout and salmon species, the implementation of regulations to sustain a diverse mix of fisheries, continued efforts to protect and restore native species, and investing in monitoring and science-based assessment to understand ecosystem change are the best management strategies to ensure the continuation of benefits (Stewart et al., 2013).

Locally, natural resource management agencies such as Conservation Authorities contribute to the continuation of benefits offered by the Lake Ontario ecosystem by supporting the Lake Ontario Fish Community Objectives through restoration and enhancement of aquatic habitat historically destroyed or degraded, as well as continued long-term fish community monitoring.

TRCA has been monitoring the fish community along the Toronto waterfront, including the Project Area shoreline, since 1989. To characterize the local fish community, data collected in the last decade have been used. Trends in species richness, fish abundance and the community composition by trophic and thermal guilds have been evaluated by habitat type, and subsequently summarized by Project Area Segment, to provide an understating of the local fish community and the role of the various habitat types found in the Project Area.

3.2.2.3.1 Project Area Fish Community Overview

Since 2006, a total of 44 individual fish species have been captured within the entire Project Area, of which 34 are considered native and 10 are considered non-native in origin (**Table 3-4**).

Table 3-4: Summary of Fish Species and Habitat Type Within the Project Area, Between 2006 and 2016

Origin	Common Name	Scientific Name	Thermal Guild[1]	Trophic Guild	Project Area	Habitat Type			
						Sheltered Embayment	Open Coast		
							Non-Engineered	*Revetment Feature*	*Headland Feature*
Native	Atlantic Salmon	*Salmo salar*	Cold	Piscivore	x			x	x
	Lake Chub	*Couesius plumbeus*		Specialist	x				x
	Longnose Sucker	*Catostomus catostomus*		Specialist	x				x
	Mottled Sculpin	*Cottus bairdii*		Specialist	x	x			x
	Threespine Stickleback	*Gasterosteus aculeatus*		Specialist	x	x	x	x	x
	Trout Perch	*Percopsis omiscomaycus*		Specialist	x				x
	American Eel	*Anguilla rostrata*	Cool	Piscivore	x	x		x	x
	Blacknose Dace	*Rhinichthys atratulus*		Generalist	x		x		
	Common Shiner	*Luxilus cornutus*		Specialist	x	x			
	Creek Chub	*Semotilus atromaculatus*		Generalist	x	x			
	Emerald Shiner	*Notropis atherinoides*		Specialist	x	x	x	x	x
	Gizzard Shad	*Dorosoma cepedianum*		Specialist	x	x	x	x	x
	Golden Shiner	*Notemigonus crysoleucas*		Generalist	x	x			
	Logperch	*Percina caprodes*		Specialist	x		x	x	x
	Longnose Dace	*Rhinichthys cataractae*		Specialist	x			x	x
	Northern Pike	*Esox lucius*		Piscivore	x	x			x
	Rainbow Darter	*Etheostoma caeruleum*		Specialist	x	x			
	Rock Bass	*Ambloplites rupestris*		Specialist	x	x		x	x
	Smallmouth Bass	*Micropterus dolomieu*		Piscivore	x	x	x	x	x
	Spottail Shiner	*Notropis hudsonius*		Specialist	x	x	x	x	
	Walleye	*Sander vitreus*		Piscivore	x	x			x
	White Sucker	*Catostomus commersonii*		Specialist	x	x	x	x	x
	Yellow Perch	*Perca flavescens*		Specialist	x	x	x	x	x
	Black Crappie	*Pomoxis nigromaculatus*	Warm	Specialist	x	x			
	Bluegill	*Lepomis macrochirus*		Specialist	x	x			
	Bluntnose Minnow	*Pimephales notatus*		Generalist	x	x			
	Bowfin	*Amia calva*		Piscivore	x	x			
	Brook Silverside	*Labidesthes sicculus*		Specialist	x	x		x	
	Brown Bullhead	*Ameiurus nebulosus*		Generalist	x	x	x	x	
	Fathead Minnow	*Pimephales promelas*		Generalist	x	x			
	Freshwater Drum	*Aplodinotus grunniens*		Specialist	x	x		x	x
	Largemouth Bass	*Micropterus salmoides*		Piscivore	x	x		x	x
	Pumpkinseed	*Lepomis gibbosus*		Specialist	x	x			x
	Spotfin Shiner	*Cyprinella spiloptera*		Specialist	x		x		

1. *Based on preferred temperature preferences identified in Holm, Mandrak and Burridge (2009) and City of Toronto (2012).*

Table 3-4: Summary of Fish Species and Habitat Type Within the Project Area, Between 2006 and 2016

Origin	Common Name	Scientific Name	Thermal Guild[1]	Trophic Guild	Project Area	Habitat Type			
						Sheltered Embayment	Open Coast		
							Non-Engineered	*Revetment Feature*	*Headland Feature*
Non-Native	Alewife	*Alosa pseudoharengus*	Cold	Specialist	x	x	x	x	x
	Brown Trout	*Salmo trutta*		Piscivore	x	x	x	x	x
	Chinook Salmon	*Oncorhynchus tshawytscha*		Piscivore	x	x		x	x
	Coho Salmon	*Oncorhynchus kisutch*		Piscivore	x				x
	Rainbow Smelt	*Osmerus mordax*		Specialist	x	x	x	x	x
	Rainbow Trout	*Oncorhynchus mykiss*		Piscivore	x		x	x	x
	Sea Lamprey	*Petromyzon marinus*		Piscivore	x	x			x
	Round Goby	*Neogobius melanostomus*	Cool	Specialist	x	x	x	x	x
	Common Carp	*Cyprinus carpio*	Warm	Generalist	x	x	x	x	x
	Goldfish	*Carassius auratus*		Generalist	x	x			
SPECIES RICHNESS					**44**	**34**	**17**	**23**	**29**

It should be noted that this species list is not exhaustive and reflects the sampling bias resulting from sampling technique, frequency and time of year. However, the techniques used to conduct the baseline surveys were appropriate for the species anticipated to be impacted by the Project. Cold (preferred temperature <19°C[2]), cool (preferred temperature 19 to 25°C[2]) and warm (preferred temperature >25°C[2]) thermal guild species were present within the Project Area, with the majority belonging to the cool water guild (19 species), followed by the warm water guild (13 species). Cold water species were slightly less numerous (12 species).

Trophic group representation was variable across habitat types and throughout the study period. A total of 24 specialist species (generally high preference for specific diet, feeding method or locations), eight generalist species (generally low preference for specific diet, feeding method or locations) and 12 piscivore (fish-eating) species were observed.

Species richness (the number of species detected in each habitat type) varied by habitat type. Species richness can be influenced by a number of factors, such as the provision of more diverse aquatic habitat for spawning and foraging or thermal refuge, and typically reflects the number of species in an area that are adapted to local environmental conditions. On average, the sheltered embayment contained the greatest number of fish species (**Table 3-5**). Embayment was followed by open coast with headland features and open coast with revetment features. Non-engineered open coast had the lowest number of species detected.

Table 3-5: Annual and Average Species Richness Values by Habitat Type Between 2006 and 2016

Habitat Type		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	*Annual Average*
Sheltered Embayment		16	14	12	13	14	11	20	13	18	17	19	***15***
Open Coast	*Revetment*	10	7	9	--	6	4	6	7	10	12	12	***8***
	Headland	18	6	5	6	8	8	15	18	15	18	16	***12***
	Non-Engineered	3	6	--	--	4	--	0	--	5	4	7	***4***
Project Area		25	17	15	13	19	16	26	20	24	26	29	***21***

Note: "--" indicates years not fished.

Alewife (non-native forage fish), Emerald Shiner (native forage fish), White Sucker (*Catostomus commersonii;* native degradation-tolerant species), and Brown Bullhead (*Ameiurus nebulosus;* native) have been detected consistently over time. American Eel (*Anguilla rostrata*) and Atlantic Salmon (both also piscivores) have been captured least frequently. In fact, until its capture in 2012, the last record of American Eel in the Project Area was made in 1993. American Eel has since been consistently captured in the Project Area sheltered embayment habitat, with additional captures along the open coast with revetment (2014) and headland features (2013 to 2015) as they move along the shoreline between areas that provide appropriate cover and shelter. Atlantic Salmon, classified as Extinct in

2. *Preferred temperature ranges defined in Coker et al. (2001).*

Lake Ontario based on the most recent status update by the Committee on the Status of Endangered Wildlife in Canada in 2010, was first detected in the Project Area in 2014, with two more captures made in 2016 as a result of stocking associated with the Bring Back the Salmon restoration program that was initiated in 2006.

An annual detection summary of the various species by habitat type during the 2006-2016 period is found in **Appendix D**.

The greater fish species richness associated with the embayment habitat is likely due to calmer conditions (embayments are well-protected from the wave action), presence of in-water woody debris, and presence of abundant aquatic vegetation throughout the summer months. Additionally, significantly reduced wave action in the embayment area results in the development of a warm water thermal refuge, allowing for establishment and persistence of a variety of fish species adapted to these conditions.

The variation in species richness values across the three types of open coast habitat could be attributed to the differences in aquatic habitat complexity (morphology and substrate diversity), as thermal conditions remain consistent across all three. Within the Project Area, the non-engineered sections of open coast are characterized by substrate consisting of predominantly fine aggregate (some large boulders are sparsely scattered farther offshore), and have a fairly linear shoreline profile – conditions most suitable for a select group of primarily forage fish species (e.g., Alewife). Similarly, the existing sections of open coast with revetment features provide uniform and relatively limited habitat due to their linear armourstone/rip-rap structure and a small amount of coarse substrate along the shoreline.

In contrast, higher species richness values were found along portions of the open coast with headland features as these systems were designed to increase the complexity of aquatic habitat available through an irregular shoreline profile and increases in substrate diversity (via cobble, rubble and/or boulder inclusion). The resulting increase in habitat complexity provides enhanced cover and foraging opportunities for a greater variety of species along the open coast with headland features relative to the non-engineered open coast or open coast with revetment features. T-shaped headland features create backwater refuge areas that provide additional cover and shelter opportunities for fish.

The creation of the Meadowcliffe headland beach system, or open coast with headland features, illustrates this in detail. A change in species richness was observed following the construction of the headland beach system (**Table 3-6**). When this section of shoreline was a non-engineered section of open coast (2006 to 2010), species richness values ranged between 2 and 4. After construction was completed, richness values increased to a maximum of 13 species. Notable species detected after the headland beach system was implemented include native piscivores Northern Pike, Largemouth Bass (*Micropterus salmoides*), Smallmouth Bass (*Micropterus dolomieu*), and the SAR American Eel.

Table 3-6: Annual Species Richness at the Meadowcliffe Headland Beach System, Pre- and Post- Headland Beach System Construction

2006	2007	2008-2009	2010	2011*	2012*	2013	2014	2015	2016
3	2	Not surveyed	4	6	10	10	12	13	8

*Note: * Construction years.*

3.2.2.3.2 Fish Community by Project Area Segment – Summary

West Segment

Three aquatic habitat types have been identified within the West Segment (see **Figure 3-41**):

- Sheltered embayment (Bluffer's Park boat basin)
- Open coast with headland features (Bluffer's Park headland)
- Non-engineered open coast (Bluffer's Park Beach)

Both fish species richness values and abundance are greatest within Bluffer's Park boat basin, followed by the open coast around the Bluffer's Park headland, then the non-engineered open coast of Bluffer's Park Beach. Alewife is the most abundant species across all three habitat types, while Emerald Shiner is the next most abundant along the open coast and Yellow Perch (*Perca flavescens*) the next most abundant in the embayment (Bluffer's Park boat basin).

In Bluffer's Park boat basin, Alewife and Emerald Shiner provide relatively small contributions by mass to the overall forage base relative to their contributions along the open coast. Additional forage species within the sheltered embayment include species such as Pumpkinseed (*Lepomis gibbosus*) and Bluntnose Minnow (*Pimephales notatus*).

Northern Pike is the most dominant native piscivore, by mass, in the sheltered embayment habitat and along the open coast with headland features. American Eel, Largemouth and Smallmouth Bass utilize these habitats as well, though their proportion by biomass is smaller. Bowfin (*Amia calva*) and Walleye also contribute to the native piscivore population within the sheltered embayment of the boat basin, while Atlantic Salmon have been recently captured along the headland feature outside the boat basin.

Degradation-tolerant benthivores Common Carp (*Cyprinus carpio*) and White Sucker constitute the greatest proportion of the fish community biomass in both Bluffer's Park boat basin and around the Bluffer's Park headland. However, both species are infrequently detected along the non-engineered coast of Bluffer's Park Beach.

Generally, cool water species are most abundant in the West Segment within the sheltered embayment and along the non-engineered open coast habitats, with cold water species more abundant along the open coast with headland features. Warm water fish are least abundant in all

habitat types of the West Segment, but show the greatest representation within the sheltered embayment of the Bluffer's Park boat basin.

Central Segment

Two aquatic habitat types have been identified within the Central Segment (see **Figure 3-42**):

- Open coast with headland features (headland beach systems of Meadowcliffe Drive and Sylvan Avenue)
- Open coast with revetment features (informal revetment between Meadowcliffe and Sylvan and along Guild Park and Gardens, and the formal revetments along South Marine Drive and Guildwood Parkway)

Both fish species richness and abundance are greater along the sections of open coast with headland beach systems relative to the sections with revetments. However, overall richness and abundance values are lower than the West Segment, which is likely due to the fact that embayments, the habitat type associated with the highest species richness and abundance, are absent from Central Segment.

A notable change in species richness was observed at Meadowcliffe following construction of the headland beach system between 2011 and 2012 (see **Table 3-6** in **Section 3.2.2.3.1**). Prior to shoreline modification, when the shoreline was a non-engineered open coast, species richness values were low, ranging from 2 to 4. After construction, an increase in richness values was observed, with a maximum of 13 species detected.

Forage fish Alewife and Emerald Shiner are most abundant in the open coast fish community within the Central Segment, followed by White Sucker.

Alewife is also the most dominant forage species by biomass along both open coast habitat types of Central Segment. Along the Meadowcliffe and Sylvan headland beach systems, Northern Pike are the greatest contributor to the native piscivore community by biomass, with additional contributions from American Eel, Largemouth Bass and Smallmouth Bass. In contrast, only two native piscivore species – Atlantic Salmon and Smallmouth Bass – have been detected along the South Marine Drive and Guild revetment features. Degradation-tolerant benthivores constitute a greater proportion of the total fish community's biomass around the headland beach systems, and make up a smaller proportion of the total fish community biomass along the South Marine Drive and Guild revetments.

Cold water species are most abundant in the Central Segment, followed by cool water species, for both habitat types present. Overall, fish abundance is lower along the open coast with revetment features compared to open coast with headland features.

East Segment

Two aquatic habitat types have been identified within the East Segment (see **Figure 3-43**):

- Open coast with headland features (groynes immediately west of Grey Abbey Park)

- Non-engineered open coast (from Grey Abbey Park to the Highland Creek mouth)

Less than 15% of the shoreline length within the East Segment is classified as open coast with headland features.

Species richness and fish abundance are the lowest in this Segment compared to the West and Central Segments. This may be attributed to the predominance of the non-engineered open coast habitat type along the Grey Abbey and East Point Park shorelines which constitute over 80% of the East Segment shoreline length. As in the open coast habitat of the West and Central Segments, Alewife is the most abundant species, followed by Emerald Shiner. Alewife also provides the greatest contribution to the forage fish community biomass.

Native piscivore biomass proportion is low compared to values observed in West and Central Segments. Only one native piscivore species – Smallmouth Bass – was detected in the East Segment, once (in 2016) in four years of sampling.

Degradation-tolerant benthivores Common Carp and White Sucker are fairly common, having been captured in three of the four years of sampling in this Segment.

Cool water fish are most abundant in East Segment along the non-engineered open coast, while cold water fish are more dominant along the open coast with headland features. Warm water fish are least abundant in all habitat types across the East Segment.

3.2.3 Species at Risk (SAR)

SAR include plants and animals identified in provincial and federal SAR legislation that have been detected within the Project Area.

3.2.3.1 SAR Recognition and Protection

There are several levels of SAR recognition and protection, based on authority and jurisdictional boundaries. Each level is identified and described in **Table 3-7** below. Not every proposed activity that occurs within or near protected habitat will damage or destroy SAR habitat (Government of Ontario, 2015). The following will be considered as they apply to SWP Alternatives development, evaluation and selection of the Preferred Alternative:

- details of the activity (i.e., type and degree of the Alternatives' impact on a given SAR and its habitat);
- which parts of habitat are likely to be altered by the activity (e.g., location of the Alternatives in the context of SAR habitat, including potential habitat); and,
- how habitat changes will affect the species' ability to carry out its life processes.

Table 3-7: SAR Levels of Recognition and Protection

Authority	Details
Committee on the Status of Endangered Wildlife in Canada (COSEWIC)[3]	▪ COSEWIC is the nation-wide authority for assessing the conservation status of wildlife species that may be at risk of Extinction in Canada. ▪ COSEWIC's assessment informs SARA and is considered to be the first step in wildlife protection.
Federal Species at Risk Act (SARA), enforced by Environment Canada[4]	▪ SARA is a federal law designed to prevent wildlife species from becoming Extinct and to help facilitate the recovery of these species. ▪ The federal list of SAR is determined by the federal government, and is based on the recommendations made by the COSEWIC. Not all species status recommended by COSEWIC is listed under SARA. ▪ The Act establishes Schedule 1 as the official list of wildlife SAR. It classifies those species as being Extirpated, Endangered, Threatened or a Special Concern. Once listed, appropriate agencies work together to lay out a Recovery Strategy that outlines a plan to recover the species. ▪ Extirpated, Endangered or Threatened species[5] on the SARA list receive protection (i.e., illegal to kill, harass, capture or harm in any way) and recovery planning under SARA. Recovery planning results in the development of recovery strategies and action plans. ▪ Special Concern species benefit from management planning.
Endangered Species Act, enforced by Ontario Ministry of Natural Resources and Forestry (MNRF)[6]	▪ The *Endangered Species Act* aims to identify, protect and facilitate the recovery of Ontario SAR. ▪ Each species is classified into one of four categories: 1. Extirpated: lives somewhere in the world, and at one time lived in the wild in Ontario, but no longer lives in the wild in Ontario 2. Endangered: lives in the wild in Ontario but is facing imminent Extinction or Extirpation 3. Threatened: 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 4. Special Concern: 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 ▪ Endangered, Threatened or Extirpated species are automatically protected from being harmed or harassed. Special Concern species are not included in this protection. ▪ General habitat of Endangered or Threatened species is automatically protected. Specific habitat is regulated based on species recovery strategy. ▪ Recovery strategies are completed for Endangered, Threatened and Extirpated species, while management plans are completed for species listed as Special Concern.

3. *Source: Government of Canada, 2013.*
4. *Source: Government of Canada, 2002.*
5. *Automatic protection of species applies to migratory birds, aquatic species, and species on federal lands. In many cases protection of terrestrial species on non-federal lands is the responsibility of the provinces/territories where they are found.*
6. *Source: Government of Ontario, 2015.*

Likewise, not every activity that occurs near a member of a protected species will kill, harm or harass that member (Government of Ontario, 2015). To help determine if a given Alternative or work associated with a given Alternative's implementation could kill, harm or harass a member of a protected species, the following will be considered:

- the biology and behaviour of the species;
- details of the activity (i.e., type and degree of Alternatives' impact on SAR); and,
- how the activity may affect the species' ability to carry out its life processes.

3.2.3.2 Plant SAR

Only two vascular plant species currently included in provincial and federal (Schedule 1) SAR lists were observed in the Project Area:

1. **Butternut:** Endangered status under both the Ontario *Endangered Species Act* and federal *Species at Risk Act*
2. **Spike Blazing-Star:** Threatened status under both the Ontario *Endangered Species Act* and federal *Species at Risk Act*

Butternut was observed in all three Segments of the Project Area, while spike blazing-star was observed in one (East Segment). Due to these species' sensitivity, specific location information is not discussed in this report, but will be considered in Project planning, design, and implementation, as applicable.

Should any of the project activities impact a SAR, MNRF will be consulted, and all efforts will be made to avoid negative impacts.

3.2.3.3 Terrestrial SAR

Twelve terrestrial SAR designated provincially and/or federally have been detected in the Project Area. These species and their current provincial and federal status are listed in **Table 3-8**.

MNRF, as well as other appropriate agencies, will be consulted throughout the Project. All efforts will be made to avoid negative impacts to SAR.

Bank Swallows are among a group of aerial insectivores with declining populations. The reasons for their population decline are not well understood and evaluation of threats to the population is incomplete. In Ontario threats include loss of nest site habitat; loss or degradation of foraging habitat; environmental contaminants, pesticides and pollutants; reduced nest productivity due to human activities and persecution; habitat loss, disturbance and persecution at roost sites; and climate change (Falconer et al., 2016).

Table 3-8: Terrestrial SAR Found in the Project Area

Species	Status		Year Detected *(most recent observation)*	Breeding Status*
	Provincial (*Endangered Species Act*)	**Federal** (*Species at Risk Act,* Schedule 1)		
Birds				
Bank Swallow	Threatened	--	2015	Confirmed
Barn Swallow	Threatened	--	2011	Possible
Bobolink	Threatened	--	2014	Probable
Chimney Swift	Threatened	Threatened	2011	Probable
Eastern Meadowlark	Threatened	--	2003	Possible
Wood Thrush	Special Concern	-	2011	Confirmed
Mammals				
Little Brown Bat	Endangered	Endangered	2016	Unknown
Tricolored Bat	Endangered	Endangered	2016	Unknown
Herpetofauna				
Common Musk Turtle (Eastern Musk Turtle or Stinkpot)	Special Concern	Special Concern	2003	Possible

Sources: Government of Ontario, 2015; Government of Canada, 2016

*Notes: * Confirmed Breeder = Signs of confirmed breeding observed (e.g., nest with eggs or young, used nest, adults carrying food)*

Probable Breeder = Signs of probably, but unconfirmed, breeding observed (e.g., nest building, pair observed in suitable habitat during breeding season, courtship displays)

Possible Breeder = Signs of possible, but unconfirmed, breeding (e.g., species observed in suitable habitat during breeding season, breeding calls or singing male heard in suitable nesting habitat) (Source: Ontario Breeding Bird Atlas, 2001)

3.2.3.4 Fish SAR

Two fish species included in provincial and federal (Schedule 1) SAR lists were observed in the Project Area:

1. **Atlantic Salmon (Lake Ontario population):** Extinct, based on the last status assessment by COSEWIC in 2010
2. **American Eel:** Endangered under the Ontario *Endangered Species Act*

Since 1898, there has been no record of the Lake Ontario Atlantic Salmon population. The disappearance of the population has been attributed to habitat destruction and overexploitation associated with European settlement in the 1800s. As a result, Lake Ontario Atlantic Salmon is listed as Extinct based on the last status assessment by COSEWIC in 2010.

Some of the first returns of Atlantic Salmon adults in the TRCA jurisdiction, following initiation of the Bring Back the Salmon restoration program in 2006, have been captured along the Scarborough shoreline, with the first individual captured in 2014 near the Guild shoreline. They have since been detected at the Bluffer's Park headland and Sylvan headland beach system in 2016.

Until its capture in 2012 in the Bluffer's Park boat basin, the last record of American Eel in the Project Area dates back to 1993. American Eel has since been consistently captured in the Project Area in

both the embayment (Bluffer's Park boat basin) and open coast habitats (Meadowcliffe, Sylvan Avenue and the Guild).

Both Atlantic Salmon and American Eel utilize the local aquatic habitat to forage and move along the shoreline. Therefore, availability of adequate food resources (forage and juvenile fish for Atlantic Salmon, and insects, crayfish and/or small and large fish for American Eel), shelter and cover is essential.

3.3 Socio-Economic Environment

3.3.1 Land Use

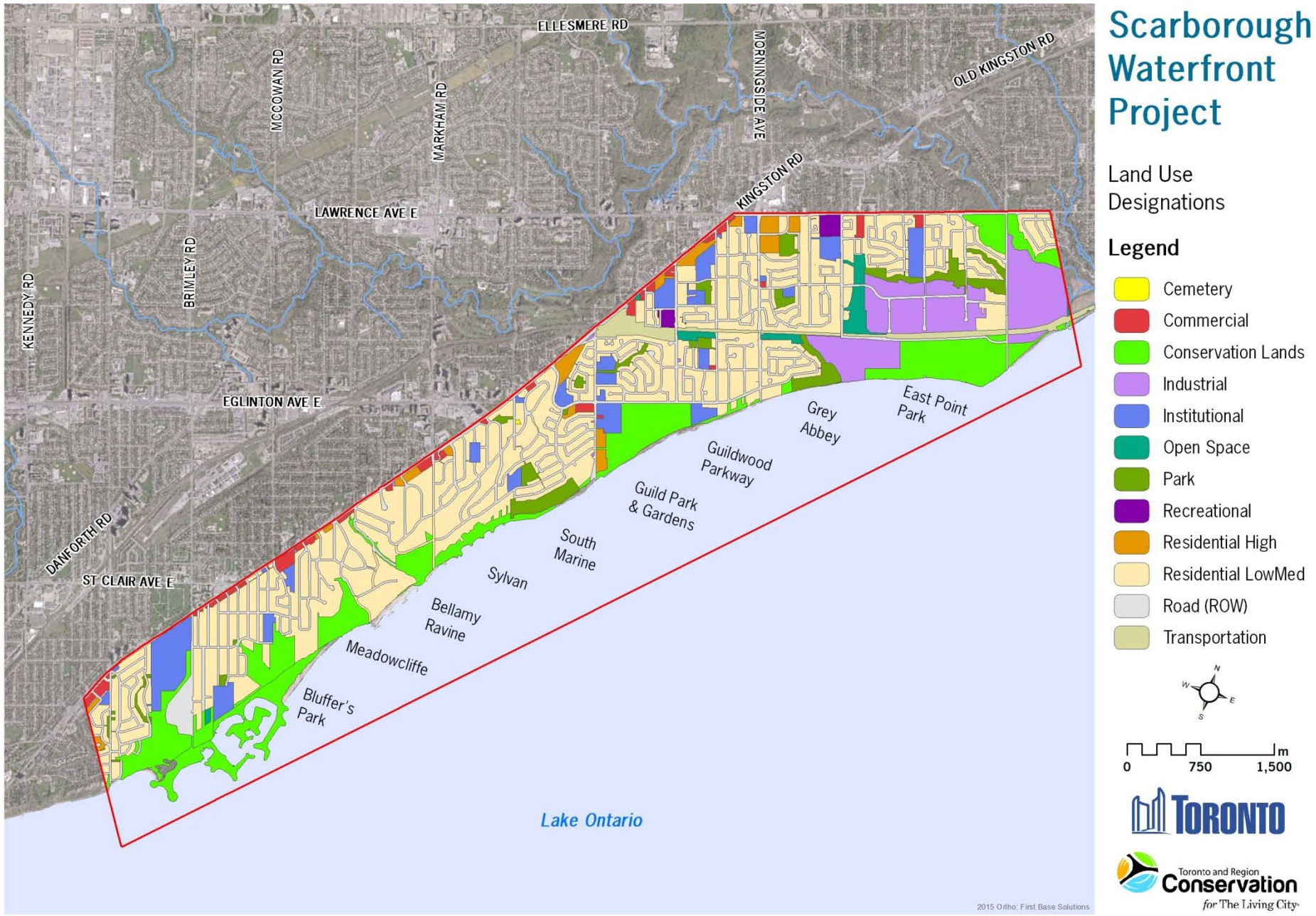
3.3.1.1 Planned Land Use

The City of Toronto Official Plan (2002; consolidated 2015) identifies the Project Study Area as consisting of a mixture of neighbourhoods, parks, natural areas and open space (**Figure 3-44**). The Official Plan designates the residential and commercial areas in the north section of the Project Study Area as neighbourhoods (areas that contain residential uses), mixed use areas (areas that contain a variety of land uses such as residential, retail, recreation) and apartment neighbourhoods (areas with rental apartments and condominium buildings). The east end of the Project Study Area, near Highland Creek, is designated as an employment area (areas that contain enterprises that offer employment). The shoreline and adjacent ravines and tableland natural areas are designated as Natural Areas with some Parks and Other Open Space Areas. Much of these areas are also designated as part of the Green Space System. The shoreline is part of the natural heritage system (an area where protecting, restoring and enhancing the natural features and functions should have high priority).

The Official Plan also identifies a large block of land in the Project Study Area located between Guildwood Parkway (east of Livingston Road) and the waterfront as Special Policy Area #115. The site is occupied by the Guild Park and Gardens. Area-specific policies relate to the permitted uses on the site including its private/public sector function. The policy indicates that further development on the property will provide a comfortable fit with the natural setting and be sensitive to the views of Lake Ontario. The policy also states that existing links to the trail system to the east and west of the Guild Park and Gardens will be maintained and improved as part of the continuous Waterfront Trail and that appropriate viewpoints overlooking the Bluffs and lake are encouraged.

As noted in **Section 2.2** (**Chapter 2**), the Official Plan sets out important direction for development along the Toronto Waterfront particularly as it relates to multi-use trails and park spaces. The Official Plan lays out guiding policies for increasing public enjoyment and use of lands along the water's edge, while improving and enhancing the Green Space System. Policies include increasing access to and along the waterfront; improving and extending the Waterfront Trail as a continuous waterfront route for cyclists, pedestrians, and people with disabilities, where possible; acquiring linkages between Open Spaces; and, restoring the landscape.

Figure 3-44: Land Use Designations within the Project Study Area (City of Toronto, 2002; consolidated 2015)



3.3.1.2 Existing Land Use

Existing land use is similar across all three Project Study Area Segments with open space located along the shoreline and built-up areas located to the north. Municipal Wards and local communities also span multiple Shoreline Segments.

The Project Study Area is located in three Wards in the City of Toronto (please note these boundaries will be changing in 2018):

- Ward 36 (Scarborough Southwest) for the west portion to approximately Markham Road;
- Ward 43 (Scarborough East) for the central portion; and,
- Ward 44 (Scarborough East) for the east portion.

The main neighbourhoods located in the Project Study Area, from west to east, include Cliffcrest, Scarborough Village, Guildwood Village and Kingston Road/Galloway Road/Orton Park Road (formerly West Hill). Scarborough Village and the Kingston Road/Galloway Road/Orton Park Road have been designated as Neighbourhood Improvement Areas by the City of Toronto, which are identified by the City of Toronto through the *Toronto Strong Neighbourhoods Strategy 2020* (2005; updated 2015) as having historical underinvestment in community infrastructure to meet social needs. Goals of the program are to build opportunities for residents and to ensure policies and programs improve outcomes in the neighbourhood.

Land use is predominantly residential (approximately 70%), with some commercial/industrial areas (approximately 5%) and institutional uses. Commercial areas are concentrated along Kingston Road at the north end of the Project Study Area. There is an industrial area surrounding East Point Park, including two municipal servicing plants (Highland Creek WWTP and the F.J. Horgan WTP). This industrial area includes companies which use or manufacture chemicals that may cause harm if released to the environment and are a potential risk to users of the trails and parks surrounding them. Industrial representatives have indicated that the existing trail location is not desirable as trail users are too close to the existing industries and chemical tanks. Industries in the area are members of the Toronto East Community Awareness and Emergency Response (CAER) Association who collaborate with Emergency Services to manage risks associated with these industrial facilities and address emergency response issues. In addition to the large regional parks of Bluffer's Park, Guild Park and Gardens, and East Point Park, there are also several smaller parks located in residential areas (see **Section 3.3.3.3**).

3.3.1.3 Future Land Use

A number of redevelopment plans have been proposed within the Project Study Area. As of early 2017, there are proposals for approximately 1,100 new residential units and new commercial spaces on existing lots. These developments are predominantly along the Kingston Road corridor or to the north. Many of these proposals are in areas that are undergoing change, and this change is likely to continue and evolve over the life of the Project. These plans are consistent with the City's policies for increasing density and mainstreeting along major corridors, and will increase the population density within the Project Study Area, which will in turn create greater demand for recreational spaces.

3.3.1.4 Land Ownership

The majority of the shoreline within the Project Study Area is owned by TRCA, the City of Toronto, or the Crown, with the exception of some private properties west of Grey Abbey Park and the industrial site adjacent to F.J. Horgan WTP within the East Segment (**Figure 3-45** to **Figure 3-47**). While approximately 15% of the East Segment shoreline is under private ownership, about 50% of the shoreline in this Segment is inaccessible to the public due to private property and restricted public access associated with critical infrastructure. The private properties extend to the shore and in some cases include ***water lots***.

3.3.2 Population and Demographics

Population and demographics data is provided at the Project Study Area level as the three Shoreline Segments are relatively similar in size and demographic form. In addition, trends related to the environment and recreational decisions of Canadians were discussed. All information is contextualized around how it will impact the park system infrastructure.

The Project Study Area has a population of approximately 37,683 residents, or 14,791 households. This would suggest a significant burden from the local population based on the numerical population but an opportunity for a far greater user burden put on the existing park infrastructure. The population is also growing as evidenced by the 184 high-rise buildings under construction in Toronto, which is highest in North America by a wide margin.[7] As noted in **Section 3.3.1.3**, there are proposals for approximately 1,100 new residential units and commercial spaces within the Project Study Area. An increase in population will increase stress on the trails if it is assumed that usage rates remain the same. Evidence however, suggests that usage rates will increase, putting further stress on the infrastructure. For example, recent new Canadians use parkland more frequently.

Approximately 23% of households are headed by those between the ages of 45 and 54 years followed by 22% between the ages of 55 and 64 in the Project Study Area. The households are predominantly comprised of two people (31%), followed by one-person (27%) and four-person (25%). This compares to the provincial rates of 32%, 24% and 26%, respectively (Environics, 2014).

Many community members are either in their mid-to-late career or late career suggesting an increase in leisure time for community members. A quarter of community members have families, as suggested by the four-person occupancy. These two factors suggest that leisure activities may be common amongst residents and could become more common as heads of household age and retire, increasing their leisure time (City of Toronto, 2013a). An increase in leisure time coupled with park usage implies more stress on the existing park infrastructure.

In terms of modes of transportation, approximately 60% of residents in the Project Study Area commute by means of vehicle (car), followed by public transit (32%), and then walking/bicycle (3%) (Environics, 2014). Parking and transit access should be a priority for infrastructure improvements to accommodate more residents in their use of the park system. Increasing access will also likely increase the burden on the existing park infrastructure.

7. New York is second with 92, or half of Toronto.

Figure 3-45: Shoreline Ownership in West Segment

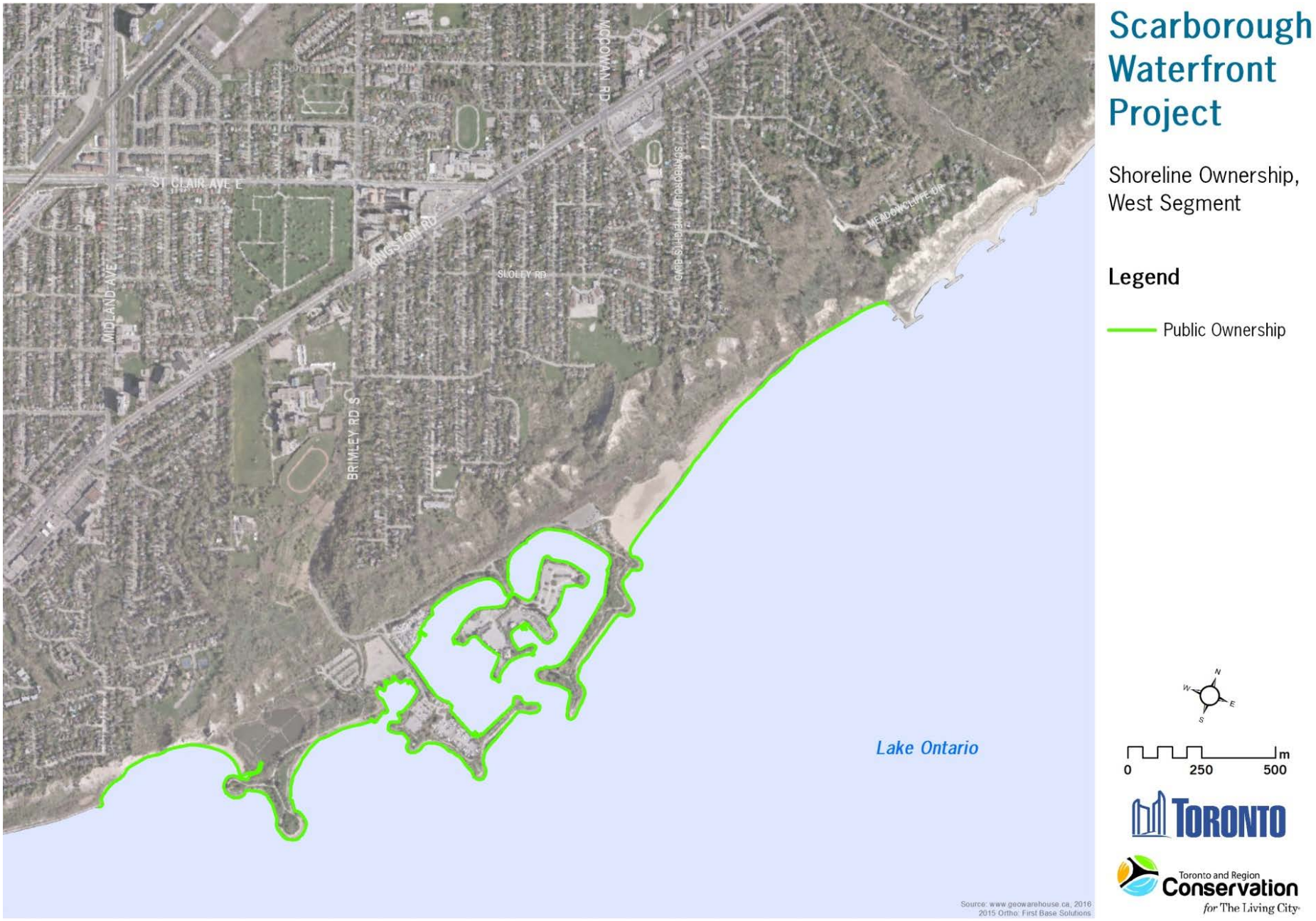


Figure 3-46: Shoreline Ownership in Central Segment

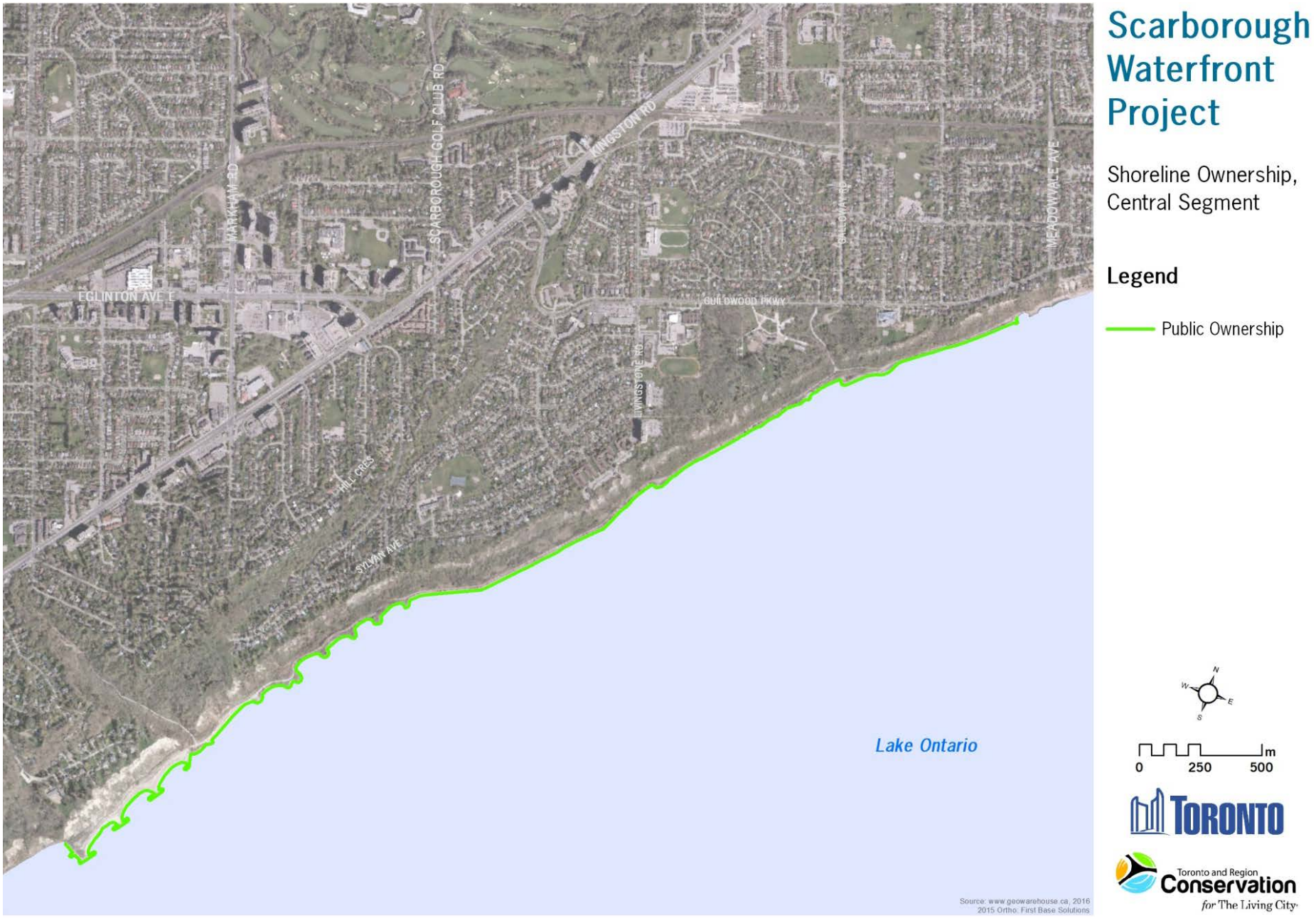


Figure 3-47: Shoreline Ownership in East Segment



Within the City population, trends exist in relation to individual choice and the environment. According to the City of Toronto Parks Plan 2013-2017 (City of Toronto, 2013a), “participation rates in organized sports across Canada are declining among all age groups. The most popular adult leisure-time activity is walking, followed by gardening, home exercise, running, swimming, and bicycling. This shift toward unstructured activities is accompanied by a growing interest in the use of trails for recreation, exercise and active transportation.” Trends suggest that a shift in desired leisure activity will increase park users, causing additional stress to existing infrastructure.

Climate change will also increase the stress on the park infrastructure as more warm weather days increase the amount of days the park is available for use on an annual basis.

3.3.3 Infrastructure, Community Services and Recreation

This section provides an overview of infrastructure, community services and recreation in the Project Study Area and by Segment, where applicable.

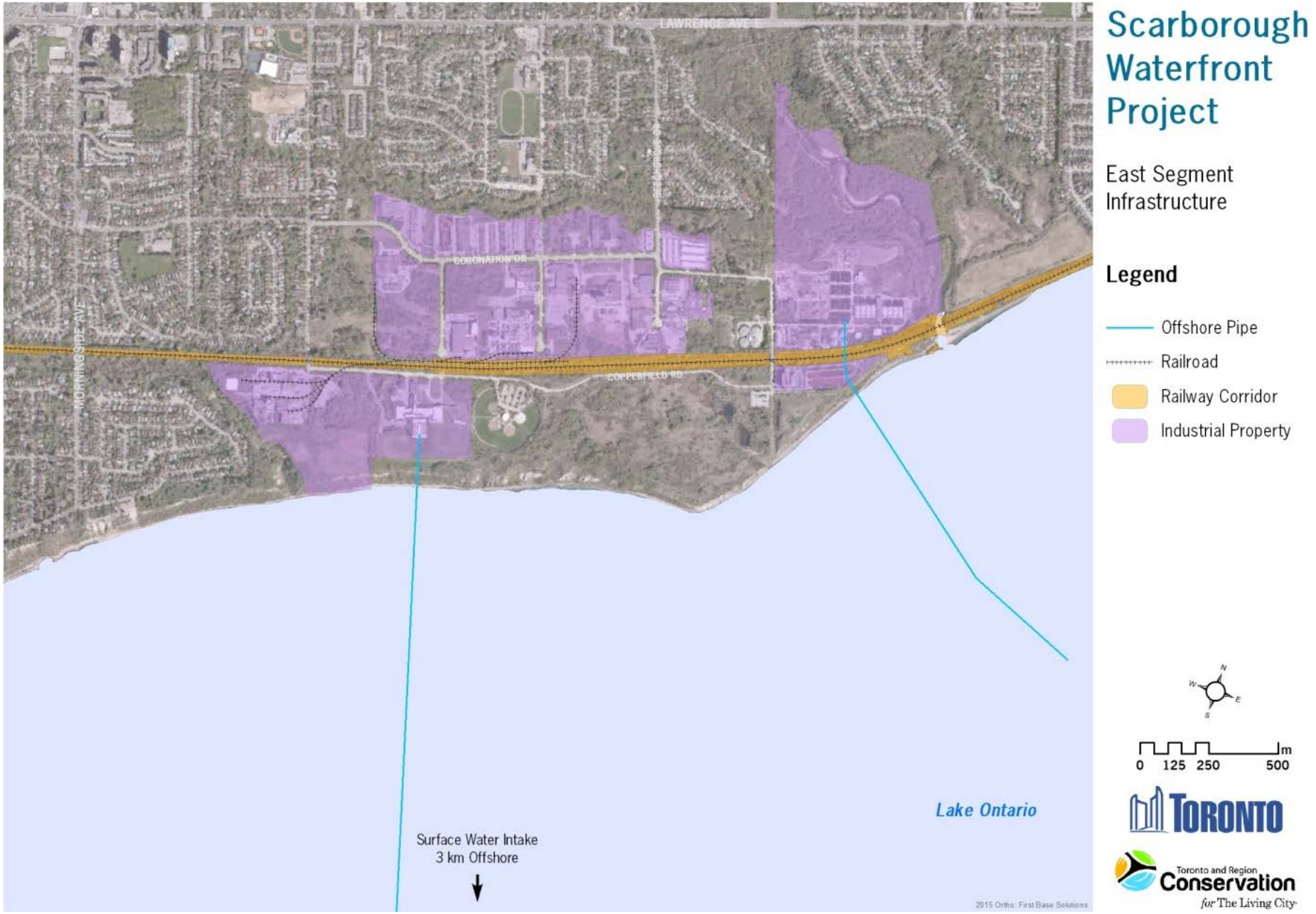
3.3.3.1 Infrastructure

The Project Study Area contains a variety of existing infrastructure typical of urban areas, including public roads (residential streets, minor/major arterial roads and collector roads), oil and natural gas pipelines, municipal servicing infrastructure (i.e., water and wastewater utilities, storm sewer), low voltage transmission lines, and a Canadian National (CN) rail corridor.

The rail corridor is only present in the eastern half of the Project Study Area and is used by both commuter trains and CN freight, which services the industrial area located in the East Segment of the Project Study Area (**Figure 3-48**). Metrolinx has completed a study for rail corridor expansion that will constrain the existing off-road and on-road portions of the Waterfront Trail through the east end of the Project Study Area, near East Point Park. There is a regional Metrolinx policy to eliminate all at-grade crossings, which means that there is the potential for the closure of some roads that currently cross these rail tracks within the Project Study Area. This may affect access to the parks and shoreline. This Segment also includes the Guildwood GO and VIA Rail Station located at the intersection of Kingston Road and Celeste Drive.

Two regional municipal infrastructure facilities are located south of the CN rail line at the east end of the Project Study Area: the F.J. Horgan WTP and the Highland Creek WWTP (**Figure 3-48**). The F.J. Horgan WTP has a water intake pipe which extends approximately 2.96 km offshore, and the Highland Creek WWTP has an outfall which extends approximately 1.2 km offshore.

Figure 3-48: East Segment Infrastructure



3.3.3.2 Community Facilities and Services

Community facilities and services in the Project Study Area include schools, places of worship, emergency medical services (such as police and fire), and recreational facilities (see **Figure 3-44**), as well as those that are privately operated such as hotels and restaurants (located primarily along Kingston Road).

On-street bicycle lanes were not identified in the Project Study Area; however, bicycle routes (including the Waterfront Trail) do extend along existing roads as "shared-roadways" (signed bicycle routes) in all three Segments of the Project Study Area.

It is noted that the existing Guild construction access route running along the shoreline east and west of the Guildwood Parkway construction route is used by cyclists, although it is not a designated cycling route and not formally accessible to the public.

A review was completed of the City of Toronto's Density of Cycling Collisions (City of Toronto, 2015b) map from 2009 to 2013 to identify areas with higher rates of collisions in the Project Study Area. Higher vehicle-bicycle collision densities were noted along Kingston Road (all three Segments), Brimley Road (West Segment), Lawrence Avenue East (East Segment), and Greyabbey Trail (East Segment).

3.3.3.3 Parks and Recreation

Several waterfront parks and open space areas were identified in the Project Study Area at the top and toe of the Bluffs, as well as within residential areas (**Figure 3-49** to **Figure 3-51**). These areas generally connect with formal recreational trails and are frequently used by residents for leisurely past times such as dog walking, bird watching, sports, and enjoying the view of the Bluffs. Connections between parks and along the top and toe of the Bluffs are limited.

Parks that will be influenced by the Project are discussed below.

Bluffer's Park

Bluffer's Park is in the west end of the Project Study Area. The park is well known with excellent views up to the Bluffs and along the shoreline from the beach and other areas of the park. The park also provides a scenic drive down to the shoreline and offers a Blue Flag Beach that is well used.

There is a formal trail down to the shoreline; however, it terminates at the east end of the beach. There is excellent beach access at this park and parking along with other facilities like washrooms and a water fountain. There is signage on Kingston Road directing traffic to Bluffer's Park. There is signage at the entrance to the trail from the parking area with mapping and some interpretive material.

Bluffer's Park is extremely well used, particularly on summer weekends. Multiple sources from the City and the public suggest that parking lots are at capacity most weekends by 9 am. Significant traffic issues and parking conflicts occur throughout the day as users become frustrated by their inability to access the parking lots and are forced to find parking elsewhere and walk down Brimley Road to the park. This is confirmed by parking complaints. Changes have been made to the local road network to

Figure 3-49: Existing Parks and Trails in West Segment

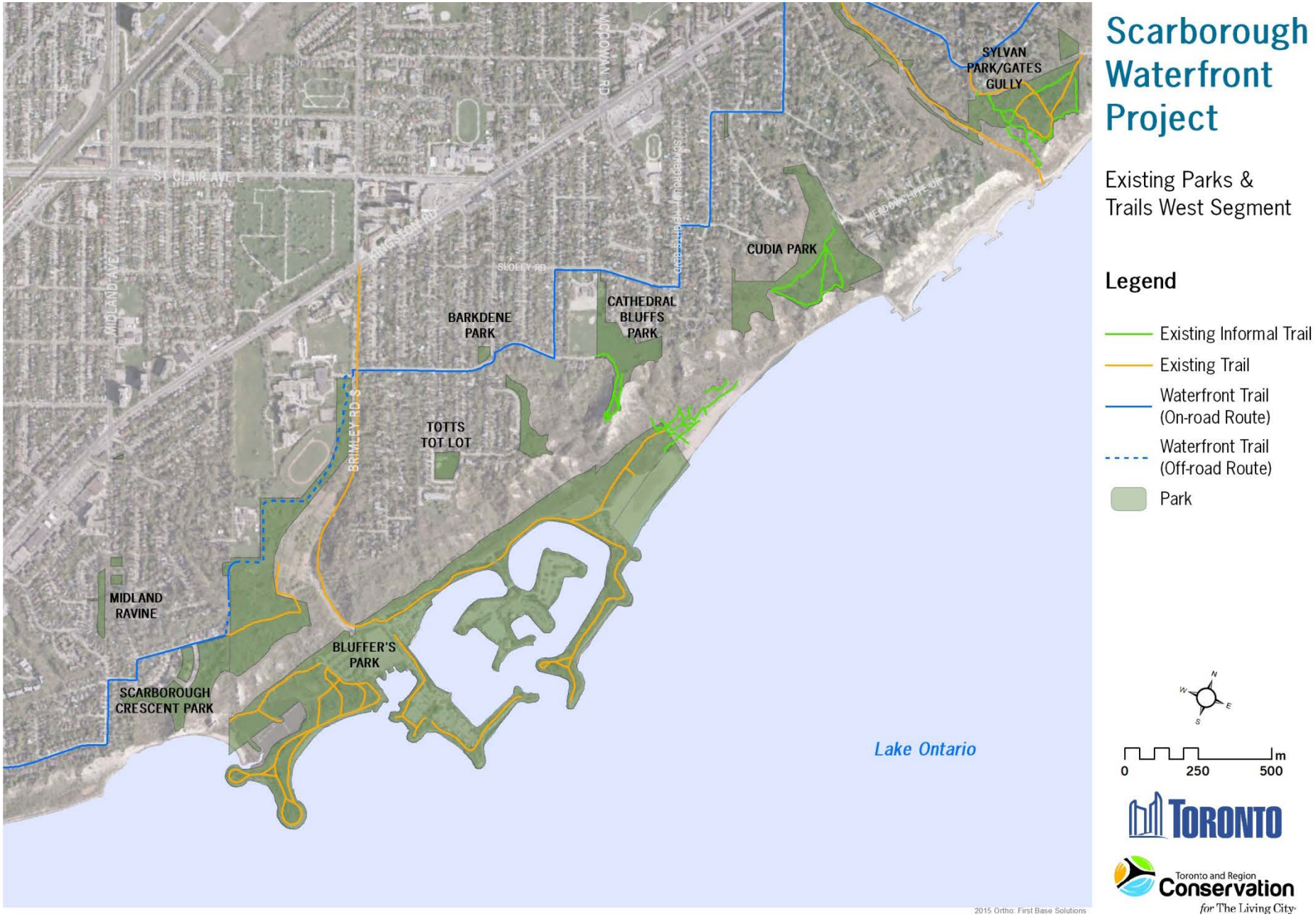


Figure 3-50: Existing Parks and Trails in Central Segment

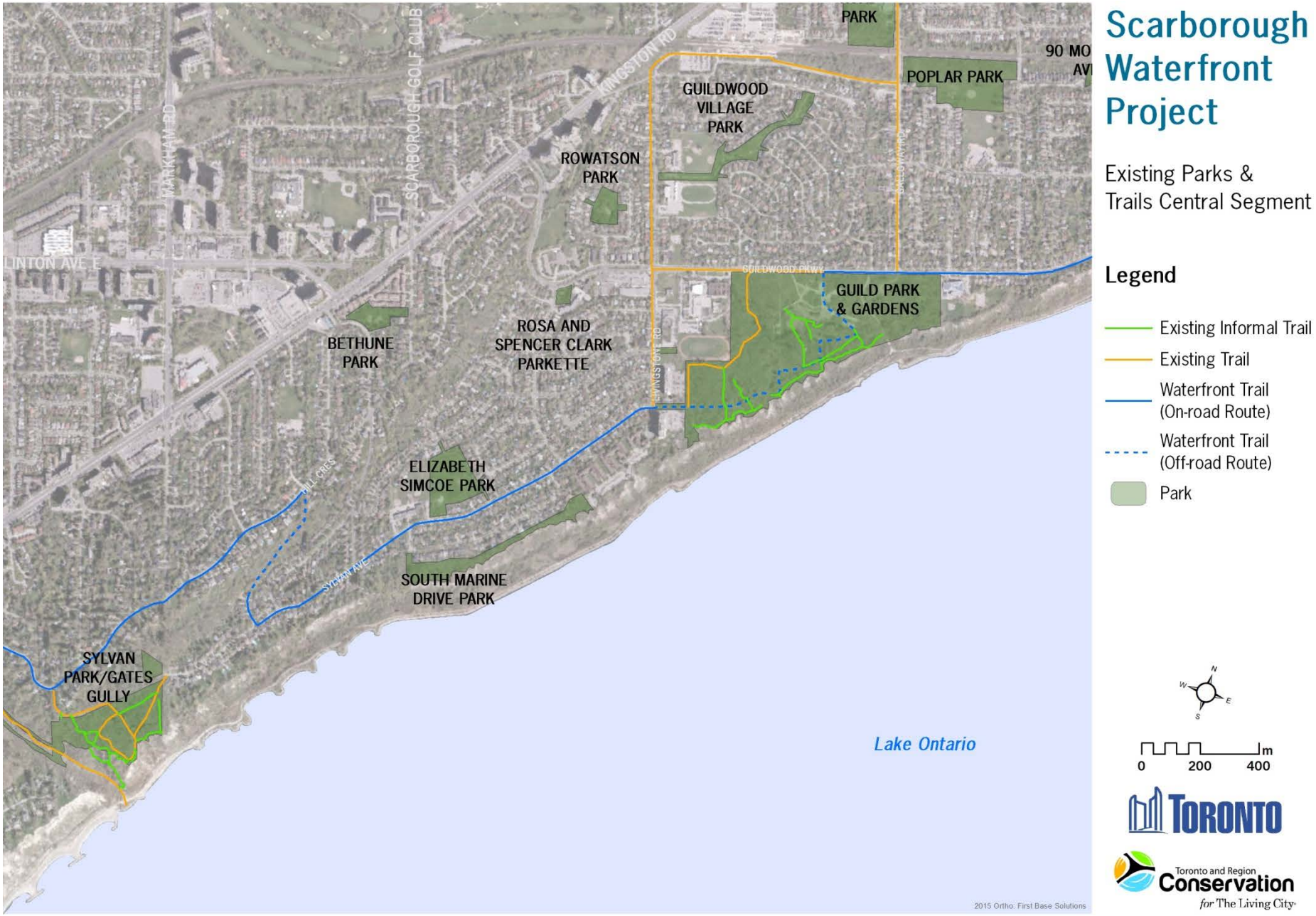
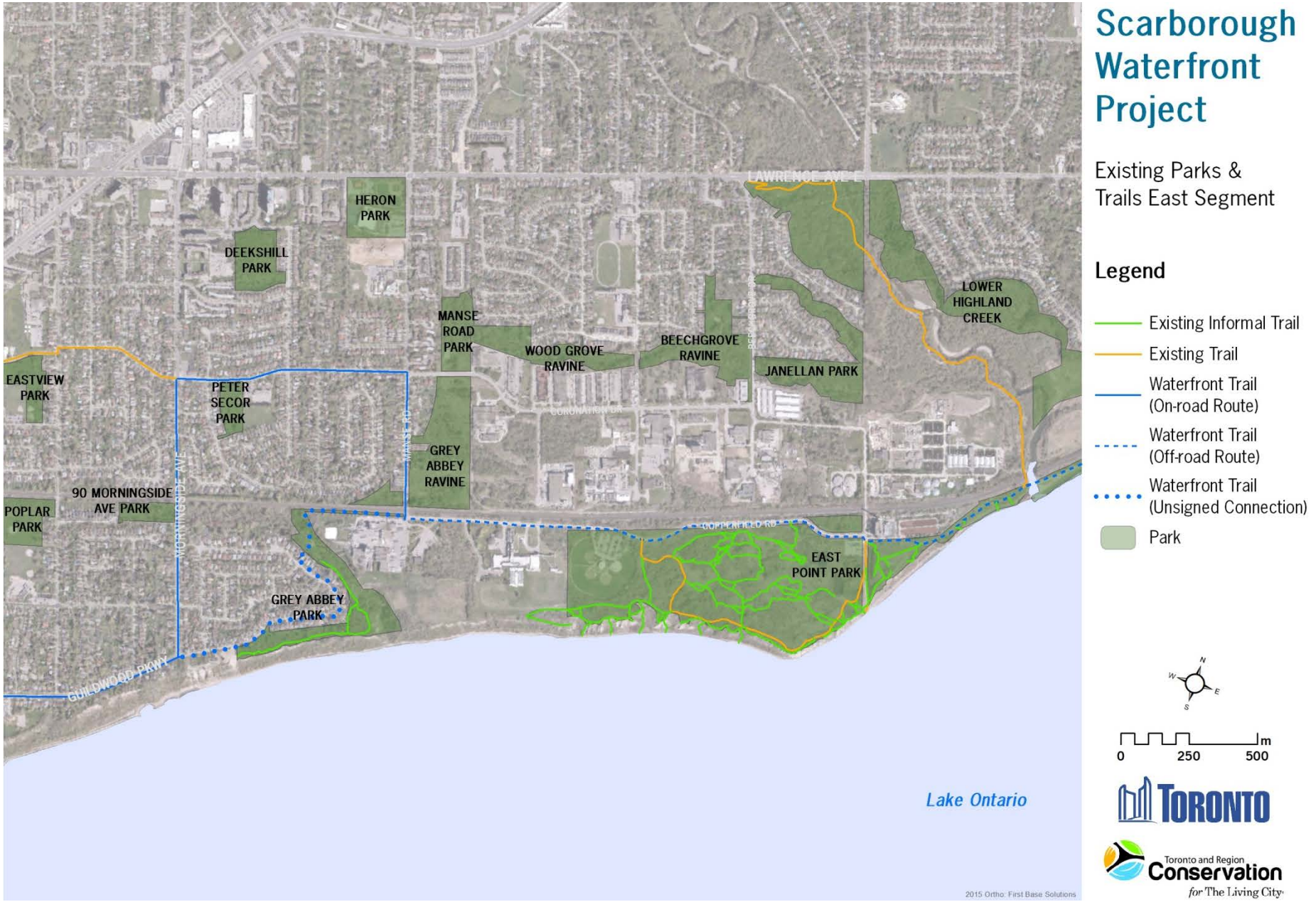


Figure 3-51: Existing Parks and Trails in East Segment



address these challenges and area neighbours indicate that noise, use of neighbourhoods by those seeking access, litter, and congestion are ongoing issues.

Guild Park and Gardens

Guild Park and Gardens is in the Central Segment. The park has an informal trail which leads down to the Guild construction access route, with many switchbacks through the ravine. There is parking at the Guild Park and Gardens. There are also several informal trails which cross the property and along the top of the Bluffs. The area surrounding the building is generally well maintained. This area is currently the subject of a Management Plan and will be redeveloped in accordance with that Plan. The new Guild Inn Estate opened in Spring 2017 and houses a restaurant and community and special event space. In addition, the City has prepared a trails Master Plan for the site. This plan considers connections to the Guild construction access route and appropriate connections to the waterfront.

Grey Abbey Park

Grey Abbey Park is in the west end of East Segment. The park consists of a large swath of manicured lawn with ornamental tree plantings that traces the edge of the Bluffs and currently offers some views of Lake Ontario, and at points has nice vistas of the shoreline and Bluffs. An unsigned off-road connection of the Waterfront Trail extends through the park, and along the western tablelands adjacent to Grey Abbey Ravine and a residential area with little room for improvements.

East Point Park

East Point Park is in the east end of East Segment. The park is situated in a largely industrial area with the CN rail corridor, industrial facilities (Rohm and Haas Canada LP), the F.J. Horgan WTP, the Highland Creek WWTP, and other industrial facilities adjacent to the park. Copperfield Road runs parallel to the shoreline and provides access to the park. The road is narrow with limited visibility for pedestrians and cyclists, with no sidewalk. There is a large parking area at the west end of the park associated with the baseball diamonds and it is only opened when the diamonds are in use. The east end of the park has access to the Port Union Waterfront Trail segment and parking. The east part of the park is a bird sanctuary. There is currently no formal access to the shoreline within this Segment.

3.3.3.4 Boat Clubs

The western end of the Project Study Area (West Segment) includes Bluffer's Park Marina and private boat clubs.

Bluffer's Park Marina is a full service marina and offers boating facilities and amenities including approximately 400 boat slips, a Mercury boat dealer, onsite mechanical shops, and restaurants. Approximately 24 float homes are moored in the marina and are inhabited year round.

In addition to the public marina, there are four private (membership only) boat clubs that operate at Bluffer's Park, including the Highland Yacht Club with close to 200 sail and power boats, Cathedral Bluffs Yacht Club with approximately 275 sail and power boats, Bluffer's Park Yacht Club with

125 monohull sail boats, and Scarborough Bluffs Sailing Club, a 'dry' club with approximately 100 sail and power boats stored on trailers.

Within the Bluffer's Park boat basin there are more than 1,200 boaters using the docking facilities of the four boat clubs and the public marina. In addition, more than 1,000 visiting boating families attend and use the boat basin each summer, resulting in heavy and constant activity through the boat basin entrance. However, ongoing sedimentation in the boat basin entrance is a navigation concern for users, and year after year the problem worsens as sediment continues to bypass Bluffer's Park Beach, which is currently at capacity. The Bluffer's Park boat basin is the only safe harbour between Ashbridges Bay in the west and Frenchman's Bay in the east. Therefore, in order to maintain safe navigation for private, commercial and Emergency Services vessels, dredging of the boat basin entrance channel by the City and TRCA has been continuous over the last decade, and annual costs continue to increase. For example, dredging costs in 2016 were $210,000, and increased to $270,000 in 2017.

No other boat clubs or marinas are present in the Project Study Area.

3.3.3.5 Regional and Local Trails

The main formal trail is the Waterfront Trail, which extends along Lake Ontario from the Niagara River to the Ontario-Quebec border. Within the City of Toronto, the Waterfront Trail provides a recreational amenity and transportation corridor that connects waterfront parks, destinations, and communities. Detailed mapping of the Waterfront Trail is available online at www.waterfronttrail.org.

Throughout its length, the Waterfront Trail includes a combination of "off-road" multi-use trails and "on-road" routes along both residential streets and major arterial roads through all three Segments (**Figure 3-49** to **Figure 3-51**). Within the Project Study Area, the Waterfront Trail is located inland and away from the shoreline and mainly along residential streets and some major arterials (Kingston Road). The steep terrain (the Bluffs) and lack of shoreline continuity limit the ability to extend the Trail along the shoreline in the Project Study Area.

Other formal and informal trails were identified in all three Segments in the Project Study Area including Bluffer's Park, Cathedral Bluffs Park, Doris McCarthy Trail, Sylvan Park, South Marine Drive Park, Guild Park and Gardens, Grey Abbey Park and East Point Park (**Figure 3-49** to **Figure 3-51**). Two sand beach walks were also identified at Bluffer's Park, with an informal "beach walk" at East Point Park (City of Toronto, 2014).

Approximately 14 km of informal trails have been mapped within the Project Study Area (through orthophotography interpretation and ground-truthing using GPS technology), with the majority (close to 8 km) located along the tablelands and Bluffs face at East Point Park. The informal trails are concentrated along the water's edge, in areas to get to the water's edge more directly, along the tablelands for views to the lake, and informal access to the shoreline. These informal trails are impacting sensitive vegetation communities and contributing to degradation of the natural environment, particularly through East Point Park.

3.3.4 Access

3.3.4.1 Shoreline Access

Project Study Area

The shoreline of the Project Study Area is characterized by steep Bluffs which create challenging access to the water's edge. While approximately 90% of the water's edge within the Project Study Area is publicly owned, there are few formal public access points to the shoreline through most of the length of the Project Study Area (**Figure 3-52**). As a result, users continually attempt to access the shoreline using informal access routes down the face of the Bluffs.

Between 2011 and 2015, a total of 21 calls were placed to Toronto Fire in response to users getting trapped on the bluff face (this number does not include additional calls placed to Toronto Police or Toronto Paramedics). Toronto Fire reported that in 2016 they had 19 Bluffs calls, with 135 units dispatched and 15 persons rescued. As of July 10, 2017, there have been seven Bluffs calls with 46 units dispatched and three persons rescued. It is expected that as user demand for park space increases with population growth, the number of required rescues will increase as more people attempt to access the shoreline via unsafe, informal access routes.

Access opportunities are largely limited to the following based on each Shoreline Segment:

West Segment

The main access to the shoreline in the West Segment is Brimley Road. Brimley Road is located at the west end of West Segment and runs south from Kingston Road into Bluffer's Park.

Brimley Road provides the only public vehicular access to the lake. Brimley Road south of Kingston Road has no sidewalks, provides a poor line of sight due to the curving nature of the road and has eroding embankments. About half-way down the length of Brimley Road, an off-road pedestrian pathway to Bluffer's Park begins and runs along the east side of the roadway.

Once at Bluffer's Park, there are many formal trails that provide access to the water's edge. Access along the shoreline to the east is restricted after the Bluffer's Park Beach area where the Bluffs under Cudia Park are steep and come down to the water's edge (**Figure 3-53**).

Under low lake level conditions a bit of shoreline does appear and would allow a pedestrian to continue to the Meadowcliffe section of the shoreline although this has some risk as the Cudia Park Bluffs are prone to failure.

Figure 3-52: Existing Access Points to the Waterfront

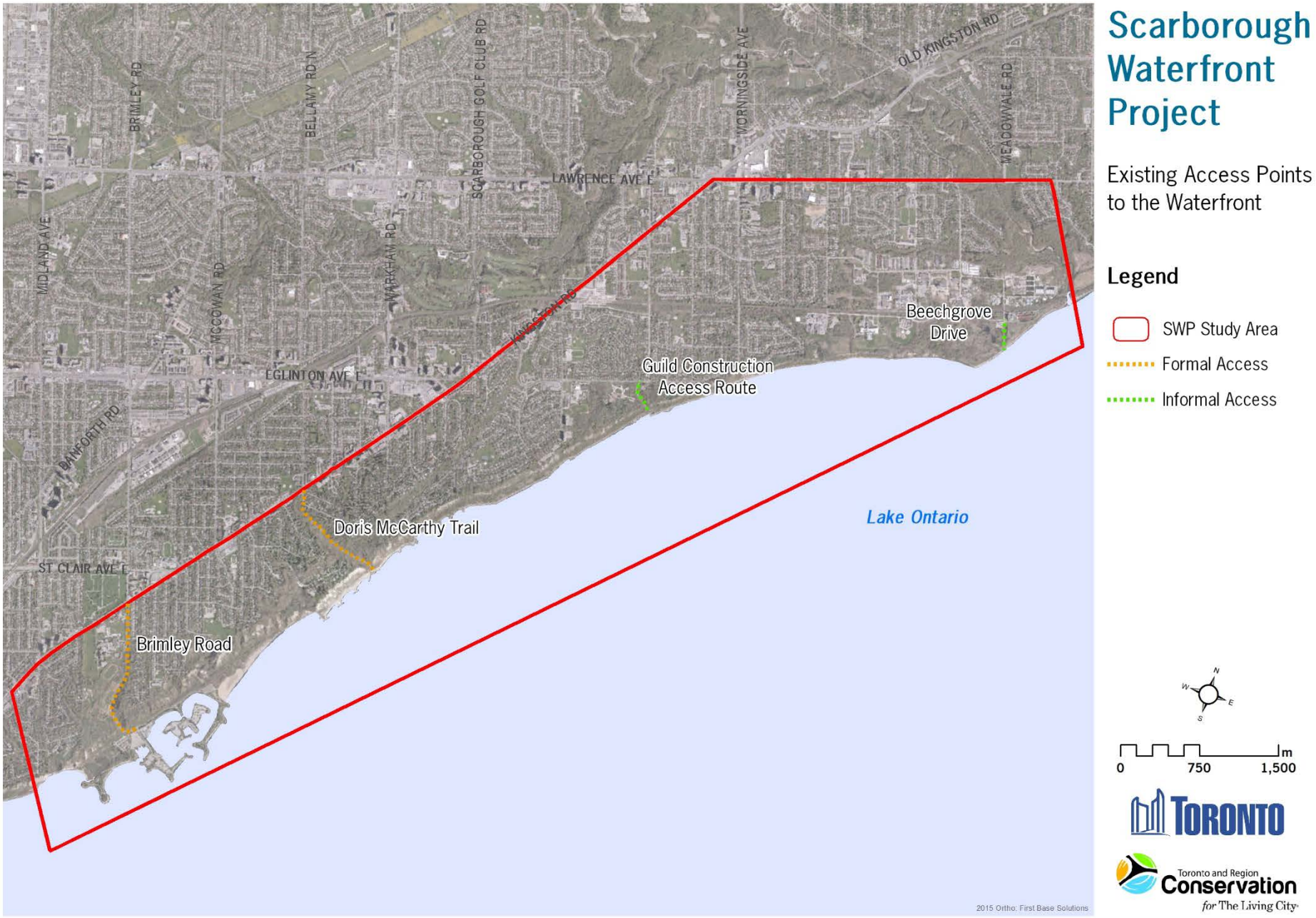


Figure 3-53: Cudia Park Bluffs Shoreline – May 10, 2017



Central Segment

There are two main access points to the shoreline in Central Segment (**Figure 3-54**). Doris McCarthy Trail is located in the west end of Central Segment. The trail starts just south of Kingston Road and runs south towards the shoreline and Sylvan Park/Gates Gully at the base of Bellamy Ravine. The trail provides pedestrian access from the base of Bellamy Road. The trailhead is located just south of Kingston Road at the end of Ravine Drive. The trailhead provides some signage but only limited street parking is available. The length of the trail to the water's edge is about 1 km and is steep in sections with a slope that exceeds 10%. The trail is not suitable for most cyclists or those with mobility issues.

The second access point is a TRCA construction access route that starts at Guildwood Parkway and runs south towards the shoreline at the Guild Park and Gardens and along the shoreline. This route is in poor condition with eroded sections containing steep grades; however, it is used informally by pedestrians and even cyclists to access along the shoreline. Anecdotal evidence suggests that there is moderate usage of this construction route by the public despite the no access signs at the entrance.

East Segment

The main access point to the shoreline south of Copperfield Road in the East Segment is Beechgrove Drive, an unopened road, which is used informally as a trail by the public (**Figure 3-55**). Beechgrove Drives runs south from Lawrence Avenue East and terminates at the CN rail line, east of East Point Park. The road provides vehicular access to the parking lot at the road terminus. A former construction access route continues from the parking lot to the water's edge, but is steep and ends before the beach. Access to the shoreline is constrained due to grades.

3.3.4.2 Parking

Parking is provided throughout the Project Study Area; however, it is limited along the waterfront.

The main parking area that services the waterfront is at Bluffer's Park. Bluffer's Park provides two large public parking lots (approximately 280 parking spaces combined) as well as a parking lot that services the boat ramp/launch (approximately 120 spaces). The only vehicular access to the parking lots is Brimley Road which is two lanes wide (one in each direction). The parking lots also service Bluffer's Park Public Boat Launch.

The turnover rates are greatest for all three lots during weekends in July, particularly on Sundays. The majority of users spend approximately one to three hours parked on any given day in any given month (67% to 73% of users, on average), while a smaller proportion spend between three to six hours parked during the same timeframe (less than 20% of users, on average). Typically, none of the lots exceed capacity during the week (some exceptions apply in July). On weekends, capacity is generally reached between 11am and 12pm.

Figure 3-54: Doris McCarthy Trail and Guild Construction Access Route





Scarborough Waterfront Project

Doris McCarthy Trail and Guild Construction Access Route





TORONTO

Toronto and Region Conservation for The Living City

Figure 3-55: Beechgrove Drive Extension



The Doris McCarthy Trail, while providing access to the waterfront, offers only on-street parking. Smaller informal parking areas and roadside parking are also located in residential areas at the top of the Bluffs including Meadowcliffe Drive (Cudia Park). There have been instances where residents and park user parking have conflicted.

Guild Park and Gardens provides public parking with two public parking lots that have approximately 274 spaces combined. There is also a smaller informal parking area on the east side of the construction access route just off of Guildwood Parkway.

Limited parking is available at East Point Park for approximately 330 vehicles out of two parking lots (one of which is paved and the other gravel). One of the lots is located adjacent to the baseball facilities at the west end of the park and is only open when the baseball diamonds are in use. The other is located at the east end of the park adjacent to the Highland Creek WWTP and at the head of the East Point Park trails.

3.3.4.3 Transit Services

Transit is also provided in the Project Study Area by the TTC and GO Transit. TTC provides transit services along Kingston Road and Morningside Avenue as well as along some residential streets. GO Transit operates on the CN rail line that crosses the east end of the Project Study Area. Transit to the areas in the Project Study Area that offer access to the waterfront varies.

There is no direct transit access to Bluffer's Park. The TTC provides bus service along Brimley Road; however, it terminates at Barkdene Hills approximately 1 km north from the park. Service was however provided directly to Bluffer's Park in the past.

For access to the informal Doris McCarthy Trail, the TTC provides transit along Kingston Road, approximately 120 m north of where the informal trail entrance meets Ravine Drive/Bellehaven Crescent.

For access to the Guild Park and Gardens, the TTC provides bus service along Guildwood Parkway which connects directly to the park.

There is no direct transit access to East Point Park. The TTC does however provide bus service along Coronation Drive, Beechgrove Drive and Manse Road, approximately 500 m north of the park.

3.3.5 Traditional Use, Interests and Identification of Indigenous and Treaty Rights within the Project Study Area

The Project Study Area does not contain any First Nation reserves. However, archaeological evidence gathered in this area shows that people were living and hunting along the Scarborough Bluffs as early as 10,000 years ago, making this one of the longest inhabited areas within the City of Toronto.

The Project Study Area is located within the traditional territory of the Mississaugas of the New Credit First Nation as well as within the ancestral homeland of the Huron Wendat Nation. Additionally, the Project Study Area is located on lands originally surrendered as part of the 1787 Johnson-Butler

Purchase. However, in 1794 the Crown acknowledged that the Johnson-Butler Purchase was not valid due to a number of irregularities in the treaty document. The lands within the Project Study Area were therefore not formally surrendered until 1923 as part of the Williams Commission. Specifically, the Project Study Area is found within the Clause 2 Williams Treaty lands. The seven First Nation signatories of the Williams Treaty include the Mississaugas of Scugog Island, the Mississaugas of Alderville, Hiawatha, Curve Lake, Chippewa of Rama-Mnjakaning, the Chippewa of Georgina Island, and Beausoleil First Nations.

In addition to the Williams Treaty signatories, the Mississaugas of the New Credit First Nation, the Huron Wendat Nation and other First Nation and Métis communities may have an interest in the Project related to traditional land and/or treaty rights and land claims. Specifically, Aboriginal and/or treaty rights related to hunting, fishing and harvesting have the potential to be affected by the Project.

Ongoing claims within the Study Area were also reviewed. TRCA is aware of the 'Aboriginal Title to Water' submitted by Mississuagas of the New Credit First Nation to the Governments of Canada and Ontario in September, 2016.

Engagement with First Nation and Métis communities, as well as applicable regulators, was undertaken to determine possible interests. TRCA considered First Nation and Métis interests during the Project planning and design phase, and the results of the consultation program are provided in **Chapter 10**.

3.3.6 Cultural Heritage/Archaeology

This section includes information that relates to ***cultural heritage*** resources which includes archaeology (terrestrial and marine) as well as ***built heritage*** and ***cultural heritage landscapes*** within the Project Study Area. Historical information available from municipal officials and/or other interested Stakeholders (i.e., municipal heritage committees) was also taken into account in the identification of cultural heritage resources. Cultural heritage resources were used for planning and design purposes.

Archaeological features typically consider items such as human remains, pottery and tools, while built heritage features consider items such as houses, bridges and churches. Cultural heritage landscapes can include town squares, scenic landscapes, cemeteries and railways.

3.3.6.1 Archaeology (Terrestrial) and Built Heritage and Cultural Heritage Landscapes

TRCA archaeologists conducted a Stage 1 Archaeological Assessment (**Appendix E**) in 2012 for the Project Study Area to provide information about the Project Study Area's geography, history, previous archaeological fieldwork, and current land conditions in order to evaluate the potential for it to contain cultural heritage resources that might be impacted by the Project. The Stage 1 was completed in accordance with the provisions of the *Ontario Heritage Act* and conforms to the *Standards and Guidelines for Consultant Archaeologists* formulated by the Ministry of Tourism, Culture and Sport (MTCS) (MTCS, 2011). The Stage 1 also included an assessment of built heritage and cultural heritage landscapes.

Following completion of the Stage 1 Archaeological Assessment, updated archaeological site data was obtained from MTCS, and is incorporated into the following overview.

3.3.6.1.1 Project Study Area

The Project Study Area has undergone extensive change since the end of the last Ice Age, approximately 12,000 BP, and there is a long history of traditional uses by Indigenous communities. Recognizing this history and the importance of the nearshore area of Lake Ontario, Scarborough Bluffs, Highland Creek, and transportation routes such as Kingston Road and the former Grand Trunk Railway, made these lands a desirable location for both Indigenous communities and early 19th Century settler families, the Stage 1 report indicated that there is potential for archaeological resources to be found within the Project Study Area. As such, recommendations were made to undertake Stage 2 assessments where physical works are planned prior to any ground disturbing activities, where past soil disturbance has not previously been documented.

Twenty and Twenty-First Century Alterations to the Land

A review of aerial photography dating between 1949 and 1989, as well as topographical maps dating between 1909 and 1949, indicates the majority of the Project Study Area has been heavily disturbed by 20th Century urbanization including construction of residential subdivisions and the roads and sewers that service them. Additional disturbances may have resulted from the construction of St. Augustine's Seminary in the West Segment, the Highland Creek WWTP in the East Segment, and the Grand Trunk Railway that crosses the Central and East Segments and heavily impacted the tract of land upon which it is located. Changes to the Project Study Area shoreline include extensive deposition of fill including the installation of groynes, headland beach systems, revetments and a boat basin. Another known source of disturbance can be attributed to seasonal flooding, with several severe floods occurring in the 19th Century and culminating with the highly destructive flood of 1954, associated with Hurricane Hazel. These storm events likely contributed to erosion along the Bluffs and changes to the alignment of Highland Creek and the various small streams that empty into Lake Ontario.

Potential for Encountering PreContact Sites

Seven of the eight registered archaeological sites within 1 km of the Project Study Area have been identified as PreContact Aboriginal sites. Only the Horgan WTP P1 site (AkGs-43) was not identified as a PreContact Aboriginal site. This low number is likely due to the limited number of archaeological assessments within the Project Study Area, rather than the nature of the area itself. The Scarborough waterfront, Highland Creek and surrounding area would have offered rich resources such as fish, waterfowl and game which would have been exploited as part of a people's seasonal round. As a result, there is potential for encountering PreContact sites within the Project Study Area.

Potential for Encountering EuroCanadian Structures

The review of 19th Century maps indicates there is potential to encounter 36 documented historic era structures within the Project Study Area: three in the West Segment, 20 in the Central Segment, and

13 in the East Segment. While 20th Century topographic maps revealed extensive development along the Scarborough waterfront that may have disturbed or destroyed remnants of 19th Century homesteads, there remains the potential to locate some cultural heritage resources intact.

3.3.6.1.2 West Segment

Archaeological Sites

Three registered archaeological sites are located within the West Segment: the Midland site (AkGt-7), the Cudia Park site (AkGt-32) site, and the Cathedral Bluffs site (AkGt-212).

The Midland site was identified by David Boyle in 1896 on Jonathon Ashbridge's farm at the foot of Midland Avenue near Lake Ontario. The site was recorded as an Aboriginal burial site containing five individuals that were likely of Mississauga origin. The current nature and extent of the site is unknown.

The Cudia Park site has previously been referred to as the Ayre Point site. Research by Kapches in 1987 was completed during which local collections were studied including Archaic projectile points and Iroquoian ceramics. However, the exact location of where these artifacts were found is not well understood. Little information beyond the site name is found within the MTCS record form for the site.

The Cathedral Bluffs site is identified by a pre-contact ***lithic scatter***.

Built Heritage Resources

Two designated and two listed built heritage resources were located in the West Segment: Scarborough Bluffs Refreshment Room (Designated); St. Augustine's Seminary (Designated); Ashbridges House (Listed); and, Fred Coates House (Listed).

The Scarborough Bluffs Refreshment Room was built in 1903 and is an important piece of the townships recreational history. The one and half storey commercial building was constructed to serve day-trippers and tourists to the Scarborough waterfront, predominately the Scarborough Bluffs in the early 20th Century. The City of Toronto designated the structure for its design as well as its associative and contextual value in 2008.

In 1913, the St. Augustine's Seminary was established by Eugene O'Keefe, a wealthy Ontario brewer and philanthropist, to train diocesan priests. The seminary was designated in 1980 for its Beaux-Arts architecture designed by architect Arthur W. Holmes. Holmes designed and built many prominent churches and buildings in Toronto such as St. Patrick's Church and St. Michael's College, as well as the college chapel at Queens College in Oxford, England.

The Fred Coates House was built in 1919 by Canadian artists and University of Toronto art professors Fred and Louise Coates. Coming from England, the Coates built their home similar to an old English cottage with an arts and crafts style. The home was built with a secret passageway and a skylight, which were uncommon features for a house built at this time.

No further information was available regarding the Ashbridges House.

Heritage Plaques

Heritage plaques located in the West Segment include:

- Cliffside Golf Course (West Segment)
- Scarborough Bluffs (West Segment)

3.3.6.1.3 Central Segment

Built Heritage Resources

A total of two designated and two listed built heritage resources were found within the Central Segment: Guild Inn (Designated); Building 191 and Sculpture Studio (Designated; Central); John Heron House (Listed); and, Washington Cemetery (Listed).

The Guild Inn was originally known as the Bickford residence when it was first constructed in 1914 as the country estate of Col. Harold C. Bickford. In 1932 it was purchased by Rose and Spencer Clark who established the Guild of All Arts. The Clarks constructed several buildings, as well as additions to the main building. The original Bickford residence, including the Clark's additions, was designated by the City of Toronto for its heritage value in 1999.

In 2005, Building 191 and the Sculpture Studio were designated because the buildings were viewed as historically, architecturally and contextually significant components of the Guild property. The Sculpture Studio was constructed in 1940 by Danish wood sculptor Aage Madsen, and Building 191 was constructed in 1962 to 1963 as storage and office space.

Washington Cemetery was originally the family burial ground to the Annis family who resided on this lot as early as 1808. After constructing an Inn for traveling preachers, a church was soon built in honour of Evangelical preacher Stephen Washington. A plaque to commemorate the Washington United Church was installed by the Scarborough Historical Society in 1988.

No further information was available regarding the John Heron House.

Heritage Plaques

Heritage plaques located in Central Segment include:

- Fool's Paradise (Central Segment)
- George H. Dix Memorial (Central Segment)
- Guildwood Village (Central Segment)
- Rosa and Spencer Clark (Central Segment)
- The Osterhout Log Cabin (Central Segment)
- Washington Methodist Church Cemetery (Central Segment)

3.3.6.1.4 East Segment

Archaeological Sites

One registered site is located within the East Segment: the Horgan WTP P1 site (AkGs-43). However, little information beyond the site name is found within the MTCS' Ontario Archaeological Sites Database (OASD).

Built Heritage Resources

One designated and one listed built heritage resource was located within the East Segment, Purvis-Castle Log Cabin (Designated); and, John Bennett House (Listed). However, no further information was available regarding either East Segment built heritage resource.

Heritage Plaque

One heritage plaque is located within the East Segment:

- Ken Morrish (East Segment)

3.3.6.2 Archaeology (Marine)

The broad waters of Lake Ontario were and continue to be critical in the development of past and current societies in Southern Ontario. The water and shorelines of Lake Ontario provide transportation, food, drinking water, materials to build communities, medicine, recreation, and contribute to spirituality, to name but a few elements. Evidence can be found along the shores and in the nearshore areas to provide evidence of human occupation and use of the lake in more distant times. As the majority of the Project Study Area involves land creation activities within Lake Ontario, it is important to ensure that evidence pointing to that past marine heritage is not lost.

A marine archaeologist was retained in 2015 to undertake background studies and detailed in-water surveys to assess the potential for marine archaeological resources and explore specific marine archaeological resources within the Project Study Area.

The Project Study Area was a hub for the past stonehooking industry of the 1800s and early 1900s. Unrestricted lake mining resulted in the loss of lakefront properties due to the removal of materials and corresponding increase in shoreline erosion as increased wave energy hit the shore. Resultantly, the intentional placement of old scows/barges and other refuse were used as a measure of shoreline protection.

Apart from the activities of the stonehookers, intentionally placed scows/barges, and the occasional shipwreck, there was no other significant alteration, such as the construction of major wharves, to the nearshore lakebed within the Project Study Area. A commercial fishery was located to the east near Port Union, but there does not seem to be any extension of it into the Project Study Area.

Following the completion of the background research, much more detailed surveys were conducted to ensure that there were no marine areas of archaeological concern. The relatively shallow nature of the majority of the Project Study Area required different survey methodologies. For the nearshore areas, a snorkel survey was conducted, and complemented the offshore side scan sonar and magnetometer survey. In addition, possible "targets", identified by the side scan sonar and magnetometer surveys, were ground-truthed as they were buried beneath the sediments.

A total of 76 targets were located with the side scan sonar, 72 with magnetometer and four with snorkel survey. The majority of targets were natural (e.g., geophysical changes in the lake-bottom, rocks, logs, and non in-situ trees) or recent vintage refuse (e.g., tires, construction materials). However, some targets were identified that were indicative of cultural interest and heritage value.

3.3.6.2.1 West Segment

No areas of marine archaeological concern were located within the West Segment.

3.3.6.2.2 Central Segment

Three areas of marine archaeological concern were found within the Central Segment. These include:

- **Target S56:** the remains of the shipwreck Alexandria at the base of Doris McCarthy Trail;
- **Target S78:** the remains of two barges used as shoreline erosion control below Guild Park and Gardens; and,
- **Target S76:** metal and wooden debris, possibly the remains of a barge or other unidentified marine structure below South Marine Drive.

The Alexandria was originally built in 1866 as a barge towing sidewheeler steamer. It was rebuilt in 1883, and for the next 30 years, the steamer cruised the St. Lawrence corridor as a combination passenger and packet freight carrier. However, on August 3, 1915, the vessel was stranded offshore from the Scarborough Bluffs in the vicinity of Bellamy Ravine. This heritage site has both provincial and local significance. As part of the wreck remains exposed or situated near the surface of the water, the Alexandria continues to be affected by weather and from natural ongoing hazards.

The two barge hulls located below the Guild Park and Gardens (Target S78) were placed near the shoreline in the 1960s as an erosion control measure. There were apparently three barges placed in this location, but only two remain visible. The third may be wrecked partially on shore (debris with metal sheet piling on rocks), or it could have drifted westward below South Marine Drive and may be Target 76.

3.3.6.2.3 East Segment

Two areas of marine archaeological concern were identified within the East Segment between East Point and the mouth of the Highland Creek. These include:

- **Target S63:** a marble slab found that ties into a historic account of a shipwreck with a cargo of marble slabs (the wreck of the Jessie Woods); and,
- **Target S114:** the remains of a possible shipwreck (Jessie Woods), which could be associated with the marble slab target.

The schooner Jessie Woods, built in 1834, was bound from Oswego, New York to Toronto when wrecked in an evening gale on November 9, 1854. The location was given vaguely, but is suspected to be near the mouth of Highland Creek. The vessel had a general cargo consisting of marble slabs, along with flour, 400 barrels of salt, and some merchandise.

3.3.6.2.4 Summary

Based on the results of the background research, the geotechnical archaeological survey of the Project Study Area, and the implementation of a recommended 20 m protection buffer around each area of marine archaeological concern, the following is recommended:

- If none of the aforementioned targets, including a 20 m protection buffer around each, is to be developed, no additional work is required.
- If, however, development of the shoreline will impact either directly or indirectly any of these target areas, additional archaeological investigation of the affected targets must be conducted prior to any development impact.
- If possible, all targets should be subject to additional archaeological assessment.
- In the case of Target S56, the wreck of the Alexandria, detailed recording of this ship should be conducted regardless of development impacts, as natural hazards (exposure to air, wind, waves, and ice) are negatively affecting the ship. It should be noted that the Alexandria currently lies on Crown water lot. The water lot owner should undertake additional archaeological investigations.
- Compliance regulations must be adhered to in the event that archaeological resources are located during the project development.

4. Description, Evaluation and Rationale for "Alternatives To"

The *EA Act* requires proponents to assess two types of Alternatives including:

- "Alternatives To" the undertaking; and,
- "Alternative Methods" of carrying out the undertaking (the Project).

"Alternatives To" the undertaking are functionally different ways of addressing or dealing with the problem (e.g., different locations along the waterfront for the Project). "Alternative Methods" (or designs) are the different ways of carrying out the Project. For example, for the Project, this may include consideration of different locations within the Project Area for project components (e.g., trail alignment, shoreline alignment). This chapter describes how "Alternatives To" were considered in the EA.

4.1 Description of "Alternative To" the Undertaking

As per the approved ToR, TRCA has completed a "focused" EA. The consideration of "Alternatives To" has been satisfied through previous studies as detailed in **Chapter 2**, particularly the Integrated Shoreline Management Plan (ISMP), which provides "an ecosystem-based framework to ensure that shoreline management activities result in a clean, green, accessible, diverse, connected, open, affordable, attractive and useable waterfront." These studies and plans also identify the need for integrating erosion protection works with habitat improvements and improved public access along the section of the Scarborough waterfront between Bluffer's Park in the west and the mouth of the Highland Creek in the east. In addition, the Project builds on the previous shoreline erosion protection works undertaken in the Project Area.

As per the ToR, the only "Alternatives To" considered in this EA was the "Do Nothing" Alternative. The "Do Nothing" Alternative includes:

- Continuation of monitoring activities by TRCA;
- Implementation of existing plans for the area, including localized shoreline erosion control works, and retrofits/maintenance activities of existing shoreline works;
- Continuation of the natural bluff erosion process (shoreline erosion and bluff crest migration) for the sections of shoreline without existing shoreline protection works;
- Continued patchwork of formalized, informal and unauthorized public access to the waterfront and its associated risks; and,
- Ongoing park management by the City of Toronto at Bluffer's Park, East Point Park, and other established park facilities within the Project Area, which include the addition of signage at the top of the Bluffer's (where danger exists), on-going repairs and movement of fencing at the top of the Bluffs (where the Bluffs collapse), and management of informal pedestrian access down the Bluffs to access the shoreline (ongoing efforts to decommission and restrict access).

Implementing the “Do Nothing” Alternative will not satisfy the SWP Vision and Objectives nor will it address any of the problems and opportunities outlined in **Chapter 2**. However, given the length of the Project Area**,** the “Do Nothing” Alternative may have merit within the West, Central and East Segments. Therefore, the “Do Nothing” Alternative was considered along with the evaluation of the developed Alternative Methods**,** or “designs”**,** for each of the three Project Area Segments that are documented in **Chapter 5** and will be compared against the Preferred Alternative to identify the Project advantages and disadvantages documented in **Chapter 11**.

5. Description, Evaluation and Rationale for "Alternative Methods"

This chapter provides the description, evaluation and rationale for the "Alternative Methods". As previously noted, "Alternative Methods" are different ways of carrying out the Project. Alternatives were identified and evaluated based on the methodology provided in the following sections and outlined in the ToR. The "Alternative Methods" were developed to address the identified existing problems (i.e., risk from erosion, limited waterfront access, low habitat integrity) and create new opportunities or benefits (i.e., access, improved habitat, and reduced risk). Furthermore, the "Alternative Methods" were developed in a manner that is complementary to the existing natural features of the Project Study Area and considered the concerns and input of the local community.

Once developed, the Alternatives were then assessed and evaluated based on their ability to achieve the Project Vision and Objectives. Evaluation Criteria and Indicators were used to assess the extent of new opportunities or benefits created and potential resulting negative environmental effects. This reflects the relative advantages and disadvantages of each Alternative. All applicable components of the environment were considered as per the *Ontario EA Act* and are reflected in the Criteria and Indicators. Based on the evaluation, a Preferred Alternative was selected that best meets the overall Project Vision and Objectives.

5.1 Step 1: Consideration of Baseline Environmental and Social Conditions

In **Chapter 3,** a description of the baseline conditions in the Project Area and Project Study Area was prepared which provided contextual information for the development of the Alternatives and their evaluation. This information was used to understand the specific physical, natural and socio-economic conditions that influenced the development of the Alternatives.

5.2 Step 2: Confirm Problems and Opportunities by Shoreline Segment

Considering the baseline conditions (refer to **Chapter 3**) and agency, public and stakeholder input (refer to **Chapter 10**), the Problems and Opportunities for each of the three Project Area Shoreline Segments were confirmed. As previously described in **Section 2.5**, the key problems/opportunities associated with this EA study included:

- Limited Access to and along the Waterfront:
  - Unsafe, informal access along sandy shorelines;
  - Vehicle, pedestrian and cyclist conflict on Brimley Road;
  - Approximately 1,770 m[1] of shoreline access constrained by private ownership and critical infrastructure;

1. *Note that all shoreline measurements are based on the curved nature of the shoreline, unless otherwise specified.*

- No access to and along the waterfront for people of limited abilities east of Bluffer's Park Beach;
- No formal access to the shoreline east of Doris McCarthy Trail; and,
- Opportunities to formalize access points, create continuous waterfront access in public ownership, provide access for all users, and manage conflicts on Brimley Road.

- Erosion and Risk to Public Safety and Property:
  - Public safety and public infrastructure at risk from erosion within the planning timelines of the Project;
  - Informal access along sandy shorelines at risk from landslides and other hazards; and,
  - Opportunities to mitigate risk to public property and infrastructure, and manage risk to users.
- Habitat Integrity:
  - Historical human activities have impacted the aquatic habitat within the nearshore;
  - Ongoing impacts to terrestrial communities of concern due to trampling and fragmentation as a result of informal access; and,
  - Opportunities to restore and enhance aquatic and terrestrial habitat.

5.3 Step 3: Develop Alternatives by Shoreline Segment

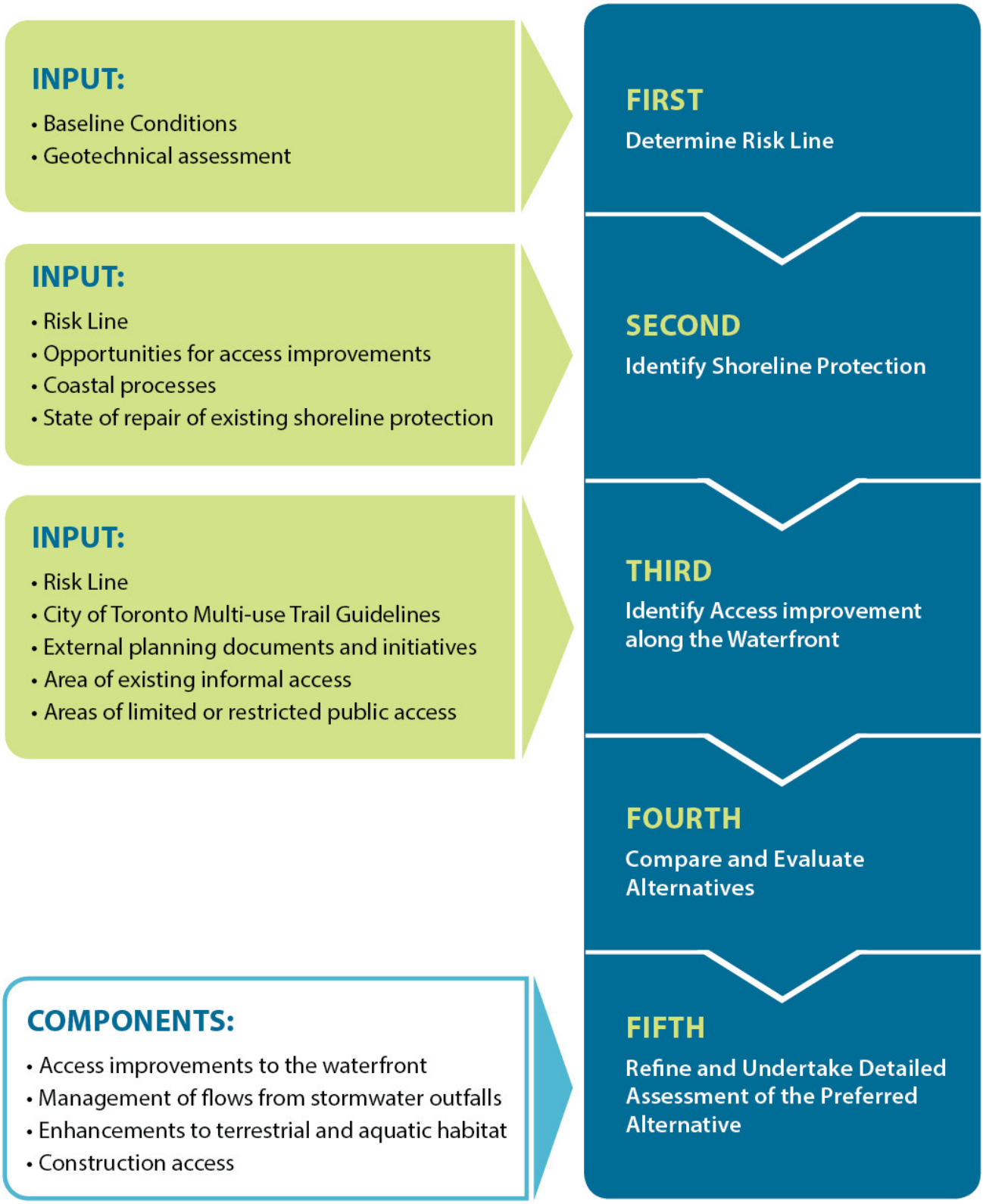
Considering the Project Vision and Objectives, baseline conditions, problems/opportunities, and public and Stakeholder input, separate sets of Project Alternatives were developed for each of the three Project Area Segments: West, Central and East (see previous **Figure 2-1** showing limits of Project Area Segments).

Alternatives were developed as follows (**Figure 5-1**):

FIRST: **Determine the Risk Line**

The risk line associated with slope crest migration and the resulting talus accumulation was identified at the toe of the Bluffs, and from the crest of slope at the top of the Bluffs for public properties. The risk line identifies a rationally estimated likely extent of talus accumulation, and is provided on the basis of MNRF technical guidelines, geotechnical engineering criteria, observation and professional judgment, which are practical for this land usage and this environment. It identified the line beyond which public safety risks have been adequately mitigated (as is the responsibility of the City of Toronto and the TRCA), but not eliminated. Trail options are to be lakeward of the risk line at the toe of the Bluffs and shoreward of the risk line at the top of the Bluffs.

Figure 5-1: Framework for the Development and Evaluation of Alternatives



SECOND: Identify Shoreline Protection

Shoreline protection options were identified which would accommodate safe public access beyond the risk line and stop toe erosion. Three main options were considered; revetments, headland beaches, and islands. Bridges were also considered as a softer Alternative for short spans only where removal from risk at the toe was required, and there was no risk to public infrastructure along the tablelands. Through coastal modeling, each Alternative was designed to consider potential increases in extreme weather events associated with climate change (more frequent storms, high waves, more intense rainfall), and all Alternatives have advantages and disadvantages in providing protection, access, and improved habitat at a reasonable cost. All Alternatives requiring fill would be constructed of approved fill, rip rap, and amourstone that meets MOECC's *Fill Quality Guide and Good Management Practices for Shore Infilling in Ontario* (2011) guidelines. In addition, existing shoreline protection works were inspected to determine which required repair, retrofit or renewal.

THIRD: Identify Access Improvements along the Waterfront

Access improvements along the waterfront were considered through trail routing. As previously noted, both the City of Toronto Official Plan and TRCA's Living City Policies provide direction that the Waterfront Trail is to be moved to the water's edge and into public ownership, where feasible. Continued growth of the City population and densification of surrounding neighbourhoods will increase demand by users to access the waterfront area. Unmanaged access will continue to degrade important ecological features. Therefore, access must be managed to protect ecological features. As noted above and earlier in this document, the City and TRCA are required to meet the City's Multi-use Trail Guidelines for a primary to high-capacity trail, allow for access by Emergency Services vehicles, and where possible they must meet AODA grade and surface requirements. Therefore, in routing the trail the initial assumptions were that the trail would require a corridor of a maximum width of 8 m, including a paved trail of 3.6 to 4.1 m, with separate marked lanes for pedestrians and cyclists, a slope of not greater than 5%, and a maximum turning radius of 20 m. These design requirements provide for access by Emergency Services vehicles and permit sufficient width to allow for separation between different user groups. These assumptions were only modified if a constraint was encountered that required a reduction to the width, or an increase to the grade. Modifications were also made if achieving these assumptions would result in substantive alterations to the Bluffs through the use of cut and fill. Access improvements that present human safety risks that cannot be reasonably mitigated or managed were not considered further. In addition, the expansion of the rail corridor within the East Segment may constrain the trail connection through this section, and may require the rerouting of the existing Waterfront Trail.

FOURTH: Identify Alternatives for Each Segment to be Evaluated and Compared to Choose the Preferred Alternative

The shoreline protection options and access improvements beyond the risk line were combined into a set of Alternatives for each Segment. Each Alternative was described at a conceptual level of detail and then assessed using Criteria and Indicators which measure how well each Alternative achieves the Project Objectives, and positive and negative net environmental effects, in order to identify a Preferred Alternative. For each Alternative, mitigation related to avoiding sensitive features was applied (see **Table 5-1**). The Alternatives for each Segment were then compared against each other to identify a Preferred Alternative.

FIFTH: Refine and Undertake Detailed Assessment of the Preferred Alternative

A number of opportunities and activities were determined to be the same for all Alternatives, and were described (**Chapter 6**) and assessed (**Chapter 7**) for the Preferred Alternative only. These included:

- Opportunities to improve access to the waterfront, for both vehicle (Emergency Services and maintenance only) and pedestrian/cycling access;
- Opportunities to manage stormwater outfalls prior to discharge to Lake Ontario;
- Opportunities to enhance and manage terrestrial habitat; and,
- Construction access and construction activities.

The following provides a description of the Alternatives that were identified for the Project. It is noted that while the evaluation is focused on the evaluation of "Alternative Methods", or designs, the "Do Nothing" Alternative was also considered in this evaluation and is included in the description of Project Alternatives for each section. The advantages and disadvantages of each Alternative are assessed in **Section 5.4**.

5.3.1 West Segment Alternatives

The following presents the Alternatives developed in the West Segment. A total of eight Alternatives plus the "Do Nothing" Alternative were developed. All Alternatives, except the "Do Nothing" Alternative, include the provision of a new water's edge trail connection between Bluffer's Park and the Meadowcliffe shoreline section (Central Segment). The Alternatives differ in how they provide this new trail connection.

5.3.1.1 West Segment, Do Nothing (Leave As Is)

The "Do Nothing" Alternative would not result in any significant changes to the shoreline. There would not be safe "water's edge" public access connecting Bluffer's Park with the Meadowcliffe shoreline

section. The Cudia Park Bluffs would continue to erode, and without shoreline protection it would remain oversteepened and in a state of active downcutting and slope erosion, until it reaches a stable state and begins to vegetate. The timeline to reach a stable slope state is expected to be in the order of decades. Bluffer's Park Beach would continue to exist in a similar condition as it is today providing recreation opportunities. The City of Toronto would continue with maintenance activities at Bluffer's Park while TRCA will maintain the TRCA/City-owned shoreline works. Regular (at least every two years) dredging of the entrance channel to Bluffer's Park boat basin would also be undertaken. **Figure 5-2** illustrates what the "Do Nothing" Alternative would include.

5.3.1.2 West Segment, Alternative 1: Headland Beach

This Alternative includes the creation of new headlands east of Bluffer's Park at the base of Cudia Park (**Figure 5-3**). As shown in the figures below, a cobblestone beach would be developed between the created headlands. The maximum distance of infill from the shoreline edge into the water would be approximately 115 m. This Alternative would connect the shoreline between Bluffer's Park and Meadowcliffe by extending the shoreline treatment at Meadowcliffe. This Alternative would halt the toe erosion at the base of Cudia Park, but crest migration would continue until a stable slope is reached.

The Alternative would be designed to accommodate the required setback of the risk line from the bluff face as well as a connecting trail along the shoreline of about 650 m in length. The existing Bluffer's Park sand beach would be retained, with the exception of approximately 330 m at the eastern extent.

The headlands/beach would improve aquatic habitat diversity through the addition of the cobble beaches, and increased length of shoreline.

The area of infill required would be approximately 40,000 m^2.

5.3.1.3 West Segment, Alternative 2A/2B: Bridge (Short Span and Long Span)

This Alternative involves constructing a bridge connection with either short spans (approximately 30 m long) or long spans (approximately 100 m). The bridge would be located along the shoreline between Cudia Park and Meadowcliffe (**Figure 5-4** and **Figure 5-5**). Its maximum distance from the shoreline into the water would be approximately 50 m to accommodate the required risk line setback from the bluff face to facilitate a new trail connection. The bridge length would be approximately 600 m. The bridge would be supported on steel piers surrounded with scour protection, which involves the placement of stone on the lake bottom without breaking the surface. The elevation of the bridge would be approximately 77.5 ***metres above sea level (mASL)*** (about 2.5 m above typical lake level). The bridge would have minimal impact on the existing Bluffer's Park sand beach (approximately 10 m).

Toe erosion at the base of Cudia Park would continue at a marginally lower rate than existing as the bluff begins to self-stabilize, although crest migration would still occur while that process continues. Early stages of stabilization would be reached in 5 to 10 years after the construction of shoreline protection.

Figure 5-2: West Segment, Do Nothing (Leave Shoreline As Is) – Overview

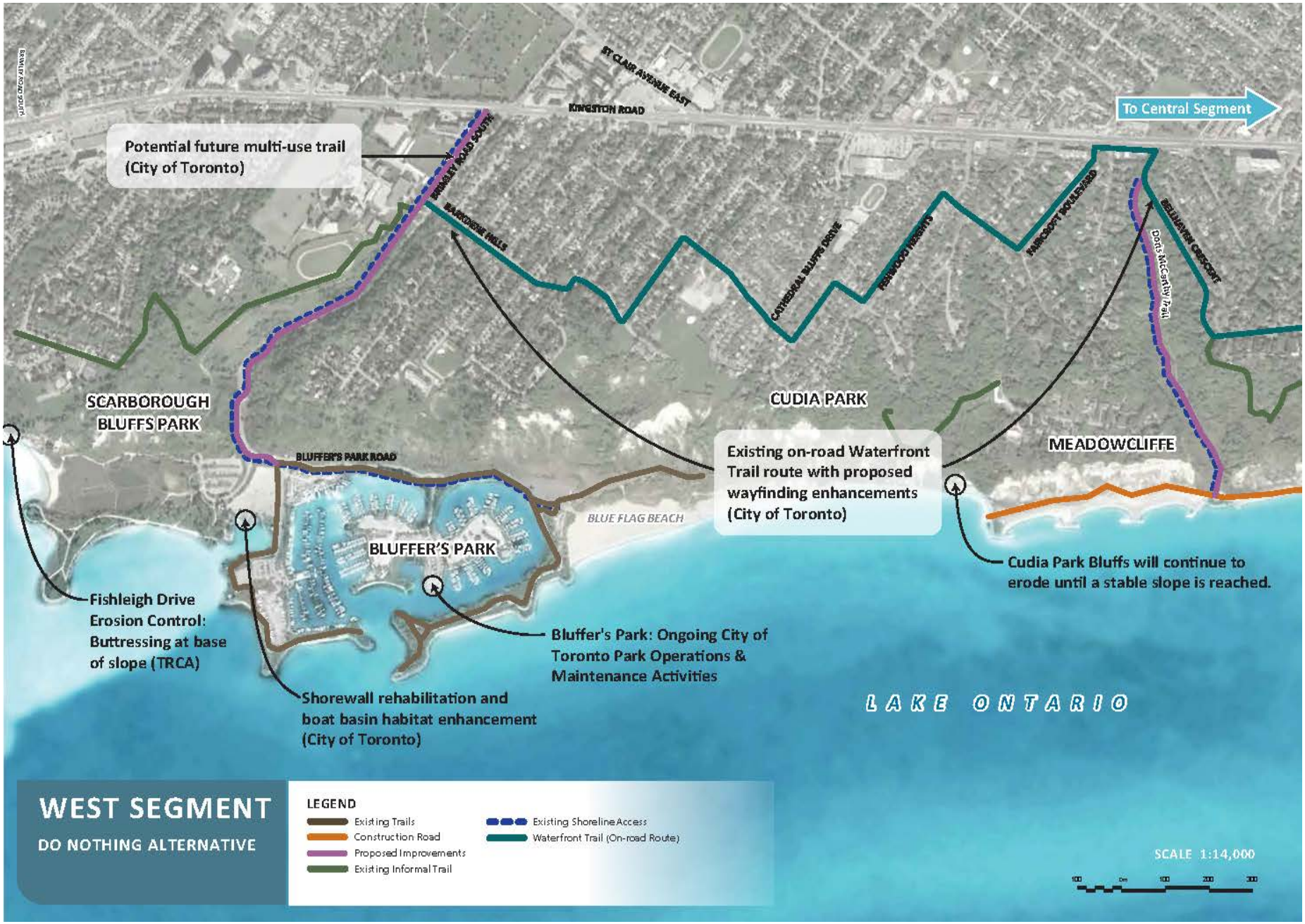


Figure 5-3: West Segment, Alternative 1: Headland Beach – Overview

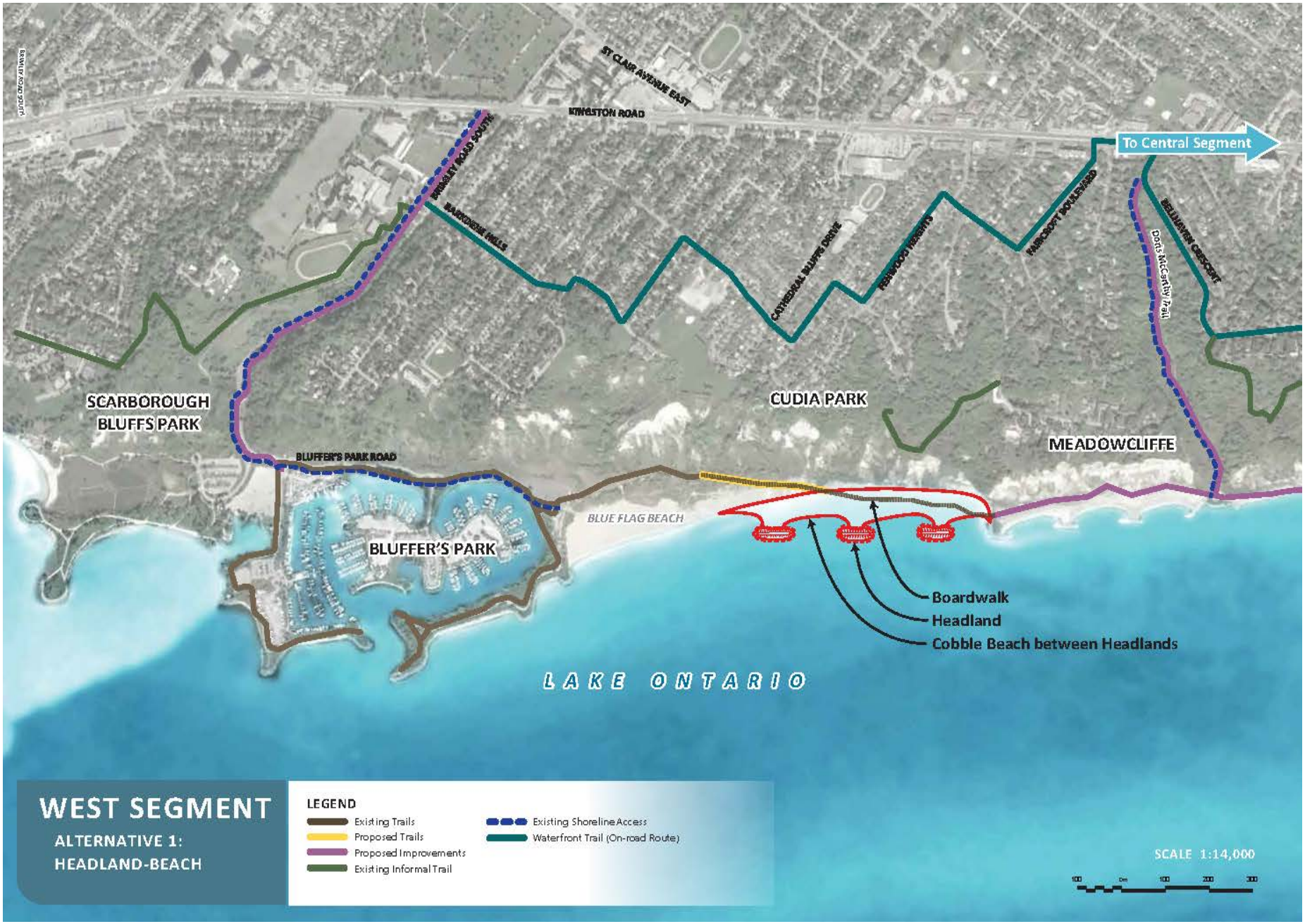


Figure 5-4: West Segment, Alternative 2A: Bridge (Short Span) – Overview

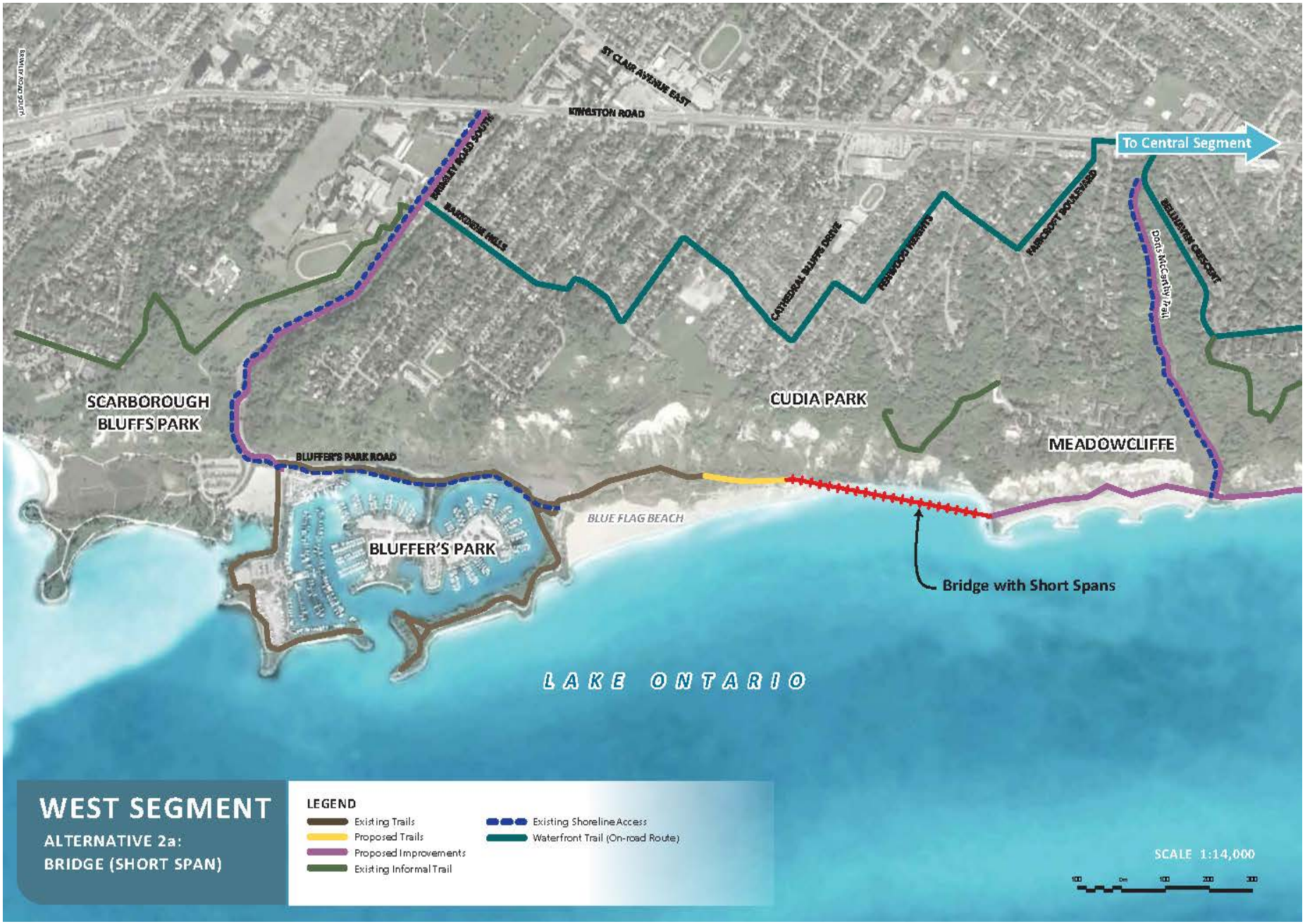
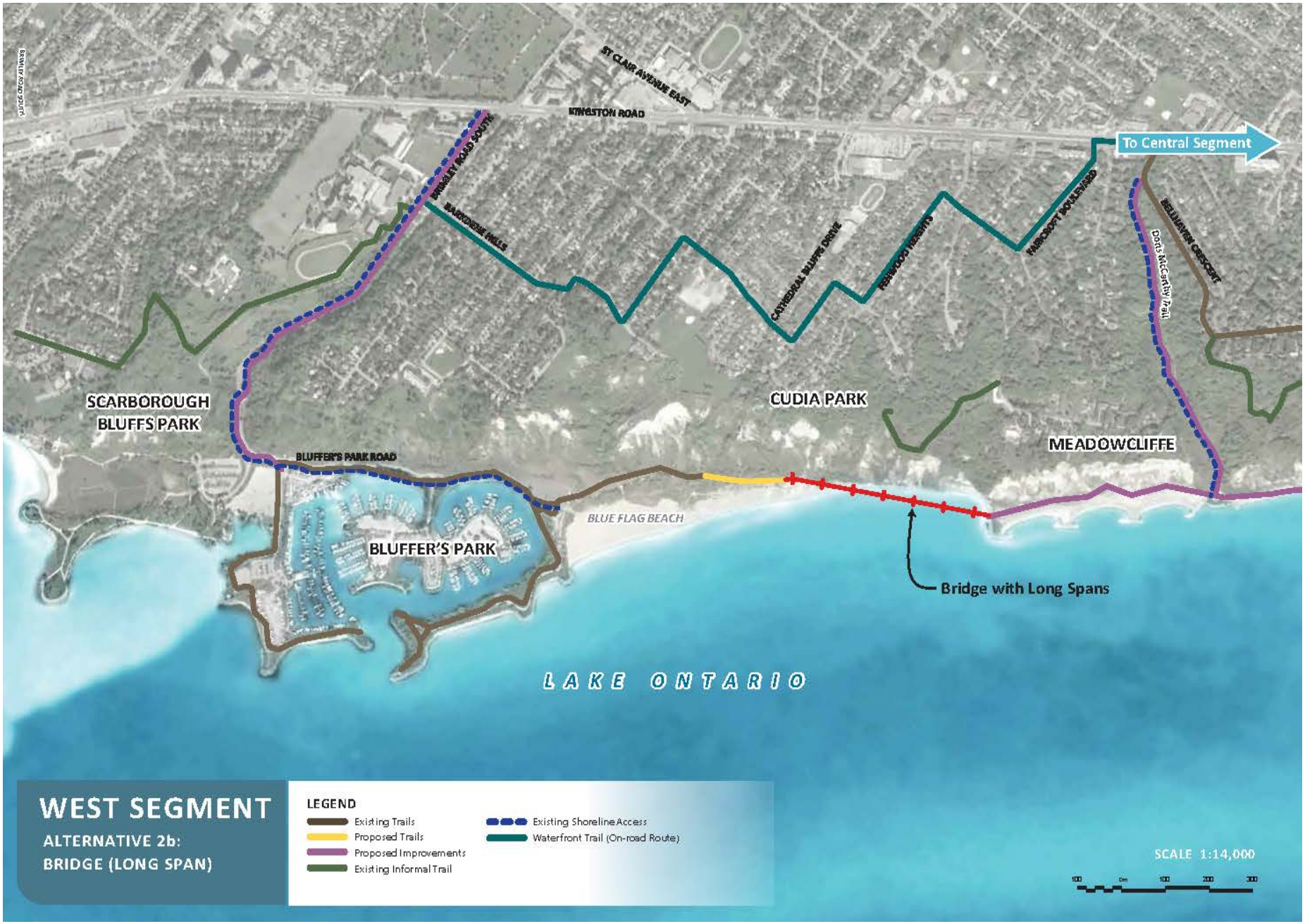


Figure 5-5: West Segment, Alternative 2B: Bridge (Long Span) – Overview



5.3.1.4 West Segment, Alternative 3A/3B: Island-Bridge (Short Span and Long Span)

This Alternative involves an island-bridge connection with short or long spans to connect the created "islands" and provide trail access between Cudia Park and Meadowcliffe (**Figure 5-6**). For the short span island-bridge, the islands would be approximately 50 to 100 m long and the bridges would involve approximate 30 m long spans. It is expected that about five to six islands would be created. Alternative 3B, the long span island-bridge, would involve fewer but longer islands and bridges (**Figure 5-7**). The bridge span lengths to connect the islands are expected to be approximately 100 m and the islands would be about 120 m in length. About three islands would be created.

The structure would have a crest elevation of 79 mASL (about 4 m above typical lake level). The maximum distance of the island-bridge concept from the shoreline into the water would be approximately 125 m and would be located lakeward of the risk line. The bridge sections would be supported on steel piers. The bridge sections would be positioned at a similar height as the islands (79 mASL).

The Alternative would also include ramps on either end for connection with the shoreline, and would have a minimal impact on the existing Bluffer's Park sand beach (approximately 30 m). It is estimated that the short span island-bridge would require an approximate area of 12,000 m^2 of infill and the long span island-bridge would require approximately 9,000 m^2 of infill.

Aquatic habitat enhancement opportunities associated with this Alternative include increased shoreline morphology through a longer, more irregular shoreline, and increased shoreline substrate type diversity through the addition of larger rocky substrate.

Toe erosion at the base of Cudia Park will be mostly eliminated. The bluff would begin to self-stabilize, although crest migration would still occur while that process continues.

5.3.1.5 West Segment, Alternative 4: Causeway

This Alternative involves constructing an armourstone-protected causeway crossing to provide a trail connection between Cudia Park and Meadowcliffe (**Figure 5-8**). The causeway would include ramps on either end for connection to the shoreline trail, and would have a moderate impact on the existing Bluffer's Park Beach (of approximately 240 m). Its maximum distance from the shoreline into the water would be approximately 120 m and the Alternative would accommodate a trail lakeward of the required risk line setback. The causeway is proposed to be located further away from the shoreline than the bridge Alternatives to allow for the creation of an inner embayment area. The causeway length would be approximately 650 m. The elevation of the causeway would be approximately 79 mASL (about 4 m above typical lake level).

This Alternative would require an area of approximately 15,000 m^2 of infill. A sloped revetment would be used to reduce wave reflection. This Alternative would also include approximately five 135 m-long, 1.5 m diameter Corrugated Steel Pipe (CSP) culverts to allow for the passage of water between the inner basin and the lake.

Figure 5-6: West Segment, Alternative 3A: Island-Bridge (Short Span) – Overview

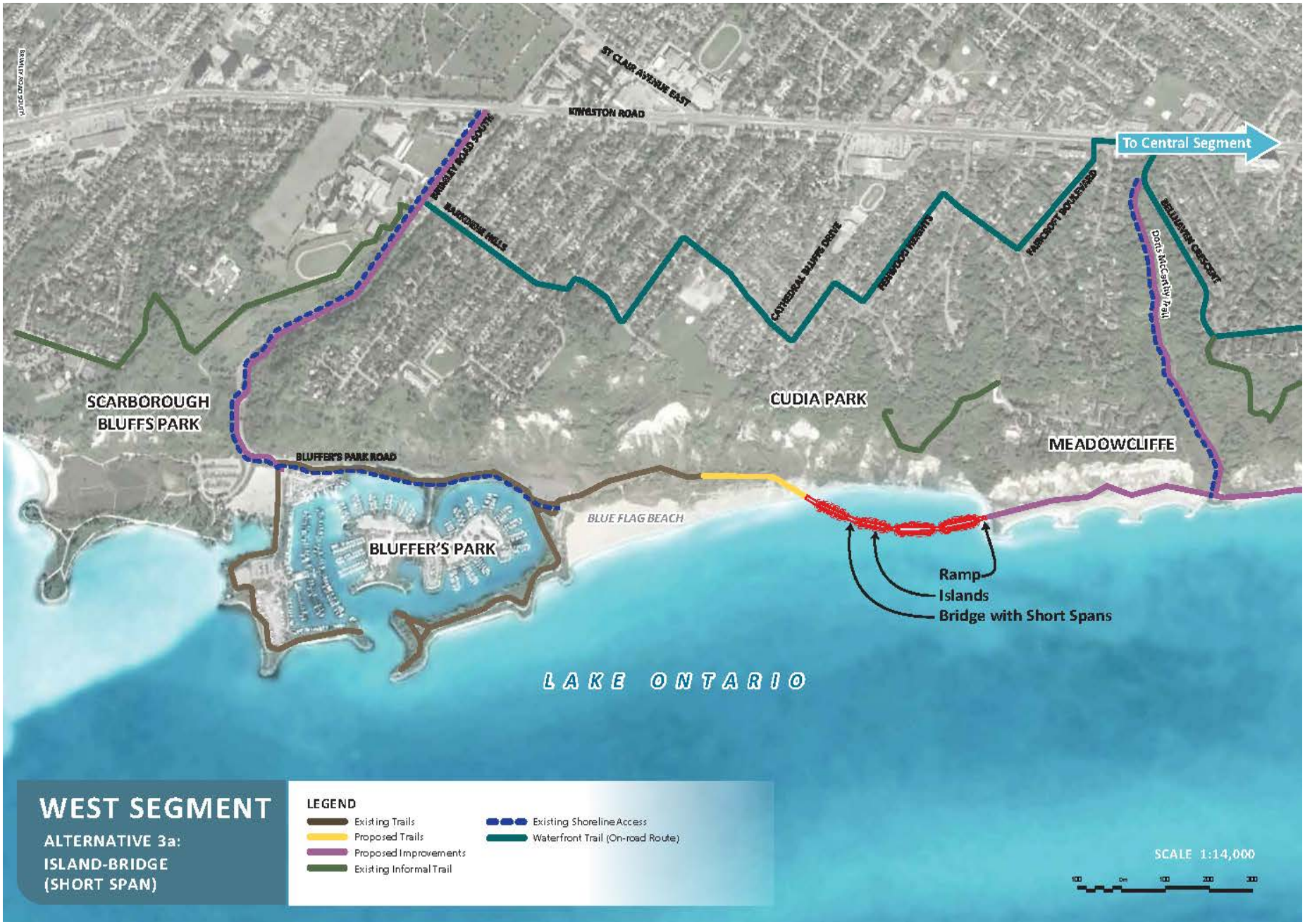


Figure 5-7: West Segment, Alternative 3B: Island-Bridge (Long Span) – Overview

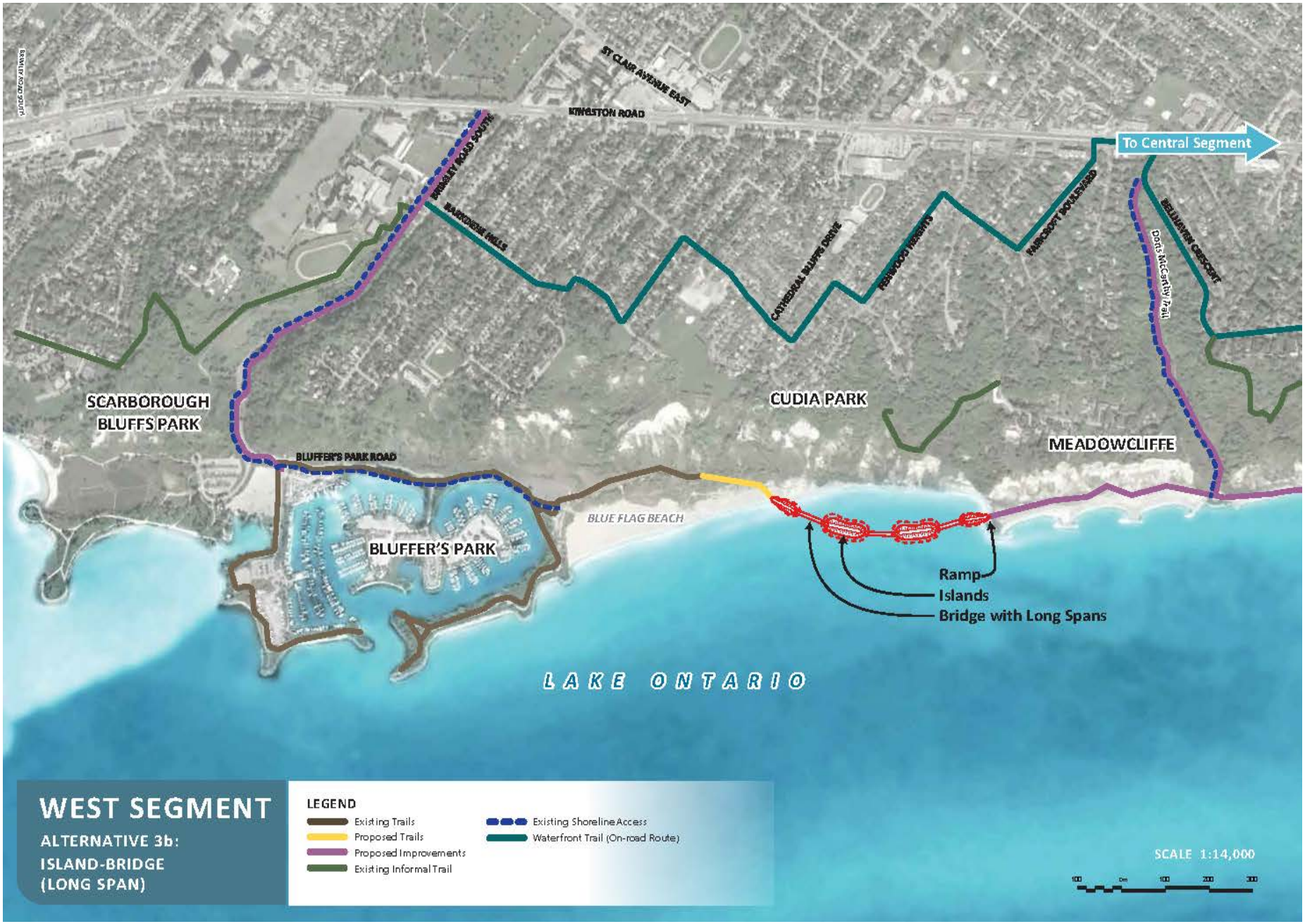
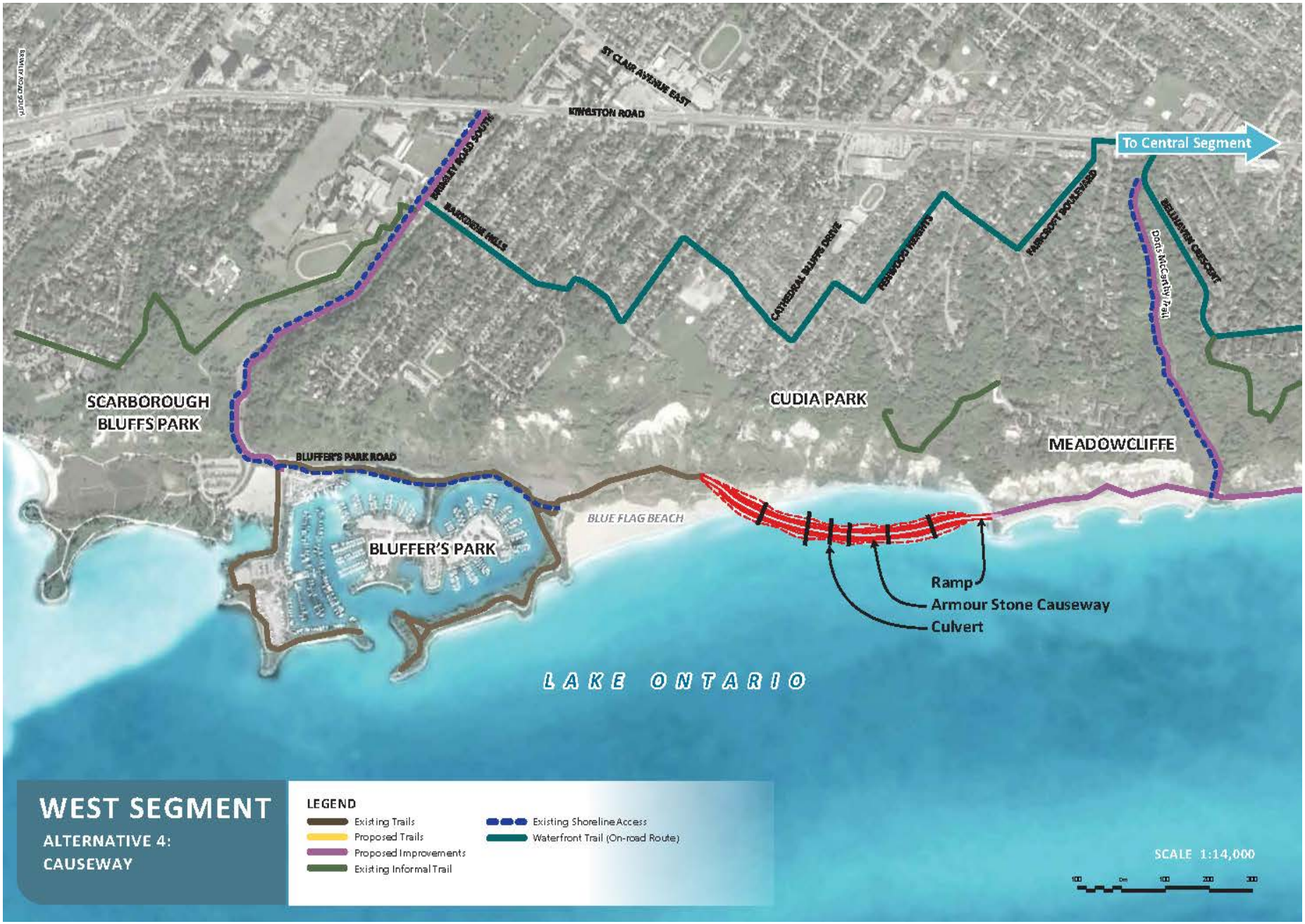


Figure 5-8: West Segment, Alternative 4: Causeway – Overview.



Aquatic habitat enhancement opportunities associated with this Alternative includes the increased shoreline substrate type diversity through the addition of larger rocky substrate.

The culverts in the causeway will provide minimal water circulation between the lake and the enclosed basin. Any talus is likely to remain within the enclosed basin and aquatic vegetation is likely to establish. Toe erosion at the base of Cudia Park will be nearly eliminated. The bluff would begin to self-stabilize although crest migration would still occur while that process continues.

5.3.1.6 West Segment, Alternative 5A/5B: Beach Expansion (Narrow/Wide)

Alternative 5A includes an expansion of the existing beach by approximately 30 m into Lake Ontario between Bluffer's Park and Meadowcliffe (**Figure 5-9**). Cobble would be located at the east end of the beach only. Included would be an extension to the existing armourstone headland at the east end near Meadowcliffe by approximately 100 m. The Alternative would also include a short span bridge crossing (to the same specifications as provided for West Segment, Alternative 2A). The existing headland in the west end at Bluffer's Park would be expanded and protected with an armourstone revetment that would extend into Lake Ontario by approximately 130 m. The area of infill required would be approximately 49,000 m^2, for the full beach build-out. The Alternative would be designed to provide continuous beach protection from Bluffer's Park to Meadowcliffe. Expansion of the headland at Bluffer's Park would be minimized to the size required to retain a beach that extends to Meadowcliffe. The extended headland will reduce the boat basin entrance dredging frequency, allowing for safe passage in and out of the basin. This minimum width beach requires a bridge span to connect the trail at Meadowcliffe to the wider area of beach at Bluffer's Park.

Alternative 5B includes an expansion of the existing beach by approximately 60 m into Lake Ontario between Bluffer's Park and Meadowcliffe (**Figure 5-10**). The Alternative also includes an extension to the existing armourstone headland at the east end near Meadowcliffe by approximately 200 m and an expansion to the existing headland at the west end of Bluffer's Park by approximately 230 m into the lake. This Alternative would also result in a reduction in the boat basin entrance dredging frequency, allowing for safe passage in and out of the basin. The area of infill required would be approximately 109,000 m^2 for the full beach build-out. The Alternative would be designed to provide a continuous sand beach connection between Bluffer's Park and Meadowcliffe within the widened beach. This increased beach width requires substantially larger headlands to retain the beach sand.

Aquatic habitat enhancement opportunities associated with both Alternatives include increased diversity of fish habitat associated with the longer, more irregular shoreline of the expanded headlands and the addition of larger substrate.

Toe erosion at the base of Cudia Park would be halted. The bluff would begin to self-stabilize, although crest migration would still occur while that process continues.

Figure 5-9: West Segment, Alternative 5A: Beach Expansion (Narrow) – Overview

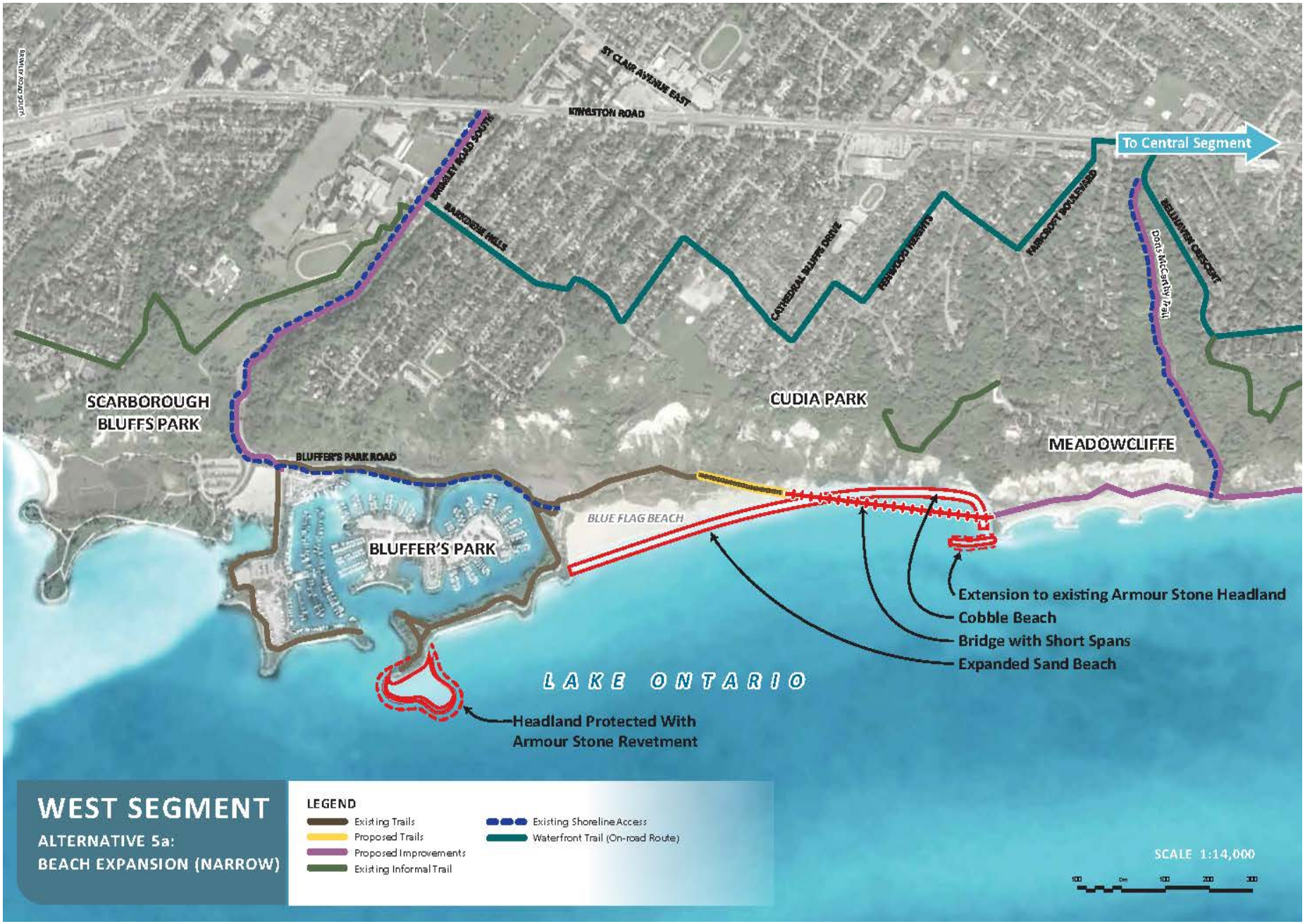
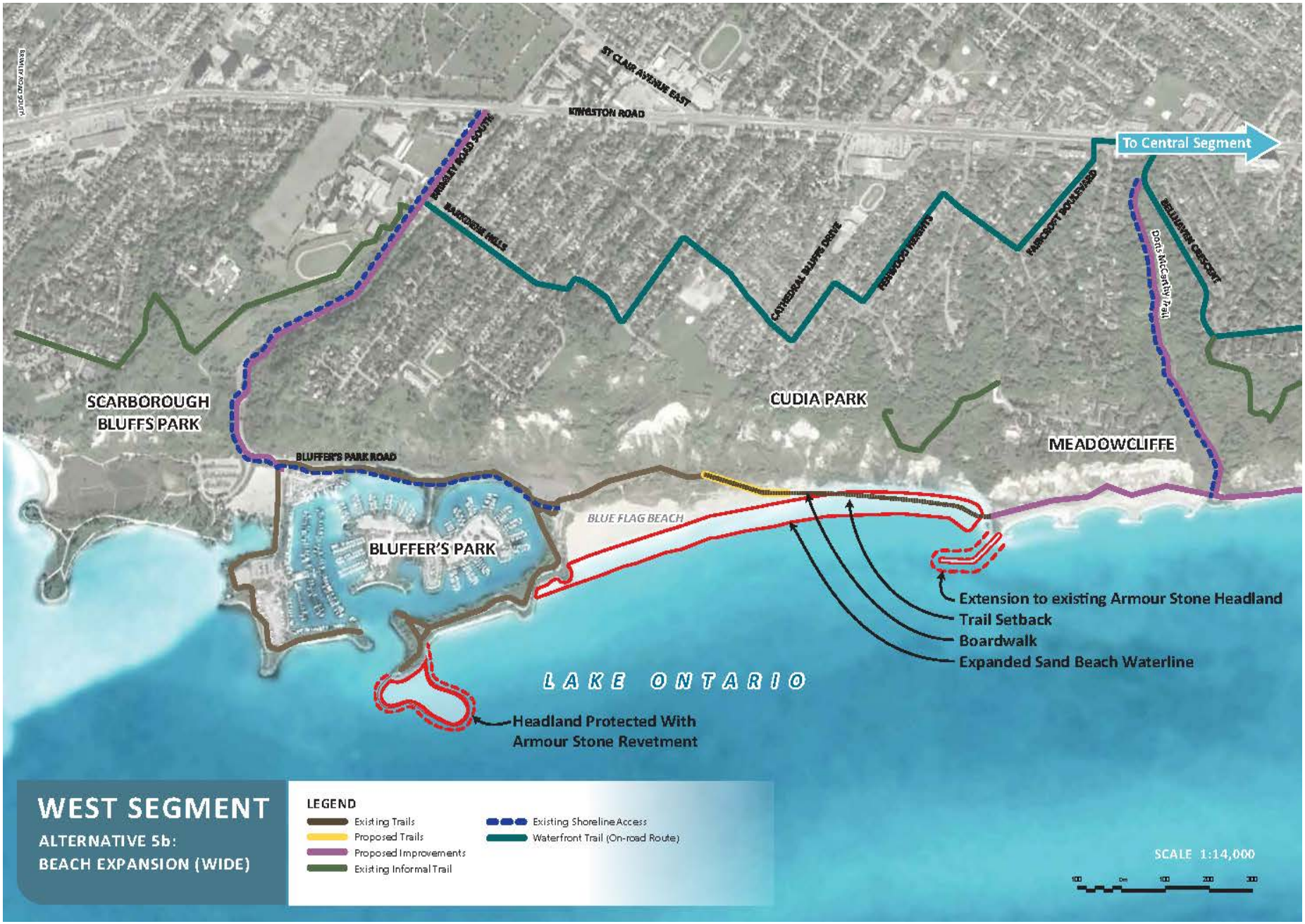


Figure 5-10: West Segment, Alternative 5B: Beach Expansion (Wide) – Overview



5.3.2 Central Segment Alternatives

The following presents the Alternatives developed in the Central Segment. Two Alternatives plus the "Do Nothing" Alternative were developed for this Segment. Both Alternatives involve extension of land base at the Sylvan and Guild Park and Gardens sections to provide long-term stability of the existing shoreline works, and safe public access along the shoreline lakeward of the risk line.

5.3.2.1 Central Segment, Do Nothing (Leave As Is)

Under the "Do Nothing" Alternative there would be no major infrastructure changes to the shoreline other than ongoing maintenance of the Guild construction access route as well as minor shoreline stabilization works as required. It is expected that the public will continue to use the construction access route as an informal trail along the shoreline even though some sections of it are within the risk line and too near the bluff face. Improvements to the Guild Park and Gardens may occur as per their Management Plan. Improvements to the Guild Park and Gardens revetment will likely be required on an ongoing basis in the future (which largely consists of construction rubble). While a 2005 ***Class EA*** was undertaken to identify a preferred option for providing long-term protection to the Guild Park and Gardens shoreline, the Project was never implemented as a comprehensive solution for the shoreline as a whole was preferred. **Figure 5-11** illustrates the "Do Nothing" Alternative.

5.3.2.2 Central Segment, Alternative 1: Headland Beach

For the base of the Doris McCarthy Trail, a new headland beach system is proposed with two new headlands and the extension of an existing headland into the lake at the east end of the Meadowcliffe shoreline protection section (**Figure 5-12**).

For the Guild Park and Gardens area, new headland features are proposed with cobble beaches in-between, which will address aesthetics by covering the existing exposed rebar along the shoreline. The maximum distance of the extension from the shoreline into the water would be approximately 100 m. A new approximately 130 m-long headland is also proposed to the east at the base of the existing Guild Park and Gardens construction access route. This Alternative is consistent with the Preferred Alternative from the 2005 Class EA that was not implemented. The purpose of this Alternative is to reassess that Preferred Alternative from the 2005 Class EA. The maximum distance for the extension from the existing shoreline into the water would be approximately 100 m.

The area of infill required would be approximately 65,000 m^2.

The shoreline sections near the base of Doris McCarthy Trail and the Guild Park and Gardens would be designed to provide a gathering space, while reducing wave overtopping levels and making public access along the shoreline safer. The extent of the gathering space into the lake was determined by the re-grading of the existing Guild construction access route to meet AODA requirements. While existing rubble is protecting the toe of the bluff, it does not provide long-term shoreline protection, and the existing shoreline construction route is within the risk line, and thus potentially unsafe for pedestrian access.

Figure 5-11: Central Segment, Do Nothing (Leave Shoreline As Is) – Overview

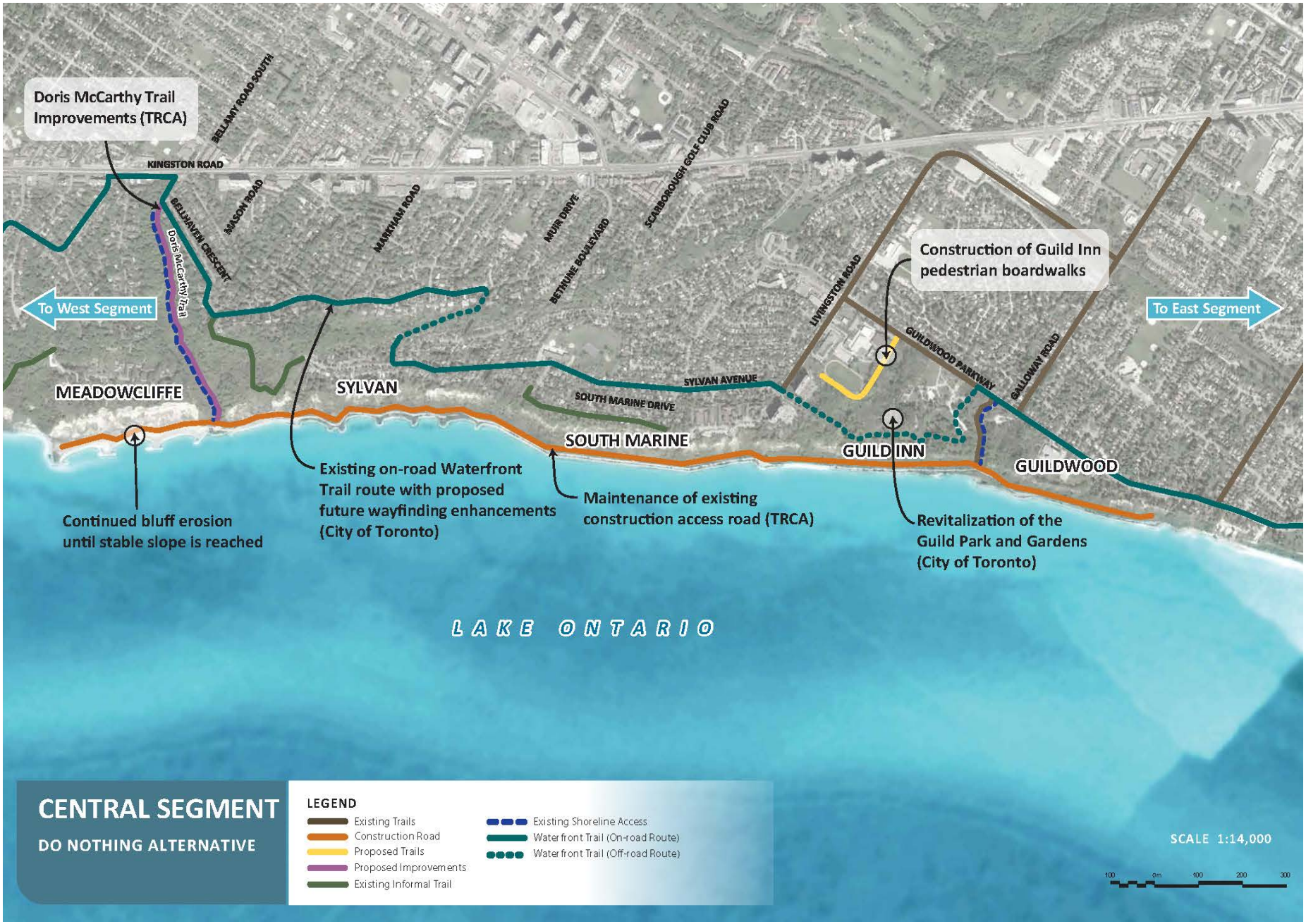
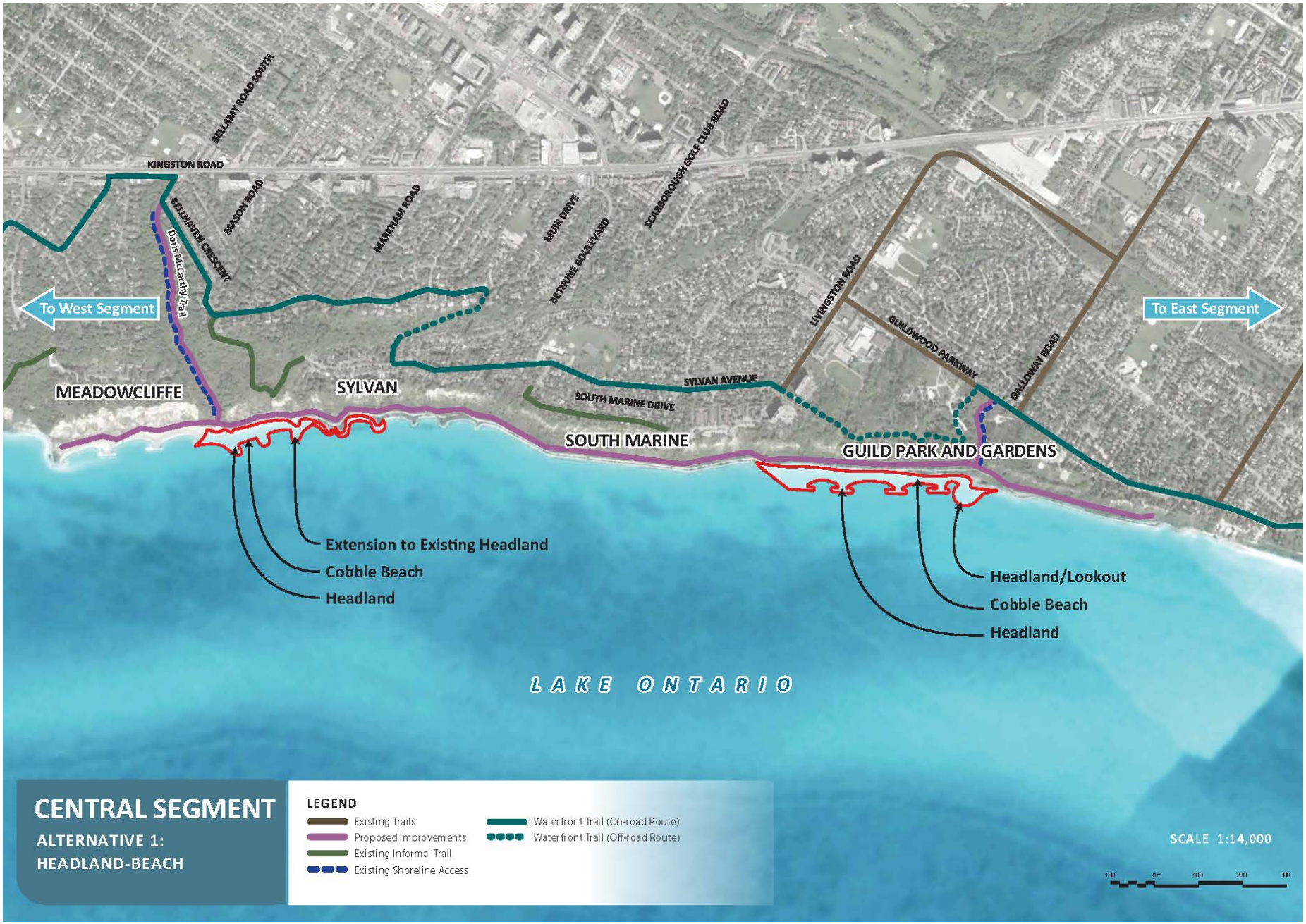


Figure 5-12: Central Segment, Alternative 1: Headland Beach – Overview



Aquatic habitat enhancement opportunities associated with this Alternative include increased diversity of fish habitat as a result of the addition of the headland beach system, with the artificially-filled cobble beaches.

5.3.2.3 Central Segment, Alternative 2: Revetment

For the base of the Doris McCarthy Trail, the same new headland beach described for Central Segment Alternative 1 is proposed (**Figure 5-13**). A revetment was also contemplated here but not pursued as it would appear out of place with the existing headland beaches on either side (Meadowcliffe and Sylvan).

For the Guild Park and Gardens area, instead of a headland beach system which is proposed in Central Segment Alternative 1, this Alternative would involve a new armourstone revetment feature with an 80 to 130 m-long headland/lookout to the east of it at the base of the existing Guild construction access route. The revetment would extend approximately 30 m into Lake Ontario, and will address aesthetics by covering the existing exposed rebar along the shoreline. The area of infill required would be approximately 42,000 m^2.

The Alternative was designed to provide a more aesthetic, long-term shoreline protection while reducing lake overtopping levels and making public access along the shoreline safer. The existing rubble protection is already providing protection to the toe of the bluff; however, the rubble material does not provide long-term shoreline protection, is within the risk line, and is subject to high wave overtopping rates, and thus potentially unsafe pedestrian access.

Aquatic habitat enhancement opportunities associated with this Alternative are similar to Alternative 1 and include increased diversity of fish habitat as a result of the headland beach feature west of the Sylvan shoreline.

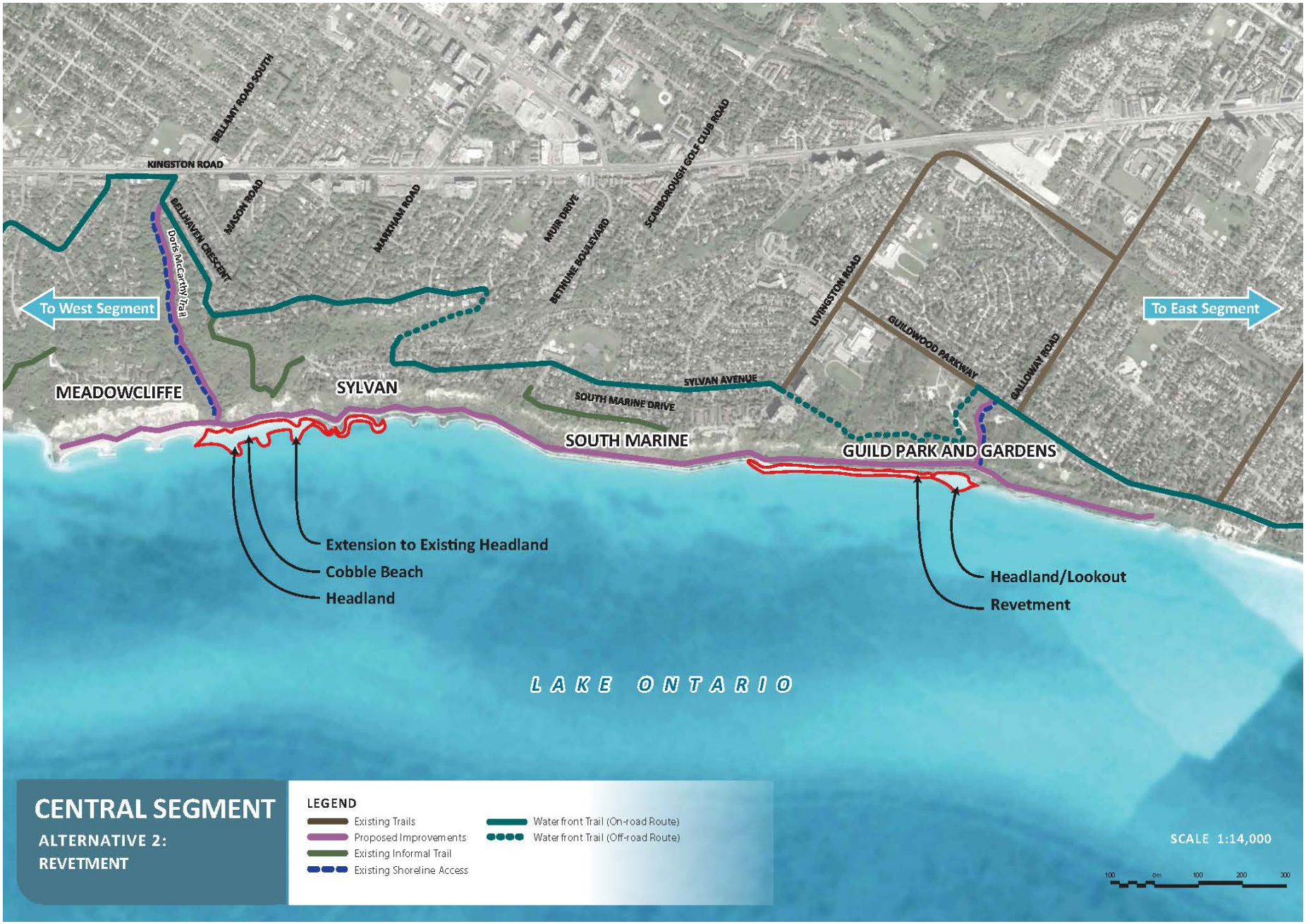
5.3.3 East Segment Alternatives

The following presents the Alternatives developed for the East Segment. Nine Alternatives plus the “Do Nothing” Alternative were developed for this Segment. All Alternatives improve access along the waterfront in this Segment. Unlike the West and Central Segments, the trail location in the East Segment varies between the top and toe of the Bluffs amongst the Alternatives.

5.3.3.1 East Segment, Do Nothing (Leave As Is)

Under the “Do Nothing” Alternative there would be no changes to the existing shoreline. Throughout this section the bluff would continue to erode and tablelands above would be slowly lost through ongoing crest migration. Greyabbey Trail (e.g., road and associated infrastructure) would be at risk from erosion within the planning timeframe of the Project (approximately 60 years). Erosion rates east of Grey Abbey Ravine are less and public infrastructure is set further back from the slope crest, therefore it will not be at risk within at least 100 years or longer.

Figure 5-13: Central Segment, Alternative 2: Revetment – Overview



Shoreline access along East Point Park is informal and at risk, and is publicly inaccessible west of the park due to private property and critical infrastructure. The only publicly accessible access point to this shoreline is east of the park at Beechgrove Drive. Many informal trails down to the shoreline exist, which negatively impact sensitive bluff vegetation communities through fragmentation and trampling and also pose a risk to users as a number of these informal trails are within existing erosion gullies and previous slope failures. Additionally, informal access along this shoreline is restricted at various times throughout the year when lake levels rise, reaching the toe of the Bluffs.

Through the East Segment, the Waterfront Trail is located on the tablelands or on roadways. The primary signed Waterfront Trail route travels north on Morningside Avenue, east on Coronation Drive, and south on Manse Road to connect with Copperfield Road. An off-road connection of the Waterfront Trail passes through Grey Abbey Park, continues along the western edge of the Grey Abbey Ravine, parallels the south side of the Metrolinx rail corridor and then connects with Copperfield Road. The planned expansion of the rail corridor through this Segment will result in constraining the trail through this area. In addition, with the expansion of the rail corridor, trains are anticipated to cross every seven minutes in either direction.

Figure 5-14 illustrates the “Do Nothing” Alternative for the East Segment.

5.3.3.2 East Segment, Alternative 1A/1B: Headlands with Top-of-Bluffs/Base-of-Bluffs Connection

Alternative 1A includes the removal of the existing breakwater feature at the east end of the Guildwood Parkway shoreline protection section and the construction of a headland beach that extends to the east side of the Grey Abbey Ravine (**Figure 5-15**).

The headlands constructed parallel to the shore would vary in length from approximately 40 to 100 m and the easternmost headland, which curves back to shore, would be approximately 180 m long. The headlands would extend up to 80 m into the lake. The area of infill required would be approximately 48,000 m^2. The beach cobble size would vary depending upon the headland length and spacing.

At the mouth of the Grey Abbey Ravine, a staircase structure would extend up to connect with a pedestrian/cycling bridge that would pass over the ravine (about 100 m in length) and connect with a new trail that would run along the top of the bluff to connect with East Point Park.

Alternative 1B is the same as Alternative 1A, but also incorporates an armourstone revetment that would protect the shoreline from Grey Abbey Park to the east side of East Point Park (**Figure 5-16**). The revetment would extend approximately 30 m offshore. As a pedestrian and cycling trail would be possible along the full length of the shoreline behind the revetment, there would be no bridge crossing of the Grey Abbey Ravine and/or pathway/stairs to access the tablelands from the bottom of the ravine. To access the revetment at the east end, the Beechgrove Drive extension down to the water’s edge would be improved and formalized.

Expected aquatic habitat improvements with these Alternatives include increased irregularity and shoreline substrate diversity.

Figure 5-14: East Segment, Do Nothing (Leave Shoreline As Is) – Overview

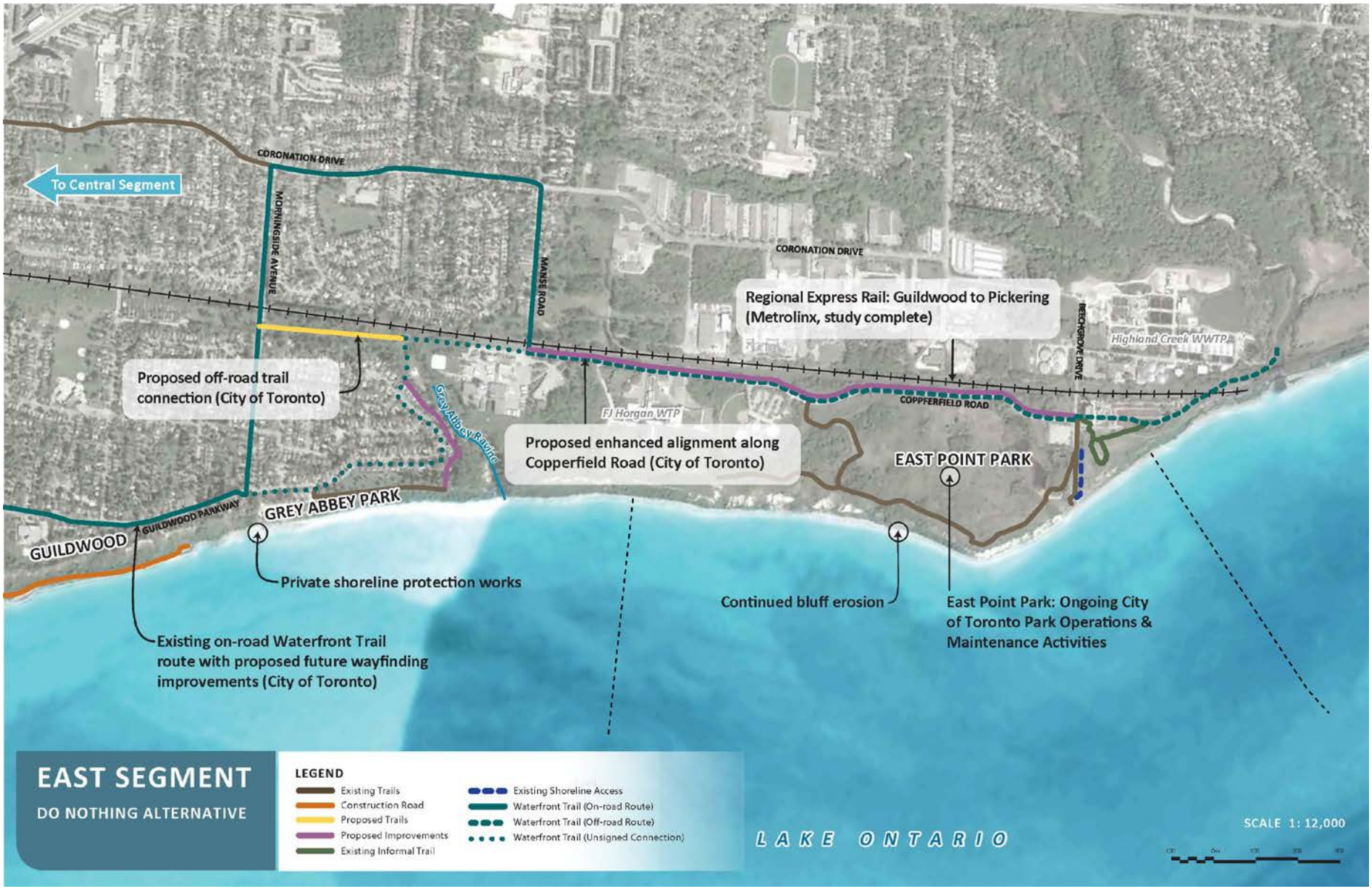


Figure 5-15: East Segment, Alternative 1A: Headland Beach with Top-of-Bluffs Connection – Overview

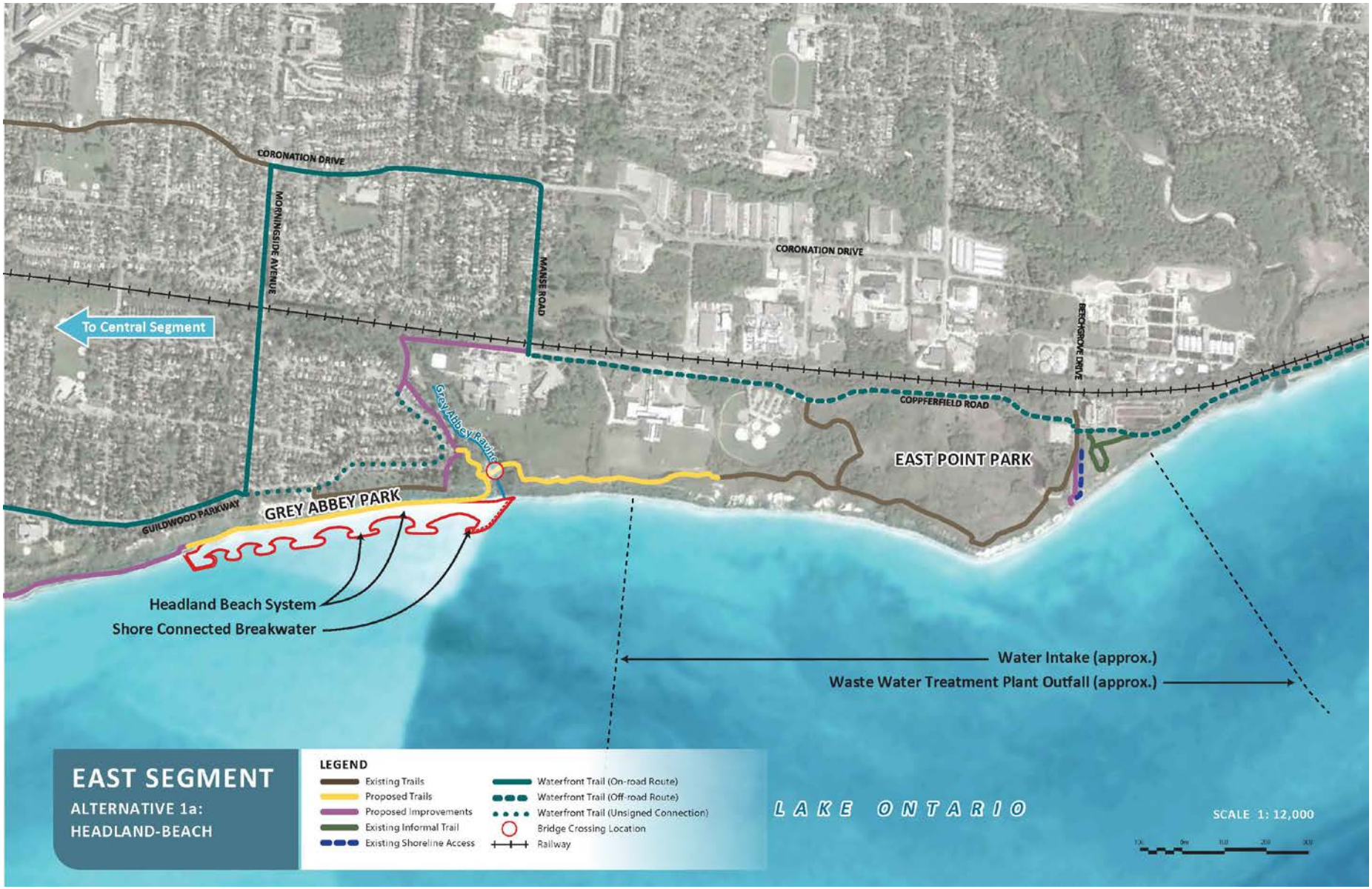
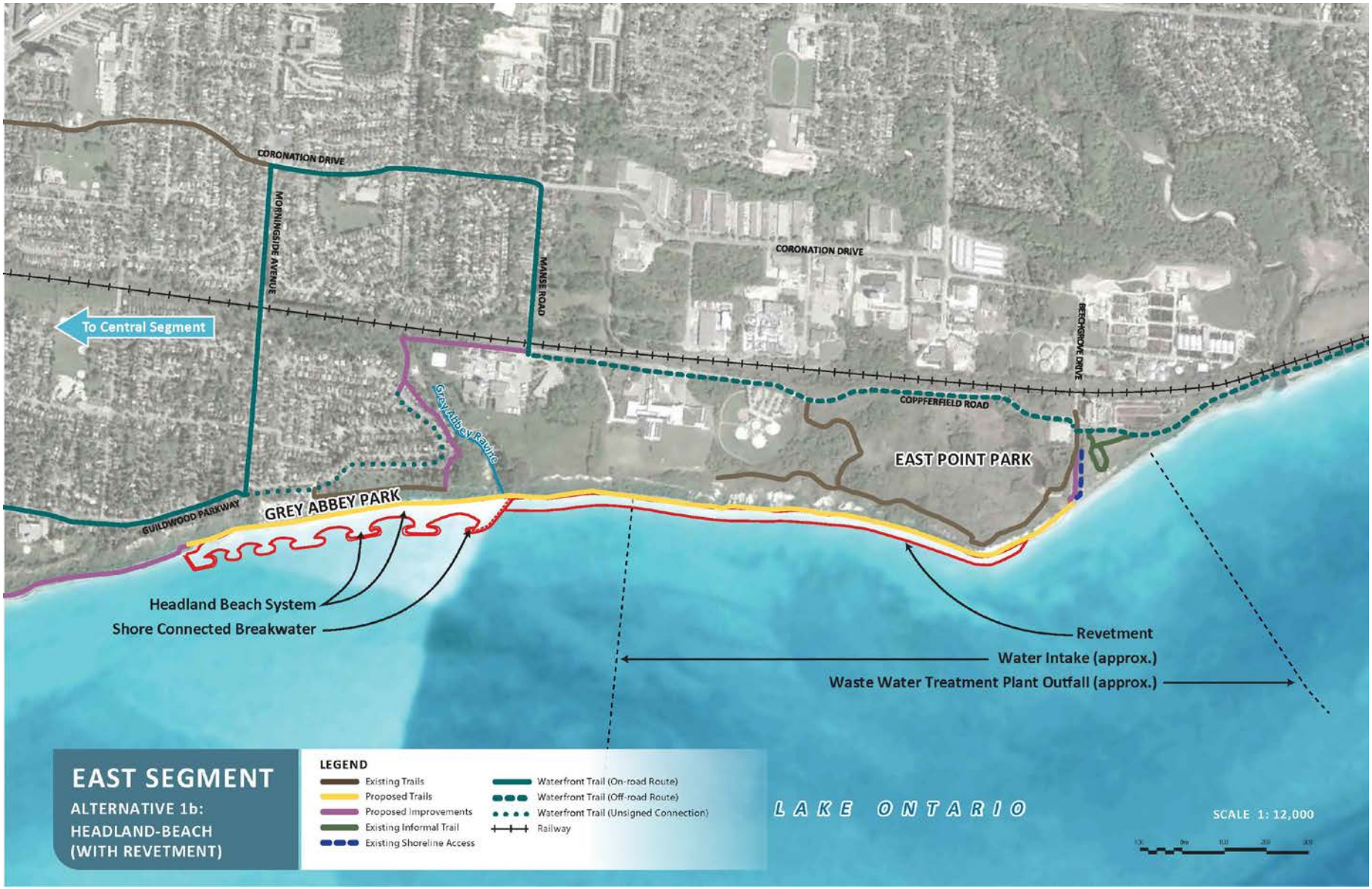


Figure 5-16: East Segment, Alternative 1B: Headland Beach with Base-of-Bluffs Connection (Revetment) – Overview



5.3.3.3 East Segment, Alternative 2A/2B: Bridge with Top-of-Bluffs Connection (Headlands/Headlands + Revetment)

Alternative 2A includes a bridge shoreline connection at the east end of the Guildwood Parkway section and a headland beach below Grey Abbey Park (**Figure 5-17**). The bridge would be constructed with approximately 30 m long spans and would be located approximately 40 m offshore. It would be approximately 430 m long. The bridge would be supported on steel piers surrounded by scour protection. The elevation of the bridge would be outside of the wave uprush area, approximately 77.5 mASL (about 2.5 m above typical lake levels). The purpose of the bridge would be to provide a pedestrian/cycling connection from the existing revetment at Guildwood Parkway to the headland beach at Grey Abbey Park.

The headland beach at Grey Abbey Park would consist of approximately 100 m-long headlands to retain a cobble beach. The headlands would extend approximately 70 to 80 m offshore. The area of infill required would be approximately 26,000 m^2. The eastern-most headland would extend to the eastern side of Grey Abbey Ravine.

The headland beach would halt toe erosion along the Grey Abbey Park shoreline, although the bridge would have no noticeable impact on erosion of the shoreline fronts.

At the mouth of Grey Abbey Ravine, a staircase structure would extend up to connect with a pedestrian/cyclist bridge that would pass over the ravine (about 100 m in length) and connect with a new trail that would run along the top of the bluff to connect with East Point Park.

Alternative 2B is the same as Alternative 2A, but also incorporates an armourstone revetment that would protect the shoreline from Grey Abbey Park to the east side of East Point Park (**Figure 5-18**). The revetment would extend approximately 30 m offshore. As a pedestrian and cycling trail would be possible along the full length of the shoreline behind the revetment, there would be no bridge crossing of the Grey Abbey Ravine and/or pathway/stairs to access the tablelands from the bottom of the ravine. To access the revetment at the east end, the Beechgrove Drive extension down to the water's edge would be improved and formalized.

Potential aquatic habitat improvement opportunities associated with both Alternative 2A and 2B include increased irregularity and shoreline substrate diversity of aquatic habitat.

5.3.3.4 East Segment, Alternative 3A/3B: Island-Bridge with Top-of-Bluffs Connection (Headland Beach/Headland Beach + Revetment)

Alternative 3A is the same as East Segment Alternative 1A, but replaces the western end of the headland beach with an island-bridge connection (**Figure 5-19**). The connection would consist of an approximately 60 m-long bridge with segments spanning approximately 50 to 60 m. The islands would be located up to 70 to 80 m into the lake. The islands would have a crest elevation above the wave uprush and overtopping height of approximately 79 mASL (4 m above typical lake level). The area of infill required would be approximately 48,000 m^2. The bridge spans would be supported by steel piers extending through the islands. Given the close proximity of the islands to the shoreline, it is expected that over time as a result of sediment deposition, the "islands" would connect with the mainland.

Figure 5-17: East Segment, Alternative 2A: Bridge with Top-of-Bluffs Connection (Headland Beach) – Overview

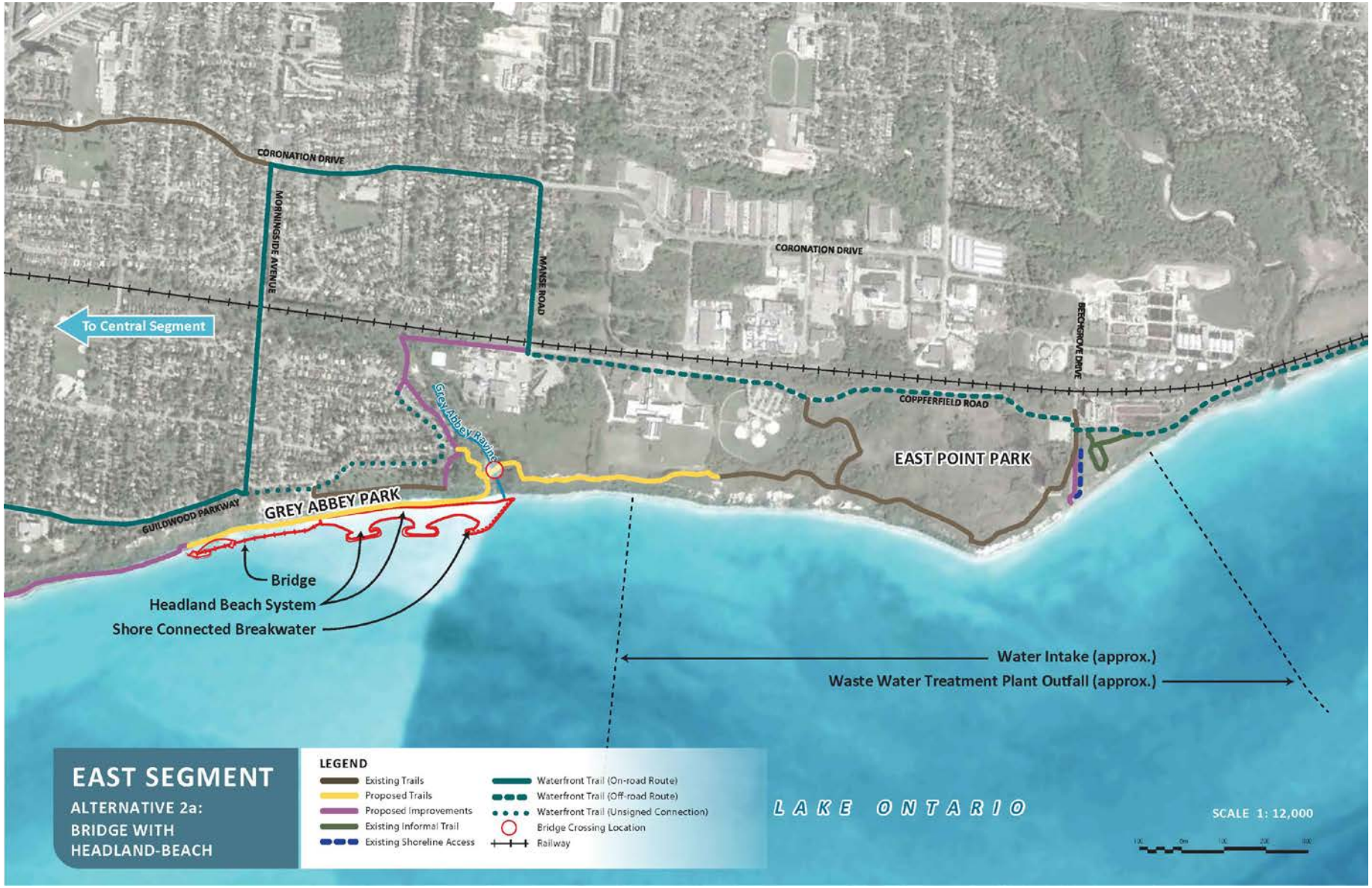


Figure 5-18: East Segment, Alternative 2B: Bridge with Base-of-Bluffs Connection (Headland Beach + Revetment) – Overview

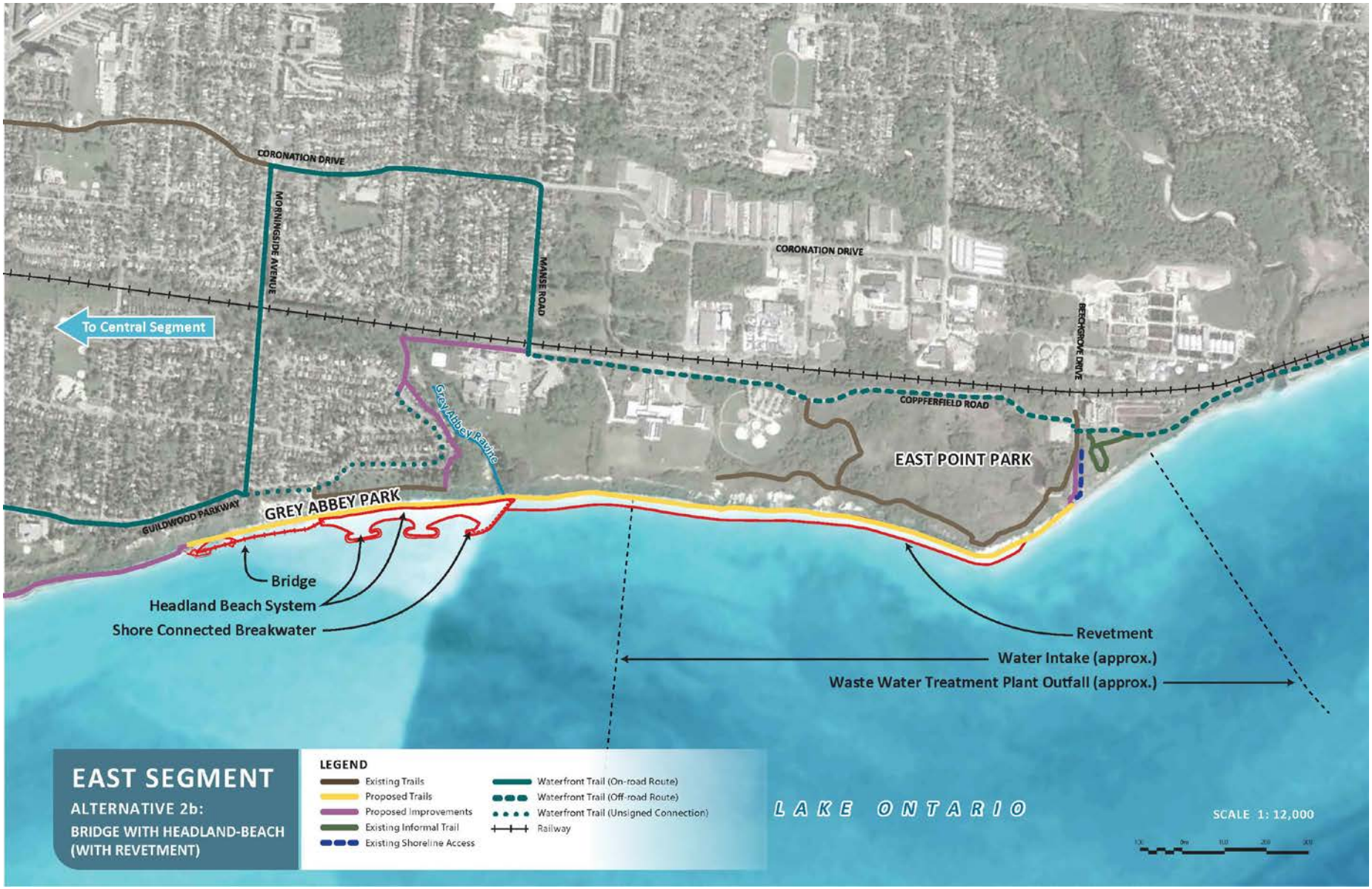
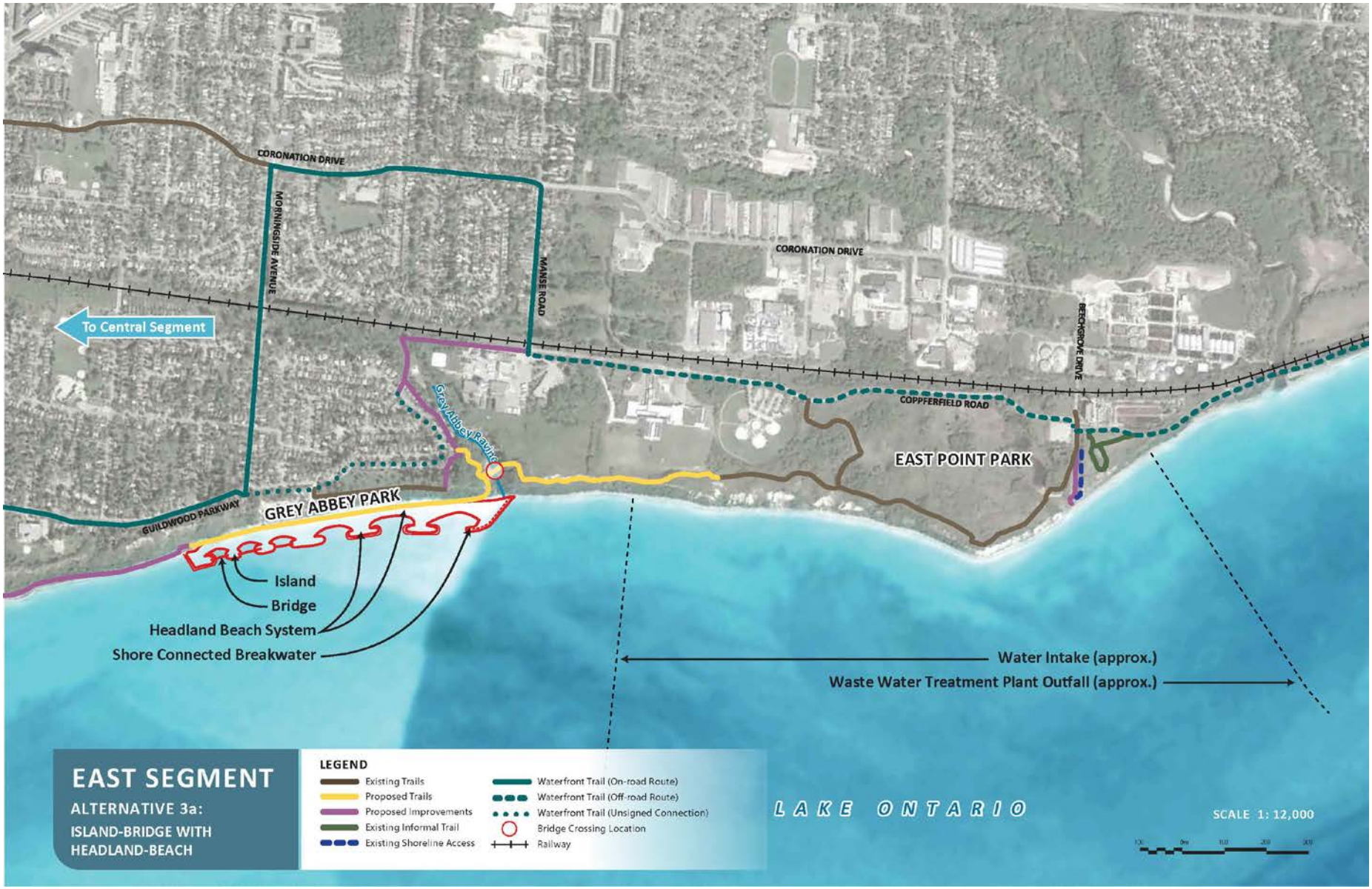


Figure 5-19: East Segment, Alternative 3A: Island-Bridge with Top-of-Bluffs Connection (Headland Beach) – Overview



At the mouth of the Grey Abbey Ravine, a staircase structure would extend up to connect with a pedestrian/cycling bridge that would pass over the ravine (about 100 m in length) and connect with a new trail that would run along the top of the bluff to connect with East Point Park.

Alternative 3B is the same as East Segment Alternative 3A, but also incorporates an armourstone revetment that would protect the shoreline from Grey Abbey Park to the east side of East Point Park (**Figure 5-20**). The revetment would extend approximately 30 m offshore. As a pedestrian and cycling trail would be possible along the full length of the shoreline behind the revetment, there would be no bridge crossing of the Grey Abbey Ravine and/or stairs up to the tablelands. To access the revetment at the east end, the Beechgrove Drive extension down to the water's edge would be improved and formalized.

Potential aquatic habitat improvement opportunities associated with both Alternative 3A and 3B include increased shoreline irregularity and shoreline substrate diversity.

5.3.3.5 East Segment, Alternative 4A/4B: Headland Beach with Revetment to East Point Park/Headland Beach to East Point Park

Alternative 4A includes the removal of the existing breakwater feature at the east end of the Guildwood Parkway shoreline protection section and the construction of a headland beach that extends to the east side of Grey Abbey Ravine (**Figure 5-21**).

The headlands constructed parallel to the shoreline would vary in length from approximately 40 to 100 m and the easternmost headland, which curves back to shore, would be approximately 180 m long. The headlands would extend up to 80 m into Lake Ontario. The beach cobble size would vary depending upon the headland length and spacing.

Alternative 4A also includes a revetment that would protect the shoreline from Grey Abbey Park to approximately 650 m east of Grey Abbey Ravine. The revetment would extend approximately 30 m offshore. For the combined area (headland and revetment) the amount of infill required would be approximately 59,000 m^2.

A trail would be possible along the length of the headland beach and revetment, with a formal tableland-waterfront connection approximately 650 m east of Grey Abbey Ravine, south of the baseball diamonds at East Point Park. At this location, there is an existing, well-used informal trail down the side of the Bluffs, which has a more gradual slope. At the proposed location of the trail shown in **Figure 5-22**, the bluff is about 25 m high and so to achieve a path slope of 7.5%, the total length of the trail would need to be about 500 m. Some trimming of the upper oversteepened slope face (extending up to 10 m from the present crest position) would be required to reduce risk from slope failure, and some fill would be required to raise the base of the trail in order to achieve the length of trail required. Depending on the nature of the trail, the slope face that could be affected would be in the range of 3,560 m^2.

Alternative 4B is the same as East Segment Alternative 4A, however, it replaces the revetment portion proposed for the east end with a continued headland beach (**Figure 5-23**).

Figure 5-20: East Segment, Alternative 3B: Island-Bridge with Base-of-Bluffs Connection (Headland Beach + Revetment) – Overview

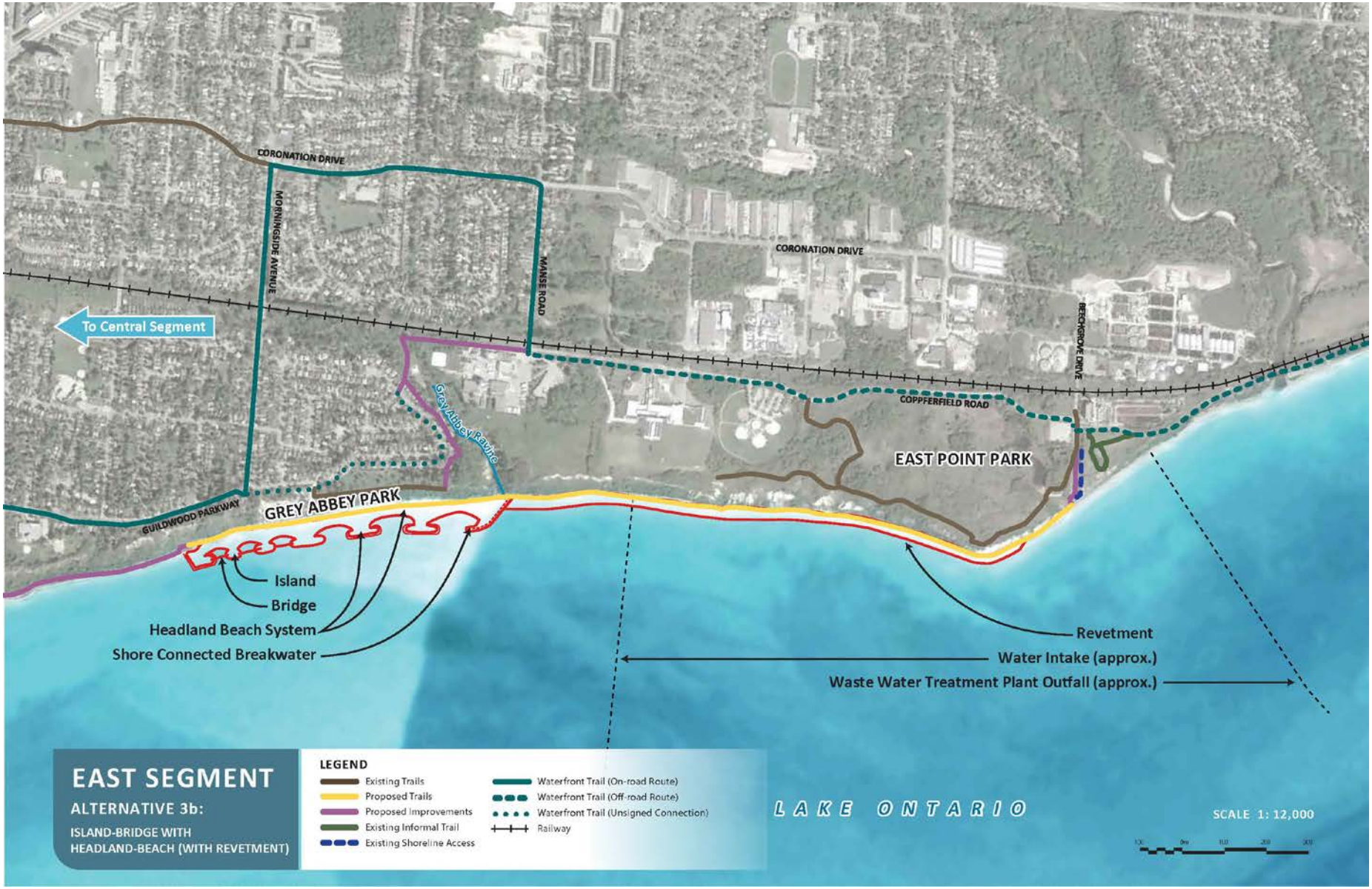


Figure 5-21: East Segment, Alternative 4A: Headland Beach with Revetment to East Point Park – Overview

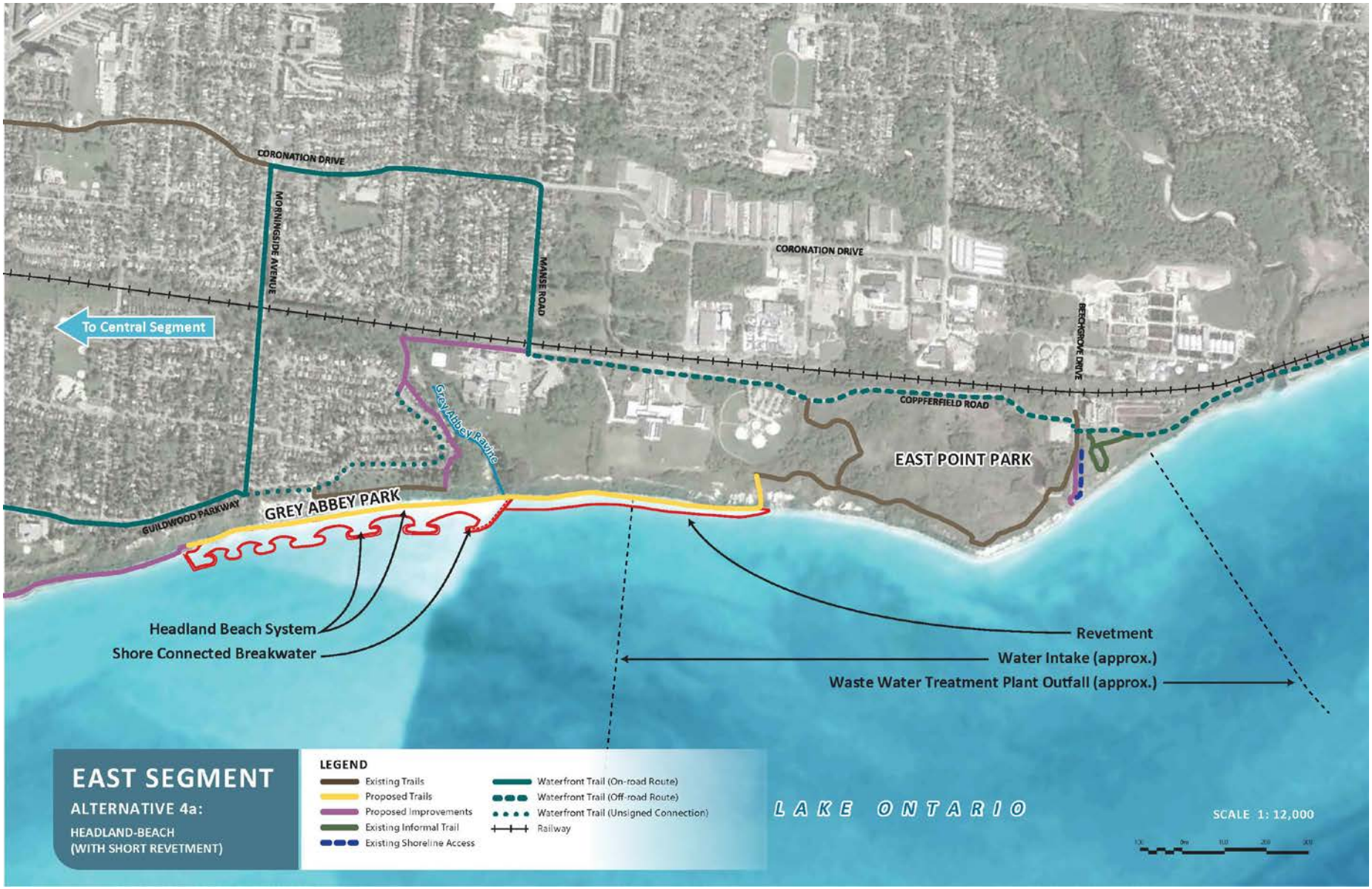
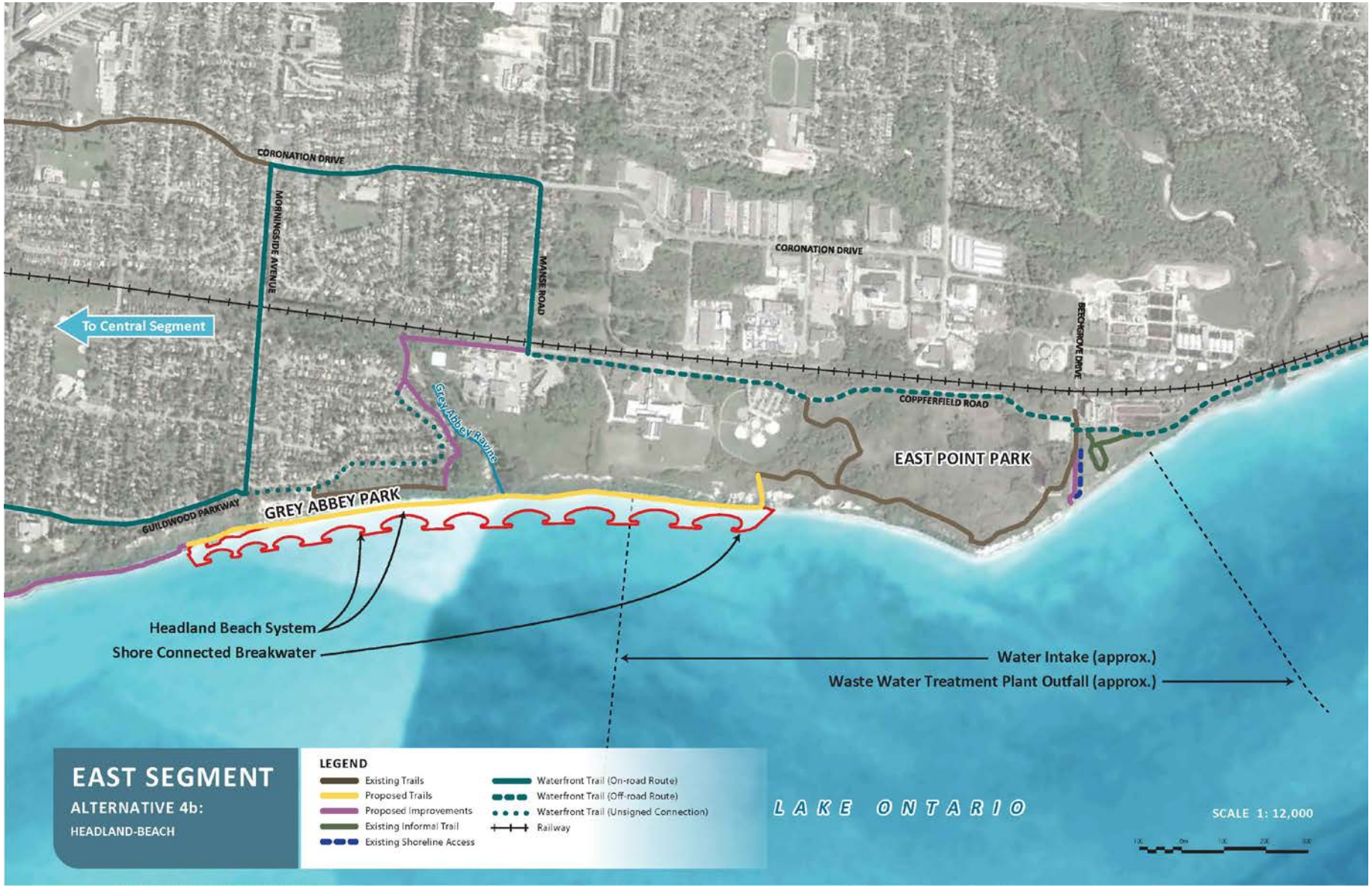


Figure 5-22: Proposed Tableland Connection at East Point Park



Figure 5-23: East Segment, Alternative 4B: Headland Beach to East Point Park – Overview



The headlands constructed parallel to the shoreline would vary in length from approximately 40 to 100 m and the eastern-most headland, which curves back to shore, would be approximately 180 m long. The headlands would extend up to 80 m into lake. The area of infill required would be approximately 86,000 m^2. The beach cobble size would vary depending upon the headland length and spacing. As with Alternative 4A, a trail would be created on the bluff face approximately 650 m east of Grey Abbey Ravine south of the baseball diamonds at East Point Park.

Potential aquatic habitat improvement opportunities associated with Alternative 4A and 4B include increased irregularity and shoreline substrate diversity.

5.3.3.6 East Segment, Alternative 5: Tableland Connection Over Grey Abbey Ravine

Alternative 5 would make no change to the shoreline east of the existing Guild construction access route. The shoreline and Bluffs would continue to erode along the sections of shoreline without existing shoreline protection. The trail connection would be along the top of the Bluffs, extending the existing Waterfront Trail from Guildwood Parkway, along the top of the Bluffs, to East Point Park and the Port Union Waterfront Trail terminus at Beechgrove Drive. To complete this trail, a pedestrian/cycling bridge would be constructed to pass over the Grey Abbey Ravine (about 100 m in length). The trail would continue east along the top of the Bluffs to connect with East Point Park (**Figure 5-24**).

5.4 Step 4: Select the Preferred Alternative

The purpose of this step was to evaluate the Alternatives in each of the Project Area Segments (West, Central and East) to identify the Preferred Alternative (i.e., the recommended project or "undertaking"). The Preferred Alternatives in each Segment were then combined to create the overall recommended Preferred Alternative. This Overall Preferred Alternative was then subject to further refinement and development in the next EA process step (see **Chapter 6**)

The evaluation of the Alternatives was undertaken using comparative Criteria and Indicators which were initially presented as draft in the ToR. The evaluation Criteria reflect the Project Vision and Objectives and were all considered to have equal levels of importance.

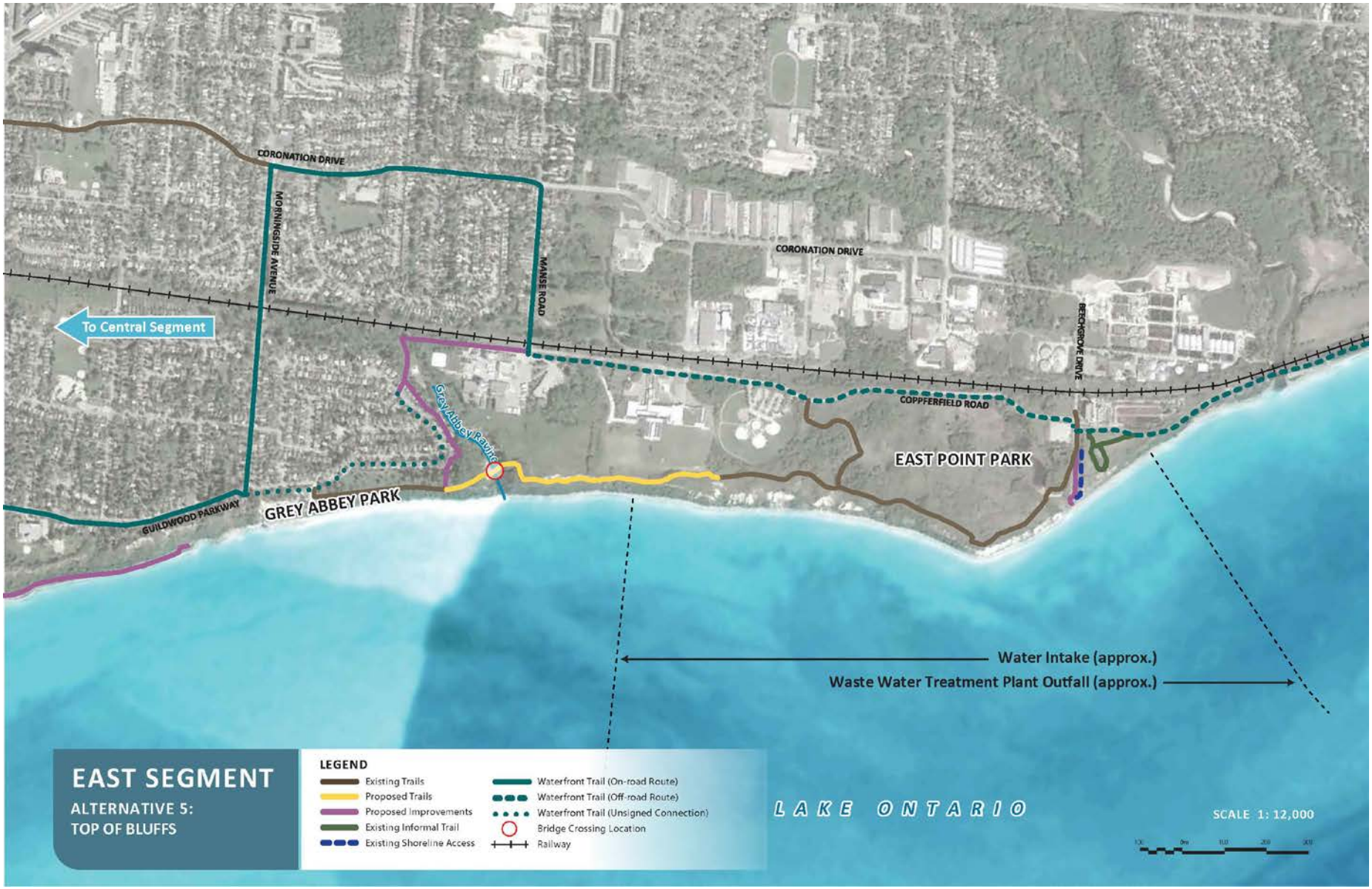
5.4.1 Evaluation Methodology

The comparative evaluation of Alternatives in each Project Area Segment involved three key steps as listed below:

1. Finalization of comparative evaluation Criteria and Indicators;
2. Assessment of net effects (effects remaining after mitigation) by Indicator for each Alternative and determination of the Alternatives' relative preference ranking (advantages and disadvantages) at an Indicator, Criterion and Objective level; and,
3. Comparative evaluation of the Alternatives in each Project Area Segment to identify the Alternative that best meets the Project Vision and Objectives.

Each of these steps is described further below.

Figure 5-24: East Segment, Alternative 5: Tableland Connection Over Grey Abbey Ravine – Overview



5.4.1.1 Criteria and Indicators

The evaluation Criteria and Indicators used for the comparative evaluation of the Alternatives were initially developed by the EA Technical Team and reviewed by a number of Stakeholders including:

- TRCA
- City of Toronto staff
- Regulatory agencies
- Stakeholder Committee
- The public
- Other interest groups

As previously noted, draft evaluation Criteria were included in the ToR and provided the basis for the finalization of the Criteria and Indicators in the EA. Various departments and individuals at TRCA, the City of Toronto, and other agencies contributed to the finalization of the evaluation Criteria. Sessions were also held with the Stakeholder Committee to gain their input on the Criteria and Indicators. Finally, the draft evaluation Criteria were made available to the public at Public Information Centre (PIC) #1 for review and comment.

The Criteria were organized by the Project Objectives and represent all aspects of the environment as per the *Ontario EA Act*. The Criteria and Indicators are objective-based, meaning they are focused on measuring the extent to which the Alternatives achieve the Project Objectives. As such, the Alternative(s) that best achieve these Objectives are identified as Preferred. An initial long list of Evaluation Criteria and Indicators were developed and then reviewed against Project information to screen out those Criteria and/or Indicators not applicable to the evaluation. For example, screening of the Evaluation Criteria included consideration of whether:

- there were no impacts;
- the feature is not present in the Project Area; and,
- there were no differences between the Alternatives.

Given differences in baseline conditions between the Segments, different Criteria and Indicators were screened from the evaluation for each Segment. **Table 5-1** presents the Criteria and Indicators considered for the comparative evaluations and **Table 5-2** presents the Criteria and Indicators screened out by Segment and the rationale for the screening.

5.4.1.2 Effects Assessment and Ranking

Each Alternative within each Segment was assessed on the basis of each Criterion and corresponding Indicator(s). The Effects Assessment considered the collected baseline data (see **Chapter 3**), Stakeholder input, and technical expertise to determine the benefits of the Alternative and/or how each Alternative would negatively impact the environment. Considering the conceptual nature of the Alternatives, the assessment was largely qualitative in nature although some quantitative measurements were taken for some Indicators (e.g., area of infill).

Table 5-1: Criteria and Indicators Considered for the Comparative Evaluation

Objectives	Criteria	Indicators	Indicator Definitions	Mitigation	Ranking Measures
Protect and enhance terrestrial and aquatic natural features and linkages	▪ Extent of aquatic habitat enhanced or diminished	▪ Ability to increase shoreline morphology by increasing shoreline irregularity	▪ As supported by long-term monitoring data, open coast shorelines with more complex profiles result in increased species richness. Each Alternative results in an impact to shoreline morphology. Increasing the morphology via increasing irregularity improves essential aquatic habitat and benefits local resident and migratory fish (including SAR American Eel) while providing optimal functional open coast habitat. In particular, a complex shoreline profile provides for increased foraging opportunities, cover, and shelter.	No mitigation measures identified as this Indicator measures the quality of habitat created.	MP = Alternative that has the highest ability to increase shoreline morphology via increasing irregularity P = Alternative with second-highest ability IP = Alternative with second-lowest ability LP = Alternative with lowest or no ability
		▪ Ability to increase shoreline substrate type diversity	▪ As supported by long-term monitoring data, more diverse open coast shorelines support increased species richness. Each Alternative results in an impact to shoreline substrate type composition. Increases in the relative amounts of cobble and boulder substrate, in relation to sand, brings the shoreline closer to historical conditions. This increased diversity improves essential aquatic habitat and benefits local resident and migratory fish, including SAR American Eel, while providing optimal functional open coast habitat. In particular, increased shoreline substrate diversity provides more foraging, cover and shelter opportunities for fish.	No mitigation measures identified as this Indicator measures the quality of habitat created.	MP = Alternative that has the highest ability to increase shoreline substrate type diversity P = Alternative with second-highest ability IP = Alternative with second-lowest ability LP = Alternative with lowest or no ability
		▪ Potential for aquatic habitat loss or modification	▪ Alternatives differ in terms of their overall ***footprint***, as indicated by their area of infill. Alternatives with the most infill have the potential to result in the highest amount of existing habitat lost or modified. As this does not consider the quality of the habitat, and as the Alternatives' conceptual designs can be refined to minimize the footprint overall, this Indicator considers the potential for habitat loss only, as compared to the other Alternatives. Alternatives with a small amount of or no infill will be ranked higher.	No mitigation measures identified as this Indicator measures the quantity of habitat lost and the area lost has been minimized to the extent possible through design.	MP = Alternative does not involve infill P = Alternative involves a small amount of infill IP = Alternative involves a medium to high amount of infill LP = Alternative that involves the highest amount of infill
	▪ Extent of terrestrial habitat attributes enhanced or diminished	▪ Potential to create appropriate ***land-water interface***	▪ Potential exists to create land-water interface that benefits terrestrial species. Where the interface provides ease of access for wildlife and is always out of the water, the Alternative is preferred.	No mitigation measures identified as this Indicator measures the quality of habitat created.	MP = Highest quality land-water interface (highest ease of access and greatest length always out of water) P = Intermediate quality land-water interface IP = Lower quality land-water interface LP = Least quality land-water interface
		▪ Impact to vegetation communities of concern (note: vegetation communities are key criteria for designation of ESAs and ANSIs)	▪ Different Alternatives have varying levels of impact on vegetation communities of concern. Vegetation communities provide habitat for both flora and fauna species.	No mitigation measures identified as this Indicator measures the quantity of habitat lost and the area lost has been minimized to the extent possible through design.	MP = No negative impacts, potential for positive impacts on vegetation communities of conservation concern P = No negative impacts IP = Some negative impacts LP = Most negative impacts
	▪ Potential for impact on terrestrial Species at Risk (SAR)	▪ Potential effects to habitat for Bank Swallow	▪ Potential terrestrial SAR present in the Study Area include Bank Swallows. Alternatives that benefit SAR and minimize negative impacts will be preferred.	No mitigation measures identified as this Indicator measures the quantity of habitat lost and the area lost has been minimized to the extent possible through design.	MP = Least degree of or no impacts on SAR P = Intermediate degree of impacts on SAR IP = Higher degree of impacts on SAR LP = Highest degree of impacts on SAR

Table 5-1: Criteria and Indicators Considered for the Comparative Evaluation

Objectives	Criteria	Indicators	Indicator Definitions	Mitigation	Ranking Measures
Manage public safety and property risk	▪ Ability to minimize public safety risk and property loss as a result of slope erosion/failure	▪ Ability to provide a trail lakeward of risk line along the shoreline and shoreward of the risk line along the top of the bluff	▪ Bluff erosion processes can result in slope failure (e.g., landslide). The improvement of existing trails and development of new trails along the toe/top of the slope could result in public safety risks as a result of the potential for slope failure. Alternatives that better accommodate this risk are more preferred.	No mitigation measures identified as this Indicator measures the relative safety of the trail for each Alternative.	MP = Provides the highest degree of safe formal public access P = Provides a relatively high degree of safe formal public access IP = Provides an intermediate degree of safe formal public access LP = Provides the lowest degree of safe formal public access
		▪ Ability to address the potential loss of public property and infrastructure as a result of slope erosion/failure (slope crest migration)	▪ Bluff erosion processes can result in slope failure (e.g., landslide), including loss of tableland and erosion of the bluff face. There are varying levels of risk for slope failure within the Study Area which can impact public property and infrastructure.	No mitigation measures identified as this Indicator measures the relative ability of each Alternative to eliminate public safety risk.	MP = Alternative eliminates risk to public property and infrastructure P = Alternative is associated with risk to public property only IP = Alternative is associated with risk to open space and public recreational amenities LP = Alternative is associated with risk to public property and infrastructure
	▪ Improve Emergency Services access to the waterfront	▪ Ability to provide additional Emergency Services access along the waterfront	▪ Currently Emergency Services vehicle access to the shoreline is largely limited to Bluffer's Park along Brimley Road; the shoreline between Meadowcliffe and Grey Abbey along the Guild construction access route; and to the tablelands at East Point Park. Alternatives which provide opportunity for additional Emergency Services vehicle access along the entire shoreline Segments are more preferred.	No mitigation measures identified as this Indicator measures the relative ability of each Alternative to provide Emergency Services access. Increasing access is achieved by using another Alternative.	MP = Allows for all vehicles to access entire Segment P = Allows for some access to entire Segment IP = Allows for limited access LP = Does not allow access beyond existing extent of access
	▪ Ability to protect source water protection areas	▪ Potential for impacts on water quality at water intake pipe locations	▪ Water supply intake pipe locations are considered as source water protection areas by the Province. Water quality within these source water protection areas cannot be negatively impacted.	No mitigation measures identified as water quality impacts of shore protection works are a product of changes to coastal processes, which cannot be altered through mitigation.	MP = No potential for negative impacts LP = Potential for negative impacts
Provide an enjoyable waterfront experience	▪ Improve public access to the waterfront	▪ Potential to provide continuous formal public access along the shoreline	▪ Various planning documents identify a trail along the water's edge as a long-term objective. The Project considers a trail along the shoreline that includes both top and toe of the Bluffs. Improved public access along the shoreline includes consideration for increased formal public access and continuous connections. Alternatives which are better able to provide continuous formal public access along the water's edge are preferred.	No mitigation measures identified. Indicator measures degree to which continuous formal public access is achieved and cannot be altered through mitigation.	MP = Provides for continuous formal public access along the entire Segment P = Provides for continuous formal public access along a large portion of the Segment IP = Provides for continuous formal public access along a small portion of the Segment LP = Provides the least amount of continuous formal public access along the Segment
		▪ Ability to accommodate a primary to high-capacity multi-use trail (width)	▪ Within the Greater Toronto Area, the Waterfront Trail experiences significant demand, and user conflicts along shared paths have been reported. The provision of a primary to high-capacity multi-use trail is recognized as an opportunity to alleviate these pressures. While existing physical and environmental constraints may limit the ability to accommodate such a trail, Alternatives which provide the greatest opportunity for a primary or high-capacity multi-use trail outside the risk line within the Segment are preferred.	No mitigation measures identified. Indicator measures degree to which primary to high-capacity multi-use trail (width) is achieved and cannot be altered through mitigation.	MP = Accommodates a multi-use trail that meets primary trail to high-capacity standard within the entire Segment P = Accommodates a multi-use trail, where only a small portion does not meet primary to high-capacity trail standard IP = Accommodates a multi-use trail, where a medium to large portion does not meet primary to high-capacity trail standard LP = Accommodates a multi-use trail, where the largest portion does not meet primary to high-capacity trail standards; or does not accommodate a primary to high-capacity multi-use trail

Table 5-1: Criteria and Indicators Considered for the Comparative Evaluation

Objectives	Criteria	Indicators	Indicator Definitions	Mitigation	Ranking Measures
		▪ Ability to meet AODA grade standard	▪ Improved access along the shoreline includes opportunities to provide physical AODA accessibility. Alternatives which are better able to accommodate a suitable grade are preferred.	Mitigation includes the use of level rest areas on steep slopes where possible. However, it is noted that while this helps it does not achieve suitable grades.	MP = Potential to meet AODA grade standard along full length P = Potential to meet AODA grade standard along most of the length IP = AODA grade standard met along least of the length LP = AODA grade standard cannot be met
		▪ Ability to provide formal direct public access to the water	▪ The public desires opportunities for direct access to the water. Alternatives that provide direct access to the water are more preferred.	Access to the water is a product of the type of shoreline protection works being proposed. As such there is no mitigation identified.	MP = Provides formal direct access to the water over the greatest length P = Provides formal direct access to the water over second-greatest distance IP = Provides formal direct access to the water over the second-shortest distance LP = Does not provide for formal direct access to the water, or provides the least amount of direct access
	▪ Potential for changes to the use of the waterfront for recreation	▪ Potential for change in character of sandy shorelines	▪ The existing sand beach at Bluffer's Park and sandy shoreline at East Point Park are valued by the public. Negative impacts and changes to the character of these shorelines are to be minimized, and Alternatives that achieve this and provide opportunities for enhancement will be considered preferred.	The potential for change in the character of sandy shorelines is a product of the type of shoreline protection works being proposed. As such there is no mitigation identified.	MP = No negative impact anticipated to the character of existing sand shoreline, with opportunities for enhancements P = No negative impact to character of existing sand shoreline IP = Minor negative impact to character of existing sand shoreline LP = Significant negative impact to character of existing sand shoreline
		▪ Potential impacts to the Blue Flag Beach at Bluffer's Park	▪ Water quality is one of many criteria considered in the designation of a Blue Flag Beach. Impacts and changes to the water quality at Bluffer's Park Blue Flag Beach are to be avoided, and Alternatives that achieve this will be considered most preferred.	Changes to water quality affecting the Blue Flag Beach at Bluffer's Park is a product of the shoreline protection works being proposed throughout the Study Area. As such there is no mitigation identified.	MP = No potential to increase the number of beach closures per season LP = Potential to increase the number of beach closures
		▪ Potential for impact on navigation and boating infrastructure	▪ Changes or modifications of sediment supply or sediment transport may impact navigational depths and/or dredging requirements of existing boating facilities at Bluffer's Park. Alternatives that minimize sediment supply will be preferred.	Change to navigation and boating infrastructure is a product of the shoreline protection works being proposed throughout the Study Area. As such there is no mitigation identified.	MP = High Potential to reduce sedimentation and therefore dredging requirements in the entrance to Bluffer's Park boat basin P = Medium potential to reduce sedimentation IP = Low potential to reduce sedimentation LP = No potential to reduce sedimentation
Consistency and co-ordination with other initiatives	▪ Ability to integrate with City and other agency plans and initiatives	▪ Ability to integrate with new and proposed plans or initiatives	▪ There are many plans and initiatives underway within the Study Area including for example: Metrolinx Regional Express Rail (RER) Program. The Alternatives will need to integrate, and accommodate these other initiatives. Alternatives that can best accommodate these plans/initiatives will be preferred.	No mitigation identified.	MP = Provides highest ability to accommodate other plans and initiatives P = Provides opportunity to accommodate other plans and initiatives IP = Provides intermediate opportunity to accommodate other plans and initiatives LP = Provides the least opportunity to accommodate other plans and initiatives
		▪ Consistency with the goals of the Fish Community Objectives for Lake Ontario	▪ The Fish Community Objectives for Lake Ontario were created to maintain and increase target fish species in Lake Ontario. Alternatives which are able to advance these objectives are more preferred.	No mitigation identified.	MP = Provides additional contributions to the advancement of applicable objectives LP = Does not provide additional contributions to the advancement of applicable objectives

Table 5-1: Criteria and Indicators Considered for the Comparative Evaluation

Objectives	Criteria	Indicators	Indicator Definitions	Mitigation	Ranking Measures
		▪ Consistency with the goals and objectives of the Management Plan for Guild Park and Gardens	▪ Significant community planning has occurred for the Guild Park and Gardens site. The Management Plan was developed to provide a framework to guide the management of the site. Alternatives which best advance the framework of the Management Plan are more preferred.	No mitigation identified.	MP = Most consistent with the Guild Park and Gardens Management Plan P = Consistent with the Guild Park and Gardens Management Plan (meets most objectives) IP = Consistent with the Guild Park and Gardens Management Plan (meets some objectives) LP = Least consistent with the Guild Park and Gardens Management Plan (does not meet any objectives)
		▪ Consistency with the objectives of Bikeway Trails Implementation Plan	▪ The 2016 Draft 10-Year Bike Plan identifies implementation priorities. Priorities for the Project Study Area include: water's edge connection from Bluffer's Park to Morningside, and opportunities for water's edge connection from Morningside Avenue to Port Union.	No mitigation identified.	MP = Consistent with the objectives of the Bikeway Trails Implementation Plan LP = Not consistent with the objectives of the Bikeway Trails Implementation Plan
		▪ Consistency with the Integrated Shoreline Management Plan (ISMP)	▪ The 1996 ISMP identified a series of recommendations for the Project Area.	No mitigation identified.	MP = Consistent with the objectives of the ISMP LP = Not consistent with the objectives of the ISMP
	▪ Compatibility with existing land uses	▪ Compatibility with existing land use (industrial)	▪ Industrial land uses exist within the Project Study Area. Alternatives which minimize impacts on existing industrial areas are more preferred.	No mitigation identified.	MP = Most compatible with existing industrial land use P = Compatible with existing industrial land use IP = Somewhat compatible with existing industrial land use LP = Least compatible with existing industrial land use
		▪ Compatibility with existing land use (residential)	▪ Residential land uses exist within the Project Study Area. Alternatives which minimize impacts on existing residential areas are more preferred.	No mitigation identified.	MP = Most compatible with existing residential land use P = Compatible with existing residential land use IP = Somewhat compatible with existing residential land use LP = Least compatible with existing residential land use
	▪ Potential impact on archaeological resources, built heritage resources, and cultural heritage landscapes	▪ Potential to impact known or potential archaeological resources	▪ Impacts to archaeological resources (terrestrial and/or marine) need to be minimized or mitigated. Alternatives that best achieve this will be considered as preferred.	Where possible archaeological resources have been avoided as part of Project design. Should a resource be affected, mitigation by conservation, documentation or in situ protection would be undertaken.	MP = Will not impact any known or potential archaeological resources P = Low potential to impact archaeological resources but mitigation would be possible IP = Moderate potential to impact archaeological resources but mitigation would be possible LP = Will impact archaeological resources and cannot be effectively mitigated
		▪ Potential for impact on traditional land uses and valued cultural features	▪ It is important to recognize any features or areas in the Study Area that have traditional/cultural importance to First Nation communities. Further, opportunities to celebrate these features and educate the public about them will be explored. Alternatives that best achieve this will be preferred.	No mitigation identified.	MP = Will not impact traditional land uses and valued cultural features P = Low potential to impact traditional land uses and valued cultural features IP = Moderate potential to impact traditional land uses and valued cultural features LP = Will impact traditional land uses and valued cultural features

Table 5-1: Criteria and Indicators Considered for the Comparative Evaluation

Objectives	Criteria	Indicators	Indicator Definitions	Mitigation	Ranking Measures
		▪ Potential to impact known built heritage resources, and cultural heritage landscapes	▪ Impacts to built heritage resources and cultural heritage landscapes need to be minimized. Alternatives that best achieve this will be considered as preferred.	Where possible heritage resources have been avoided as part of Project design. Should a resource be affected, mitigation by conservation, documentation or in situ protection would be undertaken.	MP = Will not impact known built heritage resources and cultural heritage landscapes P = Low potential to impact known built heritage resources and cultural heritage landscapes IP = Moderate potential to impact known built heritage resources and cultural heritage landscapes LP = Will impact known built heritage resources and cultural heritage landscapes
Achieve value for cost	▪ Estimated capital cost	▪ Estimated cost to construct (relative to each other)	▪ High level relative costs for the Alternatives have been developed. Less expensive Alternatives will be scored higher.	No mitigation identified	MP = Lowest construction cost P = Low intermediate construction cost IP = High intermediate construction cost LP = Highest construction cost
		▪ Potential amount of water lot and property acquisition required (relative to each other)	▪ Some Alternatives could require Crown water lots (measured between the outmost extent of the Alternative and the shoreline), private property and/or easements across private property. Alternatives that minimize impacts to Crown water lots and private property are Preferred.	No mitigation identified	MP = Will not require private property or Crown water lots P = Will require the least amount of private property parcels and/or Crown water lots IP = Will require a greater amount of private property parcels and/or Crown water lots LP = Will require the greatest amount of private property parcels and/or Crown water lots
	▪ Maintenance and operations costs	▪ Relative maintenance and operation costs of the shoreline and erosion works	▪ Alternatives that would be expected to have lower maintenance and operations cost would be preferred.	No mitigation identified.	MP = Lowest maintenance and operations costs P = Low intermediate maintenance and operation costs IP = High intermediate maintenance and operation costs LP = Highest maintenance and operation costs

Table 5-2: Criteria and Indicators Screened Out by Segment and Rationale for the Screening

Segment	Objective	Criteria	Indicator	Rationale
All	Manage public safety and property risk	Ability to protect source water protection areas	Potential for impacts on water quality at water intake pipe locations	Same for all Alternatives. There were no impacts to the water quality at the F.J. Horgan WTP intake pipes.
	Consistency and co-ordination with other initiatives	Ability to integrate with City and other agency plans and initiatives	Consistency with the objectives of Bikeway Trails Implementation Plan	Same for all Alternatives.
			Consistency with the Integrated Shoreline Management Plan	Same for all Alternatives.
		Potential impact on archaeological resources, built heritage resources, and cultural heritage landscapes	Potential for impact on traditional land uses and valued cultural features	Same for all Alternatives.
			Potential to impact known built heritage resources, and cultural heritage landscapes	Same for all Alternatives. There are no impacts to the built heritage resources and cultural heritage landscapes within the Project Study Area.
West	Protect and enhance terrestrial and aquatic natural features and linkages	Potential for impact on terrestrial Species at Risk (SAR)	Potential effects to habitat for Bank Swallow	Same for all West Segment Alternatives. None of the proposed Alternatives, including the “Do Nothing”, are anticipated to have a direct impact on Bank Swallow habitat, as the Bluffs below Cudia Park will naturally undergo self-stabilization within the next 100 years. Therefore, the quantity of Bank Swallow habitat will likely be reduced through increased vegetation for all Alternatives; however, habitat will not be eliminated and Bank Swallows will continue to nest in the unvegetated parts of the bluff face.
	Manage public safety and property risk	Ability to minimize public safety risk and property loss as a result of slope erosion/failure	Ability to address the potential loss of public property and infrastructure as a result of slope erosion/failure (slope crest migration)	No risk to public property or infrastructure in this Segment.
	Consistency and co-ordination with other initiatives	Ability to integrate with City and other agency plans and initiatives	Ability to integrate with new and proposed plans or initiatives	No new initiatives in West Segment.
			Consistency with the goals and objectives of the Management Plan for Guild Park and Gardens	Not applicable.
		Compatibility with existing land uses	Compatibility with existing land use (industrial)	Not applicable.
			Compatibility with existing land use (residential).	Not applicable.
		Potential impact on archaeological resources, built heritage resources, and cultural heritage landscapes	Potential to impact known or potential archaeological resources	No identified resources in West Segment.
Central	Protect and enhance terrestrial and aquatic natural features and linkages	Potential for impact on terrestrial Species at Risk	Potential effects to habitat for Bank Swallow	Same for all Central Segment Alternatives. No change to existing conditions.
	Manage public safety and property risk	Ability to minimize public safety risk and property loss as a result of slope erosion/failure	Ability to address the potential loss of public property and infrastructure as a result of slope erosion/failure (slope crest migration)	Existing shoreline protection structures across the Central Segment have previously addressed this risk
		Improve Emergency Services access to the waterfront	Ability to provide additional Emergency Services access along the waterfront	Same for all Central Segment Alternatives.
	Provide an enjoyable waterfront experience	Potential for changes to the use of the waterfront for recreation	Potential for change in character of sandy shorelines	Not applicable.
			Potential impacts to the Blue Flag Beach at Bluffer’s Park	Same for all Alternatives.
			Potential for impact on navigation and boating infrastructure	Same for all Alternatives.
	Consistency and co-ordination with other initiatives	Ability to integrate with City and other agency plans and initiatives	Ability to integrate with new and proposed plans or initiatives	Not applicable.
			Consistency with the goals and objectives of the Management Plan for Guild Park and Gardens	Same for all Central Segment Alternatives.
		Compatibility with existing land uses	Compatibility with existing land use (industrial)	Not applicable.
			Compatibility with existing land use (residential)	Not applicable.
East	Provide an enjoyable waterfront experience	Potential for changes to the use of the waterfront for recreation	Potential impacts to the Blue Flag Beach at Bluffer’s Park	Same for all Alternatives.
			Potential for impact on navigation and boating infrastructure	Same for all Alternatives.
	Consistency and co-ordination with other initiatives	Ability to integrate with City and other agency plans and initiatives	Consistency with the goals and objectives of the Management Plan for Guild Park and Gardens	Not applicable.

The evaluation of "Alternative Methods" was structured to assess the ability of each Alternative to meet the Project Vision and Objectives through a comparison of the net effects associated with operation/establishment of the Alternative. As an overriding goal, the Preferred Alternative is to result in an overall net benefit over the "Do Nothing" Alternative to the environment and community. Given the conceptual level of detail associated with each Alternative, mitigation of operation/establishment effects includes avoidance of negative effects (e.g., loss of terrestrial and aquatic habitats, impacts to built heritage, cultural heritage or archaeological resources, etc.) through design, where possible. Table 5-1 details the mitigation considered for each Indicator. For the purpose of this evaluation, the effects associated with construction (e.g., sedimentation, traffic, dust, noise, changes to access and use, etc.) were considered to be similar for each Alternative and generally could be mitigated using standard construction best management practices (see **Appendix H**). As construction effects did not help to distinguish among the Alternatives, the net effects from construction were not included in the evaluation.

Once the Effects Assessment was completed, the Alternatives were ranked relative to each other on the basis of the following scale: Most Preferred, Preferred, Intermediate Preferred, and Least Preferred. The rationale for each level of ranking for each Indicator is presented in **Table 5-1** above. In determining the relative rankings of the Alternatives for each Indicator the following was considered: the sensitivity of the affected feature, the potential to mitigate/enhance the effect, and the confidence level of the assessment. If the differences among the Alternatives were identified to be small, the Alternatives were rated similar or the same.

The full and complete results of the Effects Assessment and ratings are presented in **Appendix F**. Separate evaluation tables were prepared for each of the three Project Area Segments.

5.4.1.3 Comparative Evaluation

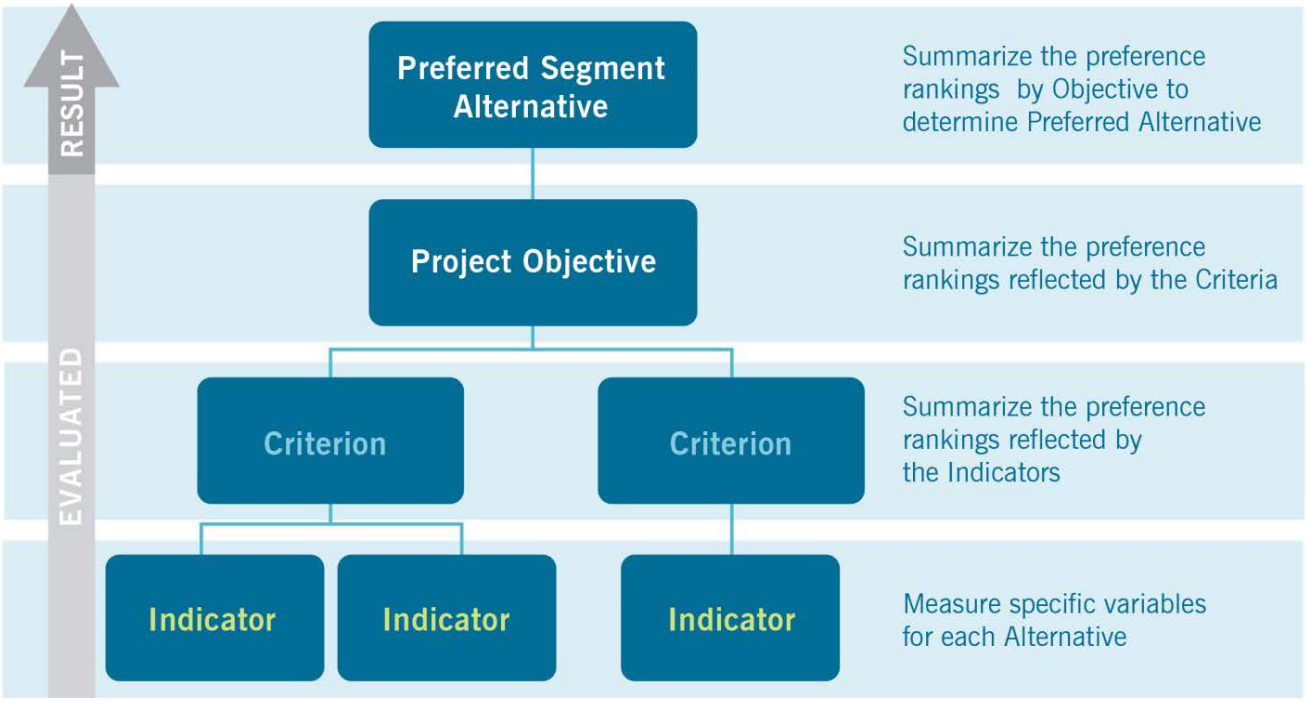
The comparative evaluation of the Alternatives was completed through a comprehensive and rational process for which all Objectives, Criteria and Indicators are of equal importance. Considering the Effects Assessment results, the first step involved the "rolling-up" of the Indicator-level rankings to an overall Criteria-level ranking. In some cases trade-offs, making a rational decision to accept some negative effects to achieve an overall benefit, were made to rationalize preference rankings by Criteria. Next, the Criteria-level rankings were then "rolled-up" to determine preference rankings at the Objective level. The final step of the evaluation process was to determine the overall Preferred Alternative by considering the preference rankings by the five Project Objectives and by discussing the relative advantages and disadvantages of each Alternative. **Figure 5-25** illustrates this process.

Each of these evaluation steps required trade-offs to be made to determine the preference rankings. The results of the Indicator-level, Criteria-level and Objective-level preference rankings are presented in **Appendix F**.

For each of the Project Area Segments, the following report sections describe the rationale for the Alternative preference ranking by Project Objective within each Project Area Segment. These descriptions of the evaluation results draws on the detailed information presented in **Appendix F** as

well as the input received from Stakeholders and the public at and following PIC #2 which presented the draft evaluation results.

Figure 5-25: Alternatives Comparative Evaluation Process



5.4.2 Evaluation Results – West Segment

The following presents the comparative evaluation results for the West Segment. The evaluation is organized by Project Objective and presents the trade-offs that were made considering the Alternative assessment results, and advantages and disadvantages, as detailed in **Appendix F**. The discussion of effects assumes that mitigation measures have been applied to address any potential effects and that construction effects and mitigation measures are common to all Alternatives. Nine Alternatives including the "Do Nothing" Alternative were assessed in the West Segment as described previously in **Section 5.3.1**.

5.4.2.1 Objective 1: Protect and Enhance Terrestrial and Aquatic Natural Features and Linkages

The Criteria and Indicators for this Objective measure the ability of each Alternative to protect existing natural features and enhance or create new habitat and ecological linkages. For this Objective, the following Criteria were considered:

- Extent of Aquatic Habitat Enhanced or Diminished; and,
- Extent of Terrestrial Habitat Attributes Enhanced or Diminished.

Table 5-3 provides a Criteria-level summary of the Alternatives comparative evaluation for Objective 1. A more detailed evaluation table is provided in **Appendix F**.

Regarding the Criterion *Extent of Aquatic Habitat Enhanced or Diminished*, the Alternatives ranked Preferred included: Alternative 1 (Headland Beach), Alternative 3A (Short Span Island-Bridge), and Alternative 5B (Wide Beach). Alternative 1 provides the greatest increase to shoreline substrate type diversity through a moderate reduction in sand supplemented by a high increase in cobble and moderate increase in armourstone (boulder). Alternative 3A and Alternative 5B provide the greatest positive change to shoreline morphology through high increases in shoreline irregularity. The changes associated with Alternative 1, Alternative 3A and Alternative 5B provide the greatest opportunities for enhancement that will benefit both resident and migratory fish, relative to the other Alternatives. No Alternatives were ranked as Most Preferred with respect to this Criterion. Although the "Do Nothing" Alternative results in no fill, this is the only Alternative that provides no improvement to shoreline morphology or shoreline substrate type diversity.

Concerning the Criterion *Extent of Terrestrial Habitat Attributes Enhanced or Diminished,* the Alternatives ranked Most Preferred included: Alternative 5A (Narrow Beach) and Alternative 5B (Wide Beach) as these Alternatives provide potential for the expansion of existing sand dune communities (by enlarging the existing sand beach) and result in enhancing the existing land-water interface to the greatest extent. Alternative 1 (Headland Beach) and the "Do Nothing" Alternative were ranked as Preferred. Alternative 1 (Headland Beach) provides the second-greatest enhancement to the existing land-water interface. The "Do Nothing" Alternative is not anticipated to have any negative impacts on vegetation communities of concern. However, with the "Do Nothing" Alternative, there are no opportunities for vegetation community of concern enhancement (i.e., sand dune expansion).

Considering the above Criteria-level rankings, the Most Preferred Alternative for Objective 1 was Alternative 5B (Wide Beach) as this Alternative provides one of the best opportunities for aquatic habitat enhancement through increases in shoreline profile morphology, some increase in shoreline substrate type diversity, and has the greatest potential to enhance the land-water interface. Alternative 5B also provides the opportunity for sand dune vegetation community expansion to the greatest extent.

5.4.2.2 Objective 2: Manage Public Safety and Property Risk

The Criteria and Indicators for this Objective measure the ability of each Alternative to manage public safety and property risk. For this Objective, the following Criteria were considered:

- Ability to Minimize Public Safety Risk and Property Loss as a Result of Slope Erosion/ Failure; and,
- Improve Emergency Services Access to the Waterfront.

Table 5-4 provides a Criteria-level summary of the Alternatives comparative evaluation for Objective 2. A more detailed evaluation table is provided in **Appendix F**.

Table 5-3: West Segment, Objective 1 Criteria Level Evaluation Summary

Objective	Criteria	Indicators	Do Nothing[1]	Alternative 1[2]	Alternative 2A[3]	Alternative 2B[4]	Alternative 3A[5]	Alternative 3B[6]	Alternative 4[7]	Alternative 5A[8]	Alternative 5B[9]
Protect and enhance terrestrial and aquatic natural features and linkages	Extent of aquatic habitat enhanced or diminished	▪ Ability to increase shoreline morphology by increasing shoreline irregularity ▪ Ability to increase shoreline substrate type diversity ▪ Potential for aquatic habitat loss or modification	**Intermediate Preferred** No fill, but no improvement in morphology or substrate type diversity, relative to the other Alternatives.	**Preferred** High amount of fill (40,000 m^2). Increase in morphology through a 30% increase in shoreline irregularity. Greatest improvement to shoreline substrate type diversity through a high increase in cobble and a moderate increase in boulder proportions, relative to the previously existing sand-dominated substrate.	**Intermediate Preferred** Minor amount of fill. No increase in morphology as shoreline irregularity remains the same. No improvement to shoreline substrate type diversity.	**Intermediate Preferred** Minor amount of fill. No increase in morphology as shoreline irregularity remains the same. No improvement to shoreline substrate type diversity.	**Preferred** Moderate amount of fill (12,000 m^2). Highest increase in morphology through a 60% increase in shoreline irregularity. Some improvement to shoreline substrate type diversity through a moderate increase in boulder proportions, relative to the previously existing sand-dominated substrate.	**Intermediate Preferred** Moderate amount of fill (9,000 m^2). Increase in morphology through a 40% increase in shoreline irregularity. Some improvement to shoreline substrate type diversity through a moderate increase in boulder proportions, relative to the previously existing sand-dominated substrate.	**Intermediate Preferred** Moderate amount of fill (15,000 m^2). No increase in morphology, as shoreline irregularity remains the same. Some improvement to shoreline substrate type diversity through a moderate increase in boulder proportions, relative to the previously existing sand-dominated substrate.	**Intermediate Preferred** High amount of fill (49,000 m^2). Increase in morphology through a 30% increase in shoreline irregularity. Some improvement to shoreline substrate type diversity through a moderate increase in boulder substrate, relative to the previously existing sand-dominated substrate.	**Preferred** Highest amount of fill (109,000 m^2). Second-highest increase in morphology through a 50% increase in shoreline irregularity. Some improvement to shoreline substrate type diversity through a moderate increase in boulder substrate, relative to the previously existing sand-dominated substrate.
	Extent of terrestrial habitat attributes enhanced or diminished	▪ Potential to create appropriate land-water interface ▪ Impact to vegetation communities of concern	**Preferred** No improvement to land-water interface. No impacts to vegetation communities of concern.	**Preferred** Positive changes to land-water interface through a 15% increase in shoreline length that provides a land-water interface that is always out of the water. Moderate temporary impacts to ~3,500 m^2 of beach vegetation communities of concern.	**Intermediate Preferred** No improvement to land-water interface. Low temporary impacts to ~400 m^2 of beach vegetation communities of concern.	**Intermediate Preferred** No improvement to land-water interface. Low temporary impacts to ~400 m^2 beach vegetation communities of concern.	**Intermediate Preferred** No improvement to land-water interface. Low temporary impacts to ~300 m^2 beach vegetation communities of concern.	**Intermediate Preferred** No improvement to land-water interface. Low temporary impacts to ~200 m^2 beach vegetation communities of concern.	**Least Preferred** Negative change in land-water interface through a 20% reduction in shoreline length that provides a land-water interface that is always out of water. Greatest permanent negative impacts (i.e., loss) to ~2,300 m^2 of beach vegetation communities of concern.	**Most Preferred** Greatest improvement to land-water interface through a 30% increase in shoreline length that provides a land-water interface that is always out of the water. Alternative provides potential for expansion of existing sand dune communities (by enlarging existing sand beach).	**Most Preferred** Greatest improvement to land-water interface through a 30% increase in shoreline length that provides a land-water interface that is always out of water. Alternative provides potential for expansion of existing sand dune communities (by enlarging existing sand beach).
Objective-Level Ranking			**Intermediate Preferred**	**Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Least Preferred**	**Preferred**	**Most Preferred**

Notes: *1. Existing Conditions* *2. Headland Beach* *3. Short Span Bridge* *4. Long Span Bridge* *5. Short Span Island-Bridge* *6. Long Span Island-Bridge* *7. Causeway* *8. Narrow Beach* *9 Wide Beach*

Table 5-4: West Segment, Objective 2 Criteria Level Evaluation Summary

Objective	Criteria	Indicators	Do Nothing[1]	Alternative 1[2]	Alternative 2A[3]	Alternative 2B[4]	Alternative 3A[5]	Alternative 3B[6]	Alternative 4[7]	Alternative 5A[8]	Alternative 5B[9]
Manage public safety and property risk	Ability to minimize public safety risk and property loss as a result of slope erosion/failure	▪ Ability to provide a trail lakeward of risk line along the shoreline and shoreward of the risk line along the top of the bluff	**Least Preferred** Cannot effectively minimize public safety risk.	**Most Preferred** Effectively minimizes risk to public safety (trail outside of risk line).	**Most Preferred** Effectively minimizes risk to public safety (trail outside of risk line).	**Most Preferred** Effectively minimizes risk to public safety (trail outside of risk line).	**Most Preferred** Effectively minimizes risk to public safety (trail outside of risk line).	**Most Preferred** Effectively minimizes risk to public safety (trail outside of risk line).	**Most Preferred** Effectively minimizes risk to public safety (trail outside of risk line).	**Most Preferred** Effectively minimizes risk to public safety (trail outside of risk line).	**Most Preferred** Effectively minimizes risk to public safety (trail outside of risk line).
	Improve Emergency Services access to the waterfront	▪ Ability to provide additional Emergency Services access along the waterfront	**Least Preferred** Provides no access beyond east parking lot at Bluffer's Park.	**Most Preferred** Provides access along entire length of Segment.	**Most Preferred** Provides access along entire length of Segment.	**Most Preferred** Provides access along entire length of Segment.	**Most Preferred** Provides access along entire length of Segment.	**Most Preferred** Provides access along entire length of Segment.	**Most Preferred** Provides access along entire length of Segment.	**Most Preferred** Provides access along entire length of Segment.	**Most Preferred** Provides access along entire length of Segment.
Objective-Level Ranking			**Least Preferred**	**Most Preferred**	**Most Preferred**	**Most Preferred**	**Most Preferred**	**Most Preferred**	**Most Preferred**	**Most Preferred**	**Most Preferred**

Notes: *1. Existing Conditions* *2. Headland Beach* *3. Short Span Bridge* *4. Long Span Bridge* *5. Short Span Island-Bridge* *6. Long Span Island-Bridge* *7. Causeway* *8. Narrow Beach* *9 Wide Beach*

Regarding the Criterion *Ability to Minimize Public Safety Risk and Property Loss as a Result of Slope Erosion/Failure,* all the Alternatives, except the "Do Nothing" Alternative, were ranked Most Preferred as these Alternatives effectively minimize risk to public safety by allowing the development of a trail outside of the risk line.

Regarding the Criterion *Improve Emergency Services Access to the Waterfront,* all of the Alternatives, except the "Do Nothing" Alternative, were ranked as Most Preferred as all would permit Emergency Services vehicle access along the full length of the Shoreline Segment.

Considering the above Criteria-level rankings, all the Alternatives, except the "Do Nothing" Alternative, were the highest ranked Alternatives for Objective 2. Key benefits of these Alternatives include the minimization of public safety risk, and provision of full Emergency Services access.

5.4.2.3 Objective 3: Provide an Enjoyable Waterfront Experience

The Criteria and Indicators for this Objective measure the extent to which each Alternative provides an enjoyable waterfront experience. For this Objective, the following Criteria were considered:

- Improve Public Access to the Waterfront; and,
- Potential for Changes to the Use of the Waterfront for Recreation.

Table 5-5 provides a Criteria-level summary of the Alternatives comparative evaluation for Objective 3. A more detailed evaluation table is provided in **Appendix F**.

For the Criterion *Improve Public Access to the Waterfront,* the Alternatives ranked Most Preferred included: Alternatives 1 (Headland Beach), 5A (Narrow Beach) and 5B (Wide Beach) as these Alternatives provide access along the water's edge, space for a primary to high-capacity multi-use trail, and safe, improved formal direct access to the water.

With respect to *Potential for Changes to the Use of the Waterfront for Recreation,* Alternatives 5A (Narrow Beach) and 5B (Wide Beach) were ranked as Most Preferred as the existing Bluffer's Park Beach would be enhanced, and sediment supply and alongshore sediment transport will be eliminated, improving navigation conditions at the entrance to the Bluffer's Park boat basin.

Considering the above two Criteria-level rankings, Alternatives 5A (Narrow Beach) and 5B (Wide Beach) were ranked as Most Preferred as they were ranked Most Preferred for both Criteria (*Improve Public Access to the Waterfront* and *Potential for Changes to the Use of the Waterfront for Recreation*).

5.4.2.4 Objective 4: Consistency and Co-ordination with Other Initiatives

The Criteria and Indicators for this Objective measure the extent to which the Alternatives are consistent and co-ordinated with other initiatives or plans in the Study Area. For this Objective, only one Criterion was considered as all the others were screened out because there were no differences between the Alternatives:

- Ability to Integrate with City and Other Agency Plans and Initiatives.

Table 5-5: West Segment, Objective 3 Criteria Level Evaluation Summary

Objective	Criteria	Indicators	Do Nothing[1]	Alternative 1[2]	Alternative 2A[3]	Alternative 2B[4]	Alternative 3A[5]	Alternative 3B[6]	Alternative 4[7]	Alternative 5A[8]	Alternative 5B[9]
Provide an enjoyable waterfront experience	Improve public access to the waterfront	▪ Potential to provide continuous formal public access along the shoreline ▪ Ability to accommodate a primary to high-capacity multi-use trail (width) ▪ Ability to meet AODA grade standard ▪ Ability to provide formal direct public access to the water	**Least Preferred** Does not provide continuous access along water's edge or space for a multi-use trail. AODA grade requirements cannot be met east of the existing beach. Provides a moderate amount of formal direct public access to the water along ~45% of the existing shoreline (Bluffer's Park Beach).	**Most Preferred** Provides continuous access along the water's edge and space for a multi-use trail. AODA grade requirements can be met. The length of shoreline that provides formal direct access to the water is increased by 20%.	**Preferred** Provides continuous access along the water's edge and space for a multi-use trail. AODA grade requirements can be met. No change to the length of shoreline that provides formal direct access to the water.	**Preferred** Provides continuous access along the water's edge and space for a multi-use trail. AODA grade requirements can be met. No change to the length of shoreline that provides formal direct access to the water.	**Preferred** Provides continuous access along the water's edge and space for a multi-use trail. AODA grade requirements can be met. No change to the length of shoreline that provides formal direct access to the water.	**Preferred** Provides continuous access along the water's edge and space for a multi-use trail. AODA grade requirements can be met. No change to the length of shoreline that provides formal direct access to the water.	**Intermediate Preferred** Provides continuous access along the water's edge and space for a multi-use trail. AODA grade requirements can be met. No change to the length of shoreline that provides formal direct access to the water.	**Most Preferred** Provides continuous access along the water's edge and space for a multi-use trail. AODA grade requirements can be met. The length of shoreline that provides formal direct access to the water is increased by 40%.	**Most Preferred** Provides continuous access along the water's edge and space for a multi-use trail. AODA grade requirements can be met. The length of shoreline that provides formal direct access to the water is increased by 40%.
	Potential for changes to the use of the waterfront for recreation	▪ Potential for change in character of sandy shorelines ▪ Potential impacts to the Blue Flag Beach at Bluffer's Park ▪ Potential for impact on navigation and boating infrastructure	**Preferred** No negative impact to character of existing sand beach or changes to existing conditions. No change to alongshore sediment transport, with gradual reductions in sediment supply.	**Preferred** Greatest physical impact on existing beach with a ~40% reduction in sand beach length, but provides approximately ~500 m of new cobble shoreline. No change to alongshore sediment transport, but sediment supply will be eliminated, thus improving navigation.	**Intermediate Preferred** Minor impact to existing beach with a ~1% reduction in sand beach length. Sediment supply will be reduced very gradually, with negligible change to alongshore sediment transport, resulting in minimal change to navigation.	**Intermediate Preferred** Minor impact to existing beach with a ~1% reduction in sand beach length. Sediment supply will be reduced very gradually, with negligible change to alongshore sediment transport, resulting in minimal change to navigation.	**Intermediate Preferred** Minor impact to existing beach with a ~5% reduction in sand beach length. Sediment supply will be reduced gradually, with little change to alongshore sediment transport, resulting in minimal change to navigation.	**Intermediate Preferred** Minor impact to existing beach with a ~5% reduction in sand beach length. Sediment supply will be reduced gradually, with little change to alongshore sediment transport, resulting in minimal change to navigation.	**Intermediate Preferred** Second greatest impact on existing beach with a ~30% reduction in sand beach length and potential for beach closures due to water quality changes. Sediment supply will be reduced gradually, with no change to alongshore sediment transport, resulting in minimal change to navigation.	**Most Preferred** Provides greatest enhancement to existing sand beach with a ~40% increase in sand beach length. Sediment supply and alongshore sediment transport will be eliminated, thus improving navigation.	**Most Preferred** Provides greatest enhancement to existing sand beach with a ~40% increase in sand beach length. Sediment supply and alongshore sediment transport will be eliminated, thus improving navigation.
Objective-Level Ranking			**Intermediate Preferred**	**Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Most Preferred**	**Most Preferred**

Notes:
1. *Existing Conditions*
2. *Headland Beach*
3. *Short Span Bridge*
4. *Long Span Bridge*
5. *Short Span Island-Bridge*
6. *Long Span Island-Bridge*
7. *Causeway*
8. *Narrow Beach*
9. *Wide Beach*

Table 5-6 provides a Criteria-level summary of the Alternatives comparative evaluation for Objective 4. A more detailed evaluation table is provided in **Appendix F**.

Considering the Criterion *Ability to Integrate with City and Other Agency Plans and Initiatives*, Alternatives 1 (Headland Beach), 2A (Short Span Bridge), 2B (Long Span Bridge), 3A (Short Span Island-Bridge), 3B (Long Span Island-Bridge), 5A (Narrow Beach), and 5B (Wide Beach) were ranked as Most Preferred as these Alternatives provide additional contributions to the advancement of applicable fish community objectives as a result of the increases in local physical morphology and substrate diversity.

5.4.2.5 Objective 5: Achieve Value for Cost

The Criteria and Indicators for this Objective consider the capital and long-term maintenance and operating costs of the Alternatives. For this Objective, the following Criteria were considered:

- Estimated Capital Cost; and,
- Maintenance and Operations Costs.

Table 5-7 provides a Criteria-level summary of the Alternatives comparative evaluation for Objective 5. A more detailed evaluation table is provided in **Appendix F**.

Considering the Criterion *Estimated Capital Cost,* the “Do Nothing” Alternative was ranked as Most Preferred as this Alternative does not involve any infrastructure works. For the Criterion *Maintenance and Operations Costs*, the Alternatives ranked as Preferred included: Alternative 1 (Headland Beach), Alternative 4 (Causeway), Alternative 5B (Wide Beach), and the “Do Nothing” Alternative, as each of these Alternatives are anticipated to have low maintenance costs. No Alternatives were ranked as Most Preferred. Overall the “Do Nothing” Alternative is Most Preferred for this Objective.

Table 5-6: West Segment, Objective 4 Criteria Level Evaluation Summary

Objective	Criteria	Indicators	Do Nothing[1]	Alternative 1[2]	Alternative 2A[3]	Alternative 2B[4]	Alternative 3A[5]	Alternative 3B[6]	Alternative 4[7]	Alternative 5A[8]	Alternative 5B[9]
Consistency and co-ordination with other initiatives	Ability to integrate with City and other agency plans and initiatives	▪ Consistency with the goals of the Fish Community Objectives for Lake Ontario	**Least Preferred** Does not provide additional contributions to the advancement of applicable fish community objectives.	**Most Preferred** Provides additional contributions to the advancement of applicable fish community objectives.	**Most Preferred** Provides additional contributions to the advancement of applicable fish community objectives.	**Most Preferred** Provides additional contributions to the advancement of applicable fish community objectives.	**Most Preferred** Provides additional contributions to the advancement of applicable fish community objectives.	**Most Preferred** Provides additional contributions to the advancement of applicable fish community objectives.	**Least Preferred** Does not provide additional contributions to the advancement of applicable fish community objectives.	**Most Preferred** Provides additional contributions to the advancement of applicable fish community objectives.	**Most Preferred** Provides additional contributions to the advancement of applicable fish community objectives.
Objective-Level Ranking			**Least Preferred**	**Most Preferred**	**Most Preferred**	**Most Preferred**	**Most Preferred**	**Most Preferred**	**Least Preferred**	**Most Preferred**	**Most Preferred**

Notes: 1. *Existing Conditions* 2. *Headland Beach* 3. *Short Span Bridge* 4. *Long Span Bridge* 5. *Short Span Island-Bridge* 6. *Long Span Island-Bridge* 7. *Causeway* 8. *Narrow Beach* 9 *Wide Beach*

Table 5-7: West Segment, Objective 5 Criteria Level Evaluation Summary

Objective	Criteria	Indicators	Do Nothing[1]	Alternative 1[2]	Alternative 2A[3]	Alternative 2B[4]	Alternative 3A[5]	Alternative 3B[6]	Alternative 4[7]	Alternative 5A[8]	Alternative 5B[9]
Achieve value for cost	Estimated capital cost	▪ Estimated cost to construct (relative to each other) ▪ Potential amount of water lot and property acquisition required (relative to each other)	**Most Preferred** No construction costs. No Crown water lot acquisition.	**Preferred** Estimated to have higher cost than the "Do Nothing" but lower than Alternatives 2A, 2B, 3B, 5A and 5B. Moderate Crown water lot acquisition required.	**Preferred** Estimated to have intermediate-high cost. Lower than Alternatives 2B, 5A and 5B. Low Crown water lot acquisition required.	**Intermediate Preferred** Estimated to have the highest relative cost. Low Crown water lot acquisition required.	**Preferred** Estimated to have higher cost than the "Do Nothing" but lower than Alternatives 2A, 2B, 3B, 5A and 5B. Moderate Crown water lot acquisition required.	**Intermediate Preferred** Estimated to have intermediate-high cost. Lower than Alternatives 2B, 5A and 5B. Moderate Crown water lot acquisition required.	**Preferred** Estimated to have higher cost than the "Do Nothing" but lower than Alternatives 2A, 2B, 3B, 5A and 5B. Moderate Crown water lot acquisition required.	**Least Preferred** Estimated to have the highest relative costs. Moderate Crown water lot acquisition required.	**Least Preferred** Estimated to have the highest relative costs. Greatest amount of Crown water lot acquisition required.
	Maintenance and operations costs	▪ Relative maintenance and operation costs of the shoreline and erosion works	**Preferred** No new infrastructure provided. Low maintenance cost relative to the other Alternatives for maintenance of existing structures.	**Preferred** Low maintenance requirements.	**Least Preferred** Expected to have highest maintenance cost due to exposed nature of the bridge and need to replace components (e.g., bridge railings, deck, etc.).	**Least Preferred** Expected to have highest maintenance cost due to exposed nature of the bridge and need to replace components (e.g., bridge railings, deck, etc.).	**Intermediate Preferred** Expected to have high-intermediate maintenance cost due to exposed nature of the bridge and need to replace components (e.g., bridge railings, deck, etc.). Shorter length of bridge than Alternatives 2A/2B. Low maintenance requirement for islands.	**Intermediate Preferred** Expected to have high-intermediate maintenance cost due to exposed nature of the bridge and need to replace components (e.g., bridge railings, deck, etc.). Shorter length of bridge than Alternatives 2A/2B. Low maintenance requirement for islands.	**Preferred** Low maintenance requirements.	**Intermediate Preferred** While beach and new headlands maintenance requirements are relatively low, bridge component requirements are high. Combined, high relative maintenance costs.	**Preferred** Low maintenance requirements.
Objective-Level Ranking			**Most Preferred**	**Preferred**	**Intermediate Preferred**	**Least Preferred**	**Preferred**	**Intermediate Preferred**	**Preferred**	**Least Preferred**	**Intermediate Preferred**

Notes: 1. *Existing Conditions* 2. *Headland Beach* 3. *Short Span Bridge* 4. *Long Span Bridge* 5. *Short Span Island-Bridge* 6. *Long Span Island-Bridge* 7. *Causeway* 8. *Narrow Beach* 9 *Wide Beach*

5.4.2.6 West Segment – Overall Evaluation Results

Table 5-8 provides a summary of the Objective rankings for the West Segment Alternatives. From this summary it is clear that Alternative 5B is Most Preferred, with four Most Preferred rankings and one Intermediate Preferred ranking. The advantages achieved by this Alternative are, on balance, outweighed by the additional costs or disadvantages. Key advantages of this Alternative leading to a rank of Most Preferred include:

- Provides greatest aquatic and terrestrial habitat enhancement opportunities, as there is the potential to increase shoreline morphology and shoreline substrate type diversity with the replacement of some of the coarse substrate material that has been removed historically, along with the potential for sand dune expansion with Alternative 5B;
- Provides good enhancement opportunities for land-water interface;
- Provides inclusive, continuous access along the shoreline;
- Reduces public safety risks; and,
- Provides additional Emergency Services access along waterfront.

Table 5-8: West Segment – Objective Level Evaluation Results Summary

Objective	Do Nothing[1]	Alternative 1[2]	Alternative 2A[3]	Alternative 2B[4]	Alternative 3A[5]	Alternative 3B[6]	Alternative 4[7]	Alternative 5A[8]	Alternative 5B[9]
Natural Environment	IP	P	IP	IP	IP	IP	LP	P	MP
Risk	LP	MP	MP	MP	MP	MP	MP	MP	MP
Experience	IP	P	IP	IP	IP	IP	IP	MP	MP
Co-ordination	LP	MP	MP	MP	MP	MP	MP	MP	MP
Cost	MP	P	IP	LP	P	IP	P	LP	IP
Overall	**Least Preferred**	**Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Preferred**	**Intermediate Preferred**	**Least Preferred**	**Preferred**	**Most Preferred**

Notes:
1. Existing Conditions
2. Headland Beach
3. Short Span Bridge
4. Long Span Bridge
5. Short Span Island-Bridge
6. Long Span Island-Bridge
7. Causeway
8. Narrow Beach
9 Wide Beach

5.4.3 Evaluation Results – Central Segment

The following presents the results for the Alternatives comparative evaluation for the Central Segment. The evaluation is organized by Project Objective and presents the trade-offs that were made considering the Alternative assessment results as detailed in **Appendix F**. Two Alternatives plus the "Do Nothing" Alternative were assessed in the Central Segment as presented previously in **Section 5.3.2**.

5.4.3.1 Objective 1: Protect and Enhance Terrestrial and Aquatic Natural Features and Linkages

The Criteria and Indicators for this Objective measure the ability of each Alternative to protect existing natural features and enhance or create new habitat and linkages. For this Objective, the following Criteria were considered:

- Extent of Aquatic Habitat Enhanced or Diminished; and,
- Extent of Terrestrial Habitat Attributes Enhanced or Diminished.

Table 5-9 provides a Criteria-level summary of the Alternatives comparative evaluation for Objective 1. A more detailed evaluation table is provided in **Appendix F**.

Regarding the Criterion *Extent of Aquatic Habitat Enhanced or Diminished*, Alternative 1 (Headland Beach) was ranked Most Preferred and ahead of Alternative 2 (Revetment). Although Alternative 1 has the highest amount of infill and corresponding loss or modification of existing habitat, this Alternative provides the highest potential for habitat enhancement opportunities through an increase in shoreline substrate type diversity with the addition of cobble beaches, along with an increase in shoreline morphology associated with a more irregular shoreline. These improvements benefit fish communities, both resident and migratory.

Concerning the Criterion *Extent of Terrestrial Habitat Attributes Enhanced or Diminished,* Alternative 1 (Headland Beach) was ranked Most Preferred as it provides the greatest length of land-water interface, relative to the existing and proposed (Alternative 2) revetment features, and is not anticipated to have any permanent negative impacts on existing vegetation communities of concern.

Considering the above Criteria rankings, the preferred Central Segment Alternative for Objective 1 was Alternative 1 (Headland Beach) as it was ranked Most Preferred for both Criteria. Its key advantage is that it provides a greater benefit for the enhancement of aquatic and terrestrial habitat than Alternative 2 (Revetment).

5.4.3.2 Objective 2: Manage Public Safety and Property Risk

The Criteria and Indicators for this Objective measure the ability of each Alternative to manage public safety and property risk. For this Objective, the following Criterion was considered:

- Ability to Minimize Public Safety Risk and Property Loss as a Result of Slope Erosion/Failure.

Table 5-10 provides a Criteria-level summary of the Alternatives comparative evaluation for Objective 2. A more detailed evaluation table is provided in **Appendix F**.

Regarding the Criterion *Ability to Minimize Public Safety Risk and Property Loss as a Result of Slope Erosion/Failure*, both Alternatives 1 and 2 were ranked as Most Preferred as they effectively minimize risk to public safety by allowing for trail development outside of the risk line. The “Do Nothing” Alternative was ranked Least Preferred as there was no change to the existing risk.

Table 5-9: Central Segment, Objective 1 Criteria Level Evaluation Summary

Objective	Criteria	Indicators	Do Nothing[1]	Alternative 1[2]	Alternative 2[3]
Protect and enhance terrestrial and aquatic natural features and linkages	Extent of aquatic habitat enhanced or diminished	▪ Ability to increase shoreline morphology by increasing shoreline irregularity ▪ Ability to increase shoreline substrate type diversity ▪ Potential for aquatic habitat loss or modification	**Least Preferred** No fill, but no increase in morphology. No improvement in shoreline substrate type diversity.	**Most Preferred** High amount of fill (65,000 m^2). Highest increase in morphology through a 15% increase in shoreline irregularity. Greatest improvement in shoreline substrate type diversity through a moderate increase in cobble substrate.	**Intermediate Preferred** High amount of fill (42,000 m^2). Virtually no change to shoreline morphology and no change to shoreline substrate type diversity.
	Extent of terrestrial habitat attributes enhanced or diminished	▪ Potential to create appropriate land-water interface ▪ Impact to vegetation communities of concern	**Intermediate Preferred** No improvement to land-water interface. No impacts to vegetation communities of concern.	**Most Preferred** Greatest positive change to land-water interface through a 50% increase in shoreline length that provides a land-water interface that is always out of water. No anticipated impacts to vegetation communities of concern.	**Intermediate Preferred** No improvement to land-water interface. No anticipated impacts to vegetation communities of concern.
Objective-Level Ranking			**Least Preferred**	**Most Preferred**	**Intermediate Preferred**

Notes: 1. Existing Conditions 2. Headland Beach 3. Revetment

Table 5-10: Central Segment, Objective 2 Criteria Level Evaluation Summary

Objective	Criteria	Indicators	Do Nothing[1]	Alternative 1[2]	Alternative 2[3]
Manage public safety and property risk	Ability to minimize public safety risk and property loss as a result of slope erosion/failure	▪ Ability to provide a trail lakeward of risk line along the shoreline and shoreward of the risk line along the top of the bluff	**Least Preferred** Along the west end of the Sylvan shoreline and along the Guild Park and Gardens shoreline, the access route is within the risk line.	**Most Preferred** Effectively minimizes risk to public safety (trail outside of risk line).	**Most Preferred** Effectively minimizes risk to public safety (trail outside of risk line).
Objective-Level Ranking			**Least Preferred**	**Most Preferred**	**Most Preferred**

Notes: 1. Existing Conditions 2. Headland Beach 3. Revetment

Considering the above Criterion ranking, the Central Segment Preferred Alternative for Objective 2 was Alternative 1 (Headland Beach) and Alternative 2 (Revetment) as both were ranked Most Preferred for the Criterion.

5.4.3.3 Objective 3: Provide an Enjoyable Waterfront Experience

The Criteria and Indicators for this Objective measure the extent of each Alternative's ability to provide an enjoyable waterfront experience. For this Objective, the following Criterion was considered:

- Improve Public Access to the Waterfront.

Table 5-11 provides a Criteria-level summary of the Alternatives comparative evaluation for Objective 3. A more detailed evaluation table is provided in **Appendix F**.

For the Criterion *Improve Public Access to the Waterfront,* Alternative 1 (Headland Beach) was ranked Most Preferred as it provides continuous formal public access along entire length of shoreline at the shoreline; allows for a primary to high-capacity multi-use trail; and offers potential to address AODA grade requirements. It also provides formal direct access to the water over the greatest length.

5.4.3.4 Objective 4: Consistency and Co-ordination with Other Initiatives

The Criteria and Indicators for this Objective measure the extent to which the Alternatives are consistent and co-ordinated with other initiatives or plans in the Study Area. For this Objective, the following Criteria were considered:

- Ability to Integrate with City and Other Agency Plans and Initiatives; and,
- Potential Impact on Archaeological Resources, Built Heritage Resources, and Cultural Heritage Landscapes.

Table 5-12 provides a Criteria-level summary of the Alternatives comparative evaluation for Objective 4. A more detailed evaluation table is provided in **Appendix F**.

Considering the Criterion *Ability to Integrate with City and Other Agency Plans and Initiatives*, both Alternative 1 (Headland Beach) and Alternative 2 (Revetment) were ranked as Most Preferred as they provide additional contributions to the advancement of applicable fish community objectives through improvements in shoreline morphology and substrate diversity.

For the Criterion *Potential Impact on Archaeological Resources, Built Heritage Resources, and Cultural Heritage Landscapes,* both Alternatives were ranked as Preferred as the marine archaeological assessment identified three targets in proximity to the new proposed shoreline structures that could potentially be impacted; however, mitigation is possible.

Considering the preference rankings for the Criteria associated with Objective 4, both Alternative 1 (Headland Beach) and Alternative 2 (Revetment) were identified as Most Preferred.

Table 5-11: Central Segment, Objective 3 Criteria Level Evaluation Summary

Objective	Criteria	Indicators	Do Nothing[1]	Alternative 1[2]	Alternative 2[3]
Provide an enjoyable waterfront experience	Improve public access to the waterfront	▪ Potential to provide continuous formal public access along the shoreline ▪ Ability to accommodate a primary to high-capacity multi-use trail (width) ▪ Ability to meet AODA grade standard ▪ Ability to provide formal direct public access to the water	**Least Preferred** Does not provide for continuous public access or a primary to high-capacity multi-use trail along the shoreline, does not accommodate AODA grade access, and does not provide formal direct public access to the water.	**Most Preferred** Provides continuous formal public access along entire length of shoreline at the shoreline and allows for a primary to high-capacity multi-use trail. Offers potential to address AODA grade requirements. Also provides formal direct access to the water for the greatest length (approximately 1,700 m).	**Preferred** Provides continuous formal public access along entire length of shoreline and allows for a primary to high-capacity multi-use trail. Offers potential to address AODA grade requirements. Provides approximately 40% less shoreline for formal direct access to the water, relative to Alternative 1 (due to the revetment).
Objective-Level Ranking			**Least Preferred**	**Most Preferred**	**Preferred**

Notes: 1. Existing Conditions 2. Headland Beach 3. Revetment

Table 5-12: Central Segment, Objective 4 Criteria Level Evaluation Summary

Objective	Criteria	Indicators	Do Nothing[1]	Alternative 1[2]	Alternative 2[3]
Consistency and co-ordination with other initiatives	Ability to integrate with City and other agency plans and initiatives	▪ Consistency with the goals of the Fish Community Objectives for Lake Ontario	**Least Preferred** Does not provide additional contributions to the advancement of any applicable fish community objectives.	**Most Preferred** Provides additional contributions to the advancement of applicable fish community objectives.	**Most Preferred** Provides additional contributions to the advancement of applicable fish community objectives.
	Potential impact on archaeological resources, built heritage resources, and cultural heritage landscapes	▪ Potential to impact known or potential archaeological resources	**Most Preferred** No impact to any known or potential archaeological resources.	**Preferred** The marine archaeological assessment identified three targets in proximity to the new proposed shoreline structures that could potentially be impacted; however, mitigation is possible.	**Preferred** The marine archaeological assessment identified three targets in proximity to the new proposed shoreline structures that could potentially be impacted, however, mitigation is possible.
Objective-Level Ranking			**Least Preferred**	**Most Preferred**	**Most Preferred**

Notes: 1. Existing Conditions 2. Headland Beach 3. Revetment

5.4.3.5 Objective 5: Achieve Value for Cost

The Criteria and Indicators for this Objective consider the capital and long-term maintenance and operating costs of the Alternatives. For this Objective, the following Criteria were considered:

- Estimated Capital Cost; and,
- Maintenance and Operations Costs.

Table 5-13 provides a Criteria-level summary of the Alternatives comparative evaluation for Objective 5. A more detailed evaluation table is provided in **Appendix F**.

For the Criterion *Estimated Capital Cost*, the "Do Nothing" Alternative was ranked as Most Preferred as it does not involve any infrastructure works or Crown water lot acquisition.

For the *Maintenance and Operations Cost* Criterion, Alternative 2 (Revetment) was ranked as Most Preferred as it has the least maintenance requirements.

Considering the above ranking Criteria, the Alternative ranked Most Preferred for Objective 5 was the "Do Nothing" Alternative, as it has no infrastructure or Crown water lot costs.

Table 5-13: Central Segment, Objective 5 Criteria Level Evaluation Summary

Objective	Criteria	Indicators	Do Nothing[1]	Alternative 1[2]	Alternative 2[3]
Achieve value for cost	Estimated capital cost	▪ Estimated cost to construct (relative to each other) ▪ Potential amount of water lot and property acquisition required (relative to each other)	**Most Preferred** No construction or property acquisition costs.	**Least Preferred** Highest relative costs. Greater amount of Crown water lots required than Alternative 2.	**Intermediate Preferred** Lower cost than Alternative 1. Lesser amount of Crown water lots required than Alternative 1.
	Maintenance and operations costs	▪ Relative maintenance and operation costs of the shoreline and erosion works	**Intermediate Preferred** Ongoing maintenance of existing concrete rubble shore will be required (existing shoreline works at Guild Parks and Gardens in need of repair).	**Preferred** Low maintenance requirements.	**Most Preferred** Least maintenance requirements.
Objective-Level Ranking			**Most Preferred**	**Intermediate Preferred**	**Preferred**

Notes: 1. Existing Conditions 2. Headland Beach 3. Revetment

5.4.3.6 Central Segment – Overall Evaluation Results

Table 5-14 provides a summary of the rankings by Objective for all Central Segment Alternatives. Alternative 1 (Headland Beach) was ranked Most Preferred for four of the five Objectives. The only Objective for which it was not ranked Most Preferred was for *Achieve Value for Cost*, therefore, this is its only disadvantage. It was determined by the Project Team that the additional advantages of Alternative 1 (Headland Beach) justify its additional costs or disadvantages. As such, Alternative 1 (Headland Beach) was ranked as the Preferred Alternative for the Central Segment.

Table 5-14: Central Segment – Objective Level Evaluation Results Summary

Objective	Do Nothing[1]	Alternative 1[2]	Alternative 2[3]
Natural Environment	LP	MP	IP
Risk	LP	MP	MP
Experience	LP	MP	P
Co-ordination	LP	MP	MP
Cost	MP	IP	P
Overall	**Intermediate Preferred**	**Most Preferred**	**Preferred**

Notes: 1. Existing Conditions 2. Headland Beach 3. Revetment

5.4.4 Evaluation Results – East Segment

The following presents the comparative evaluation results for the East Segment. The evaluation is organized by Project Objective and presents the trade-offs that were made considering the Alternative assessment results as detailed in **Appendix F**. Nine Alternatives plus the "Do Nothing" Alternative were assessed in the East Segment as described previously in **Section 5.3.3**.

5.4.4.1 Objective 1: Protect and Enhance Terrestrial and Aquatic Natural Features and Linkages

The Criteria and Indicators for this Objective measure the ability of each Alternative to protect existing natural features and enhance or create new habitat and linkages. For this Objective, the following Criteria were considered:

- Extent of Aquatic Habitat Enhanced or Diminished;
- Extent of Terrestrial Habitat Attributes Enhanced or Diminished; and,
- Potential for Impact on Terrestrial Species at Risk.

Table 5-15 provides a Criteria-level summary of the Alternatives comparative evaluation for Objective 1. A more detailed evaluation table is provided in **Appendix F**.

Regarding the Criterion *Extent of Aquatic Habitat Enhanced or Diminished*, the Most Preferred Alternative was Alternative 4B (Headland Beach to East Point Park) as, despite a fairly high amount of fill to be used, this Alternative increases the shoreline morphology through the greatest increase in

Table 5-15: East Segment, Objective 1 Criteria Level Evaluation Summary

Objective	Criteria	Indicators	Do Nothing[1]	Alternative 1A[2]	Alternative 1B[3]	Alternative 2A[4]	Alternative 2B[5]	Alternative 3A[6]	Alternative 3B[7]	Alternative 4A[8]	Alternative 4B[9]	Alternative 5[10]
Protect and enhance terrestrial and aquatic natural features and linkages	Extent of aquatic habitat enhanced or diminished	▪ Ability to increase shoreline morphology by increasing shoreline irregularity ▪ Ability to increase shoreline substrate type diversity ▪ Potential for aquatic habitat loss or modification	**Intermediate Preferred** No fill, but no improvements to morphology or substrate type diversity.	**Intermediate Preferred** Medium amount of fill (48,000 m^2). Increase in morphology through a 20% increase in shoreline irregularity. Some improvement in shoreline substrate type diversity with moderate increases in cobble and boulder proportions, relative to the previously existing sand-dominated substrate.	**Intermediate Preferred** Highest amount of fill (94,000 m^2). Increase in morphology through a 20% increase in shoreline irregularity. Some improvement to shoreline substrate type diversity with moderate increases in cobble proportions. However, high increases in boulder proportions result in a high reduction in sand proportions.	**Intermediate Preferred** Low-medium amount of fill (26,000 m^2). Minor increase in morphology through a 10% increase in shoreline irregularity. Some improvement to shoreline substrate type diversity with moderate increases in cobble and boulder proportions, relative to the previously existing sand-dominated substrate.	**Least Preferred** High amount of fill (71,000 m^2). Minor increase in morphology through a 10% increase in shoreline irregularity. Some improvement to shoreline substrate type diversity through moderate increases in cobble proportions. However, high increases in boulder proportions result in a high reduction in sand proportions.	**Intermediate Preferred** Medium amount of fill (48,000 m^2). Increase in morphology through a 20% increase in shoreline irregularity. Some improvement in shoreline substrate type diversity with moderate increases in cobble and boulder proportions, relative to the previously existing sand-dominated substrate.	**Intermediate Preferred** Highest amount of fill (94,000 m^2). Increase in morphology through a 20% increase in shoreline irregularity. Some improvement in shoreline substrate type diversity through moderate increases in cobble proportions. However, high increases in boulder proportions result in a high reduction in sand proportions.	**Preferred** High amount of fill (59,000 m^2). Increase in morphology through a 20% increase in shoreline irregularity. Improvement in shoreline substrate type diversity with moderate increases in cobble and boulder proportions, relative to the previously existing sand-dominated substrate.	**Most Preferred** High amount of fill (86,000 m^2). Greatest increase in morphology through a 30% increase in shoreline irregularity. Greatest improvement in shoreline substrate type diversity through high increases in cobble proportions, and moderate increases in boulder proportions, relative to the existing sand-dominated substrate.	**Intermediate Preferred** No fill, but no improvements to morphology or substrate type diversity.
	Extent of terrestrial habitat attributes enhanced or diminished	▪ Potential to create appropriate land-water interface ▪ Impact to vegetation communities of concern	**Intermediate Preferred** No improvement to land-water interface (100% of the shoreline provides a land-water interface that is sometimes out of the water). No additional impacts to vegetation communities of concern beyond existing conditions (trampling through informal trail use).	**Intermediate Preferred** Overall gain to land-water interface through the addition of shoreline that is always out of the water (approximately half that provided by Alternative 4B). Land-water interface that is sometimes out of water is reduced by ~30%. Moderate impact to ~1,300 m^2 of vegetation communities of concern. However, there is potential to reduce impacts on vegetation communities of concern by redirecting public access along formal trails.	**Least Preferred** Overall loss to land-water interface through a reduction in shoreline length that provides a land-water interface that is sometimes out of water by ~80%. Addition of land-water interface that is always out of water is equivalent to 1A. High degree of impact to ~18,800 m^2 of vegetation communities of concern. However, there is potential to reduce impacts on vegetation communities of concern by redirecting public access along formal trails.	**Intermediate Preferred** Overall gain to land-water interface through the addition of shoreline that is always out of the water (approximately 30% of what is provided by Alternative 4B). Land-water interface that is sometimes out of water is reduced by ~20%. Moderate impact to ~1,300 m^2 of vegetation communities of concern. However, there is potential to reduce impacts on vegetation communities of concern by redirecting public access along formal trails.	**Least Preferred** Overall loss to land-water interface through a reduction in shoreline length that provides a land-water that is sometimes out of water by ~60%. Addition of land-water interface that is always out of water is equivalent to 2A. High degree of impact to ~18,800 m^2 vegetation communities of concern. However, there is potential to reduce impacts on vegetation communities of concern by redirecting public access along formal trails.	**Intermediate Preferred** Overall gain to land-water interface through the addition of shoreline that is always out of the water (approximately 40% of what is provided by Alternative 4B). Land-water interface that is sometimes out of water is reduced by ~20%. Moderate impact to ~1,300 m^2 of vegetation communities of concern. However, there is potential to reduce impacts on vegetation communities of concern by redirecting public access along formal trails.	**Least Preferred** Overall loss to land-water interface through a reduction in shoreline length that provides a land-water that is sometimes out of water by ~60%. Addition of a land-water interface that is always out of water is equivalent to 3A. High degree of impact to ~18,800 m^2 vegetation communities of concern. However, there is potential to reduce impacts on vegetation communities of concern by redirecting public access along formal trails.	**Intermediate Preferred** Overall gain to land-water interface through the addition of shoreline that is always out of the water (approximately half that provided by Alternative 4B). Land-water interface that is sometimes out of water is reduced by ~50%. High degree of impact to 11,100 m^2 of vegetation communities of concern. However, there is also the potential to reduce impacts on vegetation communities of concern by redirecting public access along formal trails.	**Preferred** Greatest gain to land-water interface with the addition of approximately 1,400 m of shoreline that provides a land-water interface that is always out of the water. Land-water interface that is sometimes out of water is reduced by ~50%. Moderate impacts to ~5,300 m^2 of vegetation communities of concern. However, there is also the potential to reduce impacts on vegetation communities of concern by redirecting public access along formal trails.	**Least Preferred** No improvement to land-water interface. Bridge construction would likely require vegetation clearing on both sides of Grey Abbey Ravine, and potentially down within the ravine, with additional changes to bluff vegetation community composition anticipated due to the shading effects of the bridge. Significant impacts to three bluff vegetation communities of concern (BLO1, BLS1-A and BLT1-B) are anticipated. Permanent loss of ~950 m^2 of a mid-aged paper birch forest (FOD8-B) would be required for the trail on the west side of the ravine. However, there is the potential to reduce impacts on vegetation communities of concern by redirecting public access along formal trails.

Table 5-15: East Segment, Objective 1 Criteria Level Evaluation Summary

Objective	Criteria	Indicators	Do Nothing[1]	Alternative 1A[2]	Alternative 1B[3]	Alternative 2A[4]	Alternative 2B[5]	Alternative 3A[6]	Alternative 3B[7]	Alternative 4A[8]	Alternative 4B[9]	Alternative 5[10]
	Potential for impact on terrestrial Species at Risk	▪ Potential effects to habitat for Bank Swallow	**Most Preferred** Between Grey Abbey Park and west of East Point Park: No direct impacts to Bank Swallow habitat, as the nests are currently restricted to the upper portion (due to existing vegetation) that is expected to continue eroding into the future. Around East Point Park: No direct impacts to Bank Swallow habitat.	**Most Preferred** Between Grey Abbey Park and west of East Point Park: No direct impacts to Bank Swallow habitat, as the nests are currently restricted to the upper portion (due to existing vegetation) that is expected to continue eroding into the future. Around East Point Park: No direct impacts to Bank Swallow habitat, as no shoreline works are proposed. Top-of-bluff connection limits human disturbance.	**Least Preferred** Between Grey Abbey Park and west of East Point Park: No direct impacts to Bank Swallow habitat, as the nests are currently restricted to the upper portion (due to existing vegetation) that is expected to continue eroding into the future. Around East Point Park: Potential reduction in lesser quality Bank Swallow habitat availability, as protection works will halt toe erosion and encourage increased vegetation along the primarily bare bluff face. Human disturbance due to low bluff height is also increased.	**Most Preferred** Between Grey Abbey Park and west of East Point Park: No direct impacts to Bank Swallow habitat, as the nests are currently restricted to the upper portion (due to existing vegetation) that is expected to continue eroding into the future. Around East Point Park: No direct impacts to Bank Swallow habitat, as no shoreline works are proposed. Top-of-bluff connection limits human disturbance.	**Least Preferred** Between Grey Abbey Park and west of East Point Park: No direct impacts to Bank Swallow habitat, as the nests are currently restricted to the upper portion (due to existing vegetation) that is expected to continue eroding into the future. Around East Point Park: Potential reduction in lesser quality Bank Swallow habitat availability, as protection works will halt toe erosion and encourage increased vegetation along the primarily bare bluff face. Human disturbance due to low bluff height is also increased.	**Most Preferred** Between Grey Abbey Park and west of East Point Park: No direct impacts to Bank Swallow habitat, as the nests are currently restricted to the upper portion (due to existing vegetation) that is expected to continue eroding into the future. Around East Point Park: No direct impacts to Bank Swallow habitat, as no shoreline works are proposed. Top-of-bluff connection limits human disturbance.	**Least Preferred** Between Grey Abbey Park and west of East Point Park: No direct impacts to Bank Swallow habitat, as the nests are currently restricted to the upper portion (due to existing vegetation) that is expected to continue eroding into the future. Around East Point Park: Potential reduction in lesser quality Bank Swallow habitat availability, as protection works will halt toe erosion and encourage increased vegetation along the primarily bare bluff face. Human disturbance due to low bluff height is also increased.	**Most Preferred** Between Grey Abbey Park and west of East Point Park: No direct impacts to Bank Swallow habitat, as the nests are currently restricted to the upper portion (due to existing vegetation) that is expected to continue eroding into the future. Around East Point Park: No direct impacts to Bank Swallow habitat, as no shoreline works are proposed. Top-of-bluff connection limits human disturbance.	**Most Preferred** Between Grey Abbey Park and west of East Point Park: No direct impacts to Bank Swallow habitat, as the nests are currently restricted to the upper portion (due to existing vegetation) that is expected to continue eroding into the future. Around East Point Park: No direct impacts to Bank Swallow habitat, as no shoreline works are proposed. Top-of-bluff connection limits human disturbance.	**Most Preferred** Between Grey Abbey Park and west of East Point Park: No direct impacts to Bank Swallow habitat, as the nests are currently restricted to the upper portion (due to existing vegetation) that is expected to continue eroding into the future. Around East Point Park: No direct impacts to Bank Swallow habitat, as no shoreline works are proposed. Top-of-bluff connection limits human disturbance.
Objective-Level Ranking			**Intermediate Preferred**	**Preferred**	**Least Preferred**	**Intermediate Preferred**	**Least Preferred**	**Intermediate Preferred**	**Least Preferred**	**Preferred**	**Most Preferred**	**Intermediate Preferred**

Notes:
1. *Existing Conditions*
2. *Headland Beach with Top of Bluffs Connection*
3. *Headland Beach with Base of Bluffs Connection*
4. *Bridge & Headlands with Top of Bluffs Connection*
5. *Bridge & Headlands with Base of Bluffs Connection*
6. *Island-Bridge & Headlands with Top of Bluffs Connection*
7. *Island-Bridge & Headlands with Base of Bluffs Connection*
8. *Headland Beach with Revetment to East Point Park*
9. *Headland Beach to East Point Park*
10. *Top of Bluffs Connection Over Grey Abbey Ravine*

shoreline irregularity relative to all other Alternatives. Shoreline substrate type diversity is also increased to the greatest extent, with a decrease in sand supplemented by high increases in cobble and moderate increases in armourstone (boulder). The added complexity associated with increased shoreline irregularity and substrate type diversity provides more habitat to be utilized by a greater number of fish species.

Concerning the Criterion *Extent of Terrestrial Habitat Attributes Enhanced or Diminished,* Alternative 4B (Headland Beach to East Point Park) was ranked as Preferred. Alternative 4B provides the most positive changes to land-water interface through the greatest increase in an interface that is always out of water, with minor impacts to beach vegetation communities of concern and moderate impacts to bluff vegetation communities of concern. Alternative 4B will reduce existing impacts on vegetation communities of concern associated with informal trail use and trampling by creating a formal trail network to and along the water's edge. All of the Alternatives that include the revetment features result in significant impacts to beach vegetation communities of concern, while Alternative 5 (Top of Bluffs Connection Over Grey Abbey Ravine) will result in significant impacts to bluff vegetation communities of concern, as well as a mid-aged paper birch forest community, through construction. The Alternatives with revetment features will also result in an overall reduction in the existing land-water interface. While the "Do Nothing" Alternative has no direct impact, it also provides no habitat enhancement opportunity and no opportunity to decommission informal trails currently degrading vegetation communities.

Finally, regarding the Criterion *Potential for Impact on Terrestrial Species at Risk*, the "Do Nothing" Alternative, along with Alternatives 1A (Headland Beach with Top of Bluffs Connection), 2A (Bridge & Headlands with Top of Bluffs Connection), 3A (Island-Bridge & Headlands with Top of Bluffs Connection), 4A (Headland Beach with Revetment to East Point Park), 4B (Headland Beach to East Point Park), and Alternative 5 (Top of Bluffs Connection Over Grey Abbey Ravine) were ranked as Most Preferred, as the existing Bank Swallow nests between Grey Abbey and East Point Park are currently restricted to the upper portion of bluff (due to existing vegetation) that is expected to continue eroding into the future. As the existing Bank Swallow nests located at East Point Park are also situated lower to the ground due to the lower height of the Bluffs, relative to the bluff heights west of East Point Park, a tableland trail through East Point is likely to reduce human disturbance to these nests (as compared to a formal shoreline trail around East Point Park).

Considering the above Criteria-level rankings, Alternative 4B (Headland Beach to East Point Park) was ranked Most Preferred in the East Segment for Objective 1 as it provides the most opportunities for aquatic and terrestrial habitat enhancement.

5.4.4.2 Objective 2: Manage Public Safety and Property Risk

The Criteria and Indicators for this Objective measure the ability of each Alternative to manage public safety and property risk. For this Objective, the following Criteria were considered:

- Ability to Minimize Public Safety Risk and Property Loss as a Result of Slope Erosion/Failure; and,
- Improve Emergency Services Access to the Waterfront.

Table 5-16 provides a Criteria-level summary of the Alternatives comparative evaluation for Objective 2. A more detailed evaluation table is provided in **Appendix F**.

Regarding the Criterion *Ability to Minimize Public Safety Risk and Property Loss as a Result of Slope Erosion/Failure,* five Alternatives were ranked Most Preferred including Alternatives 1B, 2B, 3B, 4A, and 4B as these Alternatives effectively minimize risk to public safety by providing a public trail outside of the risk line, with less potential for property loss. Risk of erosion to Greyabbey Trail is mitigated.

Regarding the Criterion *Improve Emergency Services Access to the Waterfront*, all Alternatives except the "Do Nothing" Alternative were all ranked as Most Preferred as these Alternatives all improve Emergency Services access along the waterfront either through trail improvements along the shore or along the tablelands.

Considering the above Criteria rankings, the Preferred Alternatives in the East Segment for Objective 2 were Alternatives 1B, 2B, 3B, 4A, and 4B, as these Alternatives effectively minimize risk to public safety by providing a trail outside of the risk line, will have limited loss of property (open space, public recreational amenities and water/servicing infrastructure), and provides Emergency Services access along entire length of the Segment.

5.4.4.3 Objective 3: Provide an Enjoyable Waterfront Experience

The Criteria and Indicators for this Objective measure the extent of each Alternative's ability to provide an enjoyable waterfront experience. For this Objective, the following Criteria were considered:

- Improve Public Access to the Waterfront; and,
- Potential for Changes to the Use of the Waterfront for Recreation.

Table 5-17 provides a Criteria-level summary of the Alternatives comparative evaluation for Objective 3. A more detailed evaluation table is provided in **Appendix F**.

For the Criterion *Improve Public Access to the Waterfront*, Alternative 4B (Headland Beach to East Point Park) was ranked Most Preferred as it provides the best opportunity to improve public access along the shoreline including the development of a multi-use trail and provides opportunity to meet AODA grade requirements. Formal direct public access to the water is provided through the headland beach sections of shoreline for the greatest length, and informal access that is not restricted by private property or critical infrastructure is continued along the East Point Park sand shoreline.

With respect to *Potential for Changes to the Use of the Waterfront for Recreation*, the "Do Nothing" Alternative and Alternatives 1A, 2A, 3A, and 5 were ranked highest as Preferred. Regarding the "Do Nothing" Alternative and Alternative 5, these Alternatives would result in no change to the existing sandy shoreline, nor would formal access for the greatest number of users be provided. Alternatives 4A and 4B result in a moderate impact to the existing sandy shoreline, but less impact than the Alternatives that involve improvement to the full length of the bluff base. There has been considerable comment from the public about the value of the existing sand shorelines in the East

Table 5-16: East Segment, Objective 2 Criteria Level Evaluation Summary

Objective	Criteria	Indicators	Do Nothing[1]	Alternative 1A[2]	Alternative 1B[3]	Alternative 2A[4]	Alternative 2B[5]	Alternative 3A[6]	Alternative 3B[7]	Alternative 4A[8]	Alternative 4B[9]	Alternative 5[10]
Manage public safety and property risk	Ability to minimize public safety risk and property loss as a result of slope erosion/failure	▪ Ability to provide a trail lakeward of risk line along the shoreline and shoreward of the risk line along the top of the bluff ▪ Ability to address the potential loss of public property and infrastructure as a result of slope erosion/failure (slope crest migration)	**Least Preferred** Cannot effectively minimize public safety risk or property loss. Greyabbey Trail (e.g., road and associated infrastructure) would be at risk from erosion within the planning timeframe of the Project (approximately 60 years).	**Preferred** Effectively minimizes risk to public safety (trail outside of risk line) but will have greater degree of property loss though the loss will occur over the long-term. Risk of erosion to Greyabbey Trail is mitigated.	**Most Preferred** Effectively minimizes risk to public safety (trail outside of risk line) and will have limited loss of property. Risk of erosion to Greyabbey Trail is mitigated.	**Preferred** Effectively minimizes risk to public safety (trail outside of risk line) but will have greater degree of property loss though the loss will occur over the long-term. Risk of erosion to Greyabbey Trail is mitigated.	**Most Preferred** Effectively minimizes risk to public safety (trail outside of risk line) and will have limited loss of property. Risk of erosion to Greyabbey Trail is mitigated.	**Preferred** Effectively minimizes risk to public safety (trail outside of risk line) but will have greater degree of property loss though the loss will occur over the long-term. Risk of erosion to Greyabbey Trail is mitigated.	**Most Preferred** Effectively minimizes risk to public safety (trail outside of risk line) and will have limited loss of property. Risk of erosion to Greyabbey Trail is mitigated.	**Most Preferred** Effectively minimizes risk to public safety (trail outside of risk line) and will have limited loss of property. Risk of erosion to Greyabbey Trail is mitigated.	**Most Preferred** Effectively minimizes risk to public safety (trail outside of risk line) and will have limited loss of property. Risk of erosion to Greyabbey Trail is mitigated.	**Intermediate Preferred** Effectively minimizes risk to public safety (trail outside of risk line) but will have the greatest degree of property loss though the loss will occur over the long-term. Greyabbey Trail (e.g., road and associated infrastructure) would be at risk from erosion within the planning timeframe of the Project (approximately 60 years).
	Improve Emergency Services access to the waterfront	▪ Ability to provide additional Emergency Services access along the waterfront	**Least Preferred** Allows for only limited access for some vehicles.	**Most Preferred** Provides access along entire length of Segment.	**Most Preferred** Provides access along entire length of Segment.	**Most Preferred** Provides access along entire length of Segment.	**Most Preferred** Provides access along entire length of Segment.	**Most Preferred** Provides access along entire length of Segment.	**Most Preferred** Provides access along entire length of Segment.	**Most Preferred** Provides access along entire length of Segment.	**Most Preferred** Provides access along entire length of Segment.	**Most Preferred** Provides access along entire length of Segment.
Objective-Level Ranking			**Least Preferred**	**Preferred**	**Most Preferred**	**Preferred**	**Most Preferred**	**Preferred**	**Most Preferred**	**Most Preferred**	**Most Preferred**	**Intermediate Preferred**

Notes:
1. *Existing Conditions*
2. *Headland Beach with Top of Bluffs Connection*
3. *Headland Beach with Base of Bluffs Connection*
4. *Bridge & Headlands with Top of Bluffs Connection*
5. *Bridge & Headlands with Base of Bluffs Connection*
6. *Island-Bridge & Headlands with Top of Bluffs Connection*
7. *Island-Bridge & Headlands with Base of Bluffs Connection*
8. *Headland Beach with Revetment to East Point Park*
9. *Headland Beach to East Point Park*
10. *Top of Bluffs Connection Over Grey Abbey Ravine*

Table 5-17: East Segment, Objective 3 Criteria Level Evaluation Summary

Objective	Criteria	Indicators	Do Nothing[1]	Alternative 1A[2]	Alternative 1B[3]	Alternative 2A[4]	Alternative 2B[5]	Alternative 3A[6]	Alternative 3B[7]	Alternative 4A[8]	Alternative 4B[9]	Alternative 5[10]
Provide an enjoyable waterfront experience	Improve public access to the waterfront	▪ Potential to provide continuous formal public access along the shoreline ▪ Ability to accommodate a primary to high-capacity multi-use trail (width) ▪ Ability to meet AODA grade standard ▪ Ability to provide formal direct public access to the water	**Least Preferred** Provides the least amount of continuous formal public access along the water's edge and accommodates the shortest portion of a primary to high-capacity multi-use trail. Also cannot accommodate AODA grade access and provides limited access to the water's edge (~50% of the existing shoreline is constrained by private property and critical infrastructure).	**Intermediate Preferred** Provides public access; however, requires a staircase (cyclists to dismount), thus AODA grade access provided east and west of staircase. Provides formal direct access to the shoreline (approximately half that provided by 4B); ~25% of the remaining shoreline remains inaccessible due to private property and critical infrastructure.	**Preferred** Provides continuous access along the shoreline, accommodates the primary to high-capacity multi-use trail width, and meets AODA grade requirements. Provides formal direct access to the water's edge (equivalent length to 1A); however, informal access is reduced by 80%, due to revetment, but previously inaccessible areas are now accessible.	**Intermediate Preferred** Provides public access; however, requires a staircase (cyclists to dismount), thus AODA grade access provided east and west of staircase. Provides formal direct access to the shoreline (approximately 30% of the length provided by 4B); ~35% of the remaining shoreline remains inaccessible due to private property and critical infrastructure.	**Preferred** Provides continuous access along the shoreline, accommodates the primary to high-capacity multi-use trail width, and meets AODA grade requirements. Provides formal direct access to the shoreline (equivalent length to 2A); however, informal access is reduced by 60% due to revetment and ~30% of the remaining shoreline remains inaccessible due to private property and critical infrastructure.	**Intermediate Preferred** Provides public access; however, requires a staircase (cyclists to dismount), thus AODA grade access provided east and west of staircase. Provides formal direct access to the shoreline (approximately 40% of the length provided by 4B); ~35% of the remaining shoreline remains inaccessible due to private property and critical infrastructure.	**Preferred** Provides continuous access along the shoreline, accommodates the primary to high-capacity multi-use trail width, and meets AODA grade requirements. Provides formal direct access to the shoreline (equivalent length to 3A); informal access is reduced by 60% due to revetment and ~30% of the remaining shoreline remains inaccessible due to private property and critical infrastructure.	**Preferred** Provides continuous access along the shoreline, accommodates the primary to high-capacity multi-use trail width, and meets AODA grade requirements. Provides formal direct access to shoreline (approximately half that provided by 4B); however, informal access is reduced by 50% due to revetment, but previously inaccessible areas are now accessible.	**Most Preferred** Provides continuous access along the shoreline, accommodates the primary to high-capacity multi-use trail width, and meets AODA grade requirements. Provides longest length of formal direct access to the shoreline (approximately 1,400 m); previously inaccessible areas are now accessible.	**Preferred** Provides continuous access along the shoreline, accommodates the primary to high-capacity multi-use trail width, and meets AODA grade requirements. Provides limited access to the shoreline (no change to existing conditions).
	Potential for changes to the use of the waterfront for recreation	▪ Potential for change in character of sandy shorelines	**Preferred** No change to existing sandy shoreline, of which 50% is currently inaccessible and 15% has been previously modified. No enhanced beach area.	**Preferred** Approximate 25% reduction in existing sandy shoreline length, of which 100% is inaccessible and 40% has been previously modified. Provides approximately half the cobble beach enhancement of Alternative 4B.	**Least Preferred** Approximate 70% reduction in existing sandy shoreline length, of which 60% is inaccessible and 20% was previously modified. Provides approximately half the cobble beach enhancement of Alternative 4B.	**Preferred** Approximate 20% reduction in existing sandy shoreline length, of which 100% was inaccessible and 0% was previously modified. Provides approximately 30% of the cobble beach enhancement of Alternative 4B.	**Least Preferred** Approximate 70% reduction in existing sandy shoreline length, of which 80% is inaccessible and 0% was previously modified. Provides approximately 30% of the cobble beach enhancement of Alternative 4B.	**Preferred** Approximate 20% reduction in existing sandy shoreline length, of which 100% is inaccessible and 0% was previously modified. Provides approximately 40% of the cobble beach enhancement of Alternative 4B.	**Least Preferred** Approximate 70% reduction in existing sandy shoreline length, of which 80% is inaccessible and 0% was previously modified. Provides approximately 40% of the cobble beach enhancement of Alternative 4B.	**Intermediate Preferred** Approximate 40% reduction in existing sandy shoreline length, of which 90% is inaccessible and 25% was previously modified. Provides approximately half the cobble beach enhancement of Alternative 4B.	**Intermediate Preferred** Approximate 45% reduction in existing sandy shoreline length, of which 90% is inaccessible and 25% was previously modified. Provides the greatest enhancement to cobble beach (approximately 1400 m).	**Preferred** No change to existing sandy shoreline, of which 50% is currently inaccessible and 15% has been previously modified. No enhanced beach area.
Objective-Level Ranking			**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Preferred**	**Preferred**

Notes:
1. *Existing Conditions*
2. *Headland Beach with Top of Bluffs Connection*
3. *Headland Beach with Base of Bluffs Connection*
4. *Bridge & Headlands with Top of Bluffs Connection*
5. *Bridge & Headlands with Base of Bluffs Connection*
6. *Island-Bridge & Headlands with Top of Bluffs Connection*
7. *Island-Bridge & Headlands with Base of Bluffs Connection*
8. *Headland Beach with Revetment to East Point Park*
9. *Headland Beach to East Point Park*
10. *Top of Bluffs Connection Over Grey Abbey Ravine*

Segment. Many have reflected on the character of the sandy shoreline and the opportunity it provides for shoreline walks removed from the city. While the "Do Nothing" Alternative results in no physical changes to the sandy shoreline, it also results in limited formal, safe access to that sandy shoreline. Furthermore, 540 m of shoreline would remain in private ownership and not publically accessible. Private landowners have commented that they would like to reduce the incidences of trespass as people cross their properties to access the shore. It is noted that as the population increases more people will be drawn to the area for recreational purposes and the experience this shoreline provides today will change as use of the area increases. It is expected that the increased use will further degrade the current experience. The "Do Nothing" Alternative also does not provide long-term protection to Greyabbey Trail (e.g., road and associated infrastructure).

Considering the above two Criteria-level rankings, the Preferred East Segment Alternatives for Objective 3 were Alternatives 4B (Headland Beach to East Point Park) and 5 (Top of Bluffs Connection Over Grey Abbey Ravine). Key advantages of Alternative 4B are that it provides the opportunity to improve public access along the shoreline including a primary to high-capacity multi-use trail and has less impact to the existing sandy shoreline (does not impact East Point Park) as much as some of the other Alternatives.

5.4.4.4 Objective 4: Consistency and Co-ordination with Other Initiatives

The Criteria and Indicators for this Objective measure the extent to which each Alternative is consistent and co-ordinated with other initiatives or plans in the Study Area. The evaluation of this Objective is based on the following three Criteria:

- Ability to Integrate with City and other Agency Plans and Initiatives;
- Compatibility with Existing Land Use; and,
- Potential Impact on Archaeological Resources, Built Heritage Resources, and Cultural Heritage Landscapes.

Table 5-18 provides a Criteria-level summary of the Alternatives comparative evaluation for Objective 4. A more detailed evaluation table is provided in **Appendix F**.

Considering the Criterion *Ability to Integrate with City and Other Agency Plans and Initiatives*, all of the Alternatives, except the "Do Nothing" Alternative and Alternative 5 (Top of Bluffs Connection Over Grey Abbey Ravine), were ranked as Most Preferred as they provide the best opportunity for integration with identified plans and initiatives including:

- The trail would be rerouted away from the proposed Metrolinx Lakeshore East rail corridor expansion; and,
- The provision of additional contributions to the advancement of applicable fish community objectives.

Table 5-18: East Segment, Objective 4 Criteria Level Evaluation Summary

Objective	Criteria	Indicators	Do Nothing[1]	Alternative 1A[2]	Alternative 1B[3]	Alternative 2A[4]	Alternative 2B[5]	Alternative 3A[6]	Alternative 3B[7]	Alternative 4A[8]	Alternative 4B[9]	Alternative 5[10]
Consistency and co-ordination with other initiatives	Ability to integrate with City and other agency plans and initiatives	▪ Ability to integrate with new and proposed plans or initiatives ▪ Consistency with the goals of the Fish Community Objectives for Lake Ontario	**Least Preferred** Planned expansion of the Metrolinx Lakeshore East rail corridor to accommodate the Regional Express Rail project could impact a section of the trail and could require its rerouting. This Alternative does not provide additional contributions to the advancement of applicable fish community objectives.	**Most Preferred** This Alternative can be integrated with the identified plans and initiatives. The trail would be rerouted away from the Metrolinx Lakeshore East rail corridor. This Alternative also provides additional contributions to the advancement of applicable fish community objectives.	**Most Preferred** This Alternative can be integrated with the identified plans and initiatives. The trail would be rerouted away from the Metrolinx Lakeshore East rail corridor. This Alternative also provides additional contributions to the advancement of applicable fish community objectives.	**Most Preferred** This Alternative can be integrated with the identified plans and initiatives. The trail would be rerouted away from the Metrolinx Lakeshore East rail corridor. This Alternative also provides additional contributions to the advancement of applicable fish community objectives.	**Most Preferred** This Alternative can be integrated with the identified plans and initiatives. The trail would be rerouted away from the Metrolinx Lakeshore East rail corridor. This Alternative also provides additional contributions to the advancement of applicable fish community objectives.	**Most Preferred** This Alternative can be integrated with the identified plans and initiatives. The trail would be rerouted away from the Metrolinx Lakeshore East rail corridor. This Alternative also provides additional contributions to the advancement of applicable fish community objectives.	**Most Preferred** This Alternative can be integrated with the identified plans and initiatives. The trail would be rerouted away from the Metrolinx Lakeshore East rail corridor. This Alternative also provides additional contributions to the advancement of applicable fish community objectives.	**Most Preferred** This Alternative can be integrated with the identified plans and initiatives. The trail would be rerouted away from the Metrolinx Lakeshore East rail corridor. This Alternative also provides additional contributions to the advancement of applicable fish community objectives.	**Most Preferred** This Alternative can be integrated with the identified plans and initiatives. The trail would be rerouted away from the Metrolinx Lakeshore East rail corridor. This Alternative also provides additional contributions to the advancement of applicable fish community objectives.	**Intermediate Preferred** This Alternative can be integrated with the identified plans and initiatives. The trail would be rerouted away from the Metrolinx Lakeshore East rail corridor. This Alternative does not provide additional contributions to the advancement of applicable fish community objectives.
	Compatibility with existing land uses	▪ Compatibility with existing land use (industrial) ▪ Compatibility with existing land use (residential)	**Least Preferred** Existing trail closest to industrial and residential properties.	**Preferred** Section of new trail alignment runs directly in the back of industrial properties but trail relocated to open space. Limited private property acquisition.	**Most Preferred** The trail runs along the water's edge for its full length and is furthest away from residential and industrial properties. Limited private property acquisition.	**Preferred** Section of new trail alignment runs directly in the back of industrial properties but trail relocated to open space. Limited private property acquisition.	**Most Preferred** The trail runs along the water's edge for its full length and is furthest away from residential and industrial properties. Limited private property acquisition.	**Preferred** Section of new trail alignment runs directly in the back of industrial properties but trail relocated to open space. Limited private property acquisition.	**Most Preferred** The trail runs along the water's edge for its full length and is furthest away from residential and industrial properties. Limited private property acquisition.	**Most Preferred** The trail runs along the water's edge for its full length and is furthest away from residential and industrial properties. Limited private property acquisition.	**Most Preferred** The trail runs along the water's edge for its full length and is furthest away from residential and industrial properties. Limited private property acquisition.	**Intermediate Preferred** Existing trail closest to industrial and residential properties. Limited private property acquisition.
	Potential impact on archaeological resources, built heritage resources, and cultural heritage landscapes	▪ Potential to impact known or potential archaeological resources	**Most Preferred** No impact to any known or potential archaeological resources.	**Most Preferred** No impact to any known archaeological resources; however, there is potential to find resources on the tablelands.	**Preferred** This Alternative is not anticipated to impact any known or potential land-based archaeological resources as identified in a Stage 1 archaeological assessment. The marine archaeological assessment identified one archaeological artifact in proximity to the proposed shoreline protection structures. Mitigation is possible.	**Most Preferred** No impact to any known archaeological resources; however, there is potential to find resources on the tablelands.	**Preferred** This Alternative is not anticipated to impact any known or potential land-based archaeological resources as identified in a Stage 1 archaeological assessment. The marine archaeological assessment identified one archaeological artifact in proximity to the proposed shoreline protection structures. Mitigation is possible.	**Most Preferred** No impact to any known archaeological resources; however, there is potential to find resources on the tablelands.	**Preferred** This Alternative is not anticipated to impact any known or potential land-based archaeological resources as identified in a Stage 1 archaeological assessment. The marine archaeological assessment identified one archaeological artifact in proximity to the proposed shoreline protection structures. Mitigation is possible.	**Most Preferred** No impact to any known archaeological resources; however, there is potential to find resources on the tablelands.	**Most Preferred** No impact to any known archaeological resources; however, there is potential to find resources on the tablelands.	**Most Preferred** No impact to any known archaeological resources; however, there is potential to find resources on the tablelands.
Objective-Level Ranking			**Least Preferred**	**Preferred**	**Preferred**	**Preferred**	**Preferred**	**Preferred**	**Preferred**	**Most Preferred**	**Most Preferred**	**Intermediate Preferred**

Notes:
1. *Existing Conditions*
2. *Headland Beach with Top of Bluffs Connection*
3. *Headland Beach with Base of Bluffs Connection*
4. *Bridge & Headlands with Top of Bluffs Connection*
5. *Bridge & Headlands with Base of Bluffs Connection*
6. *Island-Bridge & Headlands with Top of Bluffs Connection*
7. *Island-Bridge & Headlands with Base of Bluffs Connection*
8. *Headland Beach with Revetment to East Point Park*
9. *Headland Beach to East Point Park*
10. *Top of Bluffs Connection Over Grey Abbey Ravine*

Regarding the Criterion *Compatibility with Existing Land Uses*, Alternatives 1B, 2B, 3B, 4A and 4B were ranked Most Preferred as the trail runs along the water's edge for its full length and is furthest away from residential and industrial properties.

For the Criterion *Potential Impact on Archaeological Resources, Built Heritage Resources, and Cultural Heritage Landscapes*, the "Do Nothing" Alternative and Alternatives 1A, 2A, 3A, 4A, 4B, and 5 were ranked Most Preferred as these Alternatives are not anticipated to impact any known or potential archaeological resources (land or marine).

Considering the rankings for the Criteria associated with Objective 4, Alternatives 4A (Headland Beach with Revetment to East Point Park) and 4B (Headland Beach to East Point Park) were ranked Most Preferred for all Criteria.

5.4.4.5 Objective 5: Achieve Value for Cost

The Criteria and Indicators for this Objective consider the capital and long-term maintenance and operating costs of the Alternatives and considered the following two Criteria:

- Estimated Capital Cost; and,
- Maintenance and Operations Costs.

Table 5-19 provides a Criteria-level summary of the Alternatives comparative evaluation for Objective 5. A more detailed evaluation table is provided in **Appendix F**.

For both the cost Criteria, the "Do Nothing" Alternative was ranked as Most Preferred as this Alternative does not involve any infrastructure works. Alternatives 1A, 1B, 4A, 4B, and 5 were the next least expensive and were ranked as Preferred.

Table 5-19: East Segment, Objective 5 Criteria Level Evaluation Summary

Objective	Criteria	Indicators	Do Nothing[1]	Alternative 1A[2]	Alternative 1B[3]	Alternative 2A[4]	Alternative 2B[5]	Alternative 3A[6]	Alternative 3B[7]	Alternative 4A[8]	Alternative 4B[9]	Alternative 5[10]
Achieve value for cost	Estimated capital cost	▪ Estimated cost to construct (relative to each other) ▪ Potential amount of water lot and property acquisition required (relative to each other)	**Most Preferred** No new infrastructure. Least cost. Lowest amount of private and Crown water lot acquisition.	**Intermediate Preferred** Higher cost relative to Alternatives 2A, 2B, 4B and 5, but lower than Alternatives 1B, 3A, 3B, 4A and 4B. Potential for higher cost due to geotechnical requirements of the staircase. Moderate amount of Crown water lot and private property acquisition.	**Intermediate Preferred** Higher cost relative to Alternatives 1A, 2A, 2B, 4B and 5, but lower than Alternatives 3A, 3B and 4A. Moderate amount of Crown water lot and private property acquisition.	**Intermediate Preferred** Higher cost than Alternative 5 but lower than Alternatives 1A, 1B, 2B, 3A, 3B, and 4A. Potential for higher cost due to geotechnical requirements of the staircase. Moderate amount of Crown water lot and private property acquisition.	**Intermediate Preferred** Higher cost relative to Alternatives 2A, 4B and 5, but lower than Alternatives 1A, 1B, 3A, 3B, and 4A. Moderate amount of Crown water lot and private property acquisition.	**Intermediate Preferred** Highest cost relative to other Alternatives. Potential for higher cost due to geotechnical requirements of the staircase. Moderate amount of Crown water lot and private property acquisition.	**Intermediate Preferred** Higher cost relative to Alternatives 1A, 1B, 2A, 2B, 4B, and 5 but lower than Alternative 3A. Moderate amount of Crown water lot and private property acquisition.	**Intermediate Preferred** Higher cost relative to Alternatives 1A, 1B, 2A, 2B, 4B and 5 but lower than Alternative 3A. Moderate amount of Crown water lot and private property acquisition.	**Intermediate Preferred** Higher cost than Alternative 5 but lower than Alternatives 1A, 1B, 2B, 3A, 3B, and 4A. Moderate amount of Crown water lot and private property acquisition.	**Preferred** Low relative cost as no shoreline works. Grey Abbey Ravine bridge construction is most significant cost. Low amount of Crown water lot and private property acquisition.
	Maintenance and operations costs	▪ Relative maintenance and operation costs of the shoreline and erosion works	**Most Preferred** Maintenance of existing works required, but most are private. Erosion works will be required in the future below Grey Abbey Park.	**Preferred** Low maintenance requirements.	**Preferred** Low maintenance requirements.	**Intermediate Preferred** Expected to have highest maintenance cost due to exposed nature of the bridge and need to replace components (e.g., bridge railings, deck, etc.). Low maintenance requirements for shore protection works.	**Least Preferred** Expected to have highest maintenance cost due to exposed nature of the bridge and need to replace components (e.g., bridge railings, deck, etc.). Low maintenance requirements for shore protection works.	**Least Preferred** Expected to have highest maintenance cost due to exposed nature of the bridge and need to replace components (e.g., bridge railings, deck, etc.). Low maintenance requirements for shore protection works.	**Least Preferred** Expected to have highest maintenance cost due to exposed nature of the bridge and need to replace components (e.g., bridge railings, deck, etc.). Low maintenance requirements for shore protection works.	**Preferred** Low maintenance requirements.	**Preferred** Low maintenance requirements.	**Most Preferred** Maintenance of existing works required, but most are private. Erosion works will be required in the future below Grey Abbey Park.
Objective-Level Ranking			**Most Preferred**	**Preferred**	**Preferred**	**Intermediate Preferred**	**Least Preferred**	**Least Preferred**	**Least Preferred**	**Preferred**	**Preferred**	**Preferred**

Notes:
1. *Existing Conditions*
2. *Headland Beach with Top of Bluffs Connection*
3. *Headland Beach with Base of Bluffs Connection*
4. *Bridge & Headlands with Top of Bluffs Connection*
5. *Bridge & Headlands with Base of Bluffs Connection*
6. *Island-Bridge & Headlands with Top of Bluffs Connection*
7. *Island-Bridge & Headlands with Base of Bluffs Connection*
8. *Headland Beach with Revetment to East Point Park*
9. *Headland Beach to East Point Park*
10. *Top of Bluffs Connection Over Grey Abbey Ravine*

5.4.4.6 East Segment – Overall Evaluation Results

Table 5-20 below provides a summary of the rankings by Objective for the East Segment Alternatives. The overall Preferred Alternative for the East Segment is Alternative 4B (Headland Beach to East Point Park) with a ranking of Most Preferred for three Objectives (Natural Environment, Risk and Co-ordination) and a ranking of Preferred for two Objectives (Experience and Cost).

Table 5-20: East Segment – Objective Level Evaluation Results Summary

Objective	Do Nothing[1]	Alternative 1A[2]	Alternative 1B[3]	Alternative 2A[4]	Alternative 2B[5]	Alternative 3A[6]	Alternative 3B[7]	Alternative 4A[8]	Alternative 4B[9]	Alternative 5[10]
Natural Environment	IP	P	LP	IP	LP	IP	LP	P	MP	IP
Risk	LP	P	MP	P	MP	P	MP	MP	MP	IP
Experience	IP	IP	IP	IP	IP	IP	IP	IP	P	P
Co-ordination	LP	P	P	P	P	P	P	MP	MP	IP
Cost	MP	P	P	IP	LP	LP	LP	P	P	P
Overall	**Intermediate Preferred**	**Preferred**	**Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Intermediate Preferred**	**Preferred**	**Most Preferred**	**Intermediate Preferred**

Notes:
1. *Existing Conditions*
2. *Headland Beach with Top of Bluffs Connection*
3. *Headland Beach with Base of Bluffs Connection*
4. *Bridge & Headlands with Top of Bluffs Connection*
5. *Bridge & Headlands with Base of Bluffs Connection*
6. *Island-Bridge & Headlands with Top of Bluffs Connection*
7. *Island-Bridge & Headlands with Base of Bluffs Connection*
8. *Headland Beach with Revetment to East Point Park*
9. *Headland Beach to East Point Park*
10. *Top of Bluffs Connection Over Grey Abbey Ravine*

Key advantages of Alternative 4B include the following:

- Provides enhancements to terrestrial and aquatic habitat;
- Addresses risk to public safety by allowing development of a trail away from the risk line;
- Improves access for Emergency Services vehicles;
- Provides access to the shoreline to a large user group and increases public access along the water for approximately an additional 1,900 m of shoreline, through the acquisition of approximately 420 m of private property;
- Retains the existing sand shoreline through East Point Park;
- Is consistent/can be integrated with existing plans, including Metrolinx, and accommodates local land use including industrial facilities and the F.J. Horgan WTP.

As such, Alternative 4B (Headland Beach to East Point Park) was ranked as the Preferred Alternative for the East Segment.

5.5 Sensitivity Analysis of Alternate Plan for the Central and East Segments Submitted by the Friends of the Bluffs

In November 2016, the SWP Project Team received an Alternate Plan from a member of the public representing the *Friends of the Bluffs* for the Central and East Segments of the SWP. Given the public interest in this plan, TRCA undertook a sensitivity analysis which evaluated the Alternate Plan using

the Objectives, Criteria and Indicators used to select the Preferred Alternative. The results of the sensitivity analysis are detailed in **Appendix G**.

Based on the evaluation of the Alternate Plan, the following disadvantages were found for each Project Objective when compared to the Preferred Alternative:

Natural Environment Objective

- The Alternate Plan does not provide for the decommissioning of informal trails currently damaging vegetation communities on the tablelands and bluff slopes within East Point Park. In fact, the Alternate Plan has the potential to make this situation worse as it does not provide access to the shore between the Guild Park and Gardens and Beechgrove Drive, for a distance of ~2.9 km. Managed formal public access to the shoreline helps to prevent informal trails which are contributing to the loss of native vegetation, habitat fragmentation, displacement of fauna, soil compaction and resultant erosion, altered hydrology, and the spread of invasive species.
- The Alternate Plan does not provide comparable opportunities to improve aquatic habitat along the shoreline through the creation of a more diverse shoreline below Grey Abbey Park and east to East Point Park.

Risk Objective

- Recreational users along the existing sandy shoreline at East Point Park will be within the risk line for slope failure and, as such, use of this area will be at their assumed risk.
- Greyabbey Trail (the road and associated infrastructure) at the western end of Grey Abbey Park will be at risk from erosion within 60 years (**Figure 5-26**).
- Emergency Services access to the shoreline between the Guild Park and Gardens and Beechgrove Drive will not be improved.

Experience Objective

- The Alternate Plan will not address the displacement or disruption of the existing on-road and off-road sections of the Waterfront Trail between Greyabbey Trail and Beechgrove Drive. The Metrolinx Lakeshore East rail corridor expansion will constrain the existing on-road Waterfront Trail at the base of Manse Road, with train frequency increasing to every seven minutes (**Figure 5-26**). This will render the at-grade crossing of the trail unsafe or difficult to manage for those who cannot move quickly. This expansion may also potentially make the resulting off-road Waterfront Trail connection west of Copperfield Road and south of the rail corridor very narrow and unsafe.
- The new beach proposed at the base of the Guild Park and Gardens will be attractive to users but there will be limited opportunities to access the area as trail improvements to the Guild construction access route are impossible without significant impacts to vegetation communities of concern and private properties. The creation of a beach without appropriate access will likely result in users parking on residential streets and seeking informal or trespass access down the slope of the Bluffs potentially causing greater environmental damage to sensitive bluff vegetation communities.

- Achieving Blue Flag Beach status requires that a number of criteria be met including the provision of washrooms and parking which cannot be achieved at the base of the Guild Park and Gardens, given the access issues.
- The creation of a long headland to achieve sand accumulation in the Central Segment will preclude the accumulation of sand at Bluffer's Park Beach, so the Preferred Alternative for the West Segment (Wide Beach) cannot be achieved. There is the potential to fill the beach in the Alternate Plan through purchased material, such that sand will reach Bluffer's Park; however, this is a very expensive option.

Co-ordination Objective

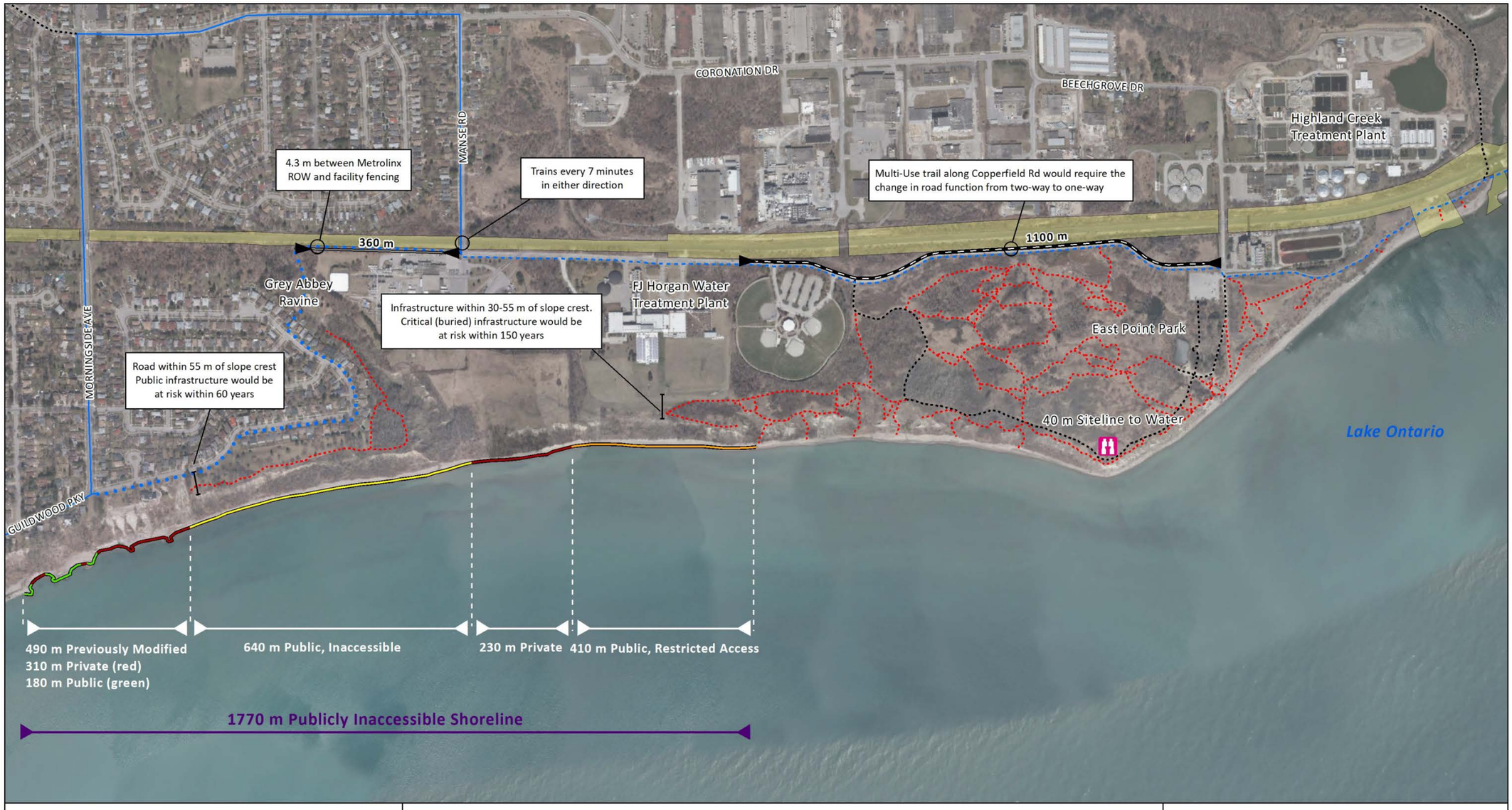
- The Alternate Plan has the potential to create significant problems for adjacent residential properties either with respect to loss of the public infrastructure due to erosion, parking problems associated with access, and increased use of the Waterfront Trail within residential areas.
- The Alternate Plan does not consider the projected population increase in the City of Toronto (24.9% increase over the next 30 years) or the resultant pressure of increased use on greenspace.

Value for Cost Objective

- The cost of the Alternate Plan is 15% less than the cost of the Preferred Alternative; however, the lower cost does not offset the other disadvantages listed above.

Therefore, it was determined that the Alternate Plan does not meet the Project Objectives.

Figure 5-26: Constraints in the East Segment



6. Description of the Preferred Alternative

This chapter describes the refinements to the Preferred Alternative, the conceptual design of the Preferred Alternative, construction techniques to build the SWP, and a proposed construction phasing plan. To ensure that the EA captures the greatest potential negative effects from the SWP, the SWP Preferred Alternative presented in this chapter, and the Effects Assessment presented in **Chapter 7**, is based on maximizing trail widths and construction footprints. During Detailed Design there may be opportunity to refine the design to further reduce effects.

6.1 Refinements to the Preferred Alternative

After the completion of the Alternatives evaluation documented in **Section 5.4,** the results were presented to the public for review and comment (at PIC #2 in June 2016) and were also reviewed with other Stakeholders including various City of Toronto departments, interest groups, and government agencies. A number of meetings with community groups and neighbourhood groups were held to discuss proposed refinements and try to create understanding around various components of the Preferred Alternative (refer to **Chapter 10**). Through the input received from these additional consultations the Preferred Alternative was further refined. The refinements are presented in the following sections and have been organized by the three Project Area Segments. **Figure 6-16** found at the end of the chapter presents the overall Refined Preferred Alternative.

6.1.1 West Segment

The Preferred Alternative for the West Segment as documented in **Section 5.4.2** is the *Wide Beach* concept. Based on input received from the public and various Stakeholders, no significant refinements are required to the concept. The one minor refinement made was regarding the shape of the Bluffer's Park headland which was modified to include a small cobble beach to provide access to the water by park users and better opportunities for fish habitat enhancement. The overall size of the headland was not substantially changed.

The redesign of the headland addressed comments with respect to ensuring that any land creation activities result in improvements to the aquatic habitat. The headland was refined to reduce the overall extent of infill, while accommodating the addition of a cobble beach, which further improves the nearshore aquatic habitat. The headland is an integral component of the Project and its purpose and function are intertwined with other components. There are two key problems the headland helps to address. First, ongoing sedimentation in the entrance to the Bluffer's Park boat basin is a navigation and cost concern for the City. Dredging of the boat basin entrance channel has been ongoing for the last decade, and annual costs continue to increase. For example, dredging costs in 2016 were $210,000, and increased to $270,000 in 2017. The proposed headland addresses this sedimentation by directing the material onto the existing sand beach, and into deeper water, where it is removed through coastal processes. Second, there is the need to provide a safe trail connecting the east end of Bluffer's Park Beach to the existing shoreline protection works at Meadowcliffe. This headland, in conjunction with the expanded Meadowcliffe headland, allows for the accumulation and retention of

sand, thereby widening the beach and providing this connection. The size and shape of the headland is the result of coastal modelling. The surfing community has raised concern that this headland eliminates the existing 'Lighthouse' surf break. As the Project proceeds into Detailed Design, TRCA has committed to continuing to work with the surfing community to see if additional changes may be made to the headland to meet both the needs of the Project, the requirements of regulators, and maintain the 'Lighthouse' surf break. The level of design and modelling necessary to resolve this issue can only occur during Detailed Design.

The modified headland configuration is shown in **Figure 6-1**.

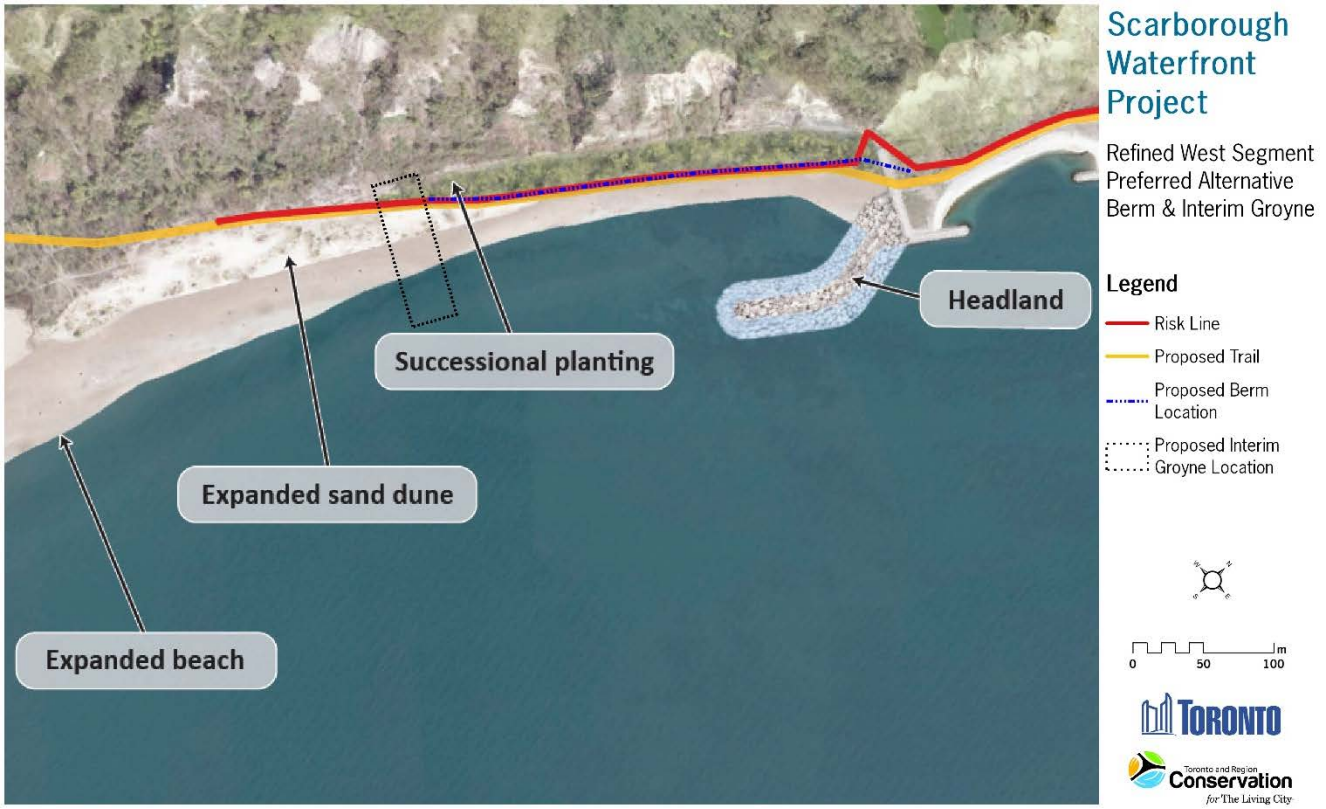
Figure 6-1: Refined West Segment Preferred Alternative – Bluffer's Park Headland



Also, considering that the *Wide Beach* concept would take decades to form through sediment capture after the headlands are in place, it is proposed that the beach build-up be accelerated through the importation of fill material and the potential use of dredge material from the Bluffer's Park boat basin entrance. This was determined by the Project Team to be desirable to allow for the creation of a connection at the east end of the beach to allow for construction access for the Central Segment and to allow for a trail connection in the near to medium term. It is proposed that a berm be constructed through this area to allow for immediate access to the Central Segment. This would be a raised berm and positioned an adequate distance from the bluff (~30 m) to minimize the risk due to landslides. The inside of the berm would collect talus from the self-stabilization of the Bluffs and eventually could be filled with sand. Cobble and/or sand would be placed along the front of the berm (lakeside). It will be

necessary to construct a temporary groyne about mid-way along the beach to keep the sand/cobble in place (**Figure 6-2**). After construction is complete the raised berm could be shaved down.

Figure 6-2: Refined West Segment Preferred Alternative – Berm and Interim Groyne



6.1.2 Central Segment

Refinements to the Central Segment were proposed for two sections as described below.

6.1.2.1 Sylvan Section

The Sylvan section is located at the west end of the Central Segment in the vicinity of the Doris McCarthy trail exit/entrance. As previously presented in **Section 5.4.3**, the preferred shoreline treatment through the Sylvan section is a headland beach. This headland beach concept has been modified considering:

- The MNRF has requested that areas of infill be minimized to the extent possible;
- The desire to further enhance aquatic habitat along the shoreline; and,
- Avoid impacts to marine archaeological resources.

A refined headland beach concept was developed through this section that is presented in **Figure 6-3**. Generally, this revision has resulted in a smaller footprint.

Figure 6-3: Refined Central Segment Preferred Alternative – Sylvan Headland Beach



6.1.2.2 Guild Park and Gardens Section

The Guild Park and Gardens shoreline is located approximately in the middle of the Central Segment and extends west of the Guild construction access route. As previously presented in **Section 5.4.3**, the preferred shoreline treatment through the Guild Park and Gardens shoreline is a headland beach. In reviewing this concept, the following was considered:

- A bump-out into the lake is still desired at the base of the Guild construction access route;
- The MNRF has requested that areas of infill be minimized to the extent possible; and,
- During Project planning it was recognized that until recently, the existing shoreline was functioning well; however, high water levels, large waves and storms in April 2017 caused damage.

Considering the above, the recommended improvement through this section is to apply a veneer of rock/stone material on top of the existing revetment to create a shoreline regeneration zone (**Figure 6-4**). Additional analysis has been done in this area to determine that a primary to high-capacity multi-use trail can be moved out of the risk line within the existing land base and aquatic habitat improvements can be achieved through refinements to the revetment and enhancements to the nearshore area. These refinements will still meet Project Objectives.

Figure 6-4: Refined Central Segment Preferred Alternative – Guild Park and Gardens Shoreline



6.1.3 East Segment

As previously presented in **Section 5.4.4**, the preferred shoreline treatment through the East Segment was a headland beach to East Point Park just south of the baseball diamonds with a trail transition from the toe to the top of the Bluffs. This headland beach concept has been modified considering:

- The MNRF has requested that areas of infill be minimized to the extent possible;
- Stakeholder requests to make the headland beach concept less uniform in its designs by incorporating different sized headlands and length of cobble beach area;
- Stakeholder request to introduce smaller size cobbles in the beach areas and retain existing sandy shoreline; and,
- Relocation of the transition between the toe and top of the Bluffs further to the west to minimize impacts to vegetation communities of concern and the sandy shoreline, and continue to achieve AODA grade standard.

The refinements to this Alternative build on the strengths of the East Segment top-of-bluffs Alternatives evaluated in **Chapter 5** (e.g., smaller impact on beach vegetation communities of concern), while removing the problems associated with a staircase and bridge connection over Grey Abbey Ravine from the west side (e.g., large impacts to forest and bluff communities of concern in and on the tablelands west of the ravine). The refinements to the East Segment Preferred Alternative included shortening the headland beach system to the east side of Grey Abbey Ravine and transitioning the trail up from the toe to the top of the Bluffs. This refined Alternative would not provide safe, formal access to the sandy shoreline along East Point Park, but it would allow this shore to continue in its current state. Shoreline toe protection works are required to east side of Grey Abbey

Ravine to halt/slow erosion below Greyabbey Trail (e.g., road and associated infrastructure) and Grey Abbey Park, as this area is at risk within the design life of the SWP. Shoreline protection works may be required in the future to protect the municipal infrastructure east of Grey Abbey Ravine; however, this would not be required within the design timeframe of the Project.

The Refined East Segment Preferred Alternative consists of a headland beach system extending from below just south of Morna Avenue to the east side of Grey Abbey Ravine, which has been designed to provide a continuous shoreline connection from Guildwood Parkway in the Central Segment to the eastern edge of the ravine (**Figure 6-5**). The shoreline connection will then transition to the tableland by way of a corkscrew ramp from the shoreline to the tablelands.

A similar Alternative was considered in **Chapter 5** with a staircase up the west side of the ravine and a bridge across it but was rejected because of significant impacts to Grey Abbey Ravine. In order to refine the Alternative, the Project Team studied the opportunity to move the transition point to the east side of the ravine and propose a freestanding structure which will connect to the top of the bluff by a bridge (**Figure 6-6**). This can meet AODA grade standards and City primary/high-capacity multi-use trail standards. The resulting structure is quite large but it is hoped that it will become an iconic feature on the Scarborough shoreline. Other options will be explored during Detailed Design.

Given the public's desire for views of the lake from the top of the Bluffs, the trail along the tablelands will be positioned closer to the crest, landward of the 10-year Crest Risk Line. Although the trail will be situated within the 100-year erosion hazard limit (EHL) (see **Section 3.1.10.2**), the trail can be moved further inland in 10-year increments when the lifecycle of the trail has expired. This approach to provide more desirable and accessible views of the lake will minimize the formation of additional informal trails from users trying to get closer to the slope crest, and will improve safety and minimize the risk to those users as a result of natural slope crest migration. The trail along the tablelands will be designed to screen the adjacent industrial and infrastructure uses and to prohibit access. The tableland trail would continue through East Point Park to continue the connection to the Port Union Waterfront Park to the east of the Project Study Area (see **Section 6.2.3.3**).

6.2 Overview of the Conceptual Design

The conceptual design for the SWP includes the following components:

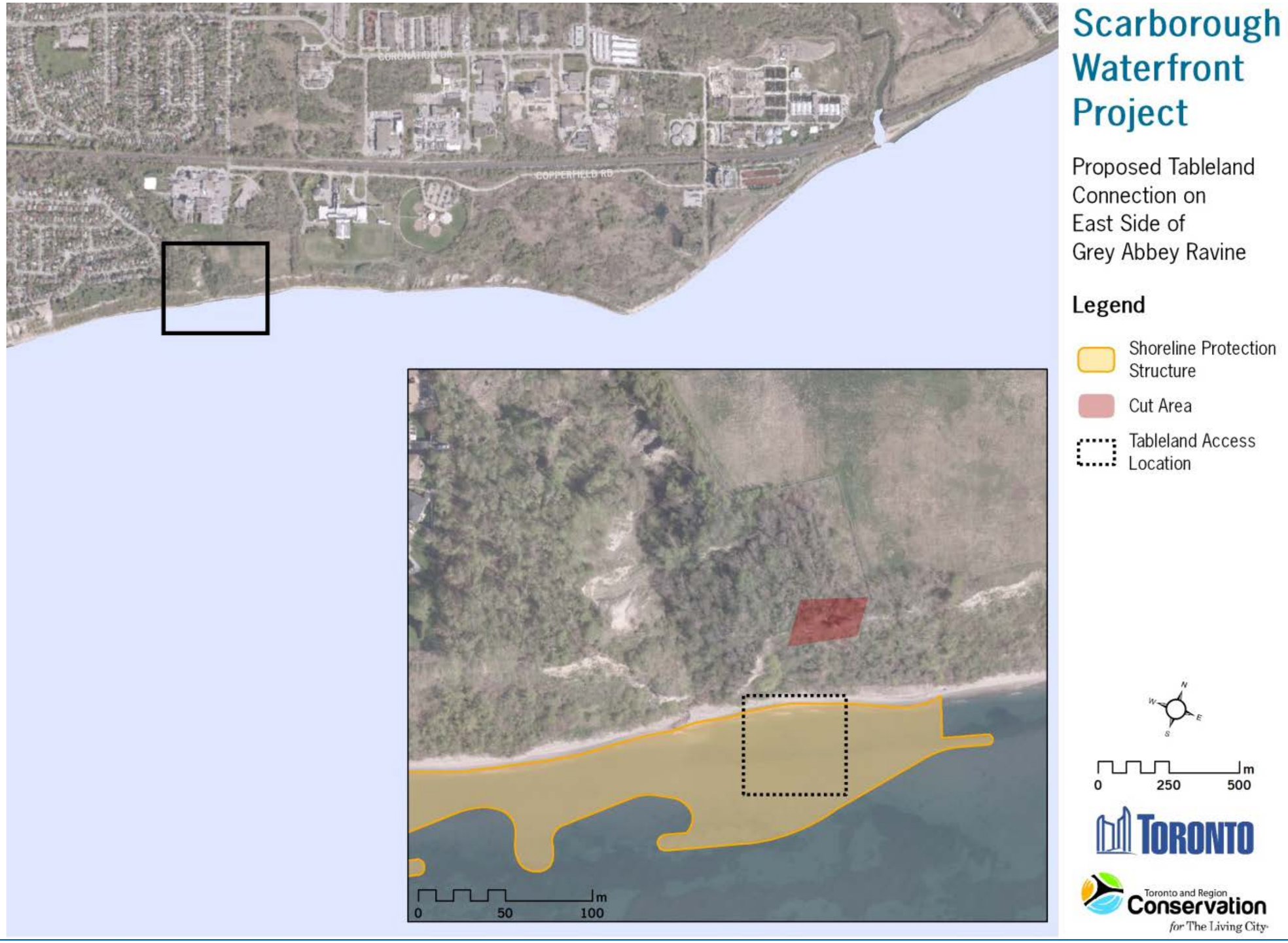
- Shoreline configuration and protection features
- Naturalization (i.e., habitat features)
- Recreational features (i.e., trails)
- Site access routes

The various shoreline components and protection features are described in their built-out state by Project Study Area Segment in **Section 6.2.1**, including a description of how each Segment is

Figure 6-5: Refined East Segment Preferred Alternative – Headland Beach



Figure 6-6: Proposed Tableland Connection on the East Side of Grey Abbey Ravine



Scarborough Waterfront Project

Proposed Tableland Connection on East Side of Grey Abbey Ravine

Legend

- Shoreline Protection Structure
- Cut Area
- Tableland Access Location

N
W
E
S

0 250 500 m

TORONTO

Toronto and Region Conservation for The Living City

connected to the next. Recommended habitat targets for both terrestrial and aquatic habitats in each Segment are described in **Section 6.2.2**. These recommended habitat targets reflect approximate dimensions that were developed during conceptual design and should be maintained (or enhanced) during Detailed Design. Approximate placement and required design specifications of recreational features (i.e., trails) are discussed in **Section 6.2.3**, while site access routes between the tablelands and shoreline are detailed in **Section 6.2.4**.

6.2.1 Shoreline Configuration and Protection Features

The shoreline features of the SWP conceptual design vary by Shoreline Segment. The following subsections describe the conceptual details of these shoreline protection features.

6.2.1.1 West Segment

The Preferred Alternative for the West Segment, shown in **Figure 6-7** is a refined version of West Alternative 5B – Wide Beach. It involves lakeward extensions of both the east headland at Bluffer's Park and the west headland at Meadowcliffe Drive to allow for the accumulation of sand along Bluffer's Park Beach. The expansion of Bluffer's Park Beach has been designed to blend easily with the existing headland beach system at Meadowcliffe, closing the gap below Cudia Park and providing a continuous connection between the West and Central Segments.

The headland extensions will be constructed with approved fill material protected by armourstone revetments. Any structure that will protect against stronger easterly waves is considered exposed. The exposed revetments will have both primary and secondary armour layers backed by rip-rap. The sheltered revetments (those not subjected to easterly waves) will have a single armour layer plus rip-rap. The required infill area will be approximately 111,000 m^2, including the full area of the expanded beach. While there is a minor increase in the infill area as a result of the refinements to the headland expansion, the addition of a cobble beach in this area will further enhance the aquatic habitat.

6.2.1.1.1 Bluffer's Park Headland Expansion

In order to retain the wider beach, the Bluffer's Park headland will be extended approximately 250 m into the lake. The headland will contain a south-facing cobble beach, which will further enhance the aquatic habitat.

6.2.1.1.2 Bluffer's Park Beach

On average, the built-out shoreline for the wider beach will be approximately 60 m further offshore than the current shoreline and will protect the bluff toe in front of Cudia Park, eliminating toe erosion. This will be wide enough to support a trail outside of the risk line established in **Section 3.1.10.2** of **Chapter 3**. The beach widening will be partly accomplished through the natural accumulation of sediment trapped by the proposed headlands. Clean material from Bluffer's Park dredging activities may be used to expedite this natural accumulation.

Figure 6-7: Refined West Segment Preferred Alternative



6.2.1.1.3 Meadowcliffe Drive Headland Expansion

In order to retain the wider beach, the westernmost headland below Meadowcliffe Drive will also be extended approximately 230 m into the lake.

6.2.1.2 Central Segment

The Preferred Alternative for the Central Segment, shown in **Figure 6-8**, includes a new headland-cobble beach system at the base of the Doris McCarthy Trail, an outlook headland at the base of the Guild construction access route, and a regeneration of the Guild Park and Gardens shoreline. As a result of the refinements undertaken to the shoreline, the overall infill area for the Central Segment has been reduced from approximately 65,000 m^2 to approximately 18,000 m^2.

6.2.1.2.1 Headland Beach System

While an informal rubble revetment is currently providing protection to the shoreline at the base of Doris McCarthy Trail, the existing informal shoreline protection does not allow for suitable pedestrian access and is subject to high wave overtopping and potential winter icing.

The refined headland beach system at the base of the Doris McCarthy Trail will consist of two headlands and one cobble beach. The eastern-most headland will be approximately 150 m wide and will tie into an existing headland from the headland beach system below Sylvan Drive. The western-most headland will also be approximately 150 m wide and will tie into the existing headland of the Meadowcliffe Drive sector headland beaches.

Both the eastern end of the west headland and the central headland will extend approximately 70 m out from the current shoreline. The total infill area for the new headland beach system will be approximately 11,500 m^2.

6.2.1.2.2 Guild Public Gathering Space

An outlook headland is proposed at the base of the existing Guild construction access route, and will extend approximately 90 m offshore. The artificially created wetland area at the base of the access route will be relocated and expanded. This wetland area will be replicated on either side of the headland by dismantling a portion of the existing Guildwood Parkway revetment on the east side of the headland, and then adding an approximately 40 m long breakwater shoal on the west side of the headland. This will produce two low elevation areas beside the headland where wetland flora and fauna can establish. The total infill area for the new headland will be approximately 6,500 m^2.

6.2.1.2.3 Guild Park and Gardens Shoreline Regeneration Zone

While an informal rubble revetment is currently providing protection to the bluff below Guild Park and Gardens, the existing informal shoreline protection does not allow for suitable pedestrian access and is subject to high wave overtopping and potential winter icing. The regeneration of this shoreline will include a new shoal and reinforcement of the informal revetment to improve stability, reduce wave overtopping, improve aesthetics, provide safer public access and improve aquatic habitat. As noted in **Section 6.1.2**, the exact location of the trail will be further investigated during Detailed Design.

Figure 6-8: Refined Central Segment Preferred Alternative



The lakebed in front of the berm will be surcharged with boulders to create a shoreline shoal. The existing rubble will then be graded to smooth out any rough features on the slope, and exposed reinforcing steel will be removed. A layer of armourstone will be added to cover the rubble slope. A cap stone row will be added at the top of the armoured slope to reduce overtopping volumes during extreme storm events.

6.2.1.3 East Segment

The headland beach system will extend from below Grey Abbey Park to the east side of Grey Abbey Ravine, as shown in **Figure 6-9**. The offshore extent of the proposed headlands vary from 40 m to 90 m with the headland beach system extending along approximately 1,250 m (or 1,100 linear metres) of shoreline. Portions of this shoreline have already been modified with toe protection works (approximately 490 m); therefore only approximately 760 m of the existing shoreline will actually change character. Further, 540 m of the existing shoreline is in private ownership; therefore, approximately 1.3 km of publicly inaccessible shoreline will become accessible as a result of Project implementation. No shoreline protection works are proposed east of Grey Abbey Ravine. The overall infill area for the East Segment has been reduced from approximately 86,000 m^2 to approximately 45,000 m^2, as a result of the refinements.

6.2.2 Naturalization

A variety of naturalized terrestrial and aquatic habitats will be created and/or enhanced as a result of the implementation of the SWP. A summary of the various habitat creation opportunities and enhancement techniques, by Project Study Area Segment, is provided below.

The habitats described in this section are at a coarse community level. Site-level details and specific plantings will be determined at the Detailed Design stage of the SWP planning. These habitat types are recommended based on similar shoreline sites found along the north shore of Lake Ontario. Species will be selected that are consistent with TRCA and the City of Toronto's approved planting lists. All vegetation to be installed will be approved by TRCA, the City of Toronto, and other applicable agencies.

6.2.2.1 Terrestrial Habitat

Approximately 17.6 ha of new naturalized terrestrial habitat is proposed in the Refined Preferred Alternative conceptual design for the SWP (**Table 6-1**). It should be noted that unvegetated shoreline and manicured areas are not considered terrestrial habitat enhancements, as they do not provide any meaningful habitat; therefore they are not included in the total area of terrestrial habitat enhanced. Terrestrial habitat features include meadow and successional habitats, as well as beach, sand dune, forest and wetland habitats. **Table 6-1** details the various terrestrial naturalization/enhancements and their contributing area per Project Study Area Segment. Native species that may be used in restoration plantings are outlined in **Table 6-2.**

Figure 6-9: Refined East Segment Preferred Alternative



Table 6-1: Terrestrial Habitat Enhancements by Project Study Area Segment

Habitat Type	West	Central	East	Total
	Approximate ha			
Beach	6.4	--	--	6.4
Sand Dunes	1.3	--	--	1.3
Meadow	1.6	0.4	1.6	3.6
Successional	1.8	1.5	2.1	5.4
Wetlands	--	0.2	0.1	0.3
Wet Features	--	0.1	--	0.1
Forest	--	--	0.5	0.5
Manicured	--	0.3	--	0.3
Unvegetated shoreline	1.6	1.2	1.8	4.6

Table 6-2: Native Species That May be Included in Restoration Plantings

Common Name	Scientific Name
Beach marram grass (grass)	*Ammophila breviligulata*
Switchgrass (grass)	*Panicum virgatum*
Black-eyed Susan (wildflower)	*Rudbeckia hirta*
Heath aster (wildflower)	*Symphyotrichum ericoides*
New England aster (wildflower)	*Symphyotrichum novae-angliae*
Common milkweed (wildflower)	*Asclepias syriaca*
Hairy beardtongue (wildflower)	*Penstemon hirsutus*
Wild bergamot (wildflower)	*Monarda fistulosa*
Canada wild rye (grass)	*Elymus canadensis*
Staghorn sumac (shrub/small tree)	*Rhus typhina*
Red-osier dogwood (shrub)	*Cornus stolonifera*
Serviceberry (shrub/small tree)	*Amelanchier sp.*
Chokecherry (shrub/small tree)	*Prunus virginiana*
Ninebark (shrub/small tree)	*Physocarpus opulifolius*
Speckled alder (tree)	*Alnus incana*
Willow species (shrub/tree)	*Salix sp.*
Eastern cottonwood (tree)	*Populus deltoides*
Trembling aspen (tree)	*Populus tremuloides*
White birch (tree)	*Betula papyrifera*

Beaches and Sand Dunes

Beaches are areas that are sparsely vegetated and are typically subject to natural or human disturbance. Sand dunes are vegetated ridges that form just landward of the beach backshore and run parallel to the shoreline. Wind-blown sand from the dry beach is trapped by vegetation, allowing an undisturbed dune to continually grow in width and height.

Coastal sand dune systems, such as the one currently at Bluffer's Park Beach, are considered to be one of the rarest and most fragile ecosystems in Canada, as they are literally held together by beach grasses (e.g., marram grass) and other vegetation (Peach, 2006). Very specialized tree, shrub and grass communities have also become adapted to these systems.

Implementation of the SWP will result in an increase in the amount of beach and sand dune habitat within the Project Study Area. Beaches and sand dunes provide habitat for species such as shorebirds and turtles.

Meadow

Meadows typically consist of a mixture of grasses and wildflowers with less than 25% shrub cover, and are generally formed following a natural or human disturbance, such as flooding, wind or land-clearing, which result in the removal of woody species and allow for the colonization of herbaceous plants and grasses, or in the case of the SWP, newly created land.

The meadow habitats will be designed to provide a number of habitat functions, including but not limited to habitat elements for butterflies and other pollinators, migratory and breeding birds and mammals. Newly created meadow habitat within the Study Area is expected to be temporary or transitional; that is, it will not be maintained as meadow and will be allowed to naturally succeed over time. For example, the newly created headland at Bluffer's Park will initially be planted as a meadow with shrub and tree nodes, with installation of native species; however, over time as the soil community matures, and seeds arrive via wind and wildlife, shrubs and trees are expected to colonize the site resulting in the transition of the meadow to successional habitat and eventually to woodland. The habitats that are restored immediately after construction will not be maintained as static communities; rather they will naturally transition to other vegetation communities based on natural conditions.

Successional

Successional habitats are those that are transitioning from being primarily unvegetated or dominated by herbaceous vegetation (i.e., containing grasses and forbs) to vegetation communities that have more woody vegetation such as thickets (i.e., containing shrubs) and eventually into woodland and forest communities (i.e., containing trees). In the case of SWP, new or restored natural habitats will be planted with native species appropriate to the specific site conditions (i.e., soil composition and moisture regime). However, those communities will be allowed to ecologically succeed; that is, communities will naturally transition to different communities – nature will do what it wants to do.

Similar to the meadows, the successional habitats will be designed to provide a number of habitat functions, including but not limited to habitat elements for butterflies and other pollinators, migratory and breeding birds, and mammals, as well as habitat features suitable for amphibians and reptiles.

Wetlands and Wet Features

Wetlands are areas of land that are seasonally or permanently covered by shallow water, or lands where the water table is close to or at the surface (MNR, 2010).

Wetland creation and enhancement for the SWP will focus on establishment of marsh communities at several locations along the shoreline. These constructed wetlands will be designed to capture water from stormwater outfalls to improve aesthetics and contribute to minor improvements in water quality, through minor reductions in ***Total Suspended Solids (TSS)***.

Coastal wetlands share similar characteristics to their land-based counterparts; however, they have a direct connection to the lake for all or part of the year, depending on water levels.

Wet features are landscape elements that contain water. These features include engineered ponds which may or may not be vegetated. In the case of SWP wet features will be designed to accommodate stormwater flows and improve aesthetics.

Forest

Forests are vegetation communities that have greater than 60% tree cover. Forests can be dominated by native or exotic species and may include coniferous, deciduous or mixed species. Forest habitat will be restored as part of the SWP and as it matures will provide habitat for various wildlife species including birds and mammals and will improve terrestrial connectivity.

Manicured

Manicured areas refer to non-naturalized areas that could include mowed grass or gathering spaces that lack natural vegetation cover. Manicured areas with the SWP helps provides gathering areas for the public which helps minimize impact on adjacent natural vegetation communities.

Unvegetated

Unvegetated shoreline refers to man-made areas of the shoreline that lack vegetation. These could include armourstone or boulder shorelines and revetments. Unvegetated shorelines are used by species such as Purple Sandpiper (*Calidris maritima*) and American Mink (*Neovison vison*).

In general habitat enhancements will focus on the provision of elements that facilitate natural succession and functional habitat for wildlife life stages.

6.2.2.1.1 West Segment

The headland at Bluffer's Park is approximately 2.8 ha and will be graded to a gently rolling topography (see **Figure 6-7** in **Section 6.2.1.1**). Natural vegetation communities will begin initially as meadow communities (approximately 1.6 ha) with strategic areas of native trees and shrubs. Over time the meadow community will naturally transition to successional communities. In addition to naturalized habitat, the headland will also contain manicured areas.

The Bluffer's Park sand beach will be extended to the Meadowcliffe shoreline and is expected to increase by approximately 6.4 ha. The associated sand dune community is projected to increase by approximately 1.3 ha over time as sand accumulates on the beach. Dune species will likely colonize the area from the adjacent dune vegetation; however strategic plantings will also advance the

establishment of dune communities. Currently, a series of informal trails bisect the existing dune habitats, particularly on the east side of Bluffer's Park Beach. These informal trails will be decommissioned and further controlled by using techniques such as fencing and signage. It is recommended that a Revitalization Plan be developed for Bluffer's Park that includes further detail on trail management, in addition to habitat restoration and management.

The area at the base of the Cudia Park Bluffs will be enhanced to facilitate the development of approximately 1.8 ha of successional habitat, and the area will be strategically planted with site appropriate native species. The area is expected to experience sedimentation from the Bluffs over the long-term which may result in natural changes to the vegetation communities.

6.2.2.1.2 Central Segment

The headland beach system at the base of Doris McCarthy Trail will allow for the creation of a constructed wet feature, approximately 0.1 ha in size, that will capture baseflow from Bellamy Ravine (see **Figure 6-8** in **Section 6.2.1.2**). It will function primarily to improve aesthetics and contribute to minor water quality improvements, through a small reduction in TSS. Species expected to colonize the wet feature include cattail. The wet feature will be designed to retain baseflows flowing through to the lake. During periods of high flow water would bypass the wetlands and flow directly into the lake.

An approximately 0.1 ha public gathering space at the base of the Bellamy Ravine, adjacent to the wet feature, will be a combination of mowed grass and a hard surface gathering area. The area at the base of the Bluffs will be actively restored to approximately 1.5 ha of successional habitat, which will succeed naturally over time.

The Guild Public Gathering Space will be actively restored to a combination of approximately 0.2 ha of mowed grass and approximately 0.4 ha of meadow habitat. It is anticipated that the manicured areas will be positioned around the perimeter of the new public gathering space, while the middle will consist of meadow habitat.

Two wetland features are expected to develop on each side of the Guild Public Gathering Space that will occupy a total area of approximately 0.2 ha. These wetlands will be connected to the lake and appropriately incorporated at the base of the Guild Park and Gardens to provide shoreline vegetation and sheltered areas for fauna such as waterfowl. The wetlands will be designed so that wave action is buffered through the use of boulders to allow wetland vegetation such as cattails to become established.

6.2.2.1.3 East Segment

The area at the base of the Bluffs will become the future backshore area and will be dominated by successional habitat (see **Figure 6-9** in **Section 6.2.1.3**). Approximately 2.1 ha of successional habitat will be developed that will provide a vegetated buffer between the trail and the Bluffs, providing wildlife a corridor along the shoreline.

The shoreline of the headland beach system, which includes cobble beaches between the headlands, provides suitable stopover habitat for species such as Purple Sandpiper that prefer rocky shorelines.

Habitats on the headland will begin primarily as meadow, but are expected to naturally transition over time to successional habitats. A total of approximately 1.6 ha of meadow habitat will be created along with strategically planted shrub nodes.

A small 0.1 ha wetland feature at Grey Abbey Ravine will be designed to capture baseflow before allowing it to return to the lake. During periods of high flow (e.g., storm events) flows will be conveyed directly to the lake.

In the area where the corkscrew ramp will be constructed to facilitate the access to the shoreline in the East Segment, the existing slope is oversteepened at the top of the bluff and will experience crest migration in the long-term. To minimize the risk to the foundations of the corkscrew ramp due to talus runout, where the upper slope is oversteepened it should be trimmed back to a stable inclination prior to construction. This slope trimming will affect the existing terrestrial habitat.

A portion of the industrial tableland in the East Segment will be re-graded to create a berm or hill with a perimeter fence to separate the industrial site from the Project Area. The hill will be planted with native shrubs to both shield the industrial site from public views, as well as discourage public access into the industrial site.

East Point Park contains some of the most significant habitat within the Study Area; however, a network of approximately 8 km of informal trails has resulted in habitat fragmentation. These informal trails will be decommissioned using techniques such as installation of habitat piles that block access, installation of native plants such as wild rose, hawthorn and raspberries, and signage. Community stewardship of East Point Park will play a significant role in providing observations and advice to the City of Toronto and TRCA on trail use and management, as well as contribute directly to efforts to decommission trails via the techniques outlined above. Community stewardship efforts will also play a significant role in communicating the rationale for informal trail decommissioning to park users, policing the site and passing on observations of new trails to the City and TRCA. It is recommended that a Revitalization Plan be developed for East Point Park that includes further detail on continued trail management as well as habitat restoration and management.

Approximately 0.5 ha on the north side of the hill east of Beechgrove Drive will be restored to a forest community which will improve forest connectivity between Highland Creek and East Point Park.

6.2.2.2 Aquatic Habitat

The SWP Refined Preferred Alternative results in the increase in sand shoreline length of close to 400 m, and an additional 1,000 m of cobble beach.

Naturalization of the aquatic habitat within the Project Study Area includes retrofitting existing shoreline structures and enhancing and/or designing the proposed structures such that their ecological value is maximized. Headland beach systems provide better aquatic habitat over the traditional linear revetment as they lengthen the shoreline, and increase the diversity of the substrate and shoreline, providing improved cover and foraging opportunities. Aquatic habitat enhancements beyond these features maximize the potential to contribute to functional nearshore open coast habitat.

The summary of individual naturalization/habitat enhancement techniques that may be implemented for the Refined Preferred Alternative is provided in **Table 6-3**, and detailed below. Where possible, combinations of techniques will be used.

Table 6-3: Potential Aquatic Habitat Enhancement Techniques Overview

Naturalization/Habitat Enhancement Technique	Target/Benefit
Surcharging (Revetments and Headlands/Groynes)	▪ Improves habitat quality by diversifying habitat structure and shoreline profile
Shoreline Shoals	▪ Adds structural elements to improve nearshore habitat quality: improves foraging opportunities, increases essential habitat for cool and cold water species (open coast) and improves submergent vegetation (sheltered embayment)
Boulder Pavement Restoration	▪ Replaces coarse substrate to re-instate substrate diversity and increase habitat structural elements.

Surcharging (Revetments, Headlands and Groynes)

Revetments, headlands, and groynes are widely used in coastal engineering for shoreline stabilization and enabling shoreline use. While these structures typically lack the physical habitat complexity of historically unaltered shorelines, they can be designed and/or enhanced to incorporate more ecological functions. Surcharging, in particular, is an effective method of improving the quality of aquatic habitat associated with these structures.

Surcharging involves placing coarse substrate (e.g., rubble, boulders and cobble) underwater within the wave zone along the revetments, vertical walls, headlands or groynes. In headland beach systems, the material can be placed both within and at the end of beach cells. Larger material is typically arranged to protect smaller material from being moved off-site, and reworked by wave action into nearshore shoals and bars, as illustrated in **Figure 6-10**.

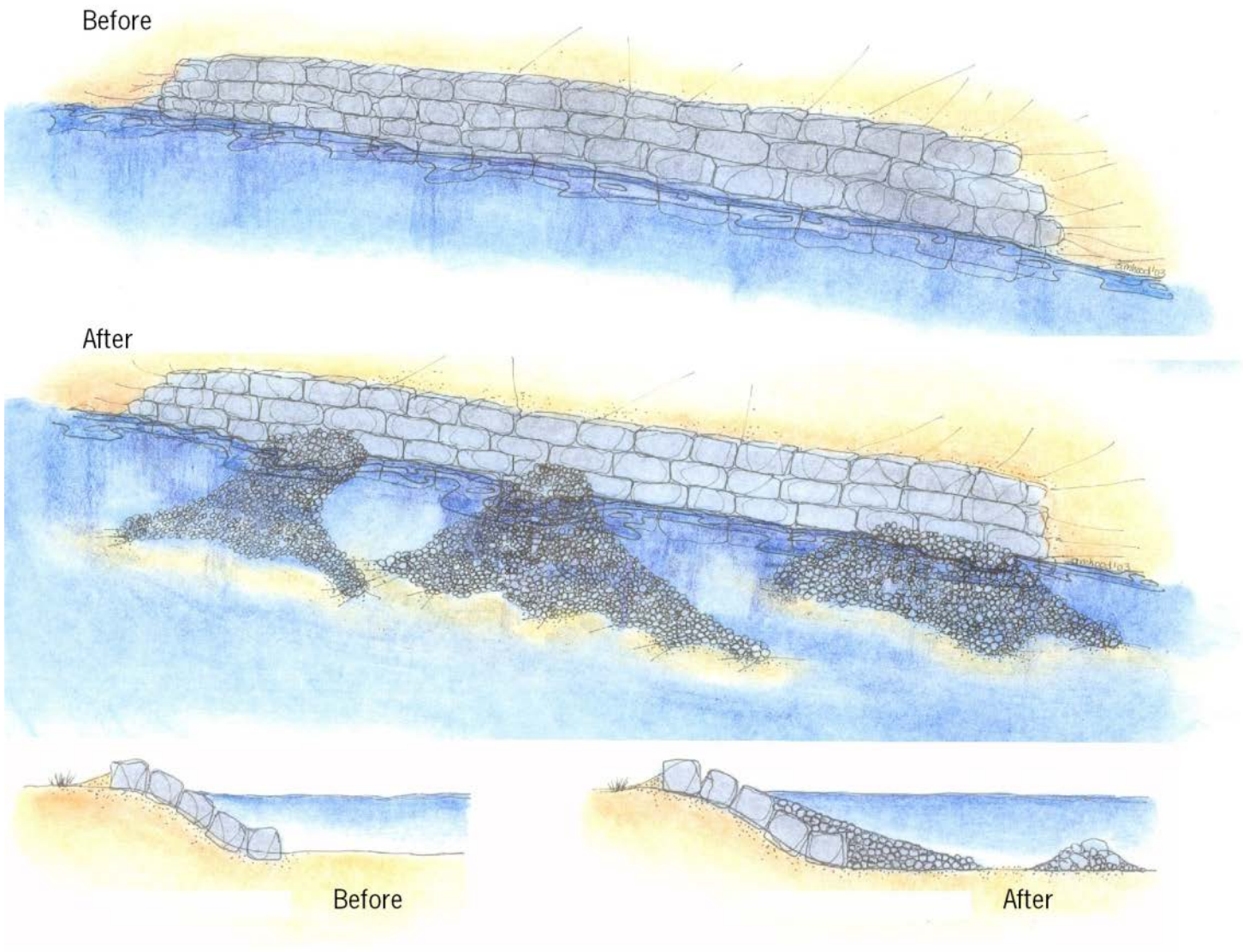
Surcharging revetments results in an improvement of habitat quality and benefits aquatic organisms utilizing the shoreline. Surcharging provides for aquatic habitat physical structure diversity along revetments, headlands and groynes, therefore making these otherwise uniform, linear (in the case of walls and revetments) shorelines more functional and attractive to fish and other aquatic life.

Shoreline Shoals

Used in areas with uniform substrates and general lack of habitat structural diversity, shoreline shoals are aggregations of coarse materials placed along the shoreline in sheltered embayment and open coast habitat. These structures improve shoreline structural habitat, providing cover and improving foraging opportunities for various aquatic organisms.

Shoreline shoals are typically connected to the shoreline (**Figure 6-11**). Materials such as armourstone, boulders, rubble, rip-rap, cobble and gravel are selected and placed (typically, with an extended reach excavator) according to coastal conditions and area use. If conditions allow, stepped shoals may be constructed by forming ridges that further increase habitat diversity.

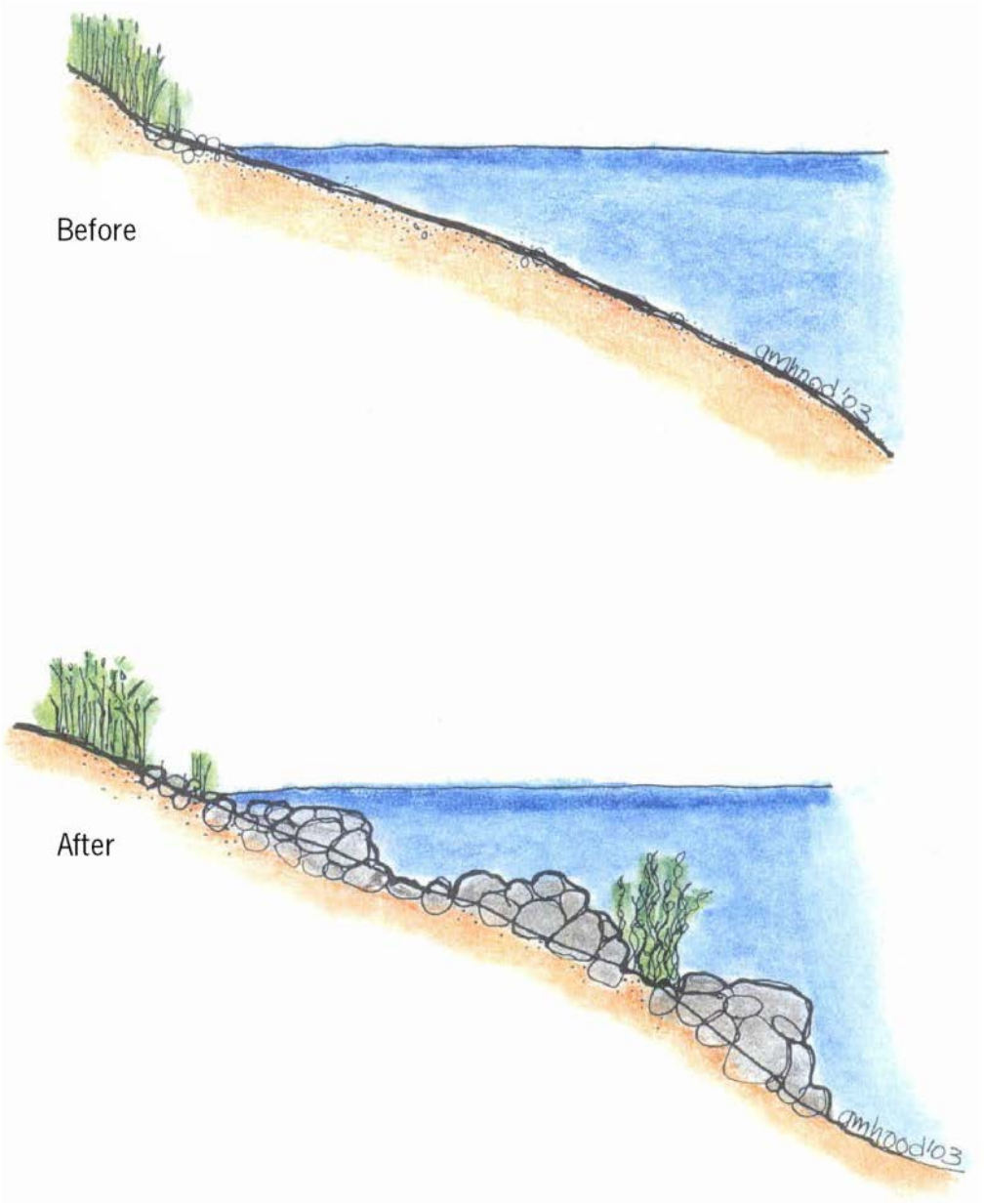
Figure 6-10: Surcharged Revetment Technique



Scarborough Waterfront Project

Surcharged Revetment Technique

Figure 6-11: Shoreline Shoal Treatment Technique



Scarborough Waterfront Project

Shoreline Shoal Treatment Technique

TORONTO

Toronto and Region Conservation for The Living City

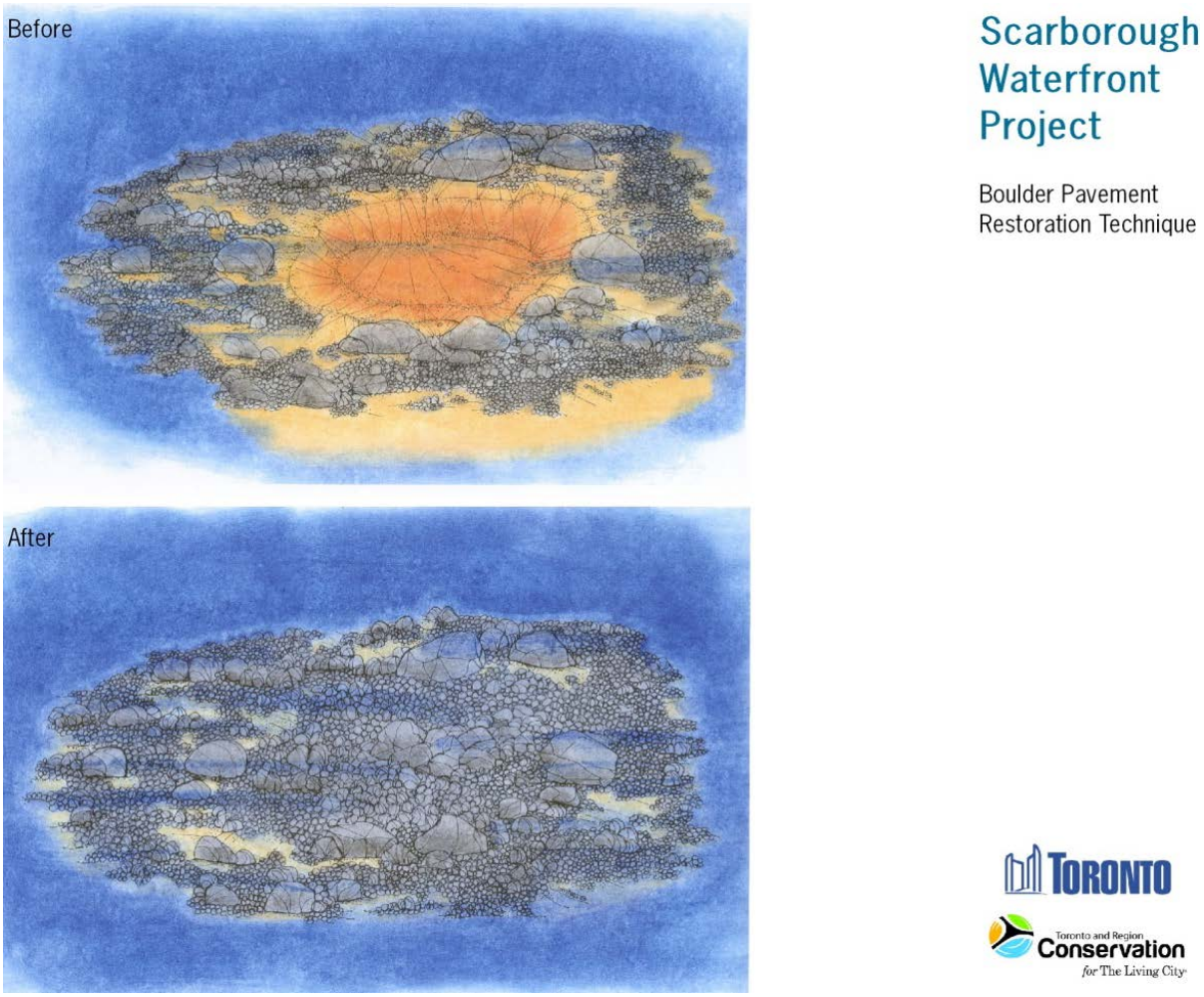
Shoreline shoals improve habitat quality for many fish and benthic invertebrate species by providing cover and improved foraging opportunities. They can also provide spawning habitat for certain fish species (e.g., Lake Trout), where shoal location, size, configuration, and aggregate materials of appropriate size would be selected based on the spawning habitat requirements of that species.

Boulder Pavement Restoration

Boulder pavement is formed by aggregations of coarse material such as cobble, gravel and boulders that were eroded from the shore. It provides essential habitat for fish species utilizing the shoreline. Historically, boulder pavement has been degraded by stonehooking activities that resulted in the partial, but substantial, removal of aggregates that formed the pavement. However, restoration can be achieved within the areas that need repair, identified by shallow depressions along the shoreline.

Boulder pavement repair consists of filling the depleted areas with boulders and cobble and bringing the materials to grade with the surrounding areas, as illustrated in **Figure 6-12**. Typically, material greater than 20 cm in diameter remains within the repair location and traps and holds smaller materials such as sand and gravel.

Figure 6-12: Boulder Pavement Restoration Technique



Boulder pavement repair replaces lost coarse substrate to re-instate substrate diversity and increase habitat structural elements. Improved habitat is better able to meet the requirements of the various life stages of fish and other aquatic organisms that utilize the Scarborough shoreline. For example, certain species of macroinvertebrates and fish require interstitial spaces within stable, coarse cobble and boulder substrates, which may serve as cover and shelter from predators.

6.2.2.2.1 West Segment

In the West Segment, open coast techniques will be used at the Bluffer's Park headland expansion, as well as the Meadowcliffe Drive headland expansion.

The Bluffer's Park headland expansion presents an excellent opportunity for installation of a Lake Trout spawning shoal/reef, contributing to re-instatement of the habitat lost to the stonehooking activities of the 1800s. Spawning shoals/reefs with a range of depths are thought to provide optimal conditions for Lake Trout reproduction. By inclining the structure into deeper water, a range of water depths and associated water currents would be available for spawning such that during any given year, conditions would be favourable along some portion of the structure for optimal egg retention and survival (**Appendix D**). In addition, the positioning of this headland would provide the shortest route for the young life stages of Lake Trout to reach deep water, therefore potentially reducing predation.

In shallower depths, other techniques appropriate for open coast habitat (surcharging, boulder pavement repair and/or shoreline shoals, in particular) will be used.

Specific locations, configuration and dimensions of the habitat enhancement features will be determined during the Detailed Design phase of the Project.

6.2.2.2.2 Central Segment

In the Central Segment, combinations of open coast naturalization/habitat enhancement techniques will be used.

The proposed shoreline structures along Sylvan shoreline and at the base of the Guild construction access route west would be enhanced through a combination of shoreline shoals and surcharging. Existing revetments along the South Marine and Guildwood Parkway shorelines would be retrofitted using a similar combination of surcharging and shoreline shoals. If possible, boulder pavement repair techniques will be applied. At the Guild Park and Gardens Shoreline Regeneration Zone, a large, continuous shoreline shoal would be installed along the shoreline. Importantly, integrating habitat enhancements along the entire length of the Central Segment shoreline would achieve a synergistic effect.

Specific locations, configuration and dimensions of the habitat enhancement features will be determined during the Detailed Design phase of the Project.

6.2.2.2.3 East Segment

In the East Segment, all three habitat enhancement techniques may be used to enhance the proposed shoreline structures. These enhancements will add structural habitat elements, increasing habitat complexity and partly re-instating substrates lost to stonehooking. Specific locations, configuration and dimensions of the habitat enhancement features will be determined during the Detailed Design phase of the Project.

6.2.3 Recreational

As part of the conceptual design, a formalized Waterfront Trail is located at the base of the Bluffs on the lakeward side of the risk line in both the West and Central Segments. The trail remains at the base of the Bluffs within the East Segment for a portion of the length, but moves to the top of the Bluffs at the eastern edge of Grey Abbey Ravine to connect to a tableland trail. The tableland trail is positioned on the landward side of the 10-year Crest Risk Line, and will continue east to connect to the Port Union Waterfront Trail.

The trail will be designed to meet the City of Toronto's primary/high-capacity multi-use trail guidelines, where possible, which requires a minimum corridor width of 5.4 m, separated, with a minimum paved or hardened surface of 3.0 m to 3.6 m, a slope of not greater than 5% and a maximum turning radius of 20 m to provide clear sight lines for cyclists. Refinements were made where achieving these assumptions resulted in substantive alterations to the Bluffs. Trail configurations are described in more detail for each Segment in the following sections.

6.2.3.1 West Segment

Through the West Segment, the Preferred Alternative for the proposed Waterfront Trail alignment will be at the base of the Bluffs, lakeward of the risk line, through Bluffer's Park, and at the base of Cathedral Bluffs and Cudia Park.

At the base of the Cudia Park Bluffs, the proposed trail alignment is close to the risk line. The risk line was assessed at a preliminary level only (i.e., ***LIDAR*** data, cross-sections spaced at 200 to 300 m apart, at critical oversteepened locations only). At Detailed Design, further refinement of the risk line will be undertaken. This will include detailed survey data, more cross-sections and additional geotechnical engineering analysis. Refinements may include minor localized works (e.g., trail raising, ***talus catchment areas*** or minor trail berms) to keep the proposed trail lakeward of the risk line in this area while minimizing lake infilling.

It is expected that the entire length of trail through this Segment will conform to the specifications outlined in the City's primary/high-capacity multi-use trail guidelines.

6.2.3.2 Central Segment

Through the Central Segment, the Preferred Alternative for the proposed Waterfront Trail alignment will be at the base of the Bluffs, lakeward of the risk line, generally following the existing informal shoreline path alignment of the Guild construction access route. Along the Sylvan and Guild Park and

Gardens shorelines, the proposed trail alignment is close to the risk line as presented in this EA. As is the case with the Cudia Park Bluffs, further refinement of the position of the risk line at Detailed Design will be undertaken to keep the Waterfront Trail lakeward of the risk line in this area while minimizing lake infilling.

A crossing, such as a bridge, would be required for the trail over the proposed conveyance of flows from Bellamy Ravine.

It is expected that the entire length of trail through this Segment will conform to the specifications outlined in the City's primary/high-capacity multi-use trail guidelines.

6.2.3.3 East Segment

Through the East Segment, the Preferred Alternative for the proposed Waterfront Trail alignment will be lakeward of the risk line, at the base of the Bluffs along the shoreline below Grey Abbey Park to the east side of Grey Abbey Ravine.

A crossing, such as a bridge, would be required for the trail over the proposed conveyance of flows from Grey Abbey Ravine.

On the eastern side of Grey Abbey Ravine, a freestanding structure, such as a corkscrew ramp, will provide access between the shoreline and the tablelands. The corkscrew ramp is expected to have a ramp width of 2.4 m and grade of 7.5%, with level rest landings. The overall diameter of the corkscrew ramp is anticipated to be a maximum of 60 m. The ramp will be connected to the tablelands via an approximately 93 m-long bridge. The primary to high-capacity multi-use trail will then continue along the tablelands, where it will split into two narrower (approximately 3 m wide) paths within East Point Park, one of which will connect to the parking lots at East Point Park and the other to the Port Union Waterfront Trail in the east along the top of the Bluffs. Appropriate screenings will be placed along the trail to screen users from the adjacent industrial uses to discourage access. The tablelands in this area contain both private industry and critical infrastructure, both of which must be protected from inappropriate access. Discussions are ongoing to attempt to secure this access to enable implementation of the refined East Segment Preferred Alternative. Users can continue to access the sandy shoreline below East Point Park east of the new access point at their own risk.

6.2.4 Shoreline Access Routes

Chapter 2 identified the need for additional access to the shoreline. Opportunities to provide additional access were studied and considered the following:

- Grades
- Bluff erosion
- Existing formal and informal access points
- ESAs/ANSIs and other Natural Heritage features
- Private property

Given grades, erosion, vegetation communities of concern and private property no additional access points to the shore were identified other than the trail transition provided between the shore and tablelands in the East Segment.

Restoration or refinement of the four existing access routes within the Project Study Area was considered, from the tablelands to the shoreline, to connect the broader community to the primary/high-capacity multi-use trail. These shoreline access routes include:

- Brimley Road South
- Doris McCarthy Trail/Bellamy Ravine
- Guild Construction Access Route
- Beechgrove Drive

Multiple opportunities were considered for each shoreline access route, including the Do Nothing option. Additional constraints (i.e., physical) were also considered to determine each option's overall feasibility and necessity.

6.2.4.1 Brimley Road

The current access to Bluffer's Park is via Brimley Road South.

The road down to Bluffer's Park is steep, with the grade varying between 4% and 17%, and there is limited safe access for pedestrians and cyclists along this roadway. While a separated informal off-road path does exist on the east side of the road for the lower third of the ravine, pedestrians and cyclists need to walk along the road shoulder above this section without adequate separation from traffic. Pedestrian usage of the roadway can be significant during summer weekends when Bluffer's Park parking spaces are all occupied. Additionally, the ravine containing Brimley Road South is the site of a former landfill that limits the ability to cut into the ravine. The valley walls are steep and come down adjacent to the road.

Given the constraints outlined above, the construction of an at-grade path adjacent to Brimley Road with a signed downhill cyclist route was deemed to be the most viable improvement. A new 1,030± m trail is proposed to the east of the existing roadway, at existing grades, from Barkdene Hills to Bluffer's Park (**Figure 6-13**).

The north-most approximately 180 m of trail will extend south from Barkdene Hills on public land on the east side of the road, which is presently occupied by a small paved stormwater interceptor and a grassed boulevard. The existing boulevard is about 2.6 to ±4.2 m wide. That boulevard is to be used to construct a new 3 m wide sidewalk, and the existing stormwater interceptor will be maintained. This portion of the access will not be consistent with the City's primary/high-capacity multi-use trail guidelines, due to existing space constraints. Cyclists travelling downhill will be required to use the road, which will be indicated by signage and pavement markings.

Figure 6-13: Proposed Path Along Brimley Road



Below the north-most section, for a length of approximately 175 m, the east edge of the pavement of Brimley Road South is directly adjacent to the rear property line of ten dwellings. As a result, there is no public land available for the construction of new pedestrian access. To accommodate the City's primary/high-capacity multi-use trail guidelines, acquisition of the rear (western-most) 6.4 m of these properties will be required. Due to a grade drop of about 1.5 m at the side of the roadway in this area, a 2 m-high retaining wall will be required to accommodate a 5.4 m-wide pathway. A signed and marked downhill route on the roadway will be provided for cyclists, acknowledging that many cyclists using this access want to use the road to descend.

Stormwater is currently managed by catch basins connected to the storm sewer within this narrow 175 m (approximately) long section. The addition of a paved trail on the east edge of the pavement will generate some additional overland flow. That minor amount of additional overland flow is to be directed into the existing stormwater interceptor or sub-drain to be maintained between the road and the trail and conveyed to the storm sewer. Another interceptor ***swale*** will be needed at the bottom of the retaining wall, to keep the wall foundation and backfill dry, thereby decreasing ongoing maintenance needs for that structure.

The south-most approximately 700 m of Brimley Road South exists on public lands. Most of the alignment in this section will replace the existing informal path on the east side of the roadway with a new trail in the same location. The new trail will be made to match existing grades, which are steep (9% to 17%) in this section, and will be widened to a width of 5.4 m. A new stormwater interceptor or swale will be needed to manage stormwater runoff from the new paved trail. Downhill cyclist usage and signage will be similar to the upper and middle sections discussed above.

6.2.4.2 Doris McCarthy Trail/Bellamy Ravine

Within the Bellamy Ravine, the Doris McCarthy trail runs down to the shoreline. This trail is in good condition (washed out sections were recently improved by the TRCA) with a surface consisting of crushed granular material. The grade of the trail is steep in sections (up to 13%), particularly through the uppermost 200 m and lower 350 m. Bellamy Creek runs through the ravine on the west side of the trail. Several stormwater outfalls discharge into the creek. The side slopes of the ravine are steep with sections of existing trail bench cut into the side slopes. Both cyclists and pedestrians utilize this trail, but the granular surface material and generally steep slopes limit access for a variety of users.

It was determined that the impact to the natural system in the ravine and the overall cost did not justify the benefit of reducing the trail grade. Additionally, the lack of parking and facilities at the head of the trail would likely reduce the attractiveness of this trail to many users.

6.2.4.3 Guild Construction Access Route

Within the Guild Ravine the existing construction access route provides informal access for pedestrians and cyclists to the shoreline for a length of approximately 300 m. Emergency and maintenance vehicles also use this route to access the toe of the Bluffs. As with other trails that connect the tablelands to the shoreline in the Project Study Area, the grade of the Guild construction access route is relatively steep and uniform, with a typical grade of about 13 to 14%. Due to the steep

grades and the surface type (highly degraded asphalt, unpaved in parts), the route is not accessible to all users. The side slopes of the ravine are also steep in sections.

It was determined that, despite the access benefits of modifying the grade, the impacts to the ravine system were too significant to justify these trail improvements, as significant cut, fill and vegetation removal would be required. Therefore, there will be no changes to the grade, however, minor improvements to the Guild construction access route including level rest areas will be explored at Detailed Design. It is anticipated that any rest areas would be within the existing footprint of the road.

6.2.4.4 Beechgrove Drive

The stretch of Beechgrove Drive south of Copperfield Road is an unopened construction access route approximately 200 m long which terminates approximately 3 to 4 m above the sandy shoreline on the east side of East Point Park. The overall grade of the unopened construction access route is relatively uniform at 15%. Informal visitor parking is available at the top of the path at Copperfield Road. A stormsewer outfall is located at the base; the resulting flow creates an open channel through the sand shoreline that creates a fairly wide obstacle and impedes east-west pedestrian movement along the shore. As a result, users must climb up and down irregularly placed rocks to access the shore. It is not possible to improve the grades along this access without having significant impacts on the adjacent areas and/or a large headland extending into the lake.

6.3 Operations and Maintenance

The SWP will require ongoing maintenance for a number of the design components. This includes shoreline protection features, naturalization components, recreational trails, and site access routes. Operation and maintenance/renewal of the SWP design components will be divided by the City of Toronto and TRCA, as per the 1972 Waterfront Agreement. TRCA will maintain responsibility for the maintenance (renewal) of the shoreline protection works, while the City will maintain responsibility for the operation and maintenance of the naturalization components, recreational trails and site access routes. A description of the maintenance activities associated with each of the design components of the SWP is provided below.

6.3.1 Shoreline Protection Features

Following the construction of the shoreline protection features, several maintenance measures will be implemented, including:

- Post-construction monitoring of completed structures to ensure proper function;
- Annual inspections for at least 5 years after construction to monitor effectiveness of protection and to assess whether maintenance is required; and,
- Inspections as necessary based on circumstantial conditions (heavy rainfall, strong winds and waves) where new damage might be suspected or reported, dependent on available funding and resources.

6.3.2 Naturalization Components

Maintenance of the naturalization features will be detailed in an operations and maintenance plan to be developed with the City as part of Detailed Design. The operations and maintenance plan will include considerations for invasive species and stewardship in concordance with City policies.

Adaptive Environmental Management (AEM), as discussed in **Chapter 8**, is an approach to improving environmental management practices by actively reviewing and adjusting current methods. This will include monitoring of ecological elements, which may dictate additional actions required to sustain the intended ecological communities.

6.3.3 Recreational Trails

Following the completion of the Project, trail maintenance in accordance with the City of Toronto management standards will be undertaken by the City. It is not anticipated that the trails will be maintained in the winter months.

6.3.4 Site Access Routes

Maintenance of the site access routes will be detailed in the operations and maintenance plan to be developed with the City of Toronto.

6.4 Construction Access

At present, there are two available construction access routes to the proposed shoreline protection works. The first route is Brimley Road to Bluffer's Park. The second route uses the existing Guild construction access route located within Guildwood Village. These access routes will allow trucks carrying construction materials to reach various sites along the shoreline. Although implementation is anticipated to take approximately 12 years, the duration may be longer or shorter depending on material and funding availability. It is assumed that Brimley Road will be used to construct the West Segment components and potentially Sylvan, and will be used from October to April (offseason) and the Guild construction access route within Guildwood Village will be used to construct the remainder of the Central and East Segment components and will be used year-round.

A Traffic Impact Assessment (TIA) was undertaken to identify current traffic patterns and to predict future traffic patterns, including SWP construction traffic via Brimley Road and through Guildwood Village. The typical volume of trucks per day on any of the construction access routes is 60 to 80, with a worst case of 220 trucks per day on Brimley Road, and 200 trucks per day on the Guild construction access route through Guildwood Village. A TIA will be redone at Detailed Design given the complexity of the additional traffic created by other projects in the area.

6.4.1 Brimley Road

Brimley Road is the primary access for the West Segment. It is a two lane, north-south collector roadway with a posted speed limit of 50 km/h. This route is proposed to provide access for both inbound and outbound truck traffic from October to April for the construction of the West Segment components, and Sylvan headlands. A map of the Brimley Road access route is shown in **Figure 6-14**.

6.4.2 Guild Construction Access Route

The Guild construction access route was constructed in the 1980s for the purpose of constructing and maintaining shoreline protection structures along the base of the Bluffs. This construction access route is shown in **Figure 6-15**.

6.4.3 Alternative Access Routes

Other access routes were considered in addition to Brimley Road and the Guild construction access route within Guildwood Village. These access routes were considered based on current trail systems and roads that approach or intersect the shoreline within the Project Area.

The Doris McCarthy Trail was not chosen as the alteration to the valley to reduce steepness and widen the trail would result in significant impact to the natural ravine system.

The East Point Park Trail was not considered as a viable access route for the shoreline protection structures, as the corkscrew ramp is anticipated to be constructed from the base of the Bluffs to the tablelands. However, some construction traffic will be required to access through East Point Park to finish construction of the corkscrew ramp and formalize the trail system along the tablelands.

6.5 Construction Activities

Prior to construction of the Project, unpatented water lots on the bed of Lake Ontario (Crown Land) or Crown Land Use Permits to access such lands will be acquired. At the same time private property acquisitions will occur.

Upon receipt of all required permits and approvals, construction activities will commence. The construction of each component will begin with site setup and will include, where necessary, the installation of construction site amenities (trailer, washroom, construction staff parking), temporary granular bases, perimeter fencing, tree protection, site drainage improvements, removal of vegetation, and re-grading. It is anticipated that construction site amenities will be located in the construction parking lot at the top of the Guild construction access route and on the eastern headland in Bluffer's Park. It is anticipated that during the winter months materials will be stockpiled on this headland to permit construction through the summer months when access along Brimley Road is not possible. During Detailed Design the possibility of construction of the Bluffer's Park headland from the water using barges will be investigated in an attempt to minimize impacts on local residents and roadways.

Figure 6-14: Brimley Road Access Route



Figure 6-15: Guild Construction Access Route



As discussed in **Section 6.4**, construction access will be via Brimley Road between October and April and the Guild construction access route year-round. Construction activities will occur year round, on weekdays, approximately 8 to 12 hours per day.

Equipment to be utilized for construction may be left on site in their respective work locations at the end of each working day and includes: track loaders, dozers, dozer loaders, excavators, rock trucks, tri-axle trucks and others as required. Setbacks from sensitive habitats and natural hazard areas will be implemented, where possible. Appropriate setbacks will be determined through discussion with applicable agencies during Detailed Design. Equipment will be fuelled on site. An emergency spill response plan will be developed and spill kits will be available on site in case of any spills or leaks. A complete list of best practice mitigation measures for the construction activities anticipated is included in **Appendix H**.

In some cases, a portion of the existing shoreline protection will be removed to facilitate land creation activities. The bulk of the material removed will be reused in construction of the final shoreline protection.

A more detailed discussion of the construction of specific components is provided in the following sections.

6.5.1 Large Headlands (Bluffer's Park, Guild Public Gathering Space)

Two temporary structures (a groyne and a cobble beach) will be constructed at the eastern end of Bluffer's Park Beach. The groyne will be constructed of approved fill, rip-rap, and armourstone in the same way as the headlands. This structure will help to anchor the placed cobble material in order to expedite the beach widening in this area. It will also allow for construction vehicles to drive along the narrow eastern portion of the beach. These structures will likely be left in place until they are buried in accumulated or placed sand.

The headland at Bluffer's Park and the Guild Public Gathering Space will be constructed by dividing the large areas to be filled into smaller cells which can be separated from Lake Ontario. This is accomplished by constructing perimeter berms using large armourstone material that encloses the core area. Perimeter berms act to protect the interior but also function as construction access to the outer portion of the cells. Once enclosed, smaller material can then be placed within the cell with less risk of displacement due to wave action. Once an appropriate amount of fill has been placed, the core material is capped with rip-rap and armourstone.

6.5.2 Headlands within the Headland Beach System

The headlands within the headland beach system will be constructed in a similar manner to the components discussed above in **Section 6.5.1**. The headland will be created by placing a core of approved fill material, capping with rip-rap and further capping with armourstone. Through Detailed Design, appropriate cell sizing will be determined based on anticipated ability to obtain rubble material, and fisheries timing windows, in order to allow construction to proceed year-round with the

filling behind the containment cells. For each of these smaller components, perimeter berms will be constructed to isolate a work area from Lake Ontario. Again, these berms will act as construction access to the outer portion of the cell. Following isolation, the core of each cell will be constructed and then capped with rip-rap and armourstone material.

6.5.3 Beaches within the Headland Beach System

Beaches will begin to be formed during the final stages of the construction of the adjacent headlands. As the headlands are nearing completion, the exterior slope of the perimeter berm between the headlands will be allowed to be flattened by wave action. This will enable each beach to find its natural formation. After material has settled and been shaped by the waves, cobble material will be placed on top to stabilize the beach.

6.5.4 Guild Park and Gardens Shoreline Regeneration Zone

The shoreline shoals along the shoreline below Guild Park and Gardens will be created from the addition of randomly placed boulders to the nearshore. A temporary working platform will be created and extended from the existing rubble berm shoreline into Lake Ontario to facilitate the placement of the shoal material. Once the shoal has been created, the working platform will be removed as part of a final slope re-grading prior to the random placement of a single layer of armourstone along the shoreline.

6.5.5 Corkscrew Ramp

The corkscrew ramp on the east side of Grey Abbey Ravine will connect the eastern-most section of the headland beach system to the trail across the tablelands. In order to construct the corkscrew ramp, standard construction techniques will be used within the footprint of the new land bases to cast concrete in place from the bottom of the ramp to the top. Groundwater control may be needed during construction at the base. As construction moves higher, some of the top sections, such as the connecting bridge, will be installed from the top of the Bluffs. Therefore, some construction access will be required through East Point Park.

6.5.6 Brimley Road Separated Pathway Access Improvement

This 3.0 to 5.4 m-wide pathway is proposed along the east side of Brimley Road south of Barkdene Hills. Implementation of this pathway requires an approximately 125 m-long retaining wall along the upper portion of the ravine in order to limit encroachment onto ten private properties along Larwood Boulevard which back on to Brimley Road. Construction of the retaining wall along this stretch will require minor excavation along the eastern side of the ravine. Following excavation, the retaining wall will be constructed. While the retaining wall is being built, suitable well-draining fill material will be added behind the wall to the excavated area. Once the wall is constructed, a layer of topsoil will be added to the top of the structure as a restoration measure. Appropriate screenings will be placed along the east side of the trail, adjacent to the private properties.

6.6 Construction Phasing

Construction phasing for the Project is generally anticipated to be carried out from west to east. Despite this general vision, it is expected that the construction of various components will be constructed concurrently providing the availability of funding and material. Further, it is expected that the order of construction may be altered during the refinement stages as logistical cost savings are explored in more detail.

6.7 Climate Change

The consideration of the effects of climate change on a project and the consideration of how a project either contributes to or eliminates GHGs are important considerations in project development and planning. MOECC has put in place guidance with respect to how climate change and resilience to climate change effects can be integrated into project planning. This guidance includes: *Ontario's Five Year Climate Change Action Plan 2016-2020* (MOECC, 2016b) and *Consideration of Climate Change in Environmental Assessment in Ontario* (MOECC, 2017).

The SWP does not generate GHG emissions during its operation however, there will be some GHG emissions associated with construction vehicles and, potentially, the creation of the surface paving for the trail. These emissions will be minimized through the application of ***best management practices (BMPs)*** for construction vehicles including ensuring they are in good repair, no idling, and if possible during Detailed Design, choosing a surface paving option with lower GHG emissions.

The SWP has been planned taking into account climate change projections for the Great Lakes including the potential for extreme weather events. The coastal engineering undertaken in support of the EA, and eventually for Detailed Design, will ensure that coastal structures are resilient to extreme weather events including high water levels and wave energy that may become more common in the future as a result of climate change. Additionally, new interceptor swales for stormwater conveyance will be incorporated into the design of the proposed Brimley Road trail to manage potential increases in overland flow associated more extreme weather events.

Finally, the SWP includes features that support cycling and walking by providing a separated off-road link to the regional Waterfront Trail and the relocation of those parts of the existing on-road and off-road sections of the Waterfront Trail constrained by the expansion of the Metrolinx Lakeshore East rail corridor. This will create a safer, better and more convenient cycling network along the Scarborough lakeshore. The SWP will also enhance the natural system through the creation of new natural areas and better management of existing habitat areas.

Figure 6-16: Overall Refined Preferred Alternative



7. Potential Effects, Effects Assessment and Mitigation Measures for Preferred Alternatives

7.1 Approach to Step 4: Detailed Assessment of the Preferred Alternatives

The provincial EA process under which the SWP must seek approval requires a proponent to identify and detail the Preferred Alternative which minimizes negative effects to the environment and best meets the identified need for the Project. The environment is defined broadly to include the natural, social, economic and cultural components and the identified need refers to the problem to be solved or the opportunity addressed. For the SWP, TRCA is seeking to address the problems and opportunities as discussed in **Chapter 2**.

For all EAs, it is recognized that minor changes to Project design and/or construction methods are likely to occur during Detailed Design between EA approval and construction.

The effects assessment presented in **Section 7.3** is based on the SWP as presented in **Chapter 6**.

The advantages of the SWP in creating a functional ecological system and providing public access to a section of the Scarborough waterfront that is currently inaccessible are anticipated to greatly exceed any potential negative effects or disadvantages during construction. The operational phase of the SWP includes a measurable improvement in ecological functioning over existing conditions, and lends itself to the use of environmental performance criteria which will measure the improvements in ecological function (detailed in **Chapter 8**).

7.2 Assessment Criteria and Indicators

Using the Criteria developed for the comparative evaluation detailed in **Chapter 5** as a basis, a set of Indicators and their associated measures were defined to structure and, where possible, quantify the effects of the SWP on the environment during construction and operation/establishment.

7.2.1 Identifying Net Effects

For each Indicator, the effects to existing conditions (**Chapter 3**) due to SWP works and activities (**Chapter 6**) were predicted. In some cases, no effects were predicted due to the application of mitigation or avoidance measures. Where net effects were predicted (i.e., effects remaining after mitigation is applied), they were classified as positive, negative, or negligible.

Positive effects (e.g., improved habitat) are generally associated with operation, and were quantified where possible.

Effects that were either negative or negligible tended to be associated with construction activities. Negligible effects are generally short-term, localized, do not occur frequently, and can be minimized to a large extent through mitigation. These are often typical of construction projects. Examples include air and noise emissions from construction equipment and construction traffic.

Negative effects are those that mitigation could not minimize to the extent that it became negligible, thus, the effect was considered a net negative effect of the SWP.

For relevant Criteria and Indicators, the potential for cumulative effects was identified and, where there was potential, cumulative effects were assessed. The only cumulative effects identified relate to construction nuisances, particularly construction traffic (see Section 7.3.4.3). The Project is not otherwise anticipated to negatively contribute to cumulative effects in the Study Area.

7.3 Effects Assessment by Objective

The effects of the SWP on the existing environment, as well as proposed mitigation and resulting net effects, are described in **Sections 7.3.1** through **7.3.5**. The discussions are organized by SWP Objective; for each Objective, effects are first presented in two tables (construction, operation/ establishment), and are followed by a summary description of the overall success of the SWP in meeting the Objective.

Table 7-1 provides the Criteria and Indicators by Objective and Project phase.

7.3.1 Objective 1: Project and Enhance Terrestrial and Aquatic Natural Features and Linkages

7.3.1.1 Construction Effects

Criterion: Ability to Minimize Effects Associated with Construction Works, Construction Access and Laydown Areas

Indicator: *Alteration and Loss of Aquatic Habitat*

SWP construction activities, particularly land creation, will result in the alteration and loss of a portion of existing aquatic habitat. This Indicator was quantitatively assessed by estimating the footprint of the land creation and habitat modification associated with the Preferred Alternative using the Preferred Alternative concept drawings and typical cross-sections in ArcGIS. Both permanent loss of habitat (portions of the proposed structures that are above the high water mark) and habitat alteration (underwater portions of the proposed structures which are associated with a change in depth, vegetation and/or substrate type) were considered. Note that the footprint of habitat altered also includes areas positioned behind the headlands where waves are attenuated, thus providing additional shelter and cover opportunities for fish.

The Project will result in the loss of up to 20 ha and alteration of up to 16 ha of open coast habitat. However, existing habitat is generally considered to be poor, as it lacks substrate diversity and shoreline morphology to provide functional habitat for a variety of fish species and life stages. The SWP will result in a shoreline which is approximately 1,700 m longer, more irregular, and more diverse, thus increasing the quality of the local aquatic habitat by providing resident and migratory fish species with enhanced cover, shelter and foraging opportunities. Retrofitting the existing revetment shoreline along South Marine Drive and Guild Park and Gardens will result in valuable gains in habitat quality. Notably, the Project presents a unique opportunity to create spawning habitat for one of the

Table 7-1: Effects Assessment Criteria and Indicators Relevant to Phase

Criteria	Indicators	Effects Relevant To	
		Construction	Operation/ Establishment
OBJECTIVE 1: Protect and Enhance Terrestrial and Aquatic Natural Features and Linkages			
Ability to minimize effects associated with construction works, construction access and laydown areas	Alteration and loss of aquatic habitat	√	
	Disruptions to fish and fish habitat	√	
	Nuisance effects on wildlife	√	
	Removal and disturbance of terrestrial habitat (include ANSI and ESA)	√	
Ability to provide functional nearshore open coast aquatic habitat	Ability to increase shoreline morphology by increasing shoreline irregularity		√
	Ability to increase shoreline substrate diversity		√
	Ability to provide habitat for various life stages		√
Ability to improve and manage functional terrestrial habitat	Area of terrestrial habitat removed from unsustainable inappropriate use		√
	Area of habitat created		√
OBJECTIVE 2: Manage Public Safety and Property Risk			
Ability to minimize public safety risk and property loss as a result of slope erosion/failure	Potential public safety risk to users of the water's edge as a result of natural slope crest migration		√
	Potential public safety risk to users of the top of bluff as a result of natural slope crest migration		√
	Change in potential for loss of public property and/or infrastructure due to natural slope crest migration		√
Ability to minimize public safety risk as a result of wave uprush/overtopping	Potential public safety risk to users of the water's edge as a result of wave uprush/overtopping		√
Resilience of shoreline protection works to potential climate change impacts	Potential for shoreline works to accommodate natural changes resulting from climate change		√
Ability to improve Emergency Services access to the waterfront	Potential for improved Emergency Services access along the shoreline		√
Ability to protect source water protection areas	Potential for impact to water quality at F.J. Horgan intake pipe		√
Potential to manage safety risk for pedestrians and cyclists gaining access to the shoreline	Safety associated with potential conflict between pedestrian/cyclists and vehicles		√

Table 7-1: Effects Assessment Criteria and Indicators Relevant to Phase

Criteria	Indicators	Effects Relevant To	
		Construction	Operation/ Establishment
OBJECTIVE 3: Provide an Enjoyable Waterfront Experience			
Improve public access to and along the waterfront	Potential to provide continuous formal public access along the waterfront		√
	Potential to provide a primary to high-capacity multi-use trail		√
	Potential to meet AODA grade standard for access to and along the shoreline		√
	Potential to improve existing access to the shoreline		√
	Potential to provide new access to the shoreline		√
	Potential to provide direct public access to water		√
Ability to maintain public access to and along the waterfront during construction	Changes to access to and along the shoreline as a result of construction activities	√	
Potential for change to use and enjoyment of park areas, existing trails and beaches/ shoreline during construction	Potential for dust, vehicle emission and noise from construction activities including traffic to affect use and enjoyment	√	
	Potential for changes in ability to use park areas during construction due to construction traffic, changes to access and unavailability of areas due to construction	√	
Changes to the use of existing beaches/shoreline	Potential for change to character and use of existing sand beaches/shoreline	√	√
	Potential for impact to water quality at Bluffer's Park Blue Flag Beach	√	√
Changes to the use of the waterfront for recreation	Potential for change in use of existing park areas	√	√
	Potential to maintain navigation along the shore	√	√
	Potential to provide new opportunities for views/viewscapes to Lake Ontario and to the Bluffs		√
	Potential to improve navigation at entrance to boat basin		√
OBJECTIVE 4: Consistency and Coordination with Other Initiatives			
Integration with City and other agency plans and initiatives	Consistency with the goals of the Fish Community Objectives for Lake Ontario		√
	City of Toronto Official Plan and TRCA Living City Policies		√
	Consistency with the goals and objectives of the Management Plan for Guild Park and Gardens		√
	Consistency with objectives of the Wet Weather Flow Master Plan (WWFMP)		√

Table 7-1: Effects Assessment Criteria and Indicators Relevant to Phase

Criteria	Indicators	Effects Relevant To	
		Construction	Operation/ Establishment
Impact on archaeological resources, built heritage resources, and cultural heritage landscapes	Potential impact to known or potential archaeological resources	√	
	Potential for impact to known built heritage resources and cultural heritage landscapes	√	
	Potential for impact on traditional land uses and valued cultural features	√	
Potential for effects to residents in the local community	Potential for disturbance effects to residents from construction related traffic	√	
	Potential impacts to arterial road traffic	√	
	Potential disturbance effects to residents from construction activity	√	
	Potential disturbance effects from waterfront users and parking		√
Integration with existing land uses	Compatibility with existing land use (open space, institutional and industrial)		√
OBJECTIVE 5: Achieve Value for Cost			
Estimated capital cost	Estimated cost to construct	√	
	Amount of water lot and private property acquisition required	√	
Renewal costs associated with the new shoreline and erosion protection structures only	Renewal costs of the shoreline and erosion works being proposed		√

most valuable native salmonids, Lake Trout, by constructing a Lake Trout spawning shoal off of the proposed Bluffer's Park headland extension.

In the Detailed Design stage, fish habitat alteration and loss will be quantified in more detail using DFO's ***Habitat/Ecosystem Assessment Tool (HEAT)***, and a comprehensive compensation plan will be developed in collaboration with appropriate agencies.

With the improvements to existing habitat quality and additional aquatic habitat enhancements, the net effect associated with fish habitat alteration and loss is expected to be negligible and the establishment of higher quality habitat will have a positive effect within the Project Study Area.

Indicator: *Disruptions to Fish and Fish Habitat*

SWP construction activities, particularly in-water works, have the potential to disrupt fish and fish habitat in adjacent areas through increases in water ***turbidity***, increases in noise and vibration, release of deleterious substances, and entrapment of fish within the land creation area, resulting in a negative effect. This Indicator was assessed by reviewing the means by which disruptions to fish and fish habitat may occur and the application of mitigation measures which will significantly reduce or eliminate the impacts.

The environmental management practices and mitigative measures that will be employed during construction are outlined in the MOECC's *Fill Quality Guide and Good Management Practices for Shore Infilling in Ontario* (2011) and TRCA's Lakefill Quality Control Program. Other guidelines to be used include DFO's *Measures to Avoid Causing Harm to Fish and Fish Habitat* (2016). A comprehensive list of mitigation measures is provided in **Appendix H**.

For each phase of fill operations, a containment berm will be constructed prior to placing any fill, which will eliminate sedimentation issues from fill placement operations. Once fill has been placed, there is potential for soils to be eroded by wind or water, resulting in offsite sedimentation issues. This will be mitigated by stabilizing soils using standard soil stabilization techniques, such as establishing vegetation cover upon completion of a construction cell. To prevent fish entrapment within the containment berm, fish rescue operations will be conducted prior to cell infilling. Potential disruptions to fish as a result of land creation activities are expected to be short-term in duration.

Restricted activity timing windows are applied to protect fish from impacts of works or undertakings in and around water during spawning migrations and other critical life stages (Fisheries and Oceans Canada, 2013). In Ontario, the MNRF has the responsibility for setting timing window guidelines. The timing windows are determined on a case-by-case basis according to the species of fish in the water body, whether those fish spawn in the spring or fall, and whether the water body is located in the Northwest, Northeast or Southern Region of Ontario.

The SWP is located in the Southern Region of Ontario. While over 100 fish species inhabit the Lake Ontario basin, only a subset of those utilizes the Project Area (**Appendix D**). Habitat conditions in the areas where land creation is proposed are most suitable for species that broadcast their eggs over sand and coarser substrates, and do not require aquatic vegetation. Moreover, spawning period start,

end and the overall length vary with environmental conditions such as temperature. Therefore, spawning periods in a given year may differ from the default timing windows set for the Southern Region of Ontario.

During the Detailed Design Project phase, TRCA will consult with MNRF to determine the appropriate fisheries timing windows based on the fish species present within the Project Study Area. These fish timing windows will be used to guide in-water construction activities; however, there may be certain circumstances where adherence to the prescribed timing window may result in undue hardship to both the residents in the Study Area, and the natural environment. Where appropriate, and in continued consultation with MNRF, an evidence-based monitoring approach will be applied, if needed, to help refine the restricted activity timing windows that maximize efficiency, ensuring construction activities for specific Project components are responsive to the fish species present, while minimizing the negative impacts experienced by both the residents and the natural environment through potential reductions in construction timelines and repeated mobilization/demobilization.

Further, potential impacts to fish and fish habitat will also be considered in developing water quality impact prevention and mitigation measures, such as a turbidity monitoring program to be developed at Detailed Design.

Overall, the negative effects associated with disruptions to fish and fish habitat as a result of construction activities will be short in duration, and mitigated with appropriate BMPs, resulting in negligible net effects.

Indicator: *Nuisance Effects on Wildlife*

This Indicator estimates the temporary displacement of wildlife as a result of construction activities, such as the increase in noise and vibration from construction equipment and the displacement from areas of the shoreline under construction. The Indicator was assessed based on previous project experience in similar environments with similar effects. It is noted that while construction will move across the shoreline, there are some areas where construction will persist throughout the entire construction period, in particular the Guild construction access route and the area at the base of the Guild construction access route. This area currently experiences maintenance traffic and many of the species are tolerant of existing traffic, are mobile, and their habitat exists across the shoreline, and are anticipated to move.

Potential impacts include reduced numbers of nesting and breeding birds; reduced foraging and loafing opportunities for migrating and resident waterfowl, waterbirds and shorebirds; reduced amphibian breeding; and the displacement of reptiles and urban mammals from areas of the shoreline that are under active construction. Wildlife is expected to relocate to other natural areas.

Mitigation measures include phasing construction across the Project Study Area into discrete areas so that wildlife that prefer the shoreline habitats will have the opportunity to move further along the shoreline where construction is not occurring to avoid construction activities. Mitigation measures will include a variety of BMPs to minimize effects where possible (**Appendix H**). In order to minimize impacts on breeding amphibians, no construction will occur during evening hours when amphibians are

calling. Construction vehicles will not access the backshore of the Bluffer's Park Beach (a likely breeding location) between the third week of May and October due to recreational use, which will also allow most of the amphibian breeding season to occur without construction interference.

Mitigation measures for wildlife at East Point Park include scheduling activities related to the construction of the tableland trail outside of the late April to late May time period to avoid impacts to migrating birds. Prior to construction commencement the active construction area will be surveyed for breeding birds and a species-appropriate buffer will be applied to any surveyed nests to avoid impact. With the implementation of mitigation measures, nuisance effects on wildlife are expected to be minimal and temporary.

Bank Swallows are generally tolerant of human activities; construction activity in areas where Bank Swallow nesting occurs (primarily the Cudia Park Bluffs) will be underway in May when swallows return so they become habituated to this disturbance. Additionally, phasing of construction activities along the shoreline will result in discrete areas of disturbance, so that not all Bank Swallow nesting locations in the Project Study Area will be disrupted at the same time, allowing for swallows to move to other locations. It is noted that Bank Swallow nest occupation significantly varies on an annual basis for a variety of reasons. Therefore, lack of Bank Swallow nesting within a discrete colony location may not be related to construction activities.

Overall, the nuisance effects on wildlife as a result of construction activities will be short in duration and mitigated with appropriate BMPs, resulting in a negligible net effect.

Indicator: *Removal and Disturbance of Terrestrial Habitat*

This Indicator quantifies the approximate area of habitat that will be removed as a result of the Project. The amount of vegetation removal was estimated using field and GIS mapping of ELC communities overlain on the SWP concept drawings.

Some areas of existing natural habitat will be disturbed to facilitate construction, and approximately 2.90 ha of existing habitat will be permanently removed for the trail (**Table 7-2**).

Table 7-2: Existing Vegetation Communities to be Removed

SWP Area Feature	Area of Habitat to be Permanently Removed (ha)
Forest Communities	0.27
Successional Communities	0.42
Meadow Communities	0.34
Beach/Dune Communities	1.80
Wetland Communities	0.016
Bluff Communities	0.05

Much of the habitat to be removed is located in ANSIs, and a portion is also within ESAs. However, the habitats are typical of urban areas, and are being impacted by unmanaged informal trails and invasive species. Although these areas provide a good representation of terrestrial habitat and natural cover within the urban context, these habitats are generally considered to be of fair to poor habitat quality, relative to less urbanized areas, based on a combined evaluation of patch size, patch shape, and matrix influences. Areas that will be impacted by construction access routes and staging activities will be restored to pre-construction conditions, where possible, and where appropriate, invasive species may be controlled to improve the quality of habitat. Impacted habitat features, such as cavity trees, will be replaced with artificial or constructed features such as nest boxes that mimic the original features. Following Project completion and habitat establishment, no long-term effects are anticipated.

Four vegetation communities will be impacted by the proposed path along Brimley Road. Two forest communities, Dry-Fresh Sugar Maple-Oak Deciduous Forest (FOD5-3) and Fresh-Moist Manitoba Maple Lowland Deciduous Forest (FOD7-a) representing 0.19 ha will be removed. Approximately 0.09 ha of the successional Sumac Deciduous Thicket (CUT1-1) community and approximately 0.1 ha of the Exotic Forb Meadow (CUM1-c) community will be removed.

A total of 11 vegetation communities will be impacted as a result of the Project at East Point Park. Three forest communities, Silver Maple-Conifer Mixed Plantation (CUP2-E), White Cedar Coniferous Plantation (CUP3-G) and Fresh-Moist Poplar Deciduous Forest (FOD8-1), representing 0.08 ha will be removed. Five successional communities, Sumac Deciduous Thicket (CUT1-1), Exotic Deciduous Thicket (CUT1-c), Red Osier Dogwood Deciduous Thicket (CUT1-E), Willow Deciduous Thicket (CUT1-G) and Native Deciduous Successional Woodland (CUW1-A3), totalling 0.33 ha will be removed. One meadow community, Native Forb Meadow (CUM1-A), totalling 0.24 ha will be removed. Two wetland communities, Common Reed Mineral Meadow Marsh (MAM2-a) and Red Osier Dogwood Thicket Swamp (SWT2-5), representing 0.008 ha will be removed.

One existing provincially rare vegetation community, Sea Rocket Open Sand Beach (BBO1-1), will be impacted by construction activities, with approximately 1.8 ha anticipated to be affected. Mitigation measures include plant salvage, where appropriate. Past salvage experience, where the sea rocket was removed and then replanted following construction, has proven successful for this species.

Approximately 0.05 ha of bluff communities is anticipated to be lost through bluff trimming to facilitate construction of the corkscrew tableland connection. This is composed of the Exotic Treed Bluff (BLTc-1) vegetation community, dominated by non-native species such as black locust (*Robinia pseudoacacia*) and Manitoba maple (*Acer negundo*), and the actively eroding Mineral Open Bluff (BLO1) community, which is not vegetated and restricted to the upper portion of the Bluffs only.

An existing artificially-created wetland feature (~0.008 ha) at the base of the Guild construction access route is expected to be relocated and expanded as a result of the construction of the Guild Public Gathering Space. The wetland area will be expanded to include two wetland features, one on either side of the Guild Public Gathering Space, for an approximate total area of 0.2 ha.

No butternut trees, a SAR, have been identified within the footprint of the construction access routes or trail, therefore no effects are anticipated. As part of the Detailed Design phase a detailed survey will be conducted to confirm the absence of butternut.

The area of privately owned tableland east of Grey Abbey Ravine has not been assessed. Therefore, impacts to vegetation communities in this location cannot be quantified, and were assessed qualitatively. Orthophotograph interpretation suggests this area consists of open habitat that is periodically mowed, likely resulting in a cultural meadow vegetation community. As this area is privately owned, the effects will be assessed at Detailed Design once access to the property has been achieved.

Approximately 2.90 ha of existing terrestrial natural habitat will be removed and approximately 17.6 ha of new naturalized habitat will be created by the Project, resulting in a net positive effect. Habitat restoration and enhancement are expected to mitigate terrestrial habitat impacts and no long-term impacts are anticipated. Impacts related to the disturbance or removal of vegetation are not expected to reduce ecosystem function within the existing ANSIs and ESAs, and together with informal trail decommissioning and the development of a Bluffer's Park Revitalization Plan, an East Point Park Revitalization Plan and a SWP Operations and Maintenance Plan, the Project will result in benefits to ANSIs and ESAs.

Summary: Ability to Minimize Effects Associated with Construction Works, Construction Access and Laydown Areas

Construction effects associated with fish and fish habitat disruptions are expected to be negligible following the implementation of mitigation measures. Although land creation is expected to result in the loss of approximately 20 ha and alteration of 16 ha of aquatic habitat, the establishment of high quality habitat within the Project Study Area and development of a comprehensive compensation program as part of Detailed Design will result in overall benefits.

Construction effects associated with wildlife and terrestrial habitat disruptions are expected to be negligible following the implementation of mitigation measures. The removal and disturbance of terrestrial habitat will result in the loss of approximately 2.90 ha of existing natural cover; however, mitigation measures including habitat enhancement and new land creation address the loss of this habitat resulting in 17.6 ha of new naturalized habitat. The amount of new habitat created will exceed the amount of existing habitat that will be impacted by the Project. Therefore, SWP meets Project Objective 1, where aquatic and terrestrial natural heritage is protected and enhanced.

Table 7-3: Detailed Effects Assessment: Objective 1 Construction

Criteria	Indicators	Effects	Mitigation Measures	Net Effects
Ability to minimize effects associated with construction works, construction access and laydown areas	Alteration and loss of aquatic habitat	▪ SWP construction activities, particularly land creation, will result in alteration and loss of the portion of existing aquatic habitat in the Project Study Area: – Up to 20 ha of nearshore habitat will be lost – Up to 16 ha of nearshore habitat will be altered	▪ The negative impacts will be mitigated via incorporating a diversity of shoreline substrate types and increased shoreline irregularity into the Preferred Alternative Detailed Design, employing a variety of aquatic habitat enhancement techniques, including retrofitting existing revetment shoreline structures, and development and implementation of a compensation program.	Negligible ▪ Project results in overall benefits to aquatic habitat
	Disruptions to fish and fish habitat	▪ Disruption to spawning fish and spawning habitat ▪ Increase in water turbidity ▪ Increase in noise and vibration ▪ Release of deleterious substances ▪ Fish entrapment in the land creation areas	▪ Examples of mitigation measures to minimize negative effects associated with fish and fish habitat disruptions include: – Use of Project-specific restricted activity timing windows for in-water works to be set in consultation with MNRF – Construct containment berm prior to placing any fill, which will minimize sedimentation – Remove any fish potentially trapped in a cell prior to commencement of filling – Sediment and erosion controls – Ensure equipment is free of leaks and fluids containing deleterious substances	Negligible ▪ Appropriate mitigation measures will ensure that the negative impacts to fish and fish habitat are prevented/minimized
	Nuisance effects on wildlife	▪ Temporary wildlife displacement as a result of noise and vibration ▪ Temporarily reduced foraging and loafing opportunities for migrating and resident waterfowl, waterbirds, shorebirds and migratory birds ▪ Temporarily reduced amphibian breeding habitat and breeding activity due to noise ▪ Temporary displacement of reptiles from shoreline ▪ Temporary displacement of urban tolerant mammals from shoreline	▪ Adhere to BMPs as outlined in **Appendix H** to minimize disturbance, noise and dust. In addition: – Avoid construction activities at East Point Park during the spring migration and breeding bird period (late April to late May) – Where Bank Swallow colonies are located within 50 m of active construction ensure works are underway prior to Bank Swallows return in spring (~May) so they become habituated to the disturbance	Negligible ▪ Nuisance effects to wildlife during construction are temporary and wildlife is generally tolerant of activities

Table 7-3: Detailed Effects Assessment: Objective 1 Construction

Criteria	Indicators	Effects	Mitigation Measures	Net Effects
	Removal and disturbance of terrestrial habitat	▪ Some areas of natural cover will be temporarily removed to facilitate construction access and staging ▪ Approximately 2.90 ha of existing habitat located within ANSIs and ESAs will be removed for the trail ▪ Approximately 0.19 ha of forest, 0.09 ha of successional, and 0.1 ha of meadow vegetation communities will be removed for the proposed path along Brimley Road ▪ Approximately 0.08 ha of forest, 0.33 ha of successional, 0.24 ha of meadow, and 0.008 ha of wetland vegetation communities will be removed for the trail through East Point Park ▪ Approximately 1.8 ha of one rare community (Sea Rocket Open Sand Beach) will be removed for the trail ▪ Approximately 0.05 ha of bluff vegetation communities, composed of non-native species and Mineral Open Bluff Face (restricted to upper portions of the Bluffs only) is anticipated to be removed ▪ Approximately 0.008 ha of an existing artificially-created wetland is to also be removed for construction of the Guild Public Gathering Space ▪ Butternut removals may be required (pending further analysis during Detailed Design)	▪ Salvage plants, including sea rocket, for replanting, where appropriate ▪ Where appropriate, vegetation communities will be restored ▪ Any habitat features (e.g., cavity trees) that will be impacted will be replaced with an artificial or constructed habitat (e.g., bird nesting boxes) ▪ Relocation and expansion of artificially created wetland at base of the Guild construction access route	Positive ▪ While some areas of existing habitat will be removed, approximately 17.6 ha of new naturalized habitat will be created resulting in a net increase in terrestrial habitat ▪ Sea rocket is expected to re-establish resulting in no net loss ▪ Habitat restoration is expected to mitigate terrestrial wildlife/bird habitat impacts and no long-term impacts are anticipated ▪ Net increase in size of wetland area which will be recreated properly

7.3.1.2 Operation/Establishment Effects

Criterion: Ability to Provide Functional Nearshore Open Coast Aquatic Habitat

Indicator: *Ability to Increase Shoreline Morphology by Increasing Shoreline Irregularity*

SWP presents a valuable opportunity to enhance the shoreline morphology within the Project Study Area via increasing shoreline irregularity. A more complex shoreline profile provides for more nearshore habitat by increasing fish foraging opportunities, cover and shelter. This Indicator was assessed quantitatively by comparing the pre-construction and post-construction shoreline lengths. The more irregular (longer) the shoreline is, the greater its ecological value. To calculate the percent change, pre-construction shoreline lengths were measured using geo-referenced aerial imagery and compared to the post-construction shoreline lengths which were measured in ArcGIS using the Preferred Alternative concept drawings.

The post-construction shoreline is approximately 15% longer and more undulating, resulting in a more irregular shoreline than the current shoreline. The Preferred Alternative increases shoreline irregularity and the ability to provide nearshore habitat. Net effects from the SWP on shoreline irregularity and nearshore habitat are positive and, as a result, no mitigation measures are required. Most gains in profile complexity are made along the shoreline between Bluffer's Park and Meadowcliffe, and along Grey Abbey Park shoreline to the east side of Grey Abbey Ravine.

Shoreline morphology enhancement through increasing shoreline irregularity as well as diversification of the shoreline vertical profile through the implementation of habitat enhancement techniques represent a net positive effect on the ability of the Preferred Alternative to provide functional nearshore habitat. No mitigation measures were identified.

Indicator: *Ability to Increase Shoreline Substrate Diversity*

The change in shoreline substrate diversity refers to the difference between each type of the pre-construction and post-construction shoreline substrate (cobble, sand, and armourstone/boulder). This Indicator was assessed quantitatively by measuring the lengths of each pre-construction shoreline substrate type using geo-referenced aerial imagery, and comparing them to the post-construction lengths of each shoreline substrate type measured in ArcGIS using the Project concept drawings.

There are three main shoreline substrate types within the Project Study Area: sand, cobble and armourstone (boulder). Coarse substrates such as cobble and boulders constitute the major building blocks of habitat physical structure as they provide fish with cover and shelter, and enhance foraging opportunities. Though sand is preferred by certain species, sand shorelines lack the substrate diversity to be able to provide adequate cover, shelter and foraging opportunities for multiple species that constitute the majority of the local fish community.

The current shoreline consists of approximately 4,700 m of sand, 1,350 m of cobble and 4,950 m of armourstone (boulder). The post-construction shoreline will consist of approximately 4,000 m of sand, 1,900 m of cobble and 6,750 m of armourstone (boulder). The Preferred Alternative reduces the length of sand shoreline by 15%, while the length of cobble shoreline is increased by 40%, and the

length of armourstone (boulder) shoreline is increased by 35%. Overall, the shoreline substrate type composition of the Preferred Alternative is more diverse, with an increase in the cobble and boulder proportions, relative to sand.

Cobble and armourstone (boulder) shorelines present valuable opportunities to increase substrate diversity in the nearshore areas adjacent to the proposed structures. This is achieved via implementing appropriate open coast habitat enhancement techniques such as shoreline shoals, underwater shoals and surcharged headlands. Moreover, habitat enhancements to the existing structures, particularly revetments, provide further benefits associated with diversifying shoreline and nearshore substrate.

Armourstone (boulder) serves an anchoring function, providing for overall shoreline stability and preventing cobble migration. At the same time, interstitial spaces between individual stones provide valuable shelter and cover for smaller fish, particularly when it comes to headlands surcharged with large, irregular shaped boulders and cobble. Cobble and rubble serve as spawning substrates for species that require these (e.g., Lake Trout).

Sand, though reduced in terms of length of shoreline, is still prevalent in the nearshore, where shallow depths (particularly east of Grey Abbey Park) are still available to those species that depend on it (e.g., Emerald Shiner).

Overall, diverse substrates provide higher quality cover, shelter and foraging opportunities, thereby increasing the capacity of the local shoreline to serve as nursery, spawning and migratory habitat. Thus, increased shoreline substrate diversity represents a net positive effect, and no mitigation measures are required.

Indicator: *Ability to Provide Aquatic Habitat for Various Life Stages*

The nearshore zone of Lake Ontario within the Project Study Area provides habitat for various fish life stages: spawning habitat, nursery and juvenile habitat, and adult habitat. This Indictor was assessed by examining the various habitat requirements of the species found utilizing the Project Study Area nearshore habitat.

Habitat requirements vary by fish life stage and species. Adequate spawning habitat is necessary for successful reproduction (egg deposition and survival). Suitable nursery habitat is required for young fish survival and attainment of reproductive maturity. Important adult habitat is necessary to sustain adult populations to ensure successive reproduction and species persistence in the ecosystem.

Suitable habitat availability and habitat quality play an important role in how successful each fish life stage is. Availability of specific substrate is crucial in determining whether a given species is able to utilize an area for spawning, as different species are adapted to use different substrate types to deposit their eggs. The species anticipated to utilize aquatic habitat within the Project Study Area for spawning include those that broadcast their eggs over substrate and do not require aquatic vegetation or presence of woody debris. Such species include forage fish species such as Alewife, Rainbow Smelt and Emerald Shiner, and native salmonids including Lake Trout and Round Whitefish.

Non-native Alewife have been reported to spawn over a variety of substrates from boulder to sand, and even silt and clay, in the 0 to 5 m depth range. Native Emerald Shiner and non-native Rainbow Smelt prefer rubble, gravel and sand, in the 0 to over 5 m depths (Lane et al., 1996). Lake Trout favor bedrock, boulder, cobble and rubble, and, though they have been observed to spawn in 0 to over 5 m depths, the 5 to 8 m range is the most suitable (**Appendix D**). Round Whitefish require rubble and gravel, and have been reported to spawn in the 0 to over 5 m depth range.

Though the land creation activities would reduce availability of sand in the primarily 0 to 3 m depth range, sand substrate in the depths utilized by Alewife, Emerald Shiner and Rainbow Smelt would still be widely available. At the same time, the Project would increase availability of cobble, boulder and rubble in depths used by Lake Trout (5 to 8 m, Bluffer's Park headland extension) and potentially Round Whitefish.

Young and adults of species such as Smallmouth Bass, Northern Pike, American Eel, Yellow Perch and White Sucker utilize the Project Study Area nearshore habitat. Nursery and juvenile habitat has to provide sufficient cover, shelter and foraging opportunities to reduce competition for habitat and resources, and ensure young fish survival. Similarly, cover, shelter and foraging opportunities availability are equally important for adult survival. Cover, shelter and foraging opportunities would be enhanced via diversifying substrate and constructing a more irregular shoreline in the nearshore zone. It is anticipated that a variety species and life stages will be able to utilize those portions of the Project Study Area that currently lack a diversity of substrates and shoreline profile complexity.

Overall, the Project results in an enhanced ability of the local nearshore habitat to serve as habitat for a variety of native species and life stages, and no mitigation measures are required.

Summary: Ability to Provide Functional Nearshore Open Coast Aquatic Habitat

Shoreline morphology enhancement, increased shoreline substrate diversity and the enhanced ability of the local nearshore habitat to serve as habitat for various life stages provide an overall positive benefit to providing functional nearshore open coast aquatic habitat.

Criterion: Ability to Improve and Manage Functional Terrestrial Habitat

Indicator: *Area of Terrestrial Habitat Removed from Unsustainable Inappropriate Use*

This Indicator measures the area of informal trails that will be decommissioned. The Indicator was assessed and mapped through field surveys and orthophoto interpretation. Final distances were measured using ArcGIS. Typically, telltale signs of human trails include a width of approximately 30 cm, trampled vegetation, broken branches, dead-ends, footprints, encounters with people, and/or litter.

The SWP will decommission approximately 8 km of informal trails at East Point Park and over 1 km of informal trails through Bluffer's Park, removing these sensitive areas from the negative effects associated with unmanaged use, such as habitat fragmentation, vegetation trampling, degradation of rare and sensitive bluff and dune vegetation communities, soil compaction, increased vulnerability for invasive species colonization, and increased wildlife predation (i.e., urban Raccoons depredating

ground/low nesting bird nests) and parasitism (i.e., Brown-headed Cowbird [*Molothrus ater*] parasitism).

Intensification and densification of residential urban areas will increase pressure on natural areas. Given the forecasted 24.9% population increase in Toronto over the next 30 years (2011 to 2041) (Hemson Consulting Ltd., 2012) and the upward trend of public use of greenspaces (Park People, 2016), managed access of natural areas, particularly ANSIs and ESAs, will be critical to helping ensure their ecological integrity persists. Techniques to manage use, including the decommissioning and management of informal trails will be detailed in the Bluffer's Park and East Point Park Revitalization Plans and could include tree and shrub planting, installation of habitat piles (i.e., woody debris and aggregates), signage and bylaw enforcement.

The addition of a well-designed formalized trail system along the toe and top of the Bluffs and through Bluffer's Park and East Point Park, with formal access points, will provide a clear route for people to enjoy the waterfront, thereby reducing unmanaged use and mitigating associated impacts. This will help to achieve better conservation of natural areas, including rare and sensitive bluff and dune vegetation communities. Management of unsustainable inappropriate use will result in a net positive effect, and no mitigation measures are identified.

Indicator: *Area of Habitat Created*

This Indicator measures the area of forest, meadow, successional, beach/dune and wetland communities created. This Indicator was assessed quantitatively by measuring the approximate new habitat area created in ArcGIS.

The SWP will produce an increase in natural habitat cover within the Project Study Area through the addition of 17.6 ha of new naturalized terrestrial habitat, improving the shoreline as a critical stepping-stone habitat for birds, mammals, fish and other wildlife (**Table 7-4**).

Table 7-4: Terrestrial Habitat Enhancements by Project Study Area Segment

Habitat Type	West	Central	East	Total
	Approximate ha			
Forest Communities	--	--	0.5	0.5
Successional Communities	1.8	1.5	2.1	5.4
Meadow Communities	1.6	0.4	1.6	3.6
Beach/Dune Communities	7.7	--	--	7.7
Wetland Communities	--	0.3	0.1	0.4

Restoration and enhancement areas include new lands, as well as a section of the north slope of the hill east of Beechgrove Drive. This 0.5 ha area will be restored to achieve a forest community, which will also improve habitat connectivity from East Point Park to Highland Creek. Native plant species will be planted to improve the overall diversity, and increase breeding, foraging and overwintering opportunities for wildlife. Appropriate restoration techniques and plant care will ensure successful establishment, and monitoring will identify areas that may require additional infill planting over time. Potential negative effects related to invasive plant species colonizing the created habitat will be managed to the extent possible using adaptive management and BMPs, such as identifying target invasive species for

removal. Invasive species management will be developed as part of an Operations and Maintenance Plan, to be prepared in collaboration with the City of Toronto at Detailed Design.

The overall quantity of forest, meadow, successional, beach/dune and wetland communities created increases due to the SWP, therefore, net effects are anticipated to be positive.

Habitat features, such as bird nest boxes and woody habitat piles, will be installed where appropriate to maximize the functionality of the new habitat for wildlife which will result in improved breeding, migratory, and overwintering opportunities. Habitat features will be closely examined during the Detailed Design phase to enhance the overall functionality of habitat within the Project Area.

Summary: Ability to Improve and Manage Functional Terrestrial Habitat

Management of unsustainable inappropriate use will result in a net positive effect to the terrestrial ecosystem. In addition the SWP will result in an increase in the quantity of terrestrial habitat in the Project Study Area, and improve the integrity of habitat in East Point Park.

Table 7-5: Detailed Effects Assessment: Objective 1 Operation/Establishment

Criteria	Indicators	Effects	Mitigation Measures	Net Effects
Ability to provide functional nearshore open coast aquatic habitat	Ability to increase shoreline morphology by increasing shoreline irregularity	▪ Shoreline irregularity is increased by 15% ▪ Enhancements provide for an increase in nearshore open coast habitat	▪ None	Positive ▪ Enhanced shoreline morphology provides for increased ability of the Preferred Alternative to provide functional nearshore open coast aquatic habitat
	Ability to increase shoreline substrate diversity	▪ Reduction of sand shoreline by approximately 15%, the length of cobble shoreline is increased by 40% and armourstone (boulder) shoreline by 35%	▪ None	Positive ▪ Increased shoreline substrate diversity represents a net positive effect associated with the ability of the Preferred Alternative to provide functional nearshore open coast habitat
	Ability to provide habitat for various life stages	▪ Sand substrate in the depths utilized by Alewife, Emerald Shiner and Rainbow Smelt would still be widely available ▪ Increase availability of cobble, boulder and rubble in depths used by Lake Trout (5 to 8 m, Bluffer's Park headland extension) and potentially Round Whitefish ▪ Nursery, juvenile and adult habitat would be enhanced via diversifying substrate and constructing a more irregular shoreline ▪ A variety species and life stages will be able to utilize portions of the Project Study Area that currently lack a diversity of substrates and shoreline profile complexity	▪ None	Positive ▪ Overall, the Project results in an enhanced ability of the local nearshore habitat to serve as habitat for various life stages

Table 7-5: Detailed Effects Assessment: Objective 1 Operation/Establishment

Criteria	Indicators	Effects	Mitigation Measures	Net Effects
Ability to improve and manage functional terrestrial habitat	Area of terrestrial habitat removed from unsustainable inappropriate use	▪ Decreased impacts associated with informal trails (i.e., habitat fragmentation, vegetation trampling, soil compaction, invasive species, predation, parasitism, etc.)	▪ None	Positive ▪ Overall the Project will decommission the number of informal trails and lead to improved habitat quality
	Area of habitat created	▪ The overall quantity of forest, meadow, successional, beach/dune and wetland communities increase through the addition of 17.6 ha of new naturalized terrestrial habitat ▪ Potential to increase the functionality of the habitat for wildlife resulting in improved breeding, migratory and overwintering opportunities ▪ Native plant species will be planted to improve diversity and maximize opportunities for breeding, foraging and overwintering habitat	▪ Development of an Operations and Maintenance Plan collaboratively with the City of Toronto to address inappropriate use and promote community stewardship	Positive ▪ Total natural cover and the number of essential wildlife habitat features increase which provide positive influences on the functionality of the habitat

7.3.1.3 Summary of Objective 1

SWP Objective 1 is to protect and enhance terrestrial and aquatic natural features and linkages within the Project Study Area.

SWP Study Area habitat will undergo changes along the Lake Ontario shoreline, tablelands, construction access routes and laydown areas both during and following construction. The summary of net gains and losses with respect to Objective 1 of the Project is presented in **Table 7-6**, while the overall effects related to Objective 1 are listed in **Table 7-7**.

Table 7-6: Net Gains and Losses with Respect to Objective 1

SWP Area Feature	Losses	Gains	Net Effect
Aquatic Habitat along the Lake Ontario shoreline	▪ Loss of 20 ha ▪ Alteration of 16 ha ▪ Sand shoreline reduced by 15%	▪ 15% increase in shoreline irregularity ▪ 40% increase in cobble beach ▪ 35% increase in armourstone (boulder) ▪ Functional habitat for all life stages	Positive
Forest Communities	0.27 ha	0.50 ha	Positive
Successional Communities	0.42 ha	5.40 ha	Positive
Meadow Communities	0.34 ha	3.60 ha	Positive
Beach/Dune Communities	1.80 ha	7.70 ha	Positive
Wetland Communities	0.016 ha	0.40 ha	Positive
Bluff Communities	0.05 ha	0.00 ha	Negative

Table 7-7: Overall Effects Related to Objective 1

Criteria	Indicator	Overall Effects
Ability to minimize effects associated with construction works, construction access and laydown areas	Alteration and loss of aquatic habitat	Negligible
	Disruptions to fish and fish habitat	Negligible
	Nuisance effects on wildlife	Negligible
	Removal and disturbance of terrestrial habitat	Positive
Ability to provide functional nearshore open coast fish habitat	Ability to increase shoreline morphology by increasing shoreline irregularity	Positive
	Ability to increase shoreline substrate diversity	Positive
	Ability to provide habitat for various life stages	Positive
Ability to improve and manage functional terrestrial habitat	Area of terrestrial habitat removed from unsustainable inappropriate use	Positive
	Area of habitat created	Positive
Summary:		
Overall, the Preferred Alternative for the SWP provides an improvement to the ecological conditions within the Project Study Area. The loss or alteration of poorer quality habitat is offset by the creation of higher quality aquatic and terrestrial habitat. Thus, the Preferred Alternative meets the Objective to protect and enhance terrestrial and aquatic features and linkages.		

7.3.2 Objective 2: Manage Public Safety and Property Risk

7.3.2.1 Construction Effects

There are no construction effects associated with the Objective of managing public safety and property risk.

7.3.2.2 Operation/Establishment Effects

Criterion: Ability to Minimize Public Safety Risk and Property Loss as a Result of Slope Erosion / Failure

Indicator: *Potential Public Safety Risk to Users of the Water's Edge as a Result of Natural Slope Crest Migration*

The Scarborough Bluffs are an eroding feature which can be a hazard for anyone at the bottom of the Bluffs caught in a landslide or slump associated with ongoing natural slope crest migration. The existing conditions in the SWP Study Area are that many areas at the base of the Bluffs are within the risk line for hazards associated with natural slope crest migration (e.g., landslides) and that people are accessing these areas despite the lack of safe trails and despite the risks. Park users want access to the water's edge and one of the Objectives of the SWP is to provide that access while mitigating the risk.

Implementation of the SWP will provide a formal trail along the water's edge outside of the risk line permitting users access to the water up to the eastern edge of Grey Abbey Ravine. Beyond these points access will continue to be informal and at the risk of the user.

Therefore, there is a positive impact in the reduction of public safety risk to users of the water's edge.

Indicator: *Potential Public Safety Risk to Users of the Top of Bluff as a Result of Natural Slope Crest Migration*

The Scarborough Bluffs are an eroding feature which can be a hazard for anyone caught in a landslide or slump associated with ongoing natural slope crest migration at the top of the Bluffs. The existing conditions in the SWP Study Area are that many areas at the top of the Bluffs are within the erozion hazard limit (EHL) for hazards associated with natural slope crest migration, and people are accessing these areas despite the lack of safe trails and despite the risks. Park users want access to the top edge of the Bluffs to enjoy views to the lake and one of the Objectives of the SWP is to provide that access while mitigating the risk.

Implementation of the SWP will provide a formal trail along the top of the Bluffs landward of the 10-year Crest Risk Line permitting user access along the top of the Bluffs from the eastern edge of the Grey Abbey Ravine to Beechgrove Drive. Although the trail will be situated within the 100-year EHL (see **Section 3.1.10.2**), the trail can be moved further inland in 10-year increments when the lifecycle of the trail has expired. This approach will provide more desirable and accessible views of the lake while improving safety and mitigating risk to users as a result of natural slope crest migration.

Therefore, there is a positive impact in the reduction of public safety risk to users along the top of the Bluffs from the east side of Grey Abbey Ravine through East Point Park.

Indicator: *Change in Potential for Loss of Public Property and/or Infrastructure Due to Natural Slope Crest Migration*

The Scarborough Bluffs are an eroding feature which can cause the potential loss of public property and/or infrastructure due to ongoing natural slope crest migration. The existing conditions in the SWP Study Area are that many areas of the Bluffs undergoing natural slope crest migration have associated public property and/or infrastructure at the top of the Bluffs at risk from the erosion within the planning period for the SWP (approximately 60 years). One of the Objectives of the SWP is to mitigate the risks to public property and/or infrastructure.

Implementation of the SWP will mitigate existing risks to public property and infrastructure including parks, trails, and roads (and associated infrastructure), from Bluffer's Park to the eastern edge of Grey Abbey Ravine. Public property and infrastructure east of this point will still be at risk; however, no structure or infrastructure is at risk within the planning period of the SWP.

Therefore, there is a positive impact in the reduction of public property and infrastructure at risk from natural slope crest migration.

Summary: Ability to Minimize Public Safety Risk and Property Loss as a Result of Slope Erosion/Failure

Implementation of the SWP will result in a net positive impact with respect to minimizing public safety risk and property loss as a result of slope erosion/failure. This will be achieved through the provision of a formal trail along the water's edge outside of the risk line up to the eastern edge of Grey Abbey Ravine, and along the top of the Bluffs outside of the 10-year Crest Risk Line from the eastern edge of Grey Abbey Ravine to Beechgrove Drive. Additionally, implementation of the SWP will mitigate risks to public property and infrastructure, including parks, trails and roads (and associated infrastructure) between Bluffer's Park and the eastern edge of Grey Abbey Ravine.

Criterion: Ability to Minimize Public Safety Risk as a Result of Wave Uprush/Overtopping

Indicator: *Potential Public Safety Risk to Users of the Water's Edge as a Result of Wave Uprush/ Overtopping*

The open coast shore of Lake Ontario can be hazardous for anyone on the water's edge during a storm or high wave conditions. Under existing conditions, sections of the waterfront are at risk as a result of wave uprush and overtopping. The shoreline protection works implemented as part of the SWP have been designed to provide safe overtopping levels.

Summary: Ability to Minimize Public Safety Risk as a Result of Wave Uprush/Overtopping

Implementation of the SWP will have a net positive impact by reducing public safety risk as a result of wave uprush and overtopping.

Criterion: Resilience of Shoreline Protection Works to Potential Climate Change Impacts

Indicator: *Potential for Shoreline Works to Accommodate Natural Changes Resulting from Climate Change*

The MOECC requires proponents to assess the contribution of a project to climate change and the projects resiliency to the effects of climate change. The SWP has no potential to contribute to climate change as it does not have emissions of GHGs associated with it. The SWP does have the potential to be affected by climate change as a result of changes to storm frequency and severity and potential changes to water levels. As discussed in **Section 3.1.8.1**, Lake Ontario water levels are regulated by the International Joint Commission so there is less water level variation associated with Lake Ontario than the other Great Lakes. Coastal design undertaken for the Project has examined worst-case scenarios which included potential changes as a result of climate change.

Summary: Resilience of Shoreline Protection Works to Potential Climate Change Impacts

The SWP has been designed to create resilience of shoreline protection works to potential climate change impacts, creating no impact.

Criterion: Ability to Improve Emergency Services Access to the Waterfront

Indicator: *Potential for Improved Emergency Services Access Along the Shoreline*

At present, Emergency Services access along the shoreline is limited by the lack of roads or wide trails in the vicinity of the shore or top of Bluffs. Consequently, there are areas of the Bluffs which are not easy to access by Emergency Services. Implementation of the SWP will improve access for Emergency Services along the shoreline from Bluffer's Park to Beechgrove Drive.

Although access along the corkscrew ramp east of Grey Abbey Ravine may not be possible by all Emergency Services vehicles, Emergency Services will be able to travel along the shoreline to east of Grey Abbey Ravine, and along the tablelands from Beechgrove Drive to the east side of Grey Abbey Ravine.

Summary: Ability to Improve Emergency Services Access to the Waterfront

Implementation of the SWP results in an improvement for Emergency Services access along the shoreline.

Criterion: Ability to Protect Source Water Protection Areas

Indicator: *Potential for Impact to Water Quality at F.J. Horgan Intake Pipe*

As discussed in Section 3.1.3, the SWP Study Area transects vulnerable areas identified in the Toronto and Region Assessment Report (CTC Source Protection Committee, 2015a). These vulnerable areas are largely associated with the F.J. Horgan WTP, which is one of four drinking water

systems withdrawing water from Lake Ontario, servicing 3.2 million residents in the City of Toronto and the southern portion of York Region Based on the vulnerability scoring within these areas and the activities expected to take place through the completion of the SWP, no significant drinking water threats to the F.J. Horgan WTP water supplies are anticipated. This is further corroborated by water quality modelling conducted using the regional water quality model for the Greater Toronto Area (**Appendix I**), which showed that no significant differences were observed at the F.J. Horgan WTP intake for any of the Segment-level Alternatives, of the Preferred Alternative.

Summary: Ability to Protect Source Water Protection Areas

Implementation of the SWP will have no effect on the quality of water at the F.J. Horgan intake pipe.

Criterion: Potential to Manage Safety Risk for Pedestrians and Cyclists Gaining Access to the Shoreline

Indicator: *Safety Associated with Potential Conflict Between Pedestrians/Cyclists and Vehicles*

Under existing conditions there are conflicts between pedestrians, cyclists and vehicles trying to access Bluffer's Park using Brimley Road. Many of these conflicts arise because of the narrow width of the roadway and the lack of dedicated pedestrian and cycling paths. The SWP will implement changes to Brimley Road to add a path for pedestrians going up and down Brimley Road. The trail will also be available to cyclists walking their bikes up or down the trail. Road markings will be used to separate cyclists riding up or down the road from vehicular traffic. The TRCA and the City of Toronto recognize that while these changes will improve the situation there are likely other changes that will need to be made to ease the traffic, congestion and resultant conflict in the Brimley Road area.

Summary: Potential to Manage Safety Risk for Pedestrians and Cyclists Gaining Access to the Shoreline

Implementation of the SWP will have a positive impact on the potential for conflict between pedestrians, cyclists and vehicles.

Table 7-8: Detailed Effects Assessment: Objective 2 Operation/Establishment

Criteria	Indicators	Effects	Mitigation Measures	Net Effects
Ability to minimize public safety risk and property loss as a result of slope erosion/failure	Potential public safety risk to users of the water's edge as a result of natural slope crest migration	▪ Implementation of the SWP will provide a formal trail along the water's edge outside of the risk line permitting users access to the water up to the eastern edge of the Grey Abbey Ravine. Beyond these points access will continue to be informal and at the risk of the user.	▪ None	Positive ▪ Positive impact in the reduction of public safety risk to users of the water's edge
	Potential public safety risk to users of the top of bluff as a result of natural slope crest migration	▪ SWP will provide a formal trail along the top of the Bluffs outside of the 10-year Crest Risk Line permitting users access along the top of the Bluffs from the eastern edge of the Grey Abbey Ravine to Beechgrove Drive.	▪ None	Positive ▪ Positive impact in the reduction of public safety risk to users along the top of the Bluffs through East Point Park
	Change in potential for loss of public property and/or infrastructure due to natural slope crest migration	▪ SWP will mitigate existing risks to public property and infrastructure including parks, trails, and roads from Bluffer's Park to the eastern edge of Grey Abbey Ravine. Public property and infrastructure to the east will still be at risk.	▪ None	Positive ▪ Positive impact in the reduction of public property and infrastructure at risk from natural slope crest migration
Ability to minimize public safety risk as a result of wave uprush/overtopping	Potential public safety risk to users of the water's edge as a result of wave uprush/ overtopping	▪ The shoreline protection works implemented as part of the SWP have been designed to remove trail users from the risk of wave uprush and overtopping.	▪ None	Positive ▪ The SWP has a positive impact by reducing public safety risk as a result of wave uprush and overtopping
Resilience of shoreline protection works to potential climate change impacts	Potential for shoreline works to accommodate natural changes resulting from climate change	▪ Coastal design undertaken for the Project has examined worst-case scenarios which reflect potential changes as a result of climate change.	▪ None	No effect ▪ The SWP has been designed to create resilience of shoreline protection works to potential climate change impacts creating no impact
Ability to improve Emergency Services access to the waterfront	Potential for improved Emergency Services access along the shoreline	▪ Implementation of SWP results in an improvement for Emergency Services access along the shoreline.	▪ None	Positive ▪ Positive change to Emergency Services access along the shoreline

Table 7-8: Detailed Effects Assessment: Objective 2 Operation/Establishment

Criteria	Indicators	Effects	Mitigation Measures	Net Effects
Ability to protect source water protection areas	Potential for impact to water quality at F.J. Horgan intake pipe	▪ No effect to water quality at intake pipe.	▪ None	No effect ▪ The implementation of the SWP will have no effect on water quality being taken from the F.J. Horgan intake pipe
Potential to manage safety risk for pedestrians and cyclists gaining access to the shoreline	Safety associated with potential conflict between pedestrian/cyclists and vehicles	▪ SWP will implement changes to Brimley Road to add a path for pedestrians going up and down Brimley Road. The path will also be available to cyclists walking their bikes up or down the trail. Road markings will be used to separate cyclists riding up or down the road from vehicular traffic.	▪ The TRCA and the City of Toronto recognize that while these changes will improve the situation there are likely other changes that will need to be made to ease the traffic, congestion and resultant conflict in the Brimley Road area	Positive ▪ The implementation of SWP will have a positive impact on the potential for conflict between pedestrians, cyclists and vehicles

7.3.2.3 Summary of Objective 2

The Objective to manage public safety and public property risk seeks to manage risks associated with natural slope crest migration at both the toe and top of the slope, public safety risk from wave uprush/overtopping, resiliency to climate change, improve access for Emergency Services, protect water quality and manage safety risks for pedestrians and cyclists accessing the shoreline. The Criteria and Indicators assessed for this Objective are only applicable in the operation/establishment phase. For all Criteria and Indicators, the implementation of SWP results in a positive change, therefore meeting this Objective (**Table 7-9**).

Table 7-9: Overall Effects Related to Objective 2

Criteria	Indicator	Overall Effects
Ability to minimize public safety risk and property loss as a result of slope erosion/failure	Potential public safety risk to users of the water's edge as a result of natural slope crest migration	Positive
	Potential public safety risk to users of the top of bluff as a result of natural slope crest migration	Positive
	Change in potential for loss of public property and/or infrastructure due to natural slope crest migration	Positive
Ability to minimize public safety risk as a result of wave uprush/overtopping	Potential public safety risk to users of the water's edge as a result of wave uprush	Positive
Resilience of shoreline protection works to potential climate change impacts	Potential for shoreline works to accommodate natural changes resulting from climate change	No effect
Ability to improve Emergency Services access to the waterfront	Potential for improved Emergency Services access along the shoreline	Positive
Ability to protect source water protection areas	Potential for impact to water quality at F.J. Horgan intake pipe	No effect
Potential to manage safety risk for pedestrians and cyclists gaining access to the shoreline	Safety associated with potential conflict between pedestrian/cyclists and vehicles	Positive
Summary:		
Overall implementation of the SWP will result in a positive change to managing public safety risk and public property risk related to slope erosion/failure, wave uprush/overtopping, resilience to climate change, access for Emergency Services, protection of water quality and management of safety risks for pedestrians and cyclists accessing the shoreline. Therefore, the Preferred Alternative for the SWP meets the Objective to manage public safety and property risk.		

7.3.3 Objective 3: Provide an Enjoyable Waterfront Experience

7.3.3.1 Construction Effects

Criterion: Ability to Maintain Public Access To and Along the Waterfront During Construction

Indicator: *Changes to Access To and Along the Shoreline as a Result of Construction Activities*

Access to and along the shoreline will be limited by construction activities intermittently. Areas under construction will be fenced off from user access. For example; sections of trails within Bluffer's Park may be closed to pedestrians and cyclists for limited periods of time to permit construction to occur. This would be done to protect public safety. Closures and limitations to access will be minimized and where possible will not occur on weekends. Construction activities along Brimley Road will be done prior to May 15 or after October (Thanksgiving) on weekdays to minimize disruption to users. When construction is occurring at the base of Doris McCarthy Trail, access to the shore will be fenced off. The Guild construction access route will be used for construction vehicle access and thus will be closed on weekdays but open on weekends to permit public access. Once construction is complete, final enhancements to the Guild construction access route to create trail amenities will be completed prior to May 24 or after October on weekdays in order to minimize disruption to users.

Summary: Ability to Maintain Public Access To and Along the Waterfront During Construction

The effects to public access to and along the waterfront will occur throughout the construction period but will be intermittent resulting in a negligible effect to users.

Criterion: Potential for Change to Use and Enjoyment of Park Areas, Existing Trails and Beaches/Shoreline During Construction

Indicator: *Potential for Dust, Vehicle Emission and Noise from Construction Activities Including Traffic to Affect Use and Enjoyment*

This Indicator identifies potential negative effects related to the generation of dust, vehicle emissions and noise to users of existing parks and open spaces within the Project Area in proximity to construction activities. This Indicator was assessed based on professional experience with similar waterfront projects on Lake Ontario.

Construction of the SWP will result in typical atmospheric emissions including dust generation from the transport and placement of fill, combustion emissions from construction equipment and other nuisance effects associated with construction noise. These effects are short-term (during active construction) and infrequent (during certain times of the day), and are limited to the areas under construction. Users of adjacent parks and open spaces in proximity to the SWP will experience some nuisance effects related to dust, vehicle emissions and noise but they will be localized, temporary and of short duration.

BMPs for dust suppression, such as watering of the access road during dry periods and speed limits on the access road, will be employed. Vehicles and other construction equipment will be well maintained to minimize emissions and vehicles will be equipped with mufflers to minimize noise from equipment. All construction activities will adhere to the City of Toronto's Noise By-Law. As a result, overall net effects are expected to be negligible.

Indicator: *Potential for Changes in Ability to Use Park Areas during Construction Due to Construction Traffic, Changes to Access and Unavailability of Areas Due to Construction*

Construction activity has the potential to create conflicts and/or restrictions for the public and local park users. This Indicator was assessed to identify potential negative impacts to users of Bluffer's Park, East Point Park and other adjacent parks and open spaces related to traffic congestion or changes to access resulting from construction. This Indicator was assessed by modeling traffic conditions along construction routes such as Brimley Road and Guildwood Parkway based on current conditions combined with anticipated construction traffic associated with the SWP.

The traffic analysis conducted for the SWP indicates that future traffic conditions are already operating at lower a Level of Service. The additional construction traffic associated with the SWP will not change these conditions. The selected truck routes will be able to accommodate the proposed truck volumes with no appreciable increase in traffic volume during peak periods (**Appendix J**).

During the 12 years of construction, visitors to Bluffer's Park and East Point Park will have restricted access to some areas, particularly the eastern portion of Bluffer's Park Beach. In addition, there is a potential for impairment to the "sense of nature" visitors may feel when the park is not under/adjacent to construction. However, users will retain use of the majority of both parks and construction hours will be limited to weekdays so that the park is construction free during evenings and weekends. Therefore, overall net effects are expected to be negligible.

Summary: Potential for Change to Use and Enjoyment of Park Areas, Existing Trails and Beaches/Shoreline During Construction

Construction of the SWP will have a negligible effect on the use and enjoyment of park areas, existing trails and beaches/shoreline. Construction BMPs will be used to minimize the potential for dust, vehicle emission and noise from construction activities and traffic. With respect to accessibility to parks and open spaces, the TIA conducted indicates that construction traffic associated with construction of the SWP will not result in an appreciable increase in traffic volumes during peak periods, as future traffic conditions are already anticipated to be operating at a lower Level of Service. During the construction period, public access will be restricted in some park and open space areas. However, construction hours will be limited to weekdays so that the park and open space areas are construction free during the evenings and weekends and users are able to retain use of the majority of both Bluffer's Park and East Point Park.

Criterion: Changes to the Use of Existing Beaches/Shoreline

Indicator: *Potential for Change to Character and Use of Existing Sand Beaches/Shoreline*

Construction of the SWP will change how existing beaches and shoreline areas are used. This Indicator was assessed to identify both positive and negative effects to the use of existing beaches/ shorelines during the construction period. This Indicator was assessed based on professional experience with similar waterfront projects on Lake Ontario and considered input received from the users of these areas.

During construction parts of Bluffer's Park Beach will be temporarily closed to public use. These effects are short-term (during active construction) and are limited to the areas under construction. Users of the beach will experience some nuisance effects related to dust, vehicle emissions and noise but they will be localized, temporary and of short duration.

Access to the eastern headland will be restricted during construction, limiting surfing and other uses in this area.

Sandy shorelines which are accessed informally by the public, including areas currently in private ownership, will also be affected by construction, particularly those areas east of the Guild construction access route. The currently privately owned sandy shoreline at the base of the Bluffs east of the Guild construction access route and west of Grey Abbey Ravine will be inaccessible during construction. As noted above, areas under construction will be fenced to limit public access. Where possible, access will be provided on weekends and evenings to minimize effects on users. The overall net effect to use of existing sand beaches/shorelines during construction is negligible.

Indicator: *Potential for Impact to Water Quality at Bluffer's Park Blue Flag Beach Along the Shoreline*

As discussed in **Section 7.3.1.1**, all fill will meet MOECC guidelines and will be placed behind containment berms, which will minimize sedimentation. Turbidity monitoring will be undertaken while construction is occurring. Construction will generally occur outside of the times the Bluffer's Park Blue Flag Beach will be used for swimming, therefore, impacts to the Bluffer's Park Blue Flag Beach are anticipated to be minimal.

BMPs as detailed in **Appendix H** will be used to further minimize the potential effects to water quality at Bluffer's Park Blue Flag Beach. Overall, net effects during construction are negligible.

Summary: Changes to the Use of Existing Beaches/Shoreline

Construction of the SWP will have a negligible effect with respect to changes to the use of the existing beaches/shoreline. Areas of Bluffer's Park Beach will be closed temporarily during construction; however, these effects will be short-term and limited to areas under construction. There is the potential for water quality at Bluffer's Park Beach to be affected by construction, but BMPs will be used to minimize the potential effects.

Criterion: Changes to the Use of the Waterfront for Recreation

Indicator: *Potential for Change in Use of Existing Park Areas*

Construction of the SWP will change how existing park areas are used. This Indicator was assessed to identify both positive and negative effects to the use of park areas during the construction period. This Indicator was assessed based on professional experience with similar waterfront projects on Lake Ontario and considered input received from the users of these areas.

Within Bluffer's Park the arm of the eastern headland will likely be closed throughout the duration of construction so that the area can be used to stage and stockpile construction material. Any other closures will be short-term, temporary and limited to areas under construction or adjacent to areas under construction. Within East Point Park informal trails will be closed permanently and decommissioned to restore ecosystem integrity. The main trail within East Point Park will be improved and there will be temporary closures and detours to manage access during construction. Any closures will be short-term. As noted above, users of the parks will experience some nuisance effects related to dust, vehicle emissions and noise but they will be localized, temporary and of short duration. Overall, the net effects to the change in use of existing park areas is negligible.

Indicator: *Potential to Maintain Navigation Along the Shore*

Construction of the SWP could change navigation along the shoreline for recreational boating. This Indicator was assessed to identify both positive and negative effects to navigation during the construction period. This Indicator was assessed based on professional experience with similar waterfront projects on Lake Ontario and considered input received from the users of these areas.

Construction activities are likely to restrict navigation for recreational boaters around the eastern headland of Bluffer's Park while construction is underway. These restrictions will be short-term and are not anticipated to negatively affect the use of Bluffer's Park by recreational boaters. The construction of headlands and other shoreline works along the remainder of the shoreline will affect navigation only within those areas under construction. There will not be additional limitations placed on navigational boating in the nearshore area. Overall, net effects to navigation during construction are negligible.

Summary: Changes to the Use of the Waterfront for Recreation

Construction of the SWP will have a negligible effect on changes to the use of the waterfront for recreation. Within Bluffer's Park, the arm of the eastern headland will likely be closed for the duration of construction in the West Segment so that the area can be used to stage and stockpile construction material. However, any other closures will be short-term, temporary and limited to areas under construction, or adjacent to areas under construction. Within East Point Park, informal trails will be closed permanently and decommissioned to restore ecosystem integrity. Temporary closures will be required to manage access through the park during construction, but the main trail within East Point Park will be improved overall. There is the potential that construction activities may restrict navigation for recreational boaters around the eastern headland of Bluffer's Park; however, these restrictions will be short-term and are not anticipated to negatively affect the use of Buffer's Park by recreational boaters.

Table 7-10: Detailed Effects Assessment: Objective 3 Construction

Criteria	Indicators	Effects	Mitigation Measures	Net Effects
Ability to maintain public access to and along the waterfront during construction	Changes to access to and along the shoreline as a result of construction activities	▪ Temporary restrictions to access generally on weekdays. Guild construction access route will be used for construction vehicles on weekdays.	▪ Timing of restrictions to periods of lower use. Opening of access points where and when possible on weeknights and weekends.	Negligible ▪ Negligible effects to access for most users
Potential for change to use and enjoyment of park areas, existing trails and beaches/ shoreline during construction	Potential for dust, vehicle emission and noise from construction activities including traffic to affect use and enjoyment	▪ Effects to users from nuisance effects will be temporary and intermittent to locations under construction.	▪ Use of BMPs for dust, emissions and noise associated with construction activities and vehicles	Negligible ▪ Negligible effects to use and enjoyment of park areas, existing trails and beaches/ shoreline during construction
	Potential for changes in ability use park areas during construction due to construction traffic, changes to access and unavailability of areas due to construction	▪ Future traffic conditions in the Project Study Area will not be negatively impacted by construction of the SWP; the selected truck routes will be able to accommodate the proposed truck volumes with no appreciable increase in traffic volume during peak periods.	▪ None	Negligible ▪ Negligible effect on ability to use park areas during construction due to traffic
Changes to the use of existing beaches/shoreline	Potential for change to character and use of existing sand beaches/shoreline	▪ Areas of Bluffer's Park Beach will be closed temporarily during construction. Sandy shorelines in other areas will also be temporarily closed while they are under construction.	▪ Areas of beaches/shoreline closed will be limited to only those areas under construction to minimize effects to users	Negligible ▪ Negligible effect on character and use of existing sand beaches/ shoreline
	Potential for impact to water quality at Bluffer's Park Blue Flag Beach	▪ Water quality may be affected by construction from placement of fill creating turbidity.	▪ BMPs will be used to reduce turbidity. Construction around Bluffer's Park Beach will likely occur outside of the summer months.	Negligible ▪ Negligible effect on water quality at Bluffer's Park Beach

Table 7-10: Detailed Effects Assessment: Objective 3 Construction

Criteria	Indicators	Effects	Mitigation Measures	Net Effects
Changes to the use of the waterfront for recreation	Potential for change in use of existing park areas	▪ Within Bluffer's Park the arm of the eastern headland will likely be closed throughout the duration of construction so that the area can be used to stage and stockpile construction material. Any other closures will be short-term, temporary and limited to areas under construction or adjacent to areas under construction. Within East Point Park informal trails will be closed permanently and decommissioned to restore ecosystem integrity. The main trail within East Point Park will be improved and there will be temporary closures and detours to manage access during construction.	▪ None	Negligible ▪ Negligible effect on the use of the waterfront for recreation
	Potential to maintain navigation along the shore	▪ Minor effects around Bluffer's Park eastern headland during construction	▪ Appropriate warnings and signage	No effect

7.3.3.2 Operation/Establishment Effects

Criterion: Improve Public Access To and Along the Waterfront

Indicator: *Potential to Provide Continuous Formal Public Access Along the Waterfront*

Currently there is no continuous formal public access along the waterfront. For this Indicator, a qualitative assessment of the degree to which continuous formal access can be provided was evaluated.

Implementation of the Preferred Alternative will provide continuous formal access along the waterfront, from Bluffer's Park in the west to just east of Grey Abbey Ravine along the water's edge, and from the east side of Grey Abbey Ravine through East Point Park to Beechgrove Drive along the top of the Bluffs.

This continuous formal access will be outside of the risk line and the shore/bluff edge of private properties along the shoreline will be purchased such that public access will be permitted along the entire length of shoreline to the west and east of Grey Abbey Ravine.

Indicator: *Potential to Provide a Primary to High-Capacity Multi-Use Trail*

Currently the Waterfront Trail is forced to bypass much of the actual waterfront within the SWP Study Area. For this Indicator, a qualitative assessment of the connection that will be provided by the new route for the Waterfront Trail following construction was evaluated.

The lands created for the SWP will allow for a primary to high-capacity multi-use trail connection of the Waterfront Trail that traverses across the Project Study Area and provides a water's edge linkage between Bluffer's Park and the east side of Grey Abbey Ravine, and a top of the Bluffs connection from the ravine to Beechgrove Drive, which will connect the Waterfront Trail back to the water's edge further to the east. This new trail connection will create a positive effect by allowing for a waterfront connection across the SWP Study Area. In addition, this provides for the relocation of the existing off-road connection of the Waterfront Trail, which may be constrained by the Metrolinx Lakeshore East rail corridor expansion.

Indicator: *Potential to Meet AODA Grade Standard for Access To and Along the Shoreline*

Currently access to the shoreline does not meet the AODA grade standard and access along the shoreline only meets the standard within Bluffer's Park. Implementation of the SWP will result in access along the shoreline that meets the AODA grade standard throughout the length of the proposed multi-use trail. Given the steepness and vegetation communities of concern associated with the bluff face, AODA grade standard was much more difficult to achieve for access to the shoreline. Modifications to Brimley Road will not improve the grades to meet AODA requirements. Access along the existing Doris McCarthy Trail and the Guild construction access route cannot be flattened to meet AODA grade requirements without considerable negative effects to the surrounding vegetation communities of concern (see **Section 6.2.4**). Therefore, for both access points, the location of level

resting areas will be considered as part of Detailed Design to improve accessibility. The proposed access at the east side of Grey Abbey Ravine will be a corkscrew ramp and bridge which will meet AODA grade requirements. Finally, the Beechgrove Drive access cannot be flattened to meet AODA grade requirements without causing significant impacts to the adjacent eroding bluff face and vegetation communities of concern.

Therefore, although AODA grade requirements will not be met in all areas, AODA accessibility with regards to grade will be improved over the existing conditions.

Indicator: *Potential to Improve Existing Access to the Shoreline*

Improvements to access to the shoreline were identified early in Project planning as a key issue to be resolved. The ability to improve existing access to the shoreline was evaluated qualitatively based on professional judgment.

Existing formal access to the waterfront is provided at Brimley Road and Doris McCarthy Trail. Informal access is provided at the Guild construction access route, Beechgrove Drive extension, and at several user-made informal trails along the bluff face, particularly within East Point Park. One of the main Objectives of this Project is to formalize access where feasible and decommission informal access points that are causing damage to the ecosystem. Access along Brimley Road will be improved through the development of a path that is continuous from Barkdene Hills to Bluffer's Park as discussed in **Section 6.2.4.1**. The Guild construction access route will become a formal trail providing pedestrian and cycling access to the shoreline. Informal trails, particularly within East Point Park, will be decommissioned and the creation of new informal trails will be deterred through the use of education, signage, and planting of native plants that discourage access (e.g., wild rose).

Overall, the SWP will result in improvements to existing access to the shoreline.

Indicator: *Potential to Provide New Access to the Shoreline*

This Indicator was assessed by qualitatively reviewing the Preferred Alternative against existing conditions to assess whether or not new access has been provided. As discussed in **Section 6.2.4**, it is difficult to provide access to the shoreline given the slope of the Bluffs, the eroding face and the vegetation communities of concern generally associated with the bluff face. One new access point will be provided between the top of the Bluffs and the toe of the Bluffs as part of the Waterfront Trail. A corkscrew ramp and bridge will be constructed on the east side of the Grey Abbey Ravine in order to minimize impacts to vegetation communities of concern and the area of eroding bluff face. The trail connection will be provided across private industrial land and the WTP provided that access can be negotiated. This trail will connect to a trail along the top of the Bluffs and it will include a trail link to the parking lot at East Point Park to allow access. Therefore, only one new access point to the shoreline has been deemed to be possible.

Indicator: *Potential to Provide Direct Public Access to Water*

Ease of regular access to the water's edge will enhance public enjoyment of the waterfront, and facilitate a variety of uses. The accessible water's edge was evaluated both qualitatively and quantitatively. Quantitatively, pre-construction lengths were measured using georeferenced aerial imagery in ArcGIS. Post-construction lengths were measured in ArcGIS using the Preferred Alternative concept drawings. Currently, only 900 m of shoreline provides formal public access to the water, limited to Bluffer's Park Beach. Approximately, 1,770 m is constrained by private ownership or critical infrastructure (through the East Segment), with a further 1,890 m of informal access provided within the risk line along the shoreline below East Point Park to the mouth of the Highland Creek.

Cobble beaches across the Toronto waterfront are well-used by the public to gain access to and into the water for a variety of activities, such as canoeing, kayaking, fishing, walking and nature appreciation. Cobble beaches will be sized to allow access for most users.

Following implementation the SWP, the shoreline distance which will provide formal access to the water will increase to approximately 3,200 m broken down as: 1,900 m of cobble and 1,300 m of sandy beach. These areas will be publicly accessible along formal trails which are AODA grade accessible and removed from the risk of slope failure (e.g., landslides). Approximately 2,560 m of existing informally accessible sandy shoreline within the East Segment will continue to be available.

While the SWP will result in a net loss in publicly inaccessible sandy/gravel shoreline, the SWP will provide a substantial increase in overall publicly accessible shoreline (predominantly cobble) and a more easily accessed water's edge. In addition, the shoreline east of Grey Abbey Ravine will remain accessible on an informal basis. The net increase in direct access to the water will result in a positive effect.

Summary: Improve Public Access To and Along the Waterfront

The SWP will improve all aspects of public access to and along the waterfront from existing conditions. This includes the provision of continuous access along the shore at the toe and top of the Bluffs from Bluffer's Park to Beechgrove Drive.

Criterion: Changes to the Use of Existing Beaches/Shoreline

Indicator: *Potential for Change to Character and Use of Existing Sand Beaches/Shoreline*

Land creation activities have the potential to change the character and use of beaches and sandy shorelines throughout the Project Area for beach, sandy shoreline, and water-based activities. Changes to the shoreline could affect the recreational experience of current beach/sand shoreline users and water sports (e.g., surfers and paddle boarders). Potential effects are assessed using professional judgment. It should be noted that this Indicator assesses the use of beaches, sandy shorelines, and other shoreline areas.

The beach at Bluffer's Park will be expanded by approximately 400 m in width and 60 m in depth which will enhance the recreational experience and the capacity of the sand beach for users. The ultimate design of the SWP has the potential to affect the use of nearshore areas around the headland for water sports, particularly surfing. Shoreline orientation and the presence of new landforms will influence how surfers use the area. Potential effects to these users are assessed using professional judgment.

The surfing community has provided input that their use of the beach on the eastern headland of Bluffer's Park, known as the 'Lighthouse surf break, is likely to be affected. A wave model was undertaken to simulate the differences in wave height in this location from pre-construction conditions (**Appendix K**). Results of the wave model suggest that there may be an impact to wave conditions under southwest waves; however, no change under easterly waves. As such, under southwest waves, surfing conditions may change. The Project Team will continue to work with the surfing community at Detailed Design to minimize impacts to surfing. Surfers will continue to have access to other sand and cobble beaches at Bluffer's Park.

Some members of the public have indicated a preference for maintaining the existing character of the sandy shorelines particularly to the east of Morna Avenue. The SWP would replace approximately 1,250 m of existing sandy shorelines with a headland and cobble beach system, of which 490 m has been previously modified. It is noted that use of these existing sandy shorelines is informal and at the risk of the users, as there is no formal trail to or along the shoreline. In addition, some of the sandy shorelines are privately owned. Consequently, current use often results in damage to vegetation communities of concern as access is gained through the use of informal and often inappropriate trails. The SWP minimizes the replacement of the existing sandy shorelines to only those areas requiring toe protection to protect public infrastructure at risk within the planning timeframe of the Project. Current use of the sandy shorelines for walking, water sports and other activities will not change as all of these activities can continue on the cobble beaches associated with the headland beach system. Access along the existing sandy shorelines to the east will continue to be informal, with no additional access between the top and toe of the Bluffs until the Beechgrove Drive extension for approximately 1.7 km to the east. Therefore, the implementation of the SWP will have a negligible effect on recreational activities on the existing beaches and sandy shorelines.

Indicator: *Potential for Impact to Water Quality at Bluffer's Park Blue Flag Beach*

The implementation of the SWP has limited potential to affect local circulation patterns and thus the water quality at Bluffer's Park Blue Flag Beach. Potential effects were assessed using a lake water quality model (**Appendix I**).

Circulation modeling indicates that following construction, there is likely to be little change in water quality. Therefore, the implementation of the SWP will have no effect on the water quality at Bluffer's Park Beach.

Summary: Changes to Use of Existing Beaches/Shoreline

Implementation of the SWP will have negligible impact to the use of existing beaches/shoreline. Bluffer's Park Beach will be expanded, which will be welcomed by users who enjoy using the beach for lounging, water sports and swimming. Water quality at Bluffer's Beach will not change as a result of this Project. Where existing sandy shorelines are being replaced with headland beach systems existing activities, such as walking and water sports, can continue. Surfing conditions for the 'Lighthouse' surf break may change, and the Project Team will continue to engage the surfers at Detailed Design to try and minimize the impacts to surfing.

Criterion: Changes to the Use of the Waterfront for Recreation

Indicator: *Potential for Change in Use of Existing Park Areas*

Operation/establishment of the SWP will change how existing park areas are used. This Indicator was assessed to identify both positive and negative effects to the use of park areas. This Indicator was assessed based on professional experience with similar waterfront projects on Lake Ontario and considered input received from the users of these areas.

Both Bluffer's Park and East Point Park are currently destination parks with limited opportunities to connect to other parks along the waterfront. The implementation of SWP will provide a connection between these existing park spaces such that users can use existing park facilities as an embarkation point or as a stopover point for a longer trip. The implementation of SWP will not change, alter or remove any existing park uses and will simply enhance the park experience. All changes to the use of existing park areas are therefore positive.

Indicator: *Potential to Maintain Navigation Along the Shore*

The nearshore of Lake Ontario is currently used for recreational boating of a variety of watercrafts including paddle boats, sailboats and recreational motor boats. Continuation of these activities is an important feature of providing an enjoyable waterfront experience. This Indicator was qualitatively assessed based on expected changes along the waterfront from establishment of the SWP.

The implementation of the shoreline works and aquatic habitat enhancements proposed for the SWP will alter some shoreline areas but will not change the ability of paddleboats, sailboats and recreational motor boats to navigate along the shore. Users of small watercraft will need to adapt to the new shoreline configuration and presence of new landforms. To mitigate these effects, navigation maps will be updated based on new shoreline configurations so that users are aware of any new potential hazards. Navigation will be maintained along the shore; therefore, there are no net effects to users anticipated.

Indicator: *Potential to Provide New Opportunities for Views/Viewscapes to Lake Ontario and to the Bluffs*

The provision of views along the shoreline and from the shoreline and adjacent areas are an important feature in enhancing public enjoyment of the waterfront. This Indicator was qualitatively assessed based on expected changes along the waterfront from establishment of the SWP.

No prominent lookout areas towards Lake Ontario will be affected. Views from the lake toward the shoreline are currently highly valued but are currently only accessible to those in boats or those who risk walking along the shore within the risk line. There will be a number of new opportunities for improved views of the Bluffs from headland areas and along the formal trail along the water's edge. As a result of toe protection works the Bluffs with start to stabilize and vegetate which will alter their appearance; however, similar changes have occurred at Bluffer's Park and have not diminished the quality of the views of the Bluffs experienced by users. Toe protection works will also alter the view from the top of the Bluffs along the shoreline as a natural shoreline will be replaced with man-made structures for a total of 1,250 m (or 1,100 linear metres). Overall, these new opportunities will create a positive net effect of the SWP.

Indicator: *Potential to Improve Navigation at Entrance to Boat Basin*

There has been an ongoing issue with the accumulation of sediment in the entrance to Bluffer's Park boat basin. This is occurring because the existing beach at Bluffer's Park is full and sediment is by-passing the beach and being deposited at the entrance to the boat basin.

The SWP has the potential to mitigate this issue by reducing the transport of sediment into the Bluffer's Park embayment. The widened and expanded Bluffer's Park Beach and the proposed headlands to protect it will trap most of the sand and sediment currently entering the embayment, thus reducing the future need for dredging and improving navigation at the entrance to the boat basin. This results in a positive impact to navigation at the entrance to the boat basin as a result of implementation of the SWP.

Summary: Changes to Use of Waterfront for Recreation

The SWP results in positive changes to the use of the waterfront for recreation. The implementation of SWP will not change, alter or remove any existing park uses and will simply enhance the park experience. Navigation along the shore will be maintained while navigation at the entrance to the boat basin will be improved as the need to dredge will be reduced. Finally, there will be a number of new opportunities for improved views of the Bluffs from headland areas and along the formal trail along the water's edge. As a result of toe protection works, the Bluffs with start to stabilize and vegetate which will alter their appearance; however, similar changes have occurred at Bluffer's Park and have not diminished the quality of the views of the Bluffs experienced by users. Toe protection works will also alter the view from the top of the Bluffs along the shoreline as a natural shoreline will be replaced with man-made structures for a total of 1,250 m (or 1,100 linear metres).

Table 7-11: Detailed Effects Assessment: Objective 3 Operation/Establishment

Criteria	Indicators	Effects	Mitigation Measures	Net Effects
Improve public access to the waterfront	Potential to provide continuous formal public access along the waterfront	▪ Continuous formal access will be outside of the risk line and the shore/bluff edge of private properties along the shore will be purchased such that public access will be permitted along the entire length of shoreline to the west and east of Grey Abbey Ravine.	▪ None	Positive ▪ Positive as continuous formal access is provided where it currently does not exist
	Potential to provide a primary to high-capacity multi-use trail	▪ Provides a multi-use trail connection of the Waterfront Trail that provides a water's edge linkage between Bluffer's Park and the east side of Grey Abbey Ravine, and a top of the Bluffs connection from the ravine to Beechgrove Drive. This provides for the relocation of the existing off-road connection of the Waterfront Trail which may be constrained by the Metrolinx Lakeshore East rail corridor expansion.	▪ None	Positive ▪ Positive as a primary to high-capacity multi-use trail is provided
	Potential to meet AODA grade standard for access to and along the shoreline	▪ Access along the shoreline will meet AODA grade standards. Due to the steepness of the Bluffs AODA grade standard can only be met through the provision of level rest areas on access trails to the shoreline.	▪ Provision of level rest areas on access trails to the shoreline to meet AODA	Positive ▪ Positive change as trail along the shoreline will meet AODA grade requirements and trails to the shoreline will have level rest areas to facilitate access for those users who may have mobility issues
	Potential to improve existing access to the shoreline	▪ Access along Brimley Road will be improved through the development of a trail that is continuous from Barkdene Hills to Bluffer's Park. Both Doris McCarthy Trail and the Guild construction access route will become formal trails providing pedestrian access to the shoreline trail. The Guild construction access route will also provide access for cyclists. Informal trails, particularly within East Point Park, will be decommissioned and the creation of new informal trails will be deterred through the use of education, signage, and planting of native plants that discourage access (e.g., wild rose).	▪ None	Positive ▪ The SWP will result in improvements to existing access to the shoreline

Table 7-11: Detailed Effects Assessment: Objective 3 Operation/Establishment

Criteria	Indicators	Effects	Mitigation Measures	Net Effects
	Potential to provide new access to the shoreline	▪ One new access point will be provided between the top of the Bluffs and the toe of the Bluffs: a corkscrew ramp and bridge will be constructed on the east side of the Grey Abbey Ravine. The trail connection will be provided across private industrial land and the WTP providing access can be negotiated. This trail will connect to a trail along the top of the Bluffs and it will include a trail link to the parking lot at East Point Park to allow access.	▪ None	Positive ▪ Positive change over existing conditions as a formal trail is provided where one currently does not exist and where impact from informal trails is considerable
	Potential to provide direct public access to water	▪ While the SWP will result in a net loss in sandy/gravel shoreline, the SWP will provide a substantial increase in overall beach (predominantly cobble) and a much more accessible water's edge, including improved opportunities for cycling, walking, bird watching and nature appreciation. In addition, the East Point Park sand shoreline east of Grey Abbey Ravine will remain accessible on an informal basis.	▪ None	Positive ▪ The net increase in shoreline that provides direct public access to the water will result in a positive effect
Changes to the use of existing beaches/ shoreline	Potential for change to character and use of existing sand beaches/ shoreline	▪ The beach at Bluffer's Park will be expanded by approximately 400 m in width and 60 m in depth which will enhance the recreational experience and the capacity of beach for users. The ultimate design of the SWP has the potential to affect the use of existing beaches/shoreline and nearshore areas by surfers. Shoreline orientation and the presence of new landforms will influence how surfers use the area. ▪ Current use of the sand beaches/shorelines for walking, water sports and other activities will not change as all of these activities can continue on the headland beach system. Access along the existing sandy shorelines to the east will continue to be informal and at the risk of the users.	▪ None	Negligible ▪ Implementation of the SWP will have a negligible effect on recreational activities on the existing beaches and sandy shorelines

Table 7-11: Detailed Effects Assessment: Objective 3 Operation/Establishment

Criteria	Indicators	Effects	Mitigation Measures	Net Effects
	Potential for impact to water quality at Bluffer's Park Blue Flag Beach	▪ No impact to water quality at Bluffer's Park Blue Flag Beach as a result of the SWP	▪ None	No effect ▪ Implementation of the SWP will have no effect on the water quality at Bluffer's Park Blue Flag Beach
Changes to the use of the waterfront for recreation	Potential for change in use of existing park areas	▪ Implementation of SWP will provide a connection between these existing park spaces such that users can use existing park facilities as an embarkation point or as a stopover point for a longer trip. The implementation of SWP will not change, alter or remove any existing park uses and will simply enhance the park experience.	▪ None	Positive ▪ All changes to the use of existing park areas are positive
	Potential to maintain navigation along the shore	▪ The implementation of the shoreline works and aquatic habitat enhancements will alter some shoreline areas but will not change the ability of paddleboats, sailboats and recreational motor boats to navigate along the shore	▪ Users of small watercraft will need to adapt to the new shoreline configuration and presence of new landforms. To mitigate these effects, navigation maps will be updated based on new shoreline configurations so that users are aware of any new potential hazards.	No effect ▪ Navigation will be maintained along the shore; therefore, there are no net effects to users anticipated
	Potential to provide new opportunities for views/ viewscapes to Lake Ontario and to the Bluffs	▪ No prominent lookout areas towards Lake Ontario will be affected. There will be a number of new opportunities for improved views of the Bluffs from headland areas and along the formal trail along the water's edge. As a result of toe protection works the Bluffs will start to stabilize and vegetate which will alter their appearance; however, similar changes have occurred at Bluffer's Park and have not diminished the quality of the views of the Bluffs experienced by users.	▪ None	Positive ▪ These new opportunities will create a positive net effect of the SWP
	Potential to improve navigation at entrance to boat basin	▪ The widened and expanded Bluffer's Park Beach and the proposed headlands to protect it will trap most of the sand and sediment currently entering the embayment reducing the future need for dredging and improving navigation at the entrance to the boat basin.	▪ None	Positive ▪ Positive impact to navigation at entrance to boat basin

7.3.3.3 Summary of Objective 3

The purpose of this Objective was to ensure that any changes to the waterfront resulted in an enjoyable waterfront experience. A large number of Criteria and Indicators were assessed for this Objective for both construction and operation/establishment.

The construction period for the Project is approximately 12 years; however, the actual construction activities are unlikely to be in any one location for the entire 12 years so the location of effects will change as construction activities occur in different places. Most nuisance effects from construction for recreational users will be short-term and localized and can be mitigated with the use of BMPs.

Once operational, the SWP will provide a better waterfront recreation experience than exists today with more of the shoreline being accessible to more people (**Table 7-12**).

Table 7-12: Overall Effects Related to Objective 3

Criteria	Indicator	Overall Effects
Improve public access to the waterfront	Potential to provide continuous formal public access along the waterfront	Positive
	Potential to provide a primary to high-capacity multi-use trail	Positive
	Potential to meet AODA grade standard for access to and along the shoreline	Positive
	Potential to improve existing access to the shoreline	Positive
	Potential to provide new access to the shoreline	Positive
	Potential to provide direct public access to water	Positive
Ability to maintain public access to and along the waterfront during construction	Changes to access to and along the shoreline as a result of construction activities	Negligible
Potential for change to use and enjoyment of park areas, existing trails and beaches during construction	Potential for dust, vehicle emission and noise from construction activities including traffic to affect use and enjoyment	Negligible
	Potential for changes in ability use park areas during construction due to construction traffic, changes to access and unavailability of areas due to construction	Negligible
Changes to the use of existing sand beaches/shoreline	Potential for change to character and use of existing beaches/shoreline	Negligible
	Potential for impact to water quality at Bluffer's Park Blue Flag Beach	No effect
Changes to the use of the waterfront for recreation	Potential for change in use of existing park areas	Positive
	Potential to maintain navigation along the shore	No effect
	Potential to provide new opportunities for views/viewscapes to Lake Ontario and to the Bluffs	Positive
	Potential to improve navigation at entrance to boat basin	Positive
Summary:		
Overall, SWP results in a positive change to the waterfront experience for recreational users. Recreational users will experience some construction nuisance effects that may detract from their experience at times but these are anticipated to be localized and short-term effects. Once operational the SWP will create a positive recreational experience when compared to existing conditions.		

7.3.4 Objective 4: Consistency and Co-ordination with Other Initiatives

7.3.4.1 Construction Effects

Criterion: Impact on Archaeological Resources, Built Heritage Resources and Cultural Heritage Landscapes

Indicator: *Potential Impact to Known or Potential Archaeological Resources*

A marine archaeological assessment completed in 2012 on the in-water portion of the SWP Study Area indicated that there are a number of marine-based archaeological resources within the SWP Study Area. The assessment located five targets that were considered to exhibit cultural heritage value or interest. Only three of these targets will be affected by the SWP. These are:

S56:.....The Alexandria was built in 1866 as a barge towing steam sidewheeler and was rebuilt in 1883. She became stranded in 1915, and all were rescued thanks to local efforts. This site has both provincial (as a vessel that operated along the key transportation corridor of the province for over three decades) and local (as seen by the stranding and rescue events of 1915) significance.

S76:.....The remains of an unidentified shipwreck (possibly barge). It is apparent that the entire ship is not present in this location, and that what has been deposited in this location was for the purposes of erosion control. Much of the wreckage is underwater and buried under rocks, and any additional information regarding its identity, type of vessel or age is unavailable without further archaeological work. This has local interest as it was used as a measure of erosion control – an early methodology that was employed along the shorelines in many locations in Ontario once a ship had reached “derelict” status.

S78:.....The remains of two barge hulls were placed in the 1960s as part of an erosion control measure. There were apparently three original barges originally located here, but the remains of only two are apparent today. The third may be wrecked partially onshore (debris with metal sheet piling on rocks) or could have drifted westwards. Barges are often overlooked in the recording of marine history, and yet they were the work vessels of the day. They are important locally and provincially in terms of their contributions to marine history, but also locally as to their use after they became “derelict” vessels and repurposed as erosion control barriers.

Specific criteria were used to evaluate significance based on type of impact to the resource, the level of effort for next archaeological steps, and the cultural and historic value of the marine archaeological resources.

S56 (Alexandria) was considered to have a high level of heritage value both provincially and locally. S76 exhibited a moderate level of significance on a local level; and lastly, S78 exhibited a moderate level of significance on a local and provincial level.

Mitigation options were explored and the TRCA favoured the avoidance and buffering option (10-20 m depending on the resource). This mitigation option is suitable for S78 which is wholly submerged. For S76 and S56; however, avoidance with buffering and additional recording of the resource by a licensed archaeologist is the preferred option. Both of these resources are exposed to the air, wind, waves and ice which can collectively and individually cause damage to the resource.

To summarize, the Project has opted to avoid all three areas, but a "Do Nothing" approach even with buffering is only suitable for S78, the two barges, as they are wholly submerged. The other two resources are exposed to elements that can cause damage to the resource. Recommendations for these two marine resources are to avoid with buffering, but also to conduct minimal archaeological recording of the two resources. Minimal archaeological recording would entail physically recording the top 1 to 2 m of the vessels, as these are the most likely to be "torn away" or otherwise destroyed by the elements. The 20 m buffer around the Alexandria (S56) is sufficient to capture the associated debris field.

TRCA archaeologists also conducted a Stage 1 Archaeological Assessment (**Appendix E**) in 2012 for the Project Study Area to provide information about the Project Study Area's geography, history, previous archaeological fieldwork and current land conditions in order to evaluate the potential for it to contain cultural heritage resources that might be impacted by the Project.

The Stage 1 report indicated that there is potential for land-based archaeological resources to be found within the Project Study Area along the tablelands. As such, in order to help guide the final tableland trail alignment, Stage 2 assessments will be undertaken during the Detailed Design phase where physical works are planned along the tablelands (i.e., trail construction down Brimley Road and from Grey Abbey Ravine to East Point Park), prior to any ground disturbing activities where past soil disturbance has not previously been documented. Should land-based resources be detected during the Stage 2 assessment, avoidance of the resource(s) will be practiced when determining tableland trail alignment, as per TRCA's mandate.

Indicator: *Potential for Impact to Known Built Heritage Resources and Cultural Heritage Landscapes*

There are no built heritage resources within the SWP Area that will be affected by construction. Therefore, no effects are anticipated.

Indicator: *Potential for Impact on Traditional Land Uses and Valued Cultural Features*

The SWP must respect and wherever possible enhance traditional uses of lands by First Nations and Métis. Currently the SWP Area is not used for traditional purposes. As such, there will be no effects to traditional uses associated with the construction period.

Summary: Impact on Archaeological Resources, Built Heritage Resources and Cultural Heritage Landscapes

Construction of the SWP is anticipated to have a negligible impact on archaeological resources as the existing marine archaeological resources will be buffered and avoided to minimize impacts.

Appropriate archaeological recording of the two resources exposed to the elements will also be undertaken. Stage 2 assessments will be undertaken during the Detailed Design phase where physical works are planned, prior to any ground disturbing activities where past soil disturbance has not been previously documented. In the event a land-based archaeological resource is found, avoidance of the resource will be practiced when determining the final tableland trail alignment.

As no built heritage resources have been located within the Project Area, and the Project Area is not used for traditional purposes, construction of the SWP will have no effect on built heritage resources or cultural heritage landscapes.

Criterion: Potential for Effects to Residents in the Local Community

Indicator: *Potential for Disturbance Effects to Residents from Construction Related Traffic*

A Traffic Impact Assessment (TIA) was undertaken to determine future traffic conditions during construction, including impacts to arterial road traffic as detailed in the next Indicator. Construction traffic can disturb residents living along construction access routes with noise, dust and limitations for access to private property. The typical volume of trucks per day on any of the construction access routes is 60 to 80 with a worst-case of 220 trucks per day on Brimley Road and 200 trucks per day accessing the Guild construction access route through Guildwood Village.

Construction traffic on Brimley Road will have minimal effects on local residents as private properties generally back onto Brimley Road rather than face it. This means that traffic is removed from affecting access to and from private properties. Many of these properties are well vegetated and are separated from the road. These physical realities will mitigate noise and dust effects from construction traffic. It is anticipated that some residents may hear the trucks rolling up and down Brimley Road and in particular they are likely to hear the trucks braking. These effects will be temporary, will happen in fall, winter, and spring, and should not impede anyone's use of their property. BMPs, such as truck back-up beepers with lower volume, conforming to local noise by-laws/ordinances, conformance with assigned construction routes, minimized use of air brakes, and minimized truck idling, will be used to lessen the effects of construction traffic noise.

Construction traffic through Guildwood Village will cause disturbance to local residents from noise and some congestion as detailed below. Guildwood residents have raised concerns about additional traffic through their neighbourhood and have raised issues about a number of other projects with the potential to add more traffic congestion. The cumulative effects of traffic from the SWP and other projects are assessed in **Section 7.3.4.3**. It is anticipated that Guildwood residents will be disturbed by the construction traffic moving through the neighbourhood. In order to address issues and concerns throughout construction, TRCA will have a dedicated community liaison officer who will respond to all community concerns and issues and seek resolution where possible. TRCA will also implement BMPs for construction traffic through neighbourhoods including tire washing, and maintenance and inspection of vehicles. The construction traffic for SWP will result in a negative effect to Guildwood residents likely to be disturbed by traffic noise and congestion.

Indicator: *Potential Impacts to Arterial Road Traffic*

A TIA was undertaken to identify current traffic patterns and to predict future traffic patterns accounting for construction traffic via Brimley Road and through Guildwood Village. The typical volume of trucks per day on any of the construction access routes is 60 to 80 with a worst-case of 220 trucks per day on Brimley Road and 200 trucks per day accessing the Guild construction access route through Guildwood Village. The TIA is provided in **Appendix J**.

Brimley Road is the primary access for the West Segment (see **Figure 6-14** in **Chapter 6**). It is a two-lane, north-south collector roadway with a posted speed limit of 50 km/h. This route is proposed to provide access for both inbound and outbound truck traffic from October to April for the construction of the West Segment components.

For the purposes of the TIA it was assumed that inbound trucks would utilize 20% right hand turns from Kingston Road, 50% left hand turns from Kingston Road, and 30% of trucks going straight south through the intersection of Brimley Road and Kingston Road. This same directional distribution is to be used for outbound traffic as well (50% right hand turns, 20% left hand turns and 30% straight). Using these assumptions, the TIA determined that the addition of construction traffic would not affect the queues at the intersection of Brimley Road and Kingston Road and the intersection would operate at an acceptable Level of Service.

The Guild construction access route was created by TRCA in the 1980s for the purpose of constructing and maintaining remedial shoreline protection below Guild Park and Gardens, Guildwood Parkway, South Marine Drive, Sylvan, and most recently Meadowcliffe.

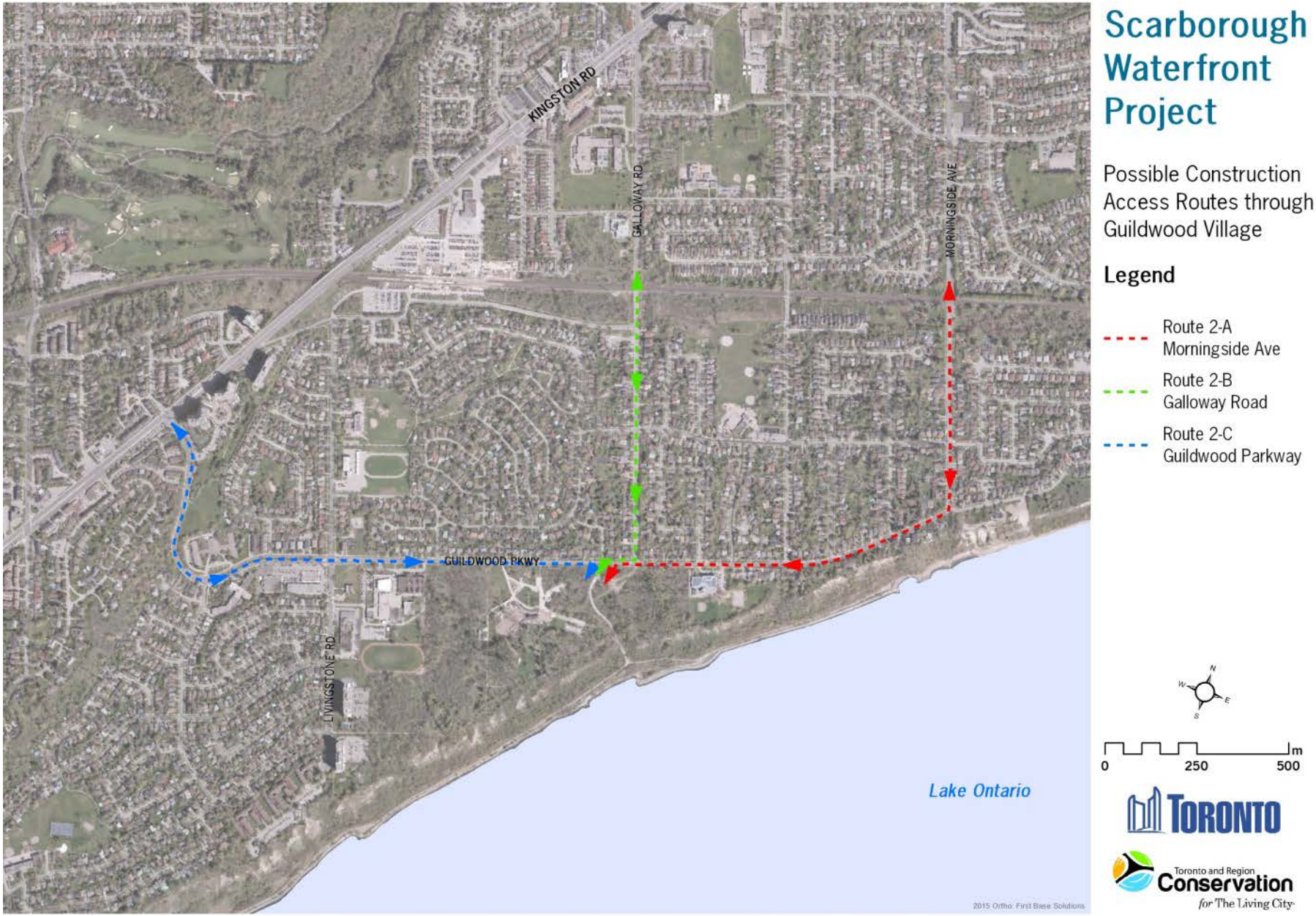
There are several possible routes through Guildwood Village that can be taken to the Guild construction access route. The routes assessed by the TIA are shown in **Figure 7-1** and outlined below.

The TIA analyzed each of the above routes for both inbound and outbound traffic. The analysis considered impacts on Level of Service, transit, pedestrian activity, cyclist activity, road type, residential frontage, as well as considering all road restrictions. For inbound routes, it was determined that Galloway Road and Guildwood Parkway are already experiencing capacity and delay problems for left turns from Kingston Road. The addition of construction traffic to these areas would further increase queuing and significantly impact the intersections. As this limitation does not apply to the intersection at Morningside Avenue and Kingston Road, it was chosen as the preferred route for 100% of inbound construction traffic.

As Morningside Avenue is the only inbound access, it was not considered as an outbound access in order to reduce truck volume traffic on Morningside Avenue. Galloway Road was chosen as the preferred outbound route over Guildwood Parkway due to the fact that Galloway Road:

- has no TTC service;
- has fewer sidewalks (less anticipated pedestrian traffic); and,
- is a wide two-lane road.

Figure 7-1: Possible Construction Access Routes through Guildwood Village



This preferred construction access route is shown in **Figure 7-2**. The TIA determined that the addition of inbound construction traffic via Morningside Avenue would not affect the queues at the intersection of Morningside Avenue and Kingston Road, nor would the addition of outbound construction traffic via Galloway Road affect the queues at the intersection of Galloway Road and Kingston Road. The TIA also determined that this preferred construction access route would allow both intersections to operate at an acceptable Level of Service.

Truck traffic mitigation measures and BMPs will be employed and are provided in **Appendix H**. Examples of BMPs to be implemented include maintenance and daily inspection of vehicles, minimized truck idling, conformance with local noise by-laws/ordinances, conformance with assigned construction routes, minimized use of air brakes, and maintenance of safe driving speeds.

Indicator: *Potential Disturbance Effects to Residents from Construction Activity*

Local residents backing onto the areas that will be under construction may be disturbed by construction activities. In particular, residents may hear the movement of construction equipment such as bulldozers, trucks and front-end loaders and the sound of material being dumped to create the new land base. Construction activities will adhere to the City of Toronto Noise By-Law with respect to the hours of construction and all equipment will be kept in proper operating condition to minimize effects. Residents may see some dust from construction activities, particularly earth movement. Given the location of residences on the top of bluff away from construction, it is not anticipated that any residents will be affected by dust. All construction activities will use BMPs to minimize the disturbance effects of construction on local residents. Disturbance effects related to construction are anticipated to be minor and temporary.

Summary: Potential for Effects to Residents in the Local Community

Overall, construction of the SWP will result in a negative effect to Guildwood residents likely to be disturbed by traffic noise and congestion. However, BMPs, such as well-maintained vehicles, adherence to construction traffic routes and minimal use of air brakes, will lessen the effects of construction traffic noise. Additionally, a dedicated community liaison officer will be available to respond to all community concerns and issues, seeking resolution where possible. Disturbance effects related to construction activity are anticipated to be minor and temporary, through adherence to BMPs and the City of Toronto's Noise By-Law. There are no effects anticipated to arterial road traffic.

Figure 7-2: Preferred Construction Access Route through Guildwood Village

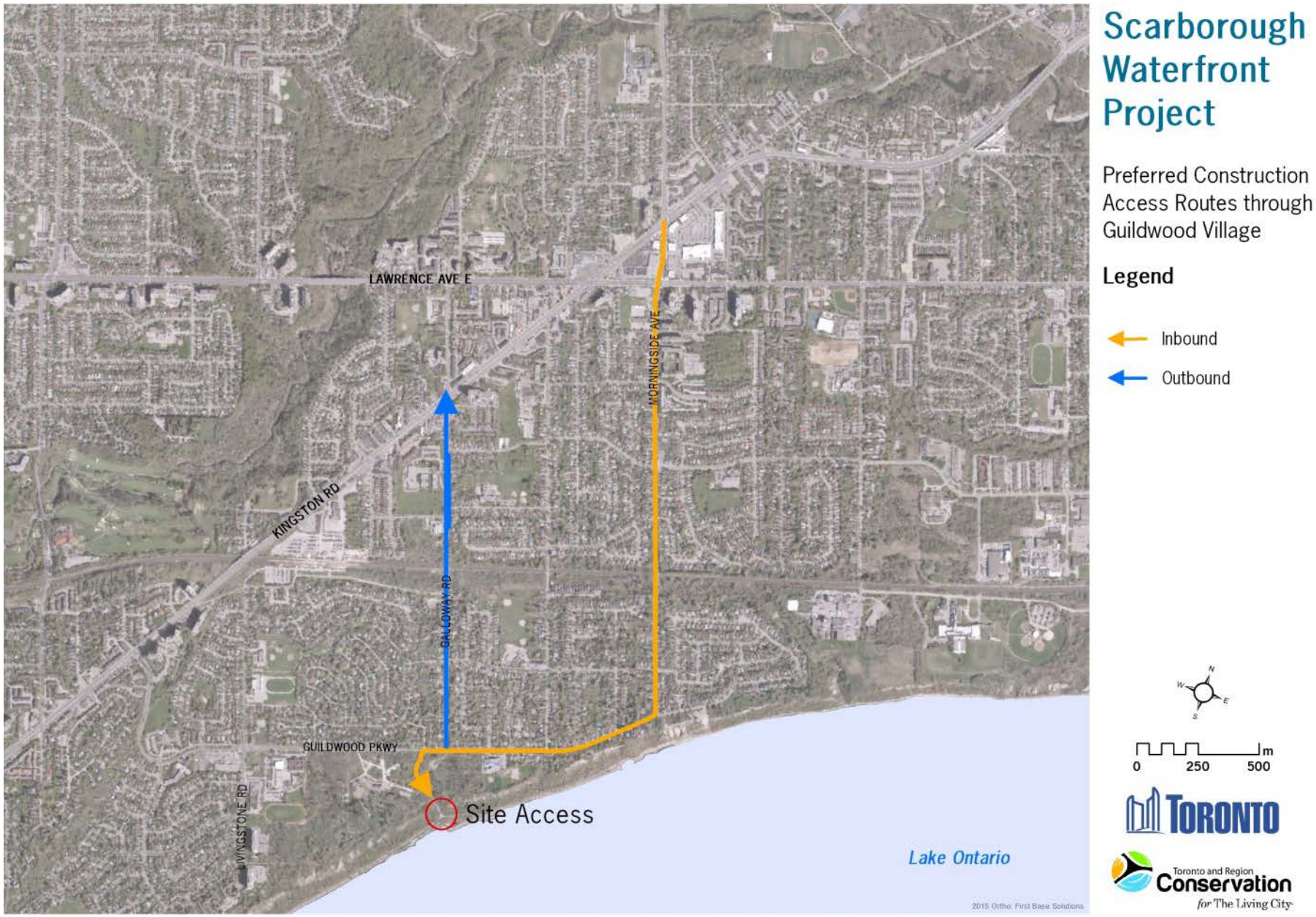


Table 7-13: Detailed Effects Assessment: Objective 4 Construction

Criteria	Indicators	Effects	Mitigation Measures	Net Effects
Impact on archaeological resources, built heritage resources, and cultural heritage landscapes	Potential impact to known or potential archaeological resources	▪ TRCA has opted to avoid all three marine resources and buffer them appropriately to minimize impacts. However, avoidance with buffering is only suitable for the two barges, as they are wholly submerged. The other two resources are exposed to elements that can cause damage to the resource, therefore, in addition to avoidance with buffering, minimal archaeological recording of the two resources will be conducted. ▪ The potential to encounter land-based archaeological resources along the tablelands was identified in the Stage 1 assessment.	▪ Stage 2 assessments will be undertaken during Detailed Design where physical works are planned, prior to any ground disturbing activities where past soil disturbance has not previously been documented. In the event a land-based archaeological resource is found, avoidance of the resource will be practiced when determining final tableland trail alignment.	Negligible ▪ Potential effects are considered negligible
	Potential for impact to known built heritage sites, and cultural heritage landscapes	▪ None	▪ None	No effect
	Potential for impact on traditional land uses and valued cultural features	▪ None	▪ None	No effect
Potential for effects to residents in the local community	Potential for disturbance effects to residents from construction related traffic	▪ Construction traffic on Brimley Road will have minimal effects on local residents as private properties generally back onto Brimley Road; therefore, traffic is removed from affecting access to and from private properties. It is anticipated that some residents may hear the trucks rolling up and down Brimley Road and in particular they are likely to hear the trucks braking. These effects will be temporary and intermittent and should not impede anyone's use of their property. ▪ Construction traffic through Guildwood Village will cause disturbance to local residents from noise and some congestion. Guildwood residents have raised concerns	▪ BMPs, such as well-maintained vehicles, adherence to construction traffic routes and minimal use of air brakes, will lessen the effects of construction traffic noise. ▪ In order to address issues and concerns throughout construction TRCA will have a dedicated community liaison officer who will respond to all community concerns and issues and seek resolution where possible.	Negative ▪ The construction traffic for SWP will result in a negative effect to Guildwood residents likely to be disturbed by traffic noise and congestion

Table 7-13: Detailed Effects Assessment: Objective 4 Construction

Criteria	Indicators	Effects	Mitigation Measures	Net Effects
	Potential impacts to arterial road traffic	▪ The TIA determined that the addition of construction traffic would not affect the queues at the major intersections along the proposed truck route (Brimley Road and Kingston Road, Morningside Avenue and Kingston Road, and Galloway Road and Kingston Road), and the intersections would operate at an acceptable Level of Service.	▪ None	No effect
	Potential disturbance effects to residents from construction activity	▪ Residents may hear the movement of construction equipment such as bulldozers, trucks and front end loaders and the sound of material being dumped to create the new land base.	▪ Construction activities will adhere to the City of Toronto Noise By-Law with respect to the hours of construction and all equipment will be kept in proper operating condition to minimize effects. All construction activities will use BMPs to minimize the disturbance effects of construction on local residents.	Negligible ▪ Disturbance effects related to construction are anticipated to be minor and temporary

7.3.4.2 Operation/Establishment Effects

Criterion: Integration with City and Other Agency Plans and Initiatives

Indicator: *Consistency with the Fish Community Objectives for Lake Ontario*

The Fish Community Objectives for Lake Ontario (Stewart et al., 2013) are to be used as a guide by the MNRF and New York State Department of Environmental Conservation to carry out their mandates to manage the fish and fisheries of Lake Ontario. On a local scale, the SWP will advance these goals and objectives once implemented. A qualitative assessment of the ability of the Preferred Alternative to support Nearshore Zone Goals and Offshore Pelagic Zone Goals of the Fish Community Objectives for Lake Ontario was assessed.

The Fish Community Objectives for Lake Ontario identifies the following goals for the Nearshore and Offshore Pelagic Zones, as shown in **Table 7-14**:

Table 7-14: Fish Community Objectives for Lake Ontario Goals for the Nearshore and Offshore Pelagic Zones

Nearshore Zone Goal	Protect, restore and sustain the diversity of the nearshore fish community, with an emphasis on self-sustaining native fish such as Walleye, Yellow Perch, Lake Sturgeon, Smallmouth Bass, Largemouth Bass, sunfish, Northern Pike, Muskellunge, Round Whitefish, and American Eel.
Offshore Pelagic Zone Goal	Maintain the offshore pelagic fish community that is characterized by a diversity of trout and salmon species including Chinook Salmon, Coho Salmon, Rainbow Trout, Brown Trout, and Atlantic Salmon, in balance with prey fish populations and lower trophic levels.

The SWP results in aquatic habitat improvements that will provide local gains in habitat quality to the nearshore habitats.

With respect to the Fish Community Objectives for Lake Ontario, SWP will:

- Support these objectives through the creation of new, longer and more diverse open coast shoreline complete with structural habitat features along the new structures and the existing revetments. Together, these measures will improve the potential foraging, spawning and nursery habitat for the native fish utilizing the open coast habitat within the Project Area.
- Support these objectives by enhancing habitat quality for the prey-fish community via improving shoreline morphology and substrate diversity to create more foraging, cover and shelter opportunities.
- Support cool and cold water pelagic fish species, such as Lake Trout, through the creation of habitat features and support cool and cold water fish communities through the creation of backwater refuge areas behind headlands and additional augmentation of the shoreline with surcharged areas.

Overall, SWP results in aquatic habitat improvements that will provide local gains to the nearshore open coast habitat that are expected to help meet the nearshore and offshore goals of the Fish Community Objectives for Lake Ontario. As a result, the SWP is expected to have a positive effect on coordination with the Fish Community Objectives for Lake Ontario.

Indicator: *City of Toronto Official Plan and TRCA Living City Policies*

The Preferred Alternative was reviewed to ensure consistency with the policies of the City of Toronto Official Plan and the TRCA's The Living City Policies. The relevant policies are outlined in **Chapter 2**. This Indicator was assessed by reviewing the Official Plan and The Living City Policies and doing a qualitative assessment of the Preferred Alternative's consistency with both sets of policies.

These policy documents support the provision of a continuous, accessible trail along the waterfront that connects green spaces and is removed from hazard risks such as landslides. By providing this trail, the SWP provides an improvement to the existing conditions which is consistent with the policy direction contained in the Official Plan and The Living City Policies.

Indicator: *Consistency with the Goals and Objectives of the Management Plan for Guild Park and Gardens*

The Management Plan for Guild Park and Gardens identifies a number of new and enhanced recreational opportunities and linkages to the open space system. The Preferred Alternative was reviewed to ensure consistency with the intent to create linkages between these amenities and the shoreline within the SWP Study Area and thus support the goals and implementation of the Management Plan. Once the SWP is established, improved trail connections along the waterfront and to the waterfront will support the Management Plan for Guild Park and Gardens.

Indicator: *Consistency with objectives of the Wet Weather Flow Master Plan (WWFMP)*

The Preferred Alternative is reviewed to ensure consistency with the City of Toronto WWFMP. The goal of the WWFMP is to reduce, and ultimately eliminate, the adverse impacts of wet weather flow, which is runoff generated when it rains or snows, in order to protect our environment and improve the ecosystem health of the watersheds. The Plan was developed with the recognition that wet weather flow will be managed on a watershed basis accompanied by a hierarchy of solutions starting with "at source", followed by "conveyance," and concluding with "end-of-pipe."

The SWP provides the opportunity to provide "end-of-pipe" management of stormwater through the improvement of stormwater outfall locations with wet features which will contribute to the primary treatment of stormwater before it enters Lake Ontario. The size and function of these wet features is limited by the land base available at the base of the Bluffs and the volume of water received. Wet features will be constructed in the following locations:

- Base of Doris McCarthy Trail
- Base of Grey Abbey Ravine

By providing these wet features, the SWP provides an improvement to the existing conditions which is consistent with the direction contained in the WWFMP.

Summary: Integration with City and Other Agency Plans and Initiatives

Implementation of the SWP will have a net positive effect with respect to integration with City and other agency planning initiatives. The Project will provide local gains with regard to achieving goals established in the Fish Community Objectives for Lake Ontario through regional and local improvements to the nearshore open coast fish communities. The SWP is also consistent with the long-term planning in the City of Toronto Official Plan and TRCA's Living City Policies with respect to the waterfront and Waterfront Trails. As well, the Project is consistent with the goals of the Management Plan for Guild Park and Gardens, and will support the achievement of objectives of the WWFMP by contributing to end-of-pipe treatment at stormwater outfalls.

Criterion: Potential for Effects to Residents in the Local Community

Indicator: *Potential Disturbance Effects from Waterfront Users and Parking*

As noted in **Chapter 2** and **Chapter 3** of this EA, it is anticipated that as the City of Toronto's population grows, densifies and changes there will be increased demand for recreational use and spaces, and consequently, increased use of the Scarborough waterfront. One of the drivers of SWP was to ensure appropriate trails and spaces are in place to manage the anticipated future uses. Local residents raised concerns during the EA planning with respect to how the current level of use and the projected increased level of use is and could affect the use and enjoyment of their private properties. It is noted that most of the existing concerns pertain to areas around Bluffer's Park and the trail heads for Doris McCarthy Trail and the Guild construction access route. In general, the concerns and potential effects relate to parking on residential streets, litter, and trespass.

With respect to Bluffer's Park, the City of Toronto is undertaking a number of pilot projects to better manage parking and the line-ups that can occur to get into the park on busy days. These projects include better security, turning cars around north at Barkdene Hills when parking lots are full, and parking gates. In addition, discussions with adjacent schools and other facilities are ongoing to secure shared use of parking lots. It is hoped that these pilot projects will alleviate some of the existing effects from inappropriate parking, litter, and trespass near Bluffer's Park. Changes to the shoreline as a result of the SWP are not anticipated to make the situation worse as it is already at capacity. The provision of the trail connection further to the east may improve the situation as users will be able to park at other locations and walk or bike to Bluffer's Park as a destination.

With respect to Doris McCarthy Trail, there will be no parking or improvements of the trail or at the trailhead which will continue to limit use. No changes to the area are contemplated at this time

With respect to the Guild construction access route, parking will be available at the existing gravel lot. This may alleviate some of the pressures at Bluffer's Park as users become aware that this access is also available.

Table 7-15: Detailed Effects Assessment: Objective 4 Operation/Establishment

Criteria	Indicators	Effects	Mitigation Measures	Net Effects
Integration with City and other agency plans and initiatives	Consistency with the goals of the Fish Community Objectives for Lake Ontario	▪ The SWP will provide local gains with regard to achieving goals established in the Fish Community Objectives for Lake Ontario	▪ None	Positive ▪ Improvements are anticipated both regionally and locally to the nearshore open coast fish communities
	City of Toronto Official Plan and TRCA Living City Policies	▪ The SWP is consistent with the City of Toronto Official Plan and TRCA Living City Policies with respect to the waterfront and Waterfront Trails	▪ None	Positive ▪ The SWP is consistent with long-term planning in the City of Toronto Official Plan and TRCA Living City Policies
	Consistency with the goals and objectives of the Management Plan for Guild Park and Gardens	▪ The SWP is consistent with the goals of the Management Plan and as such will support the achievement of the goals and objectives of the Management Plan for Guild Park and Gardens	▪ None	Positive ▪ The SWP will result in positive linkages with the Guild Park and Gardens site
	Consistency with objectives of the WWFMP	▪ The SWP supports the achievement of the objectives of WWFMP by contributing to end of pipe treatment at stormwater outfalls	▪ None	Positive ▪ The SWP will support achievement of objectives of WWFMP
Potential for effects to residents in the local community	Potential disturbance effects from waterfront users and parking	▪ The SWP is not anticipated to make disturbance effects worse at Bluffer's Park as it is already at capacity. The provision of the trail connection further to the east may improve the situation as users will be able to park at other locations and walk or bike to Bluffer's Park as a destination. ▪ With respect to Doris McCarthy Trail, there will be no parking or improvements of the trail or at the trailhead which will continue to limit use. ▪ With respect to the Guild construction access route, parking will be available at the existing gravel lot. This may alleviate some of the pressures at Bluffer's Park as users become aware that this access is also available. ▪ Throughout the Project Study Area the Waterfront Trail will move from on-street locations to the water's edge taking cyclists off of the roads and out of local communities.	▪ None	Negligible ▪ Situation will likely remain the same with no improvement as a result of SWP
Integration with existing land uses	Compatibility with existing land use (open space, institutional and industrial)	▪ The SWP is consistent with existing land uses, with the exception of the industrial facility in the vicinity of East Point Park. Industrial representatives have raised concern regarding the proximity of the industrial facility to the proposed trail, and have noted difficulties in making trail users safe in the event of an upset condition.	▪ None	Negligible

Throughout the Project Study Area the Waterfront Trail will move from on-street locations to the waterfront taking cyclists off of the roads and out of local communities.

Summary: Potential for Effects to Residents in the Local Community

It is expected that the disturbance effects from waterfront users and parking on residents in the local community will likely remain the same, with no improvements as a result of the SWP.

Criterion: Integration with Existing Land Uses

Indicator: *Compatibility with Existing Land Use (Open Space, Institutional and Industrial)*

The SWP Area is currently a patchwork of residential, open space, industrial and institutional land uses as described in **Section 3.3.1**. The SWP builds on the existing open space network in accordance with the City of Toronto Official Plan and TRCA's The Living City Policies. The park space and trail connection created by the SWP is compatible with existing land use, with the exception of the industrial facility in the vicinity of East Point Park. Industrial representatives have raised concern regarding the proximity of the industrial facility to the proposed trail, and have noted difficulties in making trail users safe in the event of an upset condition.

Summary: Integration with Existing Land Uses

The SWP is consistent with existing land uses, with the exception of the industrial facility in the vicinity of East Point Park.

7.3.4.3 Summary of Objective 4

This Objective measures consistency and coordination with other initiatives. The Preferred Alternative was evaluated for alignment with plans, policies and existing land uses. The SWP is consistent with the relevant planning and policy documents and in many cases supports the achievement of the stated goals and objectives. The SWP is also compatible with existing land uses, with the exception of the industrial facility in the vicinity of East Point Park as industrial representatives have raised concern regarding the proximity of the industrial facility to the proposed trail.

It is anticipated that construction activities and construction traffic may affect some local residents particularly in the Guildwood neighbourhood. This neighbourhood has experienced these effects in the past and is sensitive to them. In addition, there are a number of other construction projects ongoing planned and proposed that will affect local residents. These other projects are detailed in **Table 7-16**. Cumulative effects were considered based on residual effects of the preferred alternative from disturbances related to construction associated with multiple other projects including traffic, noise, etc. The Project is not otherwise anticipated to negatively contribute to cumulative effects in the Study Area.

Table 7-16: Ongoing and Proposed Construction Projects with the Potential to Impact the Guildwood Community

Project	Proponent	Location	Potential Net Cumulative Effects
Lakeshore East Rail Corridor Expansion	Metrolinx	Along rail corridor and cross streets throughout Project Study Area	▪ Construction traffic ▪ Noise ▪ Dust ▪ Corridor operation – one train every 7 minutes ▪ Closure of at grade rail crossings
Eglinton LRT Kennedy to Morningside	TTC/ Metrolinx	Kennedy to Morningside	▪ Diversion of traffic during construction from Kingston Road to Guildwood Parkway by means of Morningside, Poplar and Galloway
Morningside Grade Separation	Metrolinx	Morningside rail corridor crossing	▪ Crossing open to traffic during construction
Galloway Grade Separation	Metrolinx	Galloway rail corridor crossing	▪ Galloway road will be closed for approximately 3 years during construction
Guild Inn Estates	Dynamic Hospitality	Former Guild Inn site	▪ Anticipated to have minimal impact on traffic but that will be dependent on timing and popularity of events at the new event space and use of surrounding park land
Condo developments along Kingston Road	Various	Various	▪ Construction traffic ▪ Noise ▪ Dust
Ongoing operations at Highland Creek WWTP – two week summer biosolids removal	City of Toronto	Copperfield Road	▪ Traffic

The effects associated with many of the projects identified relate to construction nuisances and construction traffic. As such, cumulative effects are construction-related and would not extend beyond this phase. Provincial and municipal regulations, guidelines and by-laws recognize that construction is part of the growth and revitalization of urban areas and as such there are BMPs to mitigate the effects to acceptable levels. However, there are no standards in place for noise or traffic congestion related to construction.

It is recognized that the Guildwood community will be experiencing a cumulative effect from disturbances associated with construction of multiple projects over an extended period of time. Given the nature of cumulative effects it is necessary to put in place mitigative measures that address the effects from all sources. To this end, TRCA will work with Metrolinx, the City of Toronto, and the TTC to put in place a plan to coordinate construction traffic through the neighbourhood to minimize ongoing effects. This will include a dedicated community liaison officer to deal with community comments and issues, changing construction access routes as construction increases and decreases in the neighbourhood, and liaison with school boards and the TTC to ensure those uses are not making the situation worse. A TIA will be completed at Detailed Design and will incorporate all updated information available about the other projects occurring through the area.

Table 7-17: Overall Effects Related to Objective 4

Criteria	Indicator	Overall Effects
Integration with City and other agency plans and initiatives	Consistency with the goals of the Fish Community Objectives for Lake Ontario	Positive
	City of Toronto Official Plan and TRCA Living City Policies	Positive
	Consistency with the goals and objectives of the Management Plan for Guild Park and Gardens	Positive
	Consistency with objectives of the WWFMP	Positive
Impact on archaeological resources, built heritage resources, and cultural heritage landscapes	Potential impact to known or potential archaeological sites	Negligible
	Potential for impact to known built heritage resources and cultural heritage landscapes	No effect
	Potential for impact on traditional land uses and valued cultural features	No effect
Potential for effects to residents in the local community	Potential for disturbance effects to residents from construction related traffic	Negative
	Potential impacts to arterial road traffic	No effect
	Potential disturbance effects to residents from construction activity	Negligible
	Potential disturbance effects from waterfront users and parking	Negligible
Integration with existing land uses	Compatibility with existing land use (open space, institutional and industrial)	Negligible
Summary:		
Overall the SWP supports and integrates well with City and other agency plans and initiatives, and is compatible with existing land uses with the exception of the industrial facility in the vicinity of East Point Park. There are three marine archaeology sites for which effects will be avoided or mitigated. The SWP will result in negative effects to the local Guildwood neighbourhood from construction traffic particularly when the traffic from other projects in the Guildwood neighbourhood is considered. Mitigative measures have been proposed to manage these effects. These negative effects are relatively short-term and are outweighed by the positive long-term benefits of the SWP locally and regionally. Therefore, the SWP meets the Objective of integrating with City and other agency plans and initiatives.		

7.3.5 Objective 5: Achieve Value for Cost

7.3.5.1 Construction Effects

Criterion: Estimated Capital Cost

Indicator: *Estimated Cost to Construct*

A capital construction cost estimate was prepared to determine the achievement of value for cost for the SWP. Capital construction costs were developed by TRCA based on current and relevant construction rates, knowledge of the local market conditions and a database of cost information for similar large scale waterfront projects from across Southern Ontario. The costs outlined in this section

are based on material quantity estimates, assumptions, and relevant project experience with similar waterfront projects. The estimated total capital investment also includes property acquisition; however, the amount of water lot and private property required is further broken down in the next Indicator to illustrate the magnitude of acquisition.

Total capital investment is estimated to be $170 million, over a 12-year implementation period, including post-implementation reporting and monitoring. Given the conceptual level of detail considered in the EA, and annual inflation over the course of the Project, the estimated capital investment includes a healthy contingency of 50%. The total capital investment will continue to be refined during Detailed Design, as concepts are further detailed.

Indicator: Amount of Water Lot and Private Property Acquisition Required

Implementation of the SWP will require the acquisition of both water lots and the riparian or shoreline zone of private properties. The shoreline zone would include the shoreline and bluff face, up to an elevation of approximately 100 mASL, as negotiated with the property owner. Approximately 1,770 m of shoreline is currently publicly inaccessible through East Segment due to private property and critical infrastructure. Acquisition of privately owned shoreline zones and water lots is necessary to manage public safety and property risk at the top and toe of the Bluffs by moving users outside the area of risk, but to also provide an enjoyable waterfront experience that is safe and accessible to users of all abilities. It will aid in the management of the public's existing informal use of the shoreline, protecting sensitive vegetation communities from trampling and fragmentation and providing the opportunity for enhancement to the terrestrial and aquatic environments as part of the shoreline erosion protection features. Moving private land into public ownership in order to promote safe public access to and along the waterfront is also consistent with a number of provincial and municipal policies, initiatives and guidelines.

Private property acquisition will be focused on the acquisition of hazard lands, as defined by the MNRF, as this is an area property owners would have limited use of due to the inherent hazards. The SWP would result in the acquisition of 28 ha of water lots and 14 ha of private property. Property acquisition would be undertaken in Detailed Design.

Property acquisition is also required along Brimley Road to facilitate construction of the multi-use trail. In this area a few metres at the end of ten private backyards is required to allow sufficient width for the multi-use trail which will help to alleviate existing safety problems from cyclists and pedestrians.

Summary: Estimated Capital Cost

Total capital investment for the Project is estimated to be $170 million over a 12-year implementation and post-implementation period and includes property acquisition. It is expected that implementation of the SWP will result in the acquisition of 28 ha of water lots and 14 ha of private property.

Table 7-18: Detailed Effects Assessment: Objective 5 Construction

Criteria	Indicators	Effects	Mitigation Measures	Net Effects
Estimated capital cost	Estimated cost to construct	▪ $170 million	▪ None	▪ $170 million investment over a 12-year implementation and post-implementation period, including property acquisition
	Amount of water lot and private property acquisition required	▪ 28 ha of water lots ▪ 14 ha of private property	▪ Market-based compensation	▪ 28 ha of water lots ▪ 14 ha of private property

7.3.5.2 Operation/Establishment Effects

Criterion: Renewal Costs Associated with the New Shoreline and Erosion Protection Structures Only

Indicator: Renewal Costs of the Shoreline and Erosion Works Being Proposed

As per the 1972 Waterfront Agreement, operations and maintenance/renewal costs for the SWP will be borne jointly by the City of Toronto and TRCA. The City will be responsible for the operation and maintenance costs of the park areas, while TRCA will be responsible for the renewal costs associated with shoreline and erosion protection works. These costs include operational staff time, equipment, vehicles, materials required for renewal and maintenance, and modest annual capital improvements and replacements. The operation and maintenance costs associated with the park areas will be assessed during the Detailed Design phase of the Project and are not included in the EA.

The annual costs for operation and maintenance of the SWP is expected to fluctuate slightly on a year-to-year basis based on changing needs as the area matures or as particular issues arise and are addressed. The operating costs will also rise with inflation. It is important to note that the SWP will not be revenue generating and will not return any funds towards operational costs. The SWP is to remain a free amenity for public benefit with operations and maintenance costs that must be borne by public funds.

The estimated renewal costs of the shore protection works are in the order of $2,500 per linear metre of shoreline protection works, as required. Generally, structures may begin requiring renewal after approximately 25 years, after which time renewal is not anticipated for another approximately 25 years. With ongoing periodic maintenance, the design life of shore protection works can be extended nearly for the foreseeable future. Not all shoreline requires renewal at the noted at 25 year increment. TRCA's experience suggests that less than 25% of shore length requires renewal in this timeframe.

Summary: Renewal Costs Associated with the New Shoreline and Erosion Protection Structures Only

The estimated renewal costs of the shore protection works are in the order of $2,500 per linear metre of shoreline protection works, as required. These costs are not anticipated to be required until the structures have been in place approximately 25 years.

Table 7-19: Detailed Effects Assessment: Objective 5 Operation/Establishment

Criteria	Indicators	Effects	Mitigation Measures	Net Effects
Renewal costs associated with the new shoreline and erosion protection structures only	Renewal costs of the shoreline and erosion works being proposed	▪ $2,500 per linear metre of new shoreline protection works, as required. These costs are not anticipated to be required until the structures have been in place approximately 25 years.	▪ N/A	▪ $2,500 per linear metre of new shoreline protection works, as required. These costs are not anticipated to be required until the structures have been in place approximately 25 years.

7.3.5.3 Summary of Objective 5

The purpose of this Objective is to measure the Project's ability to achieve value for cost by maximizing the benefits in relation to the estimated capital and renewal costs. The estimated capital cost for the Project is $170 million, and includes a 50% contingency and acquisition of approximately 28 ha of Crown water lots and approximately 14 ha private property. Renewal costs of $2,500 per linear metre of new shoreline protection works, as required, are anticipated but not until the structures have been in place for approximately 25 years. Based on support from the City of Toronto, the SWP achieves value for cost by managing hazard risks to users and public infrastructure and providing a public amenity.

Table 7-20: Overall Effects Related to Objective 5

Criteria	Indicator	Overall Effects
Estimated capital cost	Estimated cost to construct	$170 million investment over a 12-year implementation and post-implementation period, including property acquisition
	Amount of water lot and private property acquisition required	28 ha of water lots; 14 ha of private property
Renewal costs associated with the new shoreline and erosion protection structures only	Renewal costs of the proposed shoreline and erosion works	$2,500 per linear metre of new shoreline protection works, as required. These costs are not anticipated to be required until the structures have been in place approximately 25 years.
Summary:		
Based on support from the City of Toronto, the SWP achieves value for cost by managing hazard risks to users and public infrastructure and providing a public amenity.		

8. Monitoring and Adaptive Environmental Management

The SWP Vision is to create a system of greenspaces along the Lake Ontario shoreline which respect and protect the significant natural and cultural features of the Bluffs, enhance the terrestrial and aquatic habitat, and provide a safe and enjoyable waterfront experience. Based on this Vision, a series of Alternative SWP configurations were considered (**Chapter 5**). The Preferred Alternative was selected based on its ability to best achieve SWP Objectives and is detailed in **Chapter 6** and assessed in **Chapter 7**. The monitoring and adaptive environmental management (AEM) process presented in this chapter will ensure that the ecological system modified and enhanced by the SWP is maintained through a set of performance indicators[1] to be developed during Detailed Design.

The monitoring and AEM process presented in this chapter, coupled with the EA amendment mechanism presented in **Chapter 9**, provides a framework from which designers and project managers can use the flexibility built into the EA to maximize SWP benefits and minimize any potential negative effects (see **Chapter 7**) after this EA has been approved. The monitoring and AEM process will be managed by TRCA with input from other SWP Stakeholders, where appropriate.

Section 8.1 describes the monitoring program that informs both the Detailed Design process and the AEM process for the SWP to ensure that the Project Objectives (defined in **Chapter 1**) are achieved. **Section 8.2** describes the AEM process as it relates to the SWP.

8.1 SWP Monitoring Program

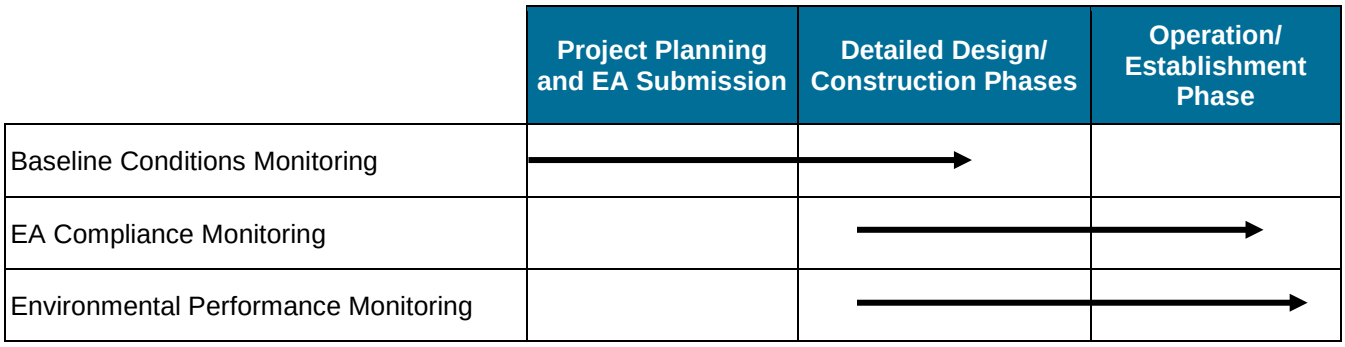
A comprehensive monitoring program is a critical element of the SWP from the pre-design phase through to the operation/establishment phase. The monitoring program serves several functions throughout the life of the SWP:

1. **Baseline conditions monitoring** during the pre-design and design phases will continue to provide data that will inform Detailed Design elements and identify changes to the existing environment that may affect SWP outcomes. Any changes identified through pre-design and design phase monitoring can be incorporated into the Detailed Design and can inform the potential need for EA amendments, if necessary (**Chapter 9** presents an EA amendment process for the SWP);
2. **EA compliance monitoring** will ensure compliance with EA commitments. This monitoring information will be used to inform the AEM process (see **Section 8.2**). The AEM process will begin once the SWP is constructed (up to this point any SWP changes are design-related and will be subject to the amendment process described in **Chapter 9**, if applicable); and,
3. **Environmental performance monitoring** will measure if the SWP functions as intended during the operation/establishment phase.

1. ***Performance Indicators*** *will be developed for the SWP through the Detailed Design process to measure the environmental performance (see* ***Section 8.1.3****). Performance Indicators relate to the functional ecological attributes of the naturalized system. Performance Indicators will be developed based on the monitoring of reference wetlands, baseline monitoring and ecological models.*

A standardized data collection protocol will be established for the monitoring program to ensure consistency. The specific data that is collected will depend on the current phase of the SWP so the type of data collected will evolve as the SWP progresses. **Figure 8-1** shows the relationship between the different monitoring phases and the SWP phases.

Figure 8-1: Relationship Between Monitoring Phases and SWP Implementation



8.1.1 Baseline Conditions Monitoring

TRCA and other agencies have been monitoring ecological conditions in Lake Ontario for decades, providing a baseline of existing conditions (see **Chapter 3**) which has informed the planning of the SWP. Continuous baseline conditions monitoring allows the Project Team to identify ecological changes that may occur between EA approval and Project implementation, and the changes that may occur throughout the life of the SWP as external influences exert their pressure on the shoreline protection structures, including the beaches, coastal shorelines and upland areas.

The baseline conditions monitoring will continue, as required, throughout the period between EA approval and Detailed Design to ensure that the most up-to-date and relevant information is used to develop the Detailed Design for the SWP.

8.1.2 EA Compliance Monitoring

EA compliance monitoring is a standard condition of approval for most projects subject to the *EA Act* in Ontario. The purpose of EA compliance monitoring is to ensure compliance with all EA and other commitments made during Project planning and ensure that the SWP is constructed and operates as described within the range of predicted effects.

EA compliance monitoring will take place during the Detailed Design and construction period for the SWP. EA compliance monitoring will ensure adequate environmental protection through the construction period, document compliance with the EA, and monitor the implementation of the approved design using standard BMPs for construction.

The EA compliance monitoring program will be managed by TRCA. A detailed compliance monitoring plan will be developed as part of the overall environmental management plan to guide compliance monitoring during the construction phase.

EA compliance monitoring will address the issues and potential effects such as:

- Ensure compliance with all federal, provincial and municipal permits, licenses and approvals (e.g., noise by-laws, tree removal by-laws, etc.); and,
- Ensure compliance with all commitments made in the EA, including the implementation of mitigative measures as identified in the EA.

Table 8-1 provides a summary of commitments resulting from the SWP EA which will be the basis for compliance monitoring.

EA compliance monitoring will continue until final grading of individual phases is completed. Once final grading is complete, the environmental performance monitoring program (see **Section 8.1.3**) will begin and continue, as required, through the life of the Project.

8.1.3 Environmental Performance Monitoring

The purpose of environmental performance monitoring is to measure desired outcomes related to naturalization and shoreline stability; determine if they have been achieved; trigger adaptive measures where necessary; and inform the refinement of the as-built features.

Environmental performance monitoring will commence at the completion of SWP construction, following final grading and as-built documentation. **Table 8-2** provides examples of environmental performance monitoring that could be conducted for biophysical components of the SWP. The specific details and measures to be included in the environmental performance monitoring program for the SWP will be developed through the Detailed Design and construction phases.

Existing monitoring frameworks provide examples of performance monitoring that could be adapted specifically for the SWP. These existing monitoring frameworks will be augmented with additional performance indicators if required that address ecological and social aspects of SWP Objectives. Monitoring results will be compared against the performance indicators developed during Detailed Design. The comparison of performance indicators against monitoring results is the key driver of the AEM process described in **Section 8.2**. Monitoring results are compared to performance indicators to determine if AEM measures are required to achieve desired outcomes.

Table 8-1: Summary of Commitments Resulting from the SWP EA

Timing	EA Commitment	EA Report Reference
Detailed Design	Ensure minimum habitat recommendations are either maintained or enhanced as refinements are made through the Detailed Design process.	Section 6.2.2
	Establish site-level details and specific habitat components for terrestrial habitat features.	Section 6.2.2
	Develop aquatic habitat compensation plan and mitigation in consultation with DFO and MNRF.	Section 7.3.1
	Establish site-level details for aquatic habitat features along the newly created shoreline.	Section 6.2.2
	Explore options to mitigate traffic effects during construction on the Guildwood and Brimley Road communities.	Section 7.3.4
	Develop a fill tracking system to account for and audit all fill coming into the site.	Section 6.5
	Establish specific triggers for potential adjustments, refinements or modifications that could occur as part of the adaptive management program.	Section 8.2
	Undertake a Revitalization Plan for Bluffer's Park and East Point Park in co-ordination with the City of Toronto.	Section 7.3.3
	Develop an Operations and Maintenance Plan for the SWP in co-ordination with the City of Toronto.	Section 6.3
	Undertake an updated Traffic Impact Assessment.	Section 7.3
	Continue to engage with the surfing community regarding the Detailed Designs for the West Segment.	Section 7.3.3 and Section 10.9
	Undertake the HEAT model on the final Detailed Designs.	Section 7.3.1
	Assess effects to the cultural meadow on the industrial property east of Grey Abbey Ravine.	Section 7.3.1
	Undertake appropriate archaeological recordings of marine resources S76 and S56, as recommended by the marine archaeologist as part of the mitigation measures.	Section 7.3.4
	Ensure detailed engineering design takes into account extreme weather events.	Section 6.1.7
	On-going consultation with Stakeholders throughout the Detailed Design period.	Section 10.9
	Commitment to discussions with Rohm and Haas Canada LP/Dow Chemical Company to address safety concerns east of Grey Abbey Ravine.	Section 10.9
	On-going consultation with Stakeholders in the East Segment throughout the Detailed Design period, with respect to refinements.	Section 10.9
Construction	Develop tree removal (include plant salvage and relocation) and compensation/restoration plan.	Section 7.3.1
	Monitoring of environmental site controls and mitigation measures during construction.	Section 6.5
	Obtain all relevant municipal, provincial, federal and/or regional occupancy permits.	Section 6.5
	Retain a dedicated community liaison staff as a direct line of contact between the local communities and the Project Team.	Section 7.3.4
	On-going consultation with Stakeholders throughout the construction period.	Section 10.9
Operation/ Establishment	Monitor environmental performance to measure desired outcomes; determine if they have been achieved; and trigger adaptive management where necessary.	Section 8.1.3

Table 8-2: Examples of Environmental Performance Monitoring for Ecological Components of the SWP

Biophysical Component	Environmental Performance Monitoring
Habitat and Species	▪ Identify trends of habitat and species targets through the post-establishment phase ▪ Evaluate habitat and species against intended outcomes and functions
Beach and Shoreline Stability	▪ Evaluate whether beach materials are performing as intended by providing a dynamically stable shoreline ▪ Evaluate whether the hardened nodes are performing as intended by anchoring the dynamic beach system and are remaining stable over a range of coastal conditions
Wave Parameters, Circulation and Sediment Transport and Lake Levels	▪ Document changes in wave parameters, circulation, sediment transport and lake levels over time to inform the need for management adjustments to shorelines

8.2 Adaptive Environmental Management

To ensure that the Preferred Alternative, as presented in **Chapter 6**, functions as desired, an approach to ongoing management is required to continually fine tune SWP components and ensure long-term SWP success. AEM provides a clear process for ongoing management of the SWP to ensure SWP Objectives continue to be achieved through positive feedback mechanisms.

8.2.1 What is Adaptive Environmental Management?

The Canadian Environmental Assessment Agency defines AEM as a systematic process for continually improving environmental management practices by learning about their outcomes and applying that knowledge to improve the outcome. AEM allows for flexibility in project management so modifications and refinements can be incorporated throughout the Project life cycle. AEM is fundamentally a way of incorporating learning through monitoring into a feedback loop that enhances Project outcomes. Undesirable environmental effects are identified early so that management interventions can be implemented promptly to avoid major problems before they occur and to maximize fulfillment of the SWP Objectives.

8.2.2 AEM Strategy for the SWP

The outcome of projects involving extensive habitat restoration and/or enhancement depends on the interaction between the biological components (habitat), the underlying physical components that are created or modified (terrain, soils, hydrology, and coastal processes which can all be modified by changes in climate), and how people use the project area and the surrounding areas.

An AEM strategy is desired for the SWP for a number of reasons including:

1. The need for a flexible strategy to address ecosystem response to changing environmental conditions and human use stressors during and following SWP construction;

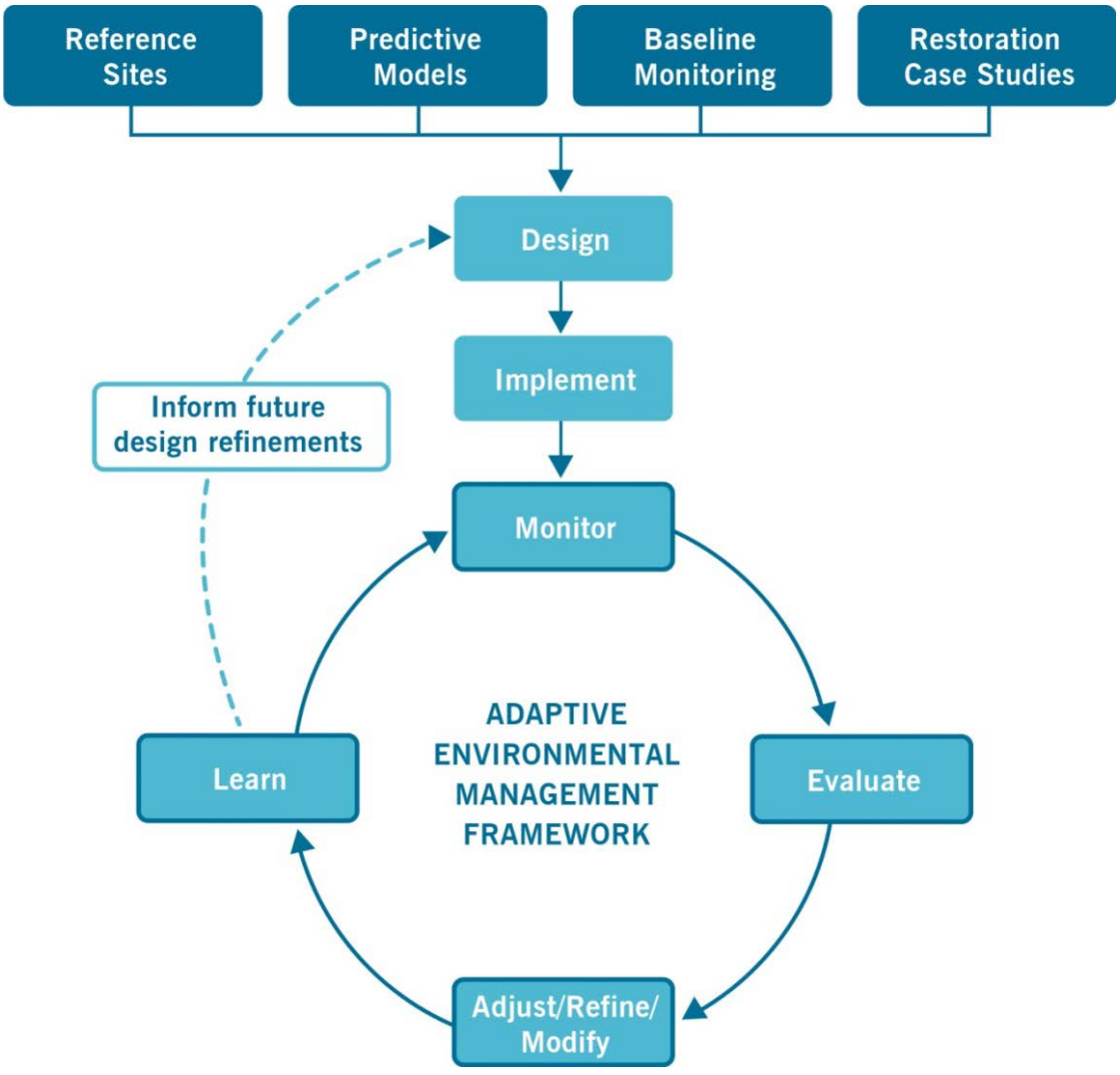
2. The need to create the opportunity to maximize SWP benefits and minimize negative effects throughout the life of the SWP;

3. The need to respond to changes in local weather patterns and long-term climate change that may alter lake water levels and the frequency and duration of inundation of the naturalized features, shoreline features; and/or the severity and frequency of extreme storm events; and,

4. The need to respond to changes or benefits related to future projects and planning initiatives in the SWP Study Area and elsewhere in the Regional Study Area, and to take advantage of enhancements that those projects may provide to this system.

Figure 8-2 outlines the AEM cycle in relation to the pre-design, construction and operation/ establishment phases of the SWP. The AEM cycle will be applied once the SWP is implemented and will inform future projects through a feedback mechanism from lessons learned. AEM is the ongoing cycle of monitoring, evaluation, adaptation and learning.

Figure 8-2: Relationship Between SWP Design and AEM



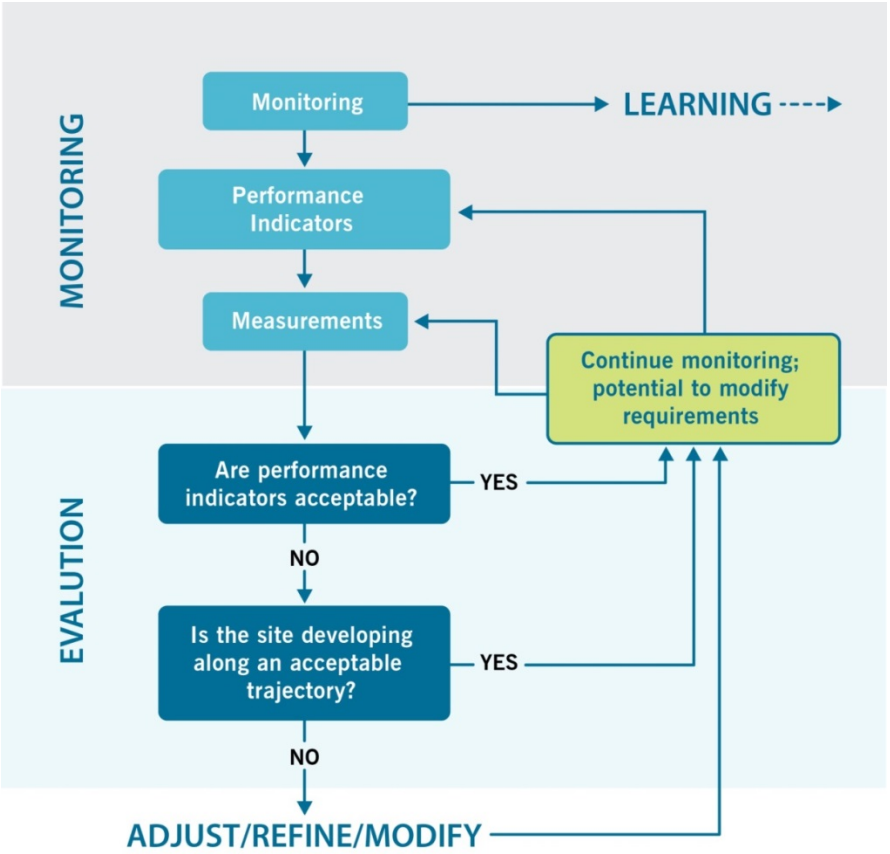
The ability to affect the outcome of the SWP through monitoring and adaptation in response to stochastic events is of paramount importance. The AEM process offers the best process by which to achieve this flexibility. The purpose of AEM and associated monitoring programs is to increase the likelihood of meeting the SWP Vision and Objectives.

8.2.2.1 Monitoring and Evaluation within the SWP AEM Process

Monitoring is a key component of the AEM framework as it establishes conditions pre- and post-construction and allows the determination of which effects are occurring as a result of SWP activities. It identifies environmental changes that are occurring at various spatial scales that may affect SWP outcomes. Monitoring allows for the systematic testing of various systems or actions to assess their ability to achieve a desired function or outcome. The key is to develop an understanding of not only which systems function as intended and which do not, but also which stressors are creating an impact to the system and the reasons for those impacts. The monitoring data that informs the AEM process will be robust and scientifically defensible, providing information that will maximize opportunities to achieve desired outcomes.

The achievement of SWP Objectives is assessed by monitoring the system and evaluating the data against pre-defined performance indicators (see **Section 8.1.3** and **Figure 8-3**). If the desired functions or outcomes are not achieved, the SWP features may need to be adapted. The objective is to maximize benefits wherever possible.

Figure 8-3: Monitoring and Evaluation within the AEM Cycle



The evaluation component of AEM will include specific triggers that will determine when management interventions will be required (see examples in **Table 8-3**). Evaluation of monitoring data provides the foundation for learning from the SWP.

8.2.2.2 Adjustments, Refinements and Modifications within the SWP AEM Process

Adaptation (adjust, refine and/or modify) is about taking action to increase the likelihood of achieving SWP Objectives. The purpose of an AEM strategy is to identify undesirable environmental effects early so management interventions can be implemented to avoid major problems before they occur. The environmental performance monitoring described in **Section 8.1.3** will provide clear evidence of SWP outcomes during the operation/establishment phase. Results from monitoring and evaluation will inform the need for adjustments, refinements or modifications to SWP design or operations. **Table 8-3** provides examples of potential AEM triggers and possible adjustments, refinements, or modifications that could be implemented to address any identified problems. The specific triggers for adjustments, refinements or modifications and the specific management options will be determined during Detailed Design and included in an AEM work plan.

Table 8-3: Potential AEM Triggers and Adaptive Measures for SWP Components

Project Component	Potential AEM Triggers	Potential Adjustments, Refinements or Modifications
Aquatic Habitat and Species	▪ Underperformance of desirable species recruitment to the area ▪ Impairment of habitat features (sedimentation, etc.) that significantly affects performance as intended/designed ▪ Impacts to created habitat and/or wildlife by people and/or pets	▪ Adjust/enhance aquatic habitat features and habitats to promote desired species composition ▪ Expand monitoring to identify root causes of low species recruitment ▪ Repair/re-establish habitat features ▪ Adjust public access to habitat areas, by-law changes, enforcement, etc.
Terrestrial/ Wetland Habitat and Species	▪ Undesired species composition ▪ Recreation/human use causing degradation of habitat ▪ In-adequate species diversity and abundance utilizing habitats as per Project design	▪ Conduct vegetation management (herbicide application, manual removal, re-seeding, etc.) ▪ Revegetate or adjust cover management system to control erosion ▪ Reconfigure/manage human use patterns ▪ Adjust/enhance terrestrial habitats as required to attract desired species or abundance
Shoreline Erosion and Bluff Crest Migration	▪ Failure of revetment, headlands or beaches ▪ Excessive loss of beach material ▪ Stable slope is not being achieved as anticipated	▪ Address shoreline erosion and dynamic beach ▪ Remedial action to address slope crest migration

8.2.2.3 Learning within the SWP AEM Process

One of the greatest benefits of the proposed AEM strategy is that it will allow for ongoing learning related to the outcomes of the SWP and future projects. Learning involves systematically documenting the results of monitoring, evaluation and adaptive measures, and providing lessons

learned to a wide audience. TRCA, academia, other agencies and organizations, and the global urban renewal community will benefit from an improved understanding of effective habitat restoration and enhancement techniques established through the planning and AEM strategy for the SWP. Monitoring programs will determine if predictive models provided accurate information to appropriately inform design. Where monitoring reveals any inaccuracies within the predictive models, adjustments can be made for future designs.

Documentation of the monitoring, evaluation and adaptive measures described in this chapter will be used to inform similar projects that are undertaken in the future.

This cycle of monitoring, evaluation, learning and adaptation will be applied to the SWP to respond to uncertainties and external influences related to the SWP and the environment. Examples of external influences are numerous with a prime example being climate. Climate change is expected to influence management of the SWP into the future. Monitoring the conditions over time following completion of the SWP will allow TRCA to respond to change by implementing appropriate AEM measures.

Further complications may arise as a result of the build out period for the SWP that may extend over a number of years. This may trigger a management response to address changes to the environmental, social or economic context of the SWP.

9. EA Amendment Process

The SWP will take approximately 12 years to construct and will exist in perpetuity as part of the Toronto waterfront. The extended duration of construction may result in changes in circumstances (e.g., availability of fill, access options, and adjustment of constructed features) that require design or scheduling modifications. This suggests that there may be Project modifications between the time of EA approval and the end of construction.

The AEM approach outlined in **Chapter 8** will identify the need for Project modifications where necessary. Adaptive measures and other changes identified during the period between EA approval and final Detailed Design will be screened by TRCA to determine if additional regulatory approval (e.g., EA addendum, public consultation) is required before proceeding. To facilitate this process, a Project-specific approach for assessing modifications to design or construction phasing has been proposed.

This chapter outlines the existing regulatory tools through which post-approval EA modifications can be made and describes the Project-specific approach that will be used for post-approval review of modifications proposed for the SWP.

9.1 Regulatory Provisions for Post-EA Modifications

Section 11.4 of the *EA Act* includes provisions for amending a project design in situations where there is a change in circumstances or new information becomes available following EA approvals. Currently, post-approval modifications to a project occur on a project-specific basis through amendment provisions included in an EA application or approval documents. The Minister of Environment and Climate Change can approve amendments to an approved undertaking when post-approval modifications are proposed where provisions for amendments have been included in the EA document.

Under the current *Ontario EA Act*, there is no formal process for review and assessment of post-approval modifications to the Project. The amendment mechanism proposed in this chapter will be used to assess design modifications proposed for the SWP. **Section 9.3** describes the process.

9.2 Screening Criteria for Post-EA Modification

Proposed Project modifications will be screened against a set of criteria to determine if there are changes to the environmental effects predicted in the EA as well as on desired Project outcomes. The screening questions TRCA will use to determine change in effects relate directly to the SWP Objectives identified in **Chapter 1**. **Table 9-1** includes proposed screening criteria.

Table 9-1: Screening Criteria

Does the change alter the ability to provide a multi-use trail outside of the risk line?	
YES → TRCA in consultation with MOECC will determine if further regulatory action is required	**NO →** Proceed if all other screening criteria are met
Does the change reduce the spatial extent of the naturalized area?	
YES → TRCA in consultation with MOECC will determine if further regulatory action is required	**NO →** Proceed if all other screening criteria are met
Does the change reduce the anticipated quality and/or function of the new aquatic habitat?	
YES → TRCA in consultation with MOECC will determine if further regulatory action is required	**NO →** Proceed if all other screening criteria are met
Does the change affect a condition of approval of the EA or any other approval or permit?	
YES → TRCA in consultation with MOECC will determine if further regulatory action is required	**NO →** Proceed if all other screening criteria are met
For modifications to construction activities, is the change likely to cause an additional nuisance to residents and recreational users?	
YES → TRCA in consultation with MOECC will determine if further regulatory action is required	**NO →** Proceed if all other screening criteria are met
Does the change result in changes to traffic flow within the Project Study Area?	
YES → TRCA in consultation with MOECC will determine if further regulatory action is required	**NO →** Proceed if all other screening criteria are met

This screening process will guide the preparation of a technical memorandum that TRCA will submit to the appropriate Stakeholders for review (in consultation with the MOECC). If the desired change results in an increase or worsening of the identified effects, further regulatory action may be required to assess the effects and identify appropriate mitigation. Any further regulatory action may require public consultation and/or broader agency consultation.

Table 9-2 provides examples of major versus minor modifications. These are only provided as general examples and a final determination of magnitude will follow screening and consultation with the MOECC.

Table 9-2: Examples of Minor vs. Major Project Modifications

Minor Modification	Major Modification
Changes to the size or spacing of headlands	Construction activity required outside of existing Project boundary
Replanting/seeding vegetation in problem areas	Moving the proposed nature and/or locations of shoreline protection works
Adjusting the layout of recreation trails	Selecting an additional construction access route
	Changing the toe to top of bluffs transition from a structure to a trail in East Point Park

Given this information, it is apparent that if modifications to the Project do not worsen the predicted effects and do not represent a major perceived change from the perspective of the public and/or agencies, they can be implemented through the existing regulatory process.

9.3 SWP Approach to Post-EA Modifications

Chapter 8 outlines a comprehensive monitoring program that will be implemented to guide the AEM strategy for the SWP. The AEM strategy may trigger proposed modifications to the Project if monitoring results indicate that SWP Objectives are not being achieved. In addition to AEM measures, there may be design modifications that result from changing circumstances over the time between EA approval and the operation/establishment phase for the SWP. Thus, a clear method to identify the types of modifications that will trigger further environmental approval is needed.

TRCA is responsible for reviewing monitoring data and identifying opportunities to alter or improve the project management, design and/or construction phasing. TRCA may also identify modifications to Project design or construction scheduling based on other factors such as fill availability, alternative access opportunities and Project funding status. When a need to modify the Project is identified, an internal effects assessment will be conducted to assess the impact of the modifications on desired Project outcomes. Wherever possible, any proposed modifications will minimize adverse environmental effects and/or maximize Project benefits. This effects assessment will determine the need (or lack thereof) for further review by the MOECC.

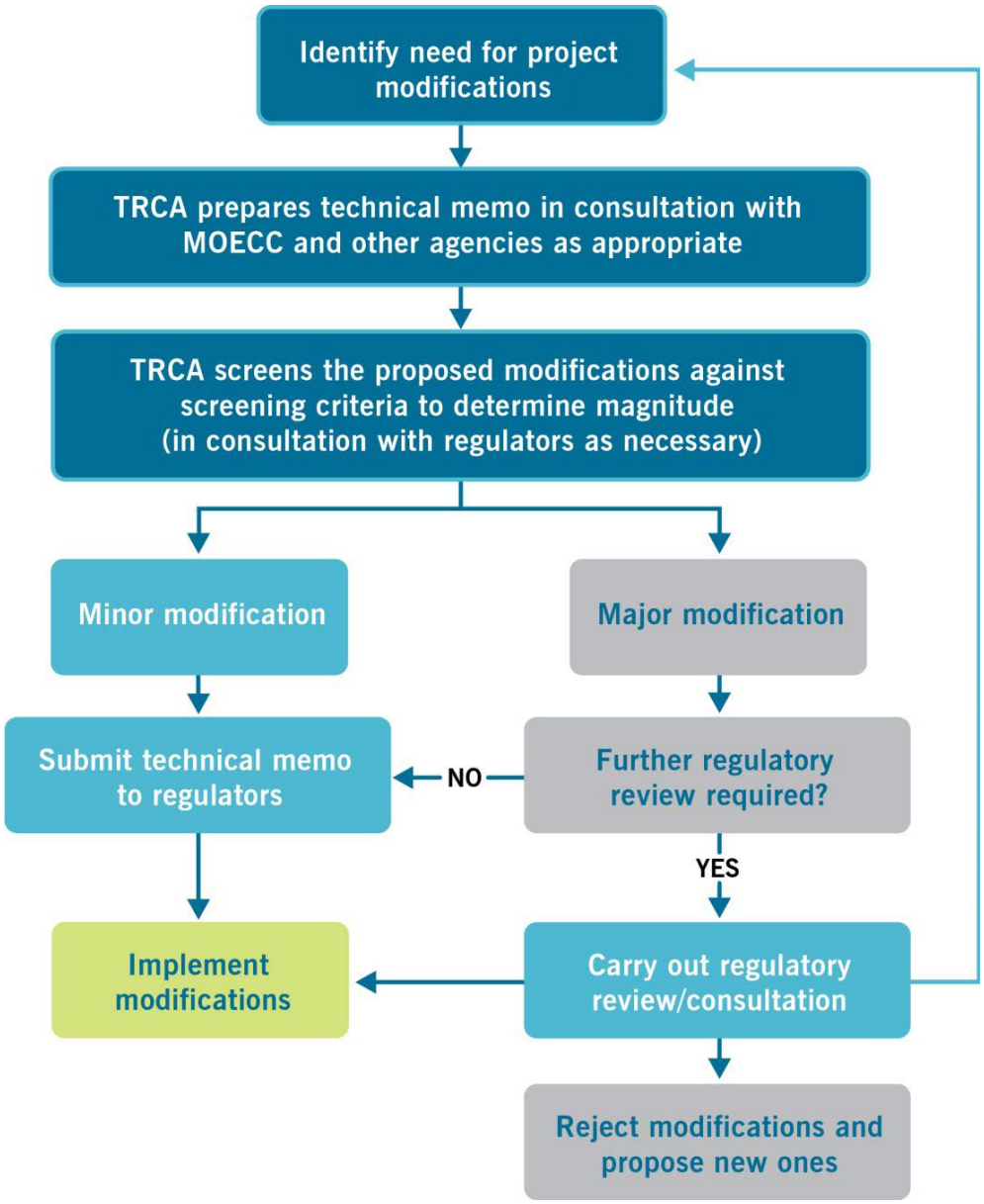
When Project modifications are identified, TRCA will prepare a technical memorandum to document the proposed modifications and their potential effects. The technical memorandum will draw upon the appropriate expertise to determine the effects of proposed modifications in relation to the predicted effects outlined in the EA. This will form the basis from which the magnitude (i.e., minor or major) of the proposed modifications can be determined. The technical memorandum will include the following information:

1. The need for modifications (e.g., new information from monitoring program, change in access, change in funding, etc.);
2. A description of the design and functions;
3. A description of the proposed modifications;
4. An assessment of how modifications will affect Project outcomes;
5. An assessment of the predicted effects on the environment;
6. A comparison of the anticipated effects from proposed modifications to the effects predicted from the original design; and,
7. A conclusion on the magnitude of the proposed modification (minor or major).

The technical memorandum will be circulated to the appropriate Stakeholders, including MOECC, for review. The technical memorandum will assess the magnitude of the proposed change in relation to the predicted effects outlined in the EA and the desired Project outcomes by screening the proposed modifications against a set of criteria. The final determination of magnitude (major modification vs.

minor modification) will be done in consultation with the MOECC. If the proposed modification increases the likelihood of achieving desired Project outcomes and/or does not change or reduces the environmental effects identified in the EA, then the modification will be considered minor and will not trigger any further action. Where there is the potential to increase the environmental effects identified in the EA, or change the type of effect, then the modification may be considered major and the appropriate regulatory body will determine the need for any additional regulatory requirements. In addition, there may be the need for additional consultation with the broader Stakeholder community. All technical memoranda and/or addenda will be submitted to the MOECC for inclusion in the Project files as part of the public record. Documentation and compliance with modification procedures and clarification of the assessment of any proposed changes may be subject to MOECC review. **Figure 9-1** summarizes the process for approving post-EA modifications.

Figure 9-1: Approval Process for Proposed Modifications to the SWP



10. Consultation

10.1 Consultation on Environmental Assessment

Chapter 10 documents the public, agency and Indigenous consultation activities that took place as part of the SWP. Consultation activities were undertaken in accordance with the *Code of Practice for Consultation* (MOECC, 2014).

Consultation on the SWP also took place during the ToR phase and is detailed in the Record of Consultation that was submitted with the ToR to the MOECC in June of 2015. This chapter provides the details of consultation activities that took place in support of the EA phase of the SWP.

10.2 Guiding Principles and Objectives

The principles of engagement for the Project were to listen; encourage all ideas and promote inclusiveness; respect other opinions; encourage full participation; seek constructive feedback; and provide informative and timely information. These principles guided the delivery of all consultation activities outlined in this chapter.

The objectives of the consultation plan were to:

- meet the consultation requirements under the *EA Act*;
- provide opportunities to participate in the consultation process;
- provide clear, concise information to the public in straight-forward language;
- create opportunities for meaningful information exchange between TRCA, its consultants, and interested persons;
- thoroughly review and consider all feedback and advice received throughout the process; and,
- prepare accurate and comprehensive summary reports that capture all feedback and advice received.

Section 10.3 of this chapter provides an overview of the consultation mechanisms that were used as part of the SWP consultation program. **Section 10.4** summarizes the outcome of the consultation activities that were undertaken with the public and provides the Project Team's responses to feedback. Consultation activities that occurred with Indigenous communities are described in **Section 10.5**. Agency meetings and associated consultation activities are outlined in **Section 10.6**. Materials used in the consultation activities, and additional details on input received, are included in **Appendix L** of this document.

10.3 Consultation Mechanisms

This section provides an overview of the various communication channels that were used as part of the public consultation program.

10.3.1 Mandatory Notices and Other Notifications

10.3.1.1 Notice of Commencement and Public Information Centre #1

The Notice of Commencement announcing the initiation of the EA was published in the Scarborough Mirror first on January 7, 2016 and then again on January 14, 2016 (**Table 10-1**). The Notice included Project and contact information, as well as an invitation to the first Public Information Centre (PIC) for the EA held on January 28, 2016 (see **Section 10.4.2** for further PIC#1 information).

The Notice was also added to the Project website on January 7, 2016, and then sent through the Project e-newsletter on January 7, 2016, with a reminder email about the PIC sent on January 25, 2016 (see **Table 10-2**). Additionally, the Notice was emailed to agencies, utilities, as well as Councillors, Members of Provincial Parliament (MPPs), and Members of Parliament (MPs) in the Project Study Area (see **Table 10-2**).

The Notice was distributed to local businesses in the Project Study Area, and circulated to 4,717 households/apartments with postal codes M1M and M1E that were located south of Kingston Road (Project Study Area) via Canada Post the week of January 11, 2016 (see **Table 10-2**). Twitter was also used as a channel to communicate PIC#1 (see **Table 10-1**).

In addition, as a follow up to PIC#1, a newsletter was distributed on March 8, 2016 with a PIC overview and summary of next steps.

A copy of the Notice of Commencement and PIC#1 is included in **Appendix L1**.

10.3.1.2 Notice of Public Information Centre #2

The Notice for PIC#2 was published in the Scarborough Mirror on June 9, 2016 and then again on June 16, 2016 (**Table 10-1**). The Notice included Project information and contact information, as well as an invitation to PIC#2 held on June 28, 2016 (see **Section 10.4.2** for further PIC#2 information).

Notice of PIC#2 was also added to the Project website on June 16, 2016, and sent through the Project e-newsletter on June 16, 2016, with a reminder email about PIC#2 sent on June 23, 2016 (see **Table 10-2**). Additionally, the Notice was emailed to agencies, as well as Councillors, MPPs and MPs in the Project Study Area (see **Table 10-2**).

The Notice was distributed to local businesses in the Project Study Area, and circulated to 4,707 households/apartments with postal codes M1M and M1E that were located south of Kingston Road (Project Study Area) via Canada Post the week of June 13, 2016 (see **Table 10-2**). Although the mail out was sent to the same area for PIC#1 and PIC#2, the number of deliveries decreased slightly for

PIC#2 as a few households/apartments and businesses had selected not to receive unaddressed mail. Twitter and Facebook were also used as channels to communicate PIC#2 (see **Table 10-1**).

In addition, as a follow up to PIC#2, a newsletter was distributed on June 30, 2016 with a link to all materials presented at the PIC and summary of next steps (including the date of when comments were due).

A copy of the Notice of PIC#2 is included in **Appendix L1**.

10.3.1.3 Notice of Public Information Centre #3

The Notice for PIC#3 was published in the Scarborough Mirror on June 8, 2017 (**Table 10-1**), and included Project and contact information, as well as PIC#3 information held on June 28, 2017 (see **Section 10.4.2** for further PIC#3 information).

Notice of PIC#3 was also added to the Project website on June 16, 2017, and sent through the Project e-newsletter on June 9, 2017, with a reminder email about PIC#3 sent on June 23, 2017 (see **Table 10-2**). Additionally, the Notice of PIC#3 was emailed to agencies, as well as Councillors, MPPs and MPs in the Project Study Area (see **Table 10-2**).

The Notice was distributed to local businesses in the Project Study Area, and circulated to 21,929 households/apartments with postal codes M1M, M1E, M1C and M1N within and to the north of the Project Study Area the week of June 19, 2017 via Canada Post (see **Table 10-2**). Recognizing the broader interest in the Project, the delivery area was expanded to include households/apartments north of Kingston Road. Twitter and Facebook were also used as channels to communicate PIC#3 (see **Table 10-1**). On June 21, 2017, the Notice was sent by email to all who previously submitted comments and/or questions to the Project Team via email since the commencement of the EA.

In addition, as a follow up to PIC#3, a newsletter was distributed on June 30, 2017, with a reminder newsletter on July 7, 2017, with a link to all materials presented at the PIC and summary of next steps (including the date of when comments were due and advisement of the opportunity to submit correspondence or make a delegation at the TRCA Authority Board). Information regarding the TRCA Authority Board meeting was also distributed by email on July 7, 2017 to everyone who previously provided comments on the Project.

A copy of the Notice of PIC#3 is included in **Appendix L1**.

10.3.1.4 Notice of Submission of Draft EA

A Notice of Submission for the Draft EA was published on August 17, 2017 in the Scarborough Mirror (**Table 10-1**), and included Project and contact information, timelines for Draft EA review period, locations for the public to view a hard copy of the EA and the details of where comments could be sent.

The Notice of Submission was also communicated on the Project website on August 17, 2017 and sent through the Project e-newsletter on August 17, 2017 (**Table 10-2**). Additionally, the Notice of Submission of the Draft EA was emailed to agencies, as well as Councillors, MPPs and MPs in the Project Study Area on August 17, 2017 (see **Table 10-2**).

The Notice was distributed to local businesses in the Project Study Area. It was also circulated to approximately 21,949 households/apartments with postal codes M1M, M1E and M1N within and to the north of the Project Study Area the week of August 14, 2017 via Canada Post (see **Table 10-2**). Twitter and Facebook were also used to distribute the Notice of Submission (**Table 10-1**). On August 17, 2017, the notice was sent by email to all who submitted comments and/or questions to the Project Team via email since the commencement of the EA.

A copy of the Notice of Submission is included in **Appendix L1**.

Table 10-1: Publication and Notification Information

Notifications	Media Outlet	Publication Date(s)
Notice of Commencement and Notice of PIC#1	Scarborough Mirror	January 7 &14, 2016
	Twitter	January 11, 2016
Notice of PIC#2	Scarborough Mirror	June 9 &16, 2016
	Twitter	June 6, 8, 14 & 27, 2016
	Facebook	June 14 & 27, 2016
Notice of PIC#3	Scarborough Mirror	June 8, 2017
	Twitter	June 13 & 22, 2017
	Facebook	June 13 & 22, 2017
Notice of Submission of Draft EA	Scarborough Mirror	August 17, 2017
	Twitter	August 17, 2017
	Facebook	August 17, 2017
Notice of Submission of Final EA	Scarborough Mirror	June 14, 2018
	Twitter	June 15, 2018
	Facebook	June 15, 2018

Table 10-2: Email/Mail Notifications

Notification	Contact	Number of Individuals and Method of Contact	Date
Notice of Commencement and Notice of PIC#1	Agencies	36 by email	January 7, 2016
	Utility Companies	4 by email	January 7, 2016
	Political Representatives	7 by email	January 7, 2016
	Indigenous Communities	14 by courier and/or email	January 7, 2016
	E-Newsletter Mailing List	536 by email	January 7, 2016
	Local Businesses Flyer Drop	664 by mail	Week of January 11, 2016
	Household Flyer Drop	4,717 by mail	Week of January 11, 2016

Table 10-2: Email/Mail Notifications

Notification	Contact	Number of Individuals and Method of Contact	Date
Notice of PIC#2	Agencies	37 by email	June 16, 2016
	Utility Companies	Not contacted	Not contacted
	Political Representatives	8 by email	June 16, 2016
	Indigenous Communities	14 by courier and/or email	June 8, 2016 (courier) June 9, 2016 (email)
	E-Newsletter Mailing List	687 by email	June 16 - 20, 2016
	Local Businesses Flyer Drop	661 by mail	Week of June 13, 2016
	Household Flyer Drop	4,707 by mail	Week of June 13, 2016
Notice of PIC#3	Agencies	33 by email	June 14, 2017
	Utility Companies	5 by email	June 14, 2017
	Political Representatives	11 by email	June 14, 2017
	Indigenous Communities	14 by courier and/or email	June 9, 2017 (email) June 12, 2017 (courier)
	E-Newsletter Mailing List	801 by email 805 by email 865 by email 855 by email	June 9, 2017 June 23, 2017 June 30, 2017 July 7, 2017
	Local Businesses Flyer Drop	868 by mail	Week of June 19, 2017
	Household Flyer Drop	21,929 by mail	Week of June 19, 2017
Notice of Submission of Draft EA	Agencies	37 by email	August 17, 2017
	Utility Companies	6 by email	August 17, 2017
	Political Representatives	11 by email	August 17, 2017
	Indigenous Communities	14 by courier and/or email	August 16, 2017 (courier) August 17, 2017 (email)
	E-Newsletter Mailing List	849 by email	August 17, 2017
	Local Businesses Flyer Drop	866 by mail	Week of August 14, 2017
	Household Flyer Drop	21,949 by mail	Week of August 14, 2017
Notice of Submission of Final EA	Agencies	38 by email	June 15, 2018
	Utility Companies	5 by email	June 15, 2018
	Political Representatives	10 by email	June 15, 2018
	Indigenous Communities	14 by courier and/or email	June 14, 2018 (courier) June 15, 2018 (email)
	E-Newsletter Mailing List	846 by email	June 15, 2018
	Local Businesses Flyer Drop	1,020 by mail	Week of June 11, 2018
	Household Flyer Drop	26,453 by mail	Week of June 11, 2018

10.3.2 E-Newsletter Project Updates

An online Project e-newsletter was created at the beginning of the ToR phase to distribute Project updates and information to subscribers. Members of the public are able to sign up to receive and download the e-newsletter through the Project website (see **Section 10.3.4**). Individuals also signed up for the e-newsletter at PICs for the Project and during Community Outreach events (**Section 10.4.4**) hosted or attended by TRCA staff.

During the EA phase, 32 e-newsletter Project updates were distributed. **Table 10-3** lists each newsletter, key topic(s), number of recipients it was delivered to, open rate (how many successfully delivered campaigns were opened by subscribers) and click rate (how many successfully delivered campaigns registered at least one click).

Table 10-3: Project E-Newsletters

Date	Key Topic(s)	Number of Recipients	Open Rate	Click Rate
August 11, 2015	Update on ToR process and promotion for Shoreline Tour #1	504	63.66%	35.16%
August 25, 2015	Shoreline Tour #1 promotion	496	65.17%	24.38%
December 15, 2015	Shoreline Tour #1 summary	540	60.75%	20.81%
January 7, 2016	Notice of Commencement and PIC#1 Save the Date	536	62.64%	26.81%
January 25, 2016	PIC#1 reminder	551	60.4%	18.73%
March 8, 2016	PIC#1 Recap, project next steps, and EA Info Sheet #3 release	643	61.25%	22.31%
April 19, 2016	Shoreline Tour #2 promotion	637	59.43%	10.13%
April 25, 2016	Shoreline Tour #2 reminder	640	60.38%	23.18%
May 24, 2016	Shoreline Tour #2 update, EA Info Sheet #4 release, Bluffs History feature on the Halfway House	652	60.43%	20.2%
June 16, 2016	PIC#2 invitation	658	54.89%	27.3%
June 23, 2016	PIC#2 reminder	659	50.38%	11.45%
June 30, 2016	PIC#2 summary	672	54.4%	15.9%
July 28, 2016	General Project Information	759	48.4%	16.1%
September 3, 2016	General Project Information	781	50.1%	20.3%
September 15, 2016	General Project Information and outreach activity promotion	775	56.7%	14.8%
October 31, 2016	Project Update	798	47.3%	9.2%
November 30, 2016	General Project information and update	795	49.1%	19.2%
December 20, 2016	General Project information and update	798	45.9%	13.8%
January 31, 2017	General Project information and update	805	46.3%	11.2%
March 1, 2017	General Project information	803	43.5%	11.1%
May 17, 2017	Notice of landslides and shoreline erosion along the Bluffs	805	58.2%	3.0%
June 9, 2017	PIC#3 invitation	801	50.8%	4.1%
June 23, 2017	PIC#3 reminder	805	38.4%	4.6%
June 30, 2017	PIC#3 summary	865	44.8%	13.0%
July 7, 2017	Notice of TRCA Authority Item in regard to the Project	855	40.7%	2.6%
August 17, 2017	Notice of Draft EA Submission	853	46.2%	10.4%
September 13, 2017	Notice of Draft EA Submission Reminder and Doris McCarthy Trail Closure	854	45.1%	4.5%
September 27, 2017	Final Reminder of Draft EA Comment Submission Deadline of October 2, 2017	852	46.6%	4.6%
December 1, 2017	Project Next Steps Update and Happy Holidays	853	46.0%	6.3%
April 20, 2018	Notice of City of Toronto Executive Committee Meeting	852	56.2%	5.2%
May 16, 2018	Notice of City Council Meeting	846	45.2%	6.7%
June 15, 2018	Notice of Final EA Submission	846	*	*

*Note: * Not known at time of publication*

The contact list for the e-newsletter was initially generated early in the ToR phase, and additions to the list have continued throughout the EA via the following avenues:

- Direct sign-ups at PICs (see **Section 10.4.3**);
- Direct sign-ups on the Project website;
- By request to the Project Team via e-mail or phone; and
- Direct sign-ups at Direct Community Engagement & Consultation events attended by TRCA staff (see **Section 10.4.4**).

The Project contact list was used for direct email notifications of relevant SWP information, including e-newsletters with Project updates and public consultation opportunities. As of May 25, 2018, the Project contact list had 846 subscribers.

Copies of the e-newsletter Project updates are included in **Appendix L2**.

10.3.3 Project Information Materials

10.3.3.1 Information Sheets

The Project Team developed two information sheets in the ToR phase, titled:

- EA Info Sheet #1 – Project Overview; and,
- EA Info Sheet #2 – EA Process.

These were created to help provide concise information about the Project to the public. These EA Info Sheets were made available through the Project website and e-newsletters.

In the EA phase two additional EA Info Sheets were developed for the Project:

- EA Info Sheet #3 – EA Alternatives; and,
- EA Info Sheet #4 – Evaluations of Alternatives.

The information sheets were made available online on the Project website (within the Resource and Project Map sections), in hard copy at Direct Community Engagement events, and at PICs (see **Section 10.4.4**).

There were a total of 480 online page views for all four information sheets from January 1, 2016 to August 1, 2017.

Copies of the information sheets are included in **Appendix L3.**

10.3.4 Project Website

At the beginning of the ToR phase in 2014, a dedicated Project website (www.trca.ca/swp) was created on the TRCA website to provide Project information.

The Project website contains a detailed description of the SWP, information on the EA process, as well as a number of document links. The website was provided in advertisements, official correspondence, and in presentations given to the public regarding the Project.

The following documents are available for download from the SWP Project website:

- PIC information and material
- E-newsletters
- Information Sheets
- Draft ToR
- Final EA ToR and Approval
- Notice of Submission of Draft EA
- Draft EA
- Notice of Submission of Final EA
- Final EA

In November 2016, an "Interactive Map" was added to the Project website. Recognizing the large scope and complexity of the Project, the purpose of the Interactive Map was to help explain the Project visually and help orient people to the Project Study Area. Since the launch, the Interactive Map has received 4,675 page views. The map was removed from the website in June 2017 prior to PIC#3 when the Refined Preferred Alternative was presented to avoid confusion. In its place, a map of the Refined Preferred Alternative was posted.

From January 1, 2016 until May 25, 2018, the SWP Project website received 38,832 page views.

10.3.5 Social Media

Two social media platforms were used throughout the EA: Twitter and Facebook. Between January 1, 2016 to June 15, 2018, these platforms were used to promote Project information, events, or public consultation initiatives/activities. **Table 10-4** illustrates the engagement summary for each platform.

Table 10-4: Social Media Platforms

Platform	Handle/Website	Number of Posts Related to SWP*	Followers/Likes*
Twitter	@WaterfrontTRCA @TRCA_News	92 36	1,189 7,683
Facebook	@WaterfrontTRCA @TorontoConservation	41 49	229 4,882

*Note: * As of May 25, 2018*

10.3.6 Project Videos

Four videos were developed during the EA phase. These were created to provide additional Project information through various communication channels. These videos quickly captured key Project topics and linked back to the Project website where more information was available. All videos were uploaded on TRCA's YouTube channel and promoted through the Project e-newsletter and social media channels.

Table 10-5 illustrates the engagement summary for each video.

Table 10-5: Project Videos

Video Topic	Link to Video	Release Date	Number of Views*
Protecting and Preserving a Natural Wonder for Everyone to Enjoy	https://www.youtube.com/watch?v=Zn8myWBns0E	June 2016	1,604
Trails and Habitat	https://www.youtube.com/watch?v=IsJ4LC0yaxM	November 2016	929
Bank Swallows	https://www.youtube.com/watch?v=_p2m7LyjiZY	December 2016	194
Physical Processes	https://www.youtube.com/watch?v=VYlSzfxopb0	January 2017	1,172

*Note: * As of May 25, 2018*

10.4 Public Consultation & Engagement

Throughout the SWP EA, the Project Team provided early and ongoing consultation activities to help develop a collective understanding of the Project and provide opportunities for Stakeholders and community members to provide input into the Project. The objectives of public consultation activities undertaken through the EA were:

- To identify any additional interested parties, including landowners, waterfront users, members of the public, and other key Stakeholders that were not identified in the ToR;
- To inform people about the Project, and the associated planning process; and,
- To obtain input from interested parties in the development of the EA.

10.4.1 Stakeholder Committee

The Stakeholder Committee for the Project was an important component of the overall consultation program. With a mix of interests represented, the goal of the Stakeholder Committee was to help the Project Team better understand different perspectives and address the various opportunities and issues that arose. The Stakeholder Committee functioned as a non-political advisory body.

The Stakeholder Committee was formed during the ToR phase. Applicants were reviewed and sorted into the following categories:

- Community groups (including local ratepayers)
- Regional user groups
- Local user groups (i.e. boat clubs, recreational user groups)
- Academia or institutions
- Local residents
- Indigenous Communities

In an effort to obtain a broader perspective throughout the EA, and as follow-up to discussions with Committee members and local community groups, additional members were added at the commencement of the EA phase. This included the addition of the Wild Bluffs, a resident within the Project Study Area, and a member of the City of Toronto's Disability, Access and Inclusion Advisory Committee. In March 2016, the Project Team further examined the list of Stakeholder Committee

members to evaluate if any gaps were present in Committee representation. As a result of this inventory, Lake Ontario Waterkeeper was invited to join the Stakeholder Committee; however, due to time commitments, Lake Ontario Waterkeeper was unable to participate as a representative of the Stakeholder Committee, and instead chose to remain engaged through other avenues.

Representation on the Stakeholder Committee was made up of representatives from the following groups:

- Bluffer's Park Boating Federation
- Bluffs Performance
- Cathedral Bluffs Yacht Club
- Centennial College
- Centennial Community & Recreation Association
- City of Toronto Disability, Access and Inclusion Advisory Committee
- Cycle Toronto
- Elected officials
- Friends of the Guild Park & Gardens
- Guild Renaissance Group
- Guildwood Village Community Association
- Local residents
- Park People
- Parkcrest Tenants Association
- Sir Wilfrid Laurier Collegiate Institute
- The Wild Bluffs
- Toronto Field Naturalists
- Toronto Ornithological Club
- Toronto Police Service
- Waterfront Regeneration Trust

10.4.1.1 Stakeholder Committee Workbooks

Prior to each Stakeholder Committee meeting, and as a follow-up summary to each session, workbooks were distributed electronically to each Committee member. Pre-meeting workbooks included sections such as objectives for the upcoming meeting, an agenda, Project update, questions for discussion, and key Project Team contact information. Summary edition workbooks distributed following each meeting generally included a summary of the previous meeting's discussions and a description of the next steps.

Stakeholder Committee Terms of Reference, meeting summaries and/or summary workbooks for the Stakeholder Committee meetings are in included in **Appendix L4**.

Table 10-6 summarizes each Stakeholder Committee meeting.

10.4.2 Public Information Centres (PICs)

Three PICs were held during the EA phase of the Project. **Table 10-7** provides an overview of PIC attendance. The information discussed and input received at each PIC is documented in the following subsections. Comments and questions raised at these PICs by members of the public are documented in **Table 10-12** (see **Section 10.4.7**).

PIC meeting summaries, panels, presentations and workbooks are included in **Appendix L5**.

Table 10-6: Stakeholder Committee Meeting Summary

Stakeholder Committee Meeting	Date	Meeting Purpose	Attendance
Stakeholder Committee Shoreline Boat Tour	August 28, 2015	▪ Provide an opportunity for members to gain a better familiarity with the Project Study Area and the area's existing conditions. Five tours were conducted from 9:00 am – 5:00 pm, with each tour approximately one hour in length.	21 Stakeholder Committee members
Stakeholder Committee Preliminary Alternatives Discussion (referred to as Meeting #4)	September 23, 2015	▪ Present and seek feedback on: ◗ Preliminary Draft Alternatives to ensure that all reasonable Alternatives were put forward for consideration; and, ◗ How to present the information to the general public at upcoming PIC#1.	16 Stakeholder Committee members
Stakeholder Committee Meeting #1	January 14, 2016	▪ Present and seek feedback on: ◗ Format and materials to be shown at EA PIC#1 (draft display panels and draft presentation); and, ◗ Members provided additional feedback regarding the draft Alternatives, draft Evaluation Criteria and Indicators.	15 Stakeholder Committee members
Stakeholder Committee Meeting #2A	June 2, 2016	▪ Present and seek feedback on: ◗ Draft Evaluation Results; and, ◗ Preliminary Preferred Alternatives by Project Area Segment.	16 Stakeholder Committee members 4 observers
Stakeholder Committee Meeting #2B	June 14, 2016	▪ Present and seek feedback on the: ◗ Materials prepared for SWP EA PIC#2; and, ◗ Draft Effects Assessment Criteria.	9 Stakeholder Committee members 4 observers
Stakeholder Committee Meeting #3A	January 11, 2017	▪ Present and seek feedback on: ◗ An update on the work undertaken since the last PIC; ◗ The concepts for shoreline access to the water; ◗ The Refined Overall Preferred Alternative; ◗ The Draft Detailed Effects Assessment Criteria; and, ◗ Discuss next steps in the process.	19 Stakeholder Committee members 9 observers
Stakeholder Committee Meeting #3B	June 14, 2017	▪ Present and seek feedback on: ◗ Update on the Project; ◗ Refined Preferred Alternative and construction approach; and, ◗ Discuss next steps in the process.	18 Stakeholder Committee members 5 observers

Table 10-7: PIC Summaries

PIC/Date/Location	Meeting Summary	Attendance
PIC#1 January 28, 2016 Qssis Banquet Hall	**Purpose:** ..... Provide Project update and present and seek input into the draft Alternatives and Evaluation Criteria. **Format:** ..... Open House session with panel display information, a formal presentation followed by a question and answer period. **Input Received:** ... 12 hard copy workbooks were received the day of the PIC, followed by an additional 50 emails received by the end of the comment period.	Approximately 122 members of the public
PIC#2 June 28, 2016 Blessed Cardinal Newman Catholic High School	**Purpose:** ..... Present and seek feedback from the public on the evaluation of the: ▸ Alternatives by Shoreline Segment; ▸ Preliminary Preferred Segment Alternative(s); and, ▸ Draft Detailed Effects Assessment Criteria. **Format:** ..... Open House session with panel display information, a formal presentation followed by a question and answer period. **Input Received:** ... 31 hard copy workbooks were received the day of the PIC, followed by an additional 77 emails received by the end of the comment period.	Approximately 250 members of the public
PIC#3 June 28, 2017 Blessed Cardinal Newman Catholic High School	**Purpose:** ..... In advance of the release of the Draft EA for review, present and obtain input on: ▸ Refinements to the Preferred Alternative; and, ▸ Detailed Effects Assessment. **Format:** ..... Open House session with panel display information, a formal presentation followed by a question and answer period. **Input Received:** ... 39 hard copy workbooks were received the day of the PIC, followed by an additional 57 emails/online forms received by the end of the comment period.	Approximately 190 members of the public

10.4.3 Direct Community Engagement

In addition to PICs and Stakeholder Committee meetings, the Project Team undertook a variety of additional community engagement initiatives including hosting various SWP targeted events (tours, walks, information stations, etc.).

A total of nine Direct Community Engagement activities led by the Project Team were undertaken during the EA phase. **Table 10-8** captures these activities.

The Project participated in a total of 13 partner organization events during the EA phase. **Table 10-9** summarizes these activities.

A summary of comments received at these engagement activities by members of the public are included in the comment summary presented in **Table 10-12**.

10.4.4 Landowners and Community Organizations

10.4.4.1 Landowners

The Project Team met with residential landowners potentially affected by the Project as a result of land acquisition. There were various touch points throughout the EA by mail, email, in-person meetings or tours, and telephone conversations. Landowners were contacted before each PIC to notify them of the public meeting details while also offering to meet with them if they so wished. In-person meetings generally provided updates on the Project at key milestones. A total of 26 landowners were engaged during the EA phase.

The Project Team also met with industrial property owners Dow Chemical/Rohm and Haas to provide information on the Project and ensure their comments and concerns were collected and recorded. Various forms of communication have occurred throughout the EA including mail, email, in-person meetings and telephone conversations. Communication from Dow Chemical Canada ULC can be found in **Appendix L6**. Communication with these landowners is summarized within **Table 10-12** and is also captured in **Appendix L9**.

10.4.4.2 Community Organizations & Local Residents

During the EA, the Project Team met individually with a number of community groups/organizations and local residents to further discuss the Project, or to address any specific concerns or questions the group/organization or local resident may have had with regards to the Project.

Table 10-10 provides an overview of these individual meetings held with community groups/ organizations and local residents during the EA. Comments and questions raised at these meetings, and the responses to these comments, are documented in **Table 10-12** (see **Section 10.4.7**).

Table 10-8: Direct Community Engagement – Project Team Led

Date	Event Name	Overview	No. of Attendees *(approximate)*
September 12, 2015	2015 Shoreline Tour	A free guided tour of the Scarborough shoreline between the Guild Park and Gardens and Meadowcliffe in the Project Study Area to inform members of the public about the history of the waterfront, highlights of the natural environment, geological features in the area and how these relate to the SWP. As this section is an informal trail, it provided the opportunity for the public to get down to the shoreline while minimizing risk.	94
May 14, 2016	2016 Shoreline Tour	Due to the popularity of the 2015 Shoreline Tour, a similar tour was held in 2016. This free guided tour of the Scarborough shoreline between the Guild Park and Gardens and Meadowcliffe in the Project Study Area was scheduled to inform members of the public about the history of the waterfront, highlights of the natural environment, geological features in the area and how these relate to the SWP. As this section is an informal trail, it provided the opportunity for the public to get down to the shoreline while minimizing risk.	79
August 20, 2016	Informational Display at East Point Park	Project Team staff set up an *"Ask Us About the Future of the Waterfront"* information station within the parking lot at East Point Park (Beechgrove Drive and Copperfield Road) to educate users of the Park on the Project and to also obtain their feedback.	25
August 27, 2016	Informational Display at Bluffer's Park	Project Team staff set up an "*Ask Us About the Future of the Waterfront*" information station within Bluffer's Park just outside the washroom station (before the entrance to Bluffer's Park Beach) to educate users of the park on the Project and to also obtain their feedback.	22
August 31, 2016	East Point Nature Walk	Project Team staff led a walk of the tablelands at East Point Park to discuss the history and natural features of the park, while discussing how the SWP will be enhancing and protecting the natural features of the Bluffs and terrestrial environment. The existing trail was walked and native plants, birds, and other wildlife were identified and discussed.	13
September 10, 2016	East Point Park Shoreline Walk	Project Team staff led a walk of the shoreline at East Point Park and reviewed the history of the area and discussed the Preferred Alternative, including the constraints and opportunities within the East Segment.	10
September 21, 2016	Guild Park & Gardens Bat Walk	Project Team staff and Royal Ontario Museum (ROM) staff led a walk at Guild Park and Gardens to speak to the bat study undertaken for the SWP Study Area. ROM staff provided a general overview of bats found in Ontario and showcased the recording device used to capture bat ultrasonic vocalizations that helped ROM staff determine the species of the bats present in the Study Area.	30
September 24, 2016	Van Tour with East Scarborough Storefront community members	Project Team staff led a van tour with members of East Scarborough Storefront of the Central and East Segment of the Project. An introduction to the Project was provided followed by the current conditions and constraints of each area with an overview of the Preliminary Preferred Alternatives by Segment.	7
September 24, 2016	Bluffer's Wetland Walk	Project Team and TRCA staff provided a brief history about the wetland located in Bluffer's Park. Detailed information was provided on the wetland restoration project that was completed at Bluffer's Park in 2009, including an examination of the issues that had resulted in poor water quality and beach closings prior to Project implementation. This past project significantly contributed to improved water quality and led to the Blue Flag designation for Bluffer's Park Beach.	27

Table 10-9: Direct Community Engagement – Partner Organizations

Date	Event Name	Overview	No. of Attendees *(approximate)*
July 25 & 26, 2015	Guild Alive with Arts & Culture	A TRCA information booth was set up at the Guild Alive with Culture Arts Festival at Guild Park and Gardens in Scarborough, Ontario. TRCA staff handed out SWP bookmarks.	205
February 18-21, 2016	Outdoor Adventure Show	Waterfront Regeneration Trust (WRT) hosted a booth at The Outdoor Adventure Show at the International Centre in Mississauga from February 18-21, 2016 and a booth at the Toronto International Bike Show from March 4-6, 2016. At these trade shows WRT handed out SWP bookmarks and posted a map of the 3 Project Area Segments and Study Area. Participants were encouraged to visit the Project website, or email the Project Team if they had any questions.	1,000
March 4-6, 2016	Toronto International Bicycle Show		1,000
June 24, 2016	Port Union Waterfront Festival	Materials about the SWP were on display to inform festival attendees about the Project. Information about PIC#2 was also shared.	60
July 1-3, 2016	Redpath Waterfront Festival	Project information and bookmarks were available at the WRT booth at the Redpath Waterfront Festival.	600
July 23, 2016	Community Summer Festival (Scarborough Centre for Healthy Communities)	Project Team staff set up an information station at the Eglinton Ave. East - Kennedy Park - Ionview Community Summer Festival. Feedback was collected from members of the public regarding the Project.	50
August 21, 2016	Community BBQ	Project Team staff set up an information station during the Annual Community BBQ hosted by Gary Anandasangaree. Staff responded to questions and obtained feedback from attendees.	30
September 17, 2016	Waterwise Festival	Project Team staff attended and provided SWP information. Information about the Study Area shoreline van tour planned with the East Scarborough Storefront for September 24th, 2016 was also provided.	30
September 24, 2016	Thompson Memorial Park Environment Day	Project Team staff set up an *Ask Us About the Future of the Waterfront* information station at Councillor Glenn DeBaeremaeker's Environment Day at Thompson Memorial Park to inform community members of the Project and obtain their feedback.	14
September 27, 2016	Centennial College Paint the Town	Project Team and TRCA staff led a group of Centennial College students and instructors on a tour of Bluffer's Park. Participants were provided with a history of Bluffer's Park as well as information about the SWP. Participants were encouraged to participate in the ongoing public consultation process.	20
September 27, 2016	Toronto Strong Neighbourhoods 2020 Summit	Project Team staff set up an *Ask Us About the Future of the Waterfront* information station at the Toronto Strong Neighbourhoods Strategy 2020 District Summit to inform community members of the Project and obtain their feedback.	4
October 2, 2016	Highland Creek Salmon Festival	Project Team staff set up an *Ask Us About the Future of the Waterfront* information station within Morningside Park coinciding with the Highland Creek Salmon Festival to inform community members of the Project and obtain their feedback.	15
July 1-3, 2017	Redpath Waterfront Festival	Project information and bookmarks were displayed at the WRT booth at the festival. WRT manned the booth and provided Project contact information.	24

Table 10-10: Consultation with Community Organizations and Local Residents

Date	Attendee	Purpose
July 15, 2015 & July 29, 2015	Wild Bluffs	Provide an update on Project status and discuss natural environment background information.
February 19, 2016	Lake Ontario Waterkeeper & Two Local Residents	Provide an overview of the Project, discuss PIC#1 and next steps in the Project process.
April 27, 2016	Lake Ontario Waterkeeper	Provide an update on Project status and discuss Stakeholder Committee participation.
August 15, 2016	East Scarborough Storefront	Provide an update on Project and seek feedback/comments.
September 27, 2016	Scarborough Community Renewal Organization and Centennial Community and Recreation Association	Provide an update on Project, specifically the East Segment, and seek feedback/comments.
September 30, 2016	Variety Village	Provide an update on the Project and seek feedback on how best to engage with their community.
October 4, 2016	Toronto Field Naturalists	Provide an update on Project, existing conditions, and historical context of the Study Area, and seek feedback / comments.
October 4, 2016	West Rouge Community Association	Provide an update on Project, specifically the East Segment, and seek feedback/comments.
October 11, 2016	Mature Adult Day	Provide an update on Project and seek feedback/comments.
October 11, 2016	Guildwood Village Community Association	Provide an update on Project and seek feedback/comments.
November 1, 2016	Coronation Community Association of West Hill	Provide an update on Project, specifically the East Segment, and seek feedback/comments.
December 13, 2016	Friends of the Bluffs	Provide an update on Project, specifically the East Segment, and seek feedback/comments.
December 19, 2016	The Wild Bluffs	Provide an update on Project, specifically on the materials to be presented at PIC#2, summary of input received, Project Team activities and next steps.
January 18, 2017	Variety Village	Provide an update on Project, and seek feedback on accessibility.
February 13, 2017	Waterfront Regeneration Trust	Provide an update on Project.
March 29, 2017	Centennial College Environmental Student Society	Provide overview of entire EA process.
April 10, 2017	Friends of the Bluffs	Provide an update on Project, specifically the East Segment along with Project experts, and seek feedback/comments.
May 2, 2017	Toronto Field Naturalists	Provide an update on Project, specifically on natural environment opportunities.
May 12, 2017	Surfing Community	Provide an update on Project, specifically the West Segment, and seek feedback/comments.
June 15, 2017	Surfing Community	Provide an update on Project, specifically on the West Segment of the Refined Preferred Alternative, its relationship to surfing conditions, and future engagement with the surfing community.

For direct community organization meeting summaries, see **Appendix L7**.

10.4.5 Petitions

Throughout Project planning TRCA was made aware of three petitions being circulated with respect to the Project. Each petition is described in the following paragraphs.

The first petition, *Keep our Trail at Water's Edge*, was submitted to TRCA in hard copy to Nancy Gaffney on June 28, 2016 at PIC #2. Additional signatures were added by email following the PIC for a total of 273 signatures. The petition reads as follows:

> *Toronto and Region Conservation (TRCA) has initiated a study under the Environmental Assessment Act to create a trail system connecting the Lake Ontario shoreline between Bluffer's Park and East Point Park in eastern Scarborough.*
>
> *It has always been the vision of the local community to have a truly accessible water's edge experience (bottom of bluff's trail) that would complete a seamless trail system from Bluffers Park in the west to Rouge Beach in the east.*
>
> *One of the their leading proposals is a top of bank (bluffs) option that would require tree removal in East Point Park, interfering with an environmentally sensitive forested and bird habitat area. This option would also severely restrict the community's access to the water's edge.*
>
> *We have one chance to get this right! We need your support and input to promote and ensure this vision becomes realized.*
>
> *Please sign our petition and let them know Scarborough East wants a true water's edge trail.*

The second petition, *East Point Park and Bluffer's Beach – Keep Our Shorelines Natural*, has not been submitted to TRCA although some members of the public have referenced it in their comments. Also, for a period of time TRCA received emails at regular intervals indicating how many signatures were on the petition; this ceased in mid-2017. In early 2018 the petition was closed. According to the torontonaturalshorelines.com website, 1,029 people signed the petition. It is unclear if any of the signatures are duplicates and where the signatories reside given limited access to the petition information. The petition reads as follows online:

> *The Toronto and Region Conservation Authority (TRCA) is currently planning a major overhaul of about 11 kilometres of the Scarborough waterfront, from Bluffer's Park in the west to East Point Park, near the mouth of Highland Creek. This is a very big decision that has the potential to fundamentally alter the contour and shape of the eastern waterfront, and the way we relate to the lake, for generations to come.*
>
> *Our primary concern is the preservation of the beaches, ravines and diverse animal species that live along the shore. We are not opposed to people coming down to experience Lake Ontario. What we are opposed to is any development proposal to facilitate access to the*

waterfront that will ultimately destroy the delicate ecology of the ravines and sand beaches, limit unobstructed views of the water and/or compromise the remarkably varied wildlife that inhabits the shore and near shore areas.

We support a diversified and balanced waterfront that allows for varied experiences and interactions with Lake Ontario. We hold that the placement of the Waterfront Trail should not supersede the preservation of the remaining beach areas in Scarborough.

Please tell the TRCA that Scarborough's beaches are off-limits. This means that you want the beaches that already exist to remain intact.

The third petition, *Save Lighthouse Surf Break*, has not been submitted to TRCA, however, the SWP team was informed that it existed online. This petition has been referenced in email correspondence by members of the surfing community. The petition is located on activisim.com or the savelighthouse.ca website. Based on a review of the petition online, as of May 2018, approximately 311 people have signed the petition. The petition reads as follows online:

Lighthouse surf break at Bluffers Park Toronto is in imminent danger of being destroyed forever. The Toronto and Region Conservation Authority (TRCA) will be seeking approval from government bodies (City Council) as early as June of 2017 to approve coastal development in Scarborough, including the development of the Western segment of the Bluffers Park.

As surfers, SUPers and residents, we support Headland Protection and a Bluffers Redevelopment for the enjoyment and safety of everyone. However, the proposed changes to the Western Segment of the Scarborough Waterfront Project will destroy the most unique, high quality SW surf break in the City of Toronto which we call Lighthouse. This piece of the development will also stand to eliminate the SW swell in the Bluffers East Main Beach which is often surfed by the growing numbers of beginner surfers and SUP enthusiasts.

We, the undersigned, ask the TRCA, the Toronto City Council, our MPs and MPPs to work together with the GTA's growing SUP/surf community and reconsider the plans for the Western segment of the Scarborough Waterfront Project so that it can achieve the goals of the project without destroying what many of us consider to be the best quality surf break that the City of Toronto has to offer. We urge the TRCA to work with members of our SUP/surf community on this and other coastal development projects so that these developments can add to our community without destroying what we already have.

10.4.6 Utilities

Utility companies with existing infrastructure in the Study Area were kept apprised of the SWP during the EA. Notifications sent to these utility companies included Project updates and contact information for the Project Team.

Utility companies contacted included:

- Bell Canada
- Enbridge Gas
- Hydro One
- Rogers
- Toronto Hydro

Following the Notice of Commencement, Hydro One advised that the Project was not within its distribution area, and that no further consultation regarding the Project was required. Hydro One was removed from further contact lists. As Toronto Hydro infrastructure is present along Brimley Road, Toronto Hydro was engaged following development of the concept for improvements along Brimley Road (e.g., separated pedestrian and cycling path along the east side of the road). No concerns were raised with regards to the proposed improvements.

Table 10-11 provides an overview of the contact with these companies.

Table 10-11: Consultation with Utilities

Notification	Utilities	Method of Communication	Date
Notice of Commencement and PIC#1	Enbridge Gas Bell Canada Rogers Hydro One	Email	January 7, 2016
Project Update	Toronto Hydro	Email Webinar	February 23, 2017 April 24, 2017
PIC#3	Enbridge Gas Bell Canada Rogers Toronto Hydro	Email	June 14, 2017
Submission of Draft EA	Enbridge Gas Bell Canada Rogers Toronto Hydro	Email	August 17, 2017
Submission of Final EA	Enbridge Gas Bell Canada Rogers Toronto Hydro	Email	June 15, 2018

The Project Team met with Toronto Hydro on April 24, 2017 to provide an overview of the Project, and discuss the relationship between the proposed works along Brimley Road and Toronto Hydro infrastructure in the area. **Appendix L8** provides the meeting materials.

10.4.7 Response to Public Comments

Table 10-12 provides a summary of the comments and concerns received from the public to date through PICs, Stakeholder Committee meetings, direct community engagement initiatives, the Project email and other sources. The table also provides an explanation of how the Project Team has taken the comments received into consideration during Project planning. All comments received during the EA are included in **Appendix L9**.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
Access	Consider maintaining safe access for both cyclists and pedestrians.	Please see Section 2.2. The City and TRCA are required to meet the City's Multi-Use Trail Design Guidelines, which includes safe access for pedestrians, cyclists, and Emergency Services.
	Consider additional access points.	Please see Section 6.2, which details the provision of access to and along the shoreline.
	More people having access to the area is not necessarily a good thing.	Comment noted. TRCA and the City of Toronto cannot control the number of people accessing the shoreline; however, how the shoreline is accessed can be managed.
	Access should be given to the bottom of the Bluffs.	Please see Section 6.2, which details the provision of access to and along the shoreline.
	How can one get down the Bluffs from Guild Park?	Please see Section 6.2. The existing informal construction access route will be formalized.
	Consider a gondola/funicular/etc.	Comment noted.
	Consider an access point at Guild Inn and Park. It is currently steep and dangerous.	Please see Section 6.2. Changes to access at the Guild Park and Gardens were investigated, but were found to be unfeasible.
	Consider paving Doris McCarthy Trail.	Please see Section 6.2.
	Consider no access to the waterfront off Greyabbey Trail.	Alternative access through Grey Abbey Ravine was investigated, but was deemed unfeasible.
	Consider improving access down Beechgrove Drive.	Please see Section 6.2. Improving access down the Beechgrove Drive extension was investigated and deemed unfeasible.
	Consider limiting public access.	Comment noted.
	Consider alternate modes of access down to Bluffs (TTC, shuttle, water taxi, etc.).	The City of Toronto recognizes the existing congestion issues at Bluffer's Park and is exploring alternate modes of access outside of the SWP.
	Boat clubs are concerned with increased public access.	Comment noted.
	Consider access by car.	It is not within the mandate of TRCA to provide private vehicle access.
	Consider clearer public access points and connections to Bluffs.	The City of Toronto is undertaking a wayfinding strategy outside of the SWP.
	Consider emergency access throughout.	Please see Section 6.2. Provision of a multi-use trail includes provision for Emergency Services access.
	Consider access that does not impact nearby neighbourhoods.	Please see Section 7.3.4. Where possible, a formal multi-use trail has been provided along the water's edge.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	Does access need to be given 24/7?	Operations and maintenance of the new park space will be the responsibility of the City of Toronto.
	Consider shoreline access.	Please see Section 6.2, which details the provision of access to and along the shoreline.
	Consider providing additional access will cause negative impacts (garbage, climate change, etc.).	An Operations and Maintenance Plan will be developed during Detailed Design in collaboration with the City of Toronto.
	Access points are still not clear – can you provide further information on what it will look like?	Please see Section 6.2.
	Can access realistically be granted to accommodate a multi-use trail along a shoreline that is currently narrow?	Please see Section 6.2. Shoreline protection structures will extend far enough into the lake such that a multi-use trail can be constructed outside the risk line.
	Consider access into the water (not just to the shoreline).	Section 7.3.3 assesses how the Preferred Alternative changes the use of the shoreline. The cobble beaches will still permit access into the water.
	Consider alternate route for cyclists (not along the shoreline to lessen/remove impact to current shoreline).	An alternate route for cyclists is not possible; however, where possible, a separated trail will be explored during Detailed Design.
	Consider naturalized access routes similar to Doris McCarthy Trail.	See Section 6.2 for consideration of alternate access points.
	Consider sound barrier along the Brimley Road access route that border residential areas.	Operation of the future path, including a potential sound barrier adjacent to residential properties, is the responsibility of the City of Toronto, and may be explored with the City as part of Detailed Design.
Accessibility (AODA)	Consider accessibility so all can access the trail safely.	Please see Section 7.3. Where feasible, City of Toronto primary to high-capacity multi-use trail standards will be achieved, which meet or exceed minimum requirements for accessibility.
	Consider accessibility along Beechgrove Drive.	Please see Section 6.2. Unfortunately, grade changes to the Beechgrove Drive extension were not feasible without considerable impacts to the surrounding area.
	Consider accessibility at the top of Bluffs in the East Segment.	See Section 6.2. Where feasible, City of Toronto primary to high-capacity multi-use trail standards will be achieved, which meet or exceed minimum requirements for accessibility.
	Is accessibility achievable in all areas of the Bluffs without changing the characteristic of the Bluffs?	Please see Section 6.2. For detailed discussion for where and how accessibility is possible.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	Consider placing the trail along Copperfield Road for those who require an accessible trail in the East Segment.	Please see Section 5.4.4. The alignment along Copperfield Road was considered as part of the "Do Nothing" Alternative.
	Consider a trail surface that is accessible.	Where feasible, City of Toronto primary to high-capacity multi-use trail standards will be achieved, which meet or exceed minimum requirements for accessibility.
	Consider protecting natural beach and accessibility.	Please see Section 7.3. Throughout Project planning, careful consideration was given to the provision of the accessibility and protection of Bluffer's Park Beach and other sandy shorelines.
	Consider a fully accessible trail from Bluffer's Park to East Point Park.	Please see Section 6.2. Where feasible, City of Toronto primary to high capacity multi-use trail standards will be achieved, which meet or exceed minimum requirements for accessibility.
	Consider accessible parking at the access routes.	Operations and maintenance of the new park space will be the responsibility of the City of Toronto.
	Consider that accessibility does not need to be considered in all areas of the Project Area.	Please see Section 6.2. The City of Toronto and TRCA policies require that we examine accessibility throughout the Project Area. The SWP mandate is to consider opportunities to provide access to the water's edge throughout the Study Area, where feasible, in accordance with the City of Toronto Official Plan and TRCA's The Living City Policies.
	Consider consulting with Variety Village.	See Section 10.4. Variety Village has been consulted.
	Disagree that residents opposing Project should be viewed as selfish to want to keep it to themselves and not support use of the area by all people at varying levels of mobility.	Comment noted.
	Consider accessibility without impacting natural features of the Bluffs.	Please see Section 7.3. Throughout Project planning, careful consideration was given to the provision of accessibility and protection of the natural environment.
	Will access routes be accessible?	Please Section 6.2. Where feasible, City of Toronto primary to high-capacity multi-use trail standards will be achieved, which meet or exceed minimum requirements for accessibility.
Beach	Consider preserving as much beach as possible considering all opportunities are explored.	Please see Section 6.2 and Section 7.3. Throughout the identification and evaluation of Alternatives, trade-offs between the preservation of Bluffer's Park Beach and other sandy shorelines, and achieving Project Objectives, were evaluated.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	What criteria are needed to acquire an additional Blue Flag Beach status?	Detailed Criteria are available at www.blueflag.global.
	A revetment would eliminate the current shoreline experience of the Bluffs in the East Segment.	Please see Section 5.4.4, which details the evaluation of the revetment option and its impact on the shoreline experience.
	Will the beach at Bluffer's Park be designated as a Blue Flag beach?	The beach at Bluffer's Park is currently designated as a Blue Flag Beach and it is not anticipated to change as a result of this Project.
	Consider using the sand dredged from Bluffer's Park to fill the beach at Cudia Bluff.	Opportunities to use dredged material have been examined. Please see Section 6.1.1 or 6.2.1.
	Consider beaches that are swimmable.	The City of Toronto designates swimmable beaches.
	Consider not having a beach that is swimmable.	The City of Toronto designates swimmable beaches.
	Do not consider hardened beaches (e.g. revetments, headlands); instead soft sand beaches.	In order to provide toe erosion protection in an open coast environment, hardened structures are required at various points of the Project Area.
	Consider removal of rebar embedded in concrete along the shoreline.	Please see Section 6.1. Areas of historic shoreline protection works which utilized old concrete will be covered to enhance habitat opportunities. TRCA also has an annual monitoring program that inspects these areas and cuts rebar that becomes visible over the winter.
	Construct a stone wall 100 m offshore at East Segment to protect the beach and provide a protected water recreation area.	This Alternative was not considered as it would not achieve the Project Vision and Objectives, and would have high costs.
	Consider habitat creation along the beach.	Please see Section 6.2.2 and Section 7.3.1. An Objective of this Project is to protect and enhance terrestrial and aquatic natural features and linkages.
Boat Dock / Launch / Marina	Consider a marina/canoe launch within the East Segment.	A formalized marina/canoe launch was not considered because: ▪ Potentially unsafe lake conditions for small motorized boats. ▪ Unsuitable for large motorized and sail boats. ▪ Paddle craft do not require a formal launch facility. ▪ Potential to impact Highland Creek Waste Water Treatment Plant truck traffic operations. ▪ Potential to impact local water quality. ▪ Other launch facilities available close by.
	A boat launch was previously approved. Why is it not being considered now?	Please note a boat launch has not been previously approved for East Point Park.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	Consider having a boat launch in the West Segment.	There is an existing boat launch in Bluffer's Park. No additional boat launch opportunities have been identified as part of the Preferred Alternative.
	To accommodate the loss of the Marina in Frenchman's Bay, one should be considered at the Guild.	The marina at Frenchman's Bay is not being lost to the best of our knowledge.
	Support how the headland option in the West Segment will decrease the amount of dredging required at the current entrance of the Marina.	Comment noted.
	Consider a boat launch at the Guild Inn and Park construction road.	A formalized marina/canoe launch is not a part of the Preferred Alternative. Vehicular access will not be provided at the Guild Park and Gardens to the water.
Brimley Road	Consider safe access down Brimley Road (for pedestrians, cyclists, cars).	Please see Section 6.2 for proposed changes to Brimley Road access.
	Consider a crosswalk along Brimley Road.	The City of Toronto has responsibility for providing cross walks.
	Consider that Brimley Road is priority one in terms of creating a safe pathway for pedestrians/cyclists.	Improvements to Brimley Road have been proposed; please see Section 6.2.
	Consider that speed bumps are not suitable for cyclists along Brimley Road.	The City of Toronto has responsibility for traffic calming measures, such as speed bumps.
By-Law Enforcement	Consider by-law enforcement along the entire Scarborough Bluffs.	Operations and maintenance of the new park space will be the responsibility of the City of Toronto.
Climate Change	Consider with increased access, there will be an increase impact on Climate Change effects in the area.	The Project and the recreational use of the area will not create measurable impacts to climate change.
	Consider climate change should not be planned for.	Provincial EA guidance requires TRCA to consider climate change as part of project planning.
	Consider climate change impacts for all Alternatives.	The effects of climate change on the Project have been considered.
Community Involvement	Consider inviting local community groups to assist with the implementation phase.	Comment noted.
Comment on Alternative	Central Segment: consider tableland trail east of Guild Inn Park & Gardens.	The existing Waterfront Trail is on the tablelands in this area and has been considered as part of the 'Do Nothing' Alternative in Sections 5.3 and 5.4.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	East Segment: Why can't the sandy shoreline be left as is at the bottom of Grey Abbey Park?	Shoreline protection structures are required at the bottom of Grey Abbey Park as the roadway and associated infrastructure is at risk from erosion within the planning timeframe of the Project.
	Consider additional Alternatives.	Comment noted.
	Consider classifying this proposed trail as the waterfront trail.	Comment noted. It is anticipated that the proposed trail will become part of the Waterfront Trail.
	Consider connection to Rouge Park.	Comment noted. The trail will connect to the Port Union Waterfront Trail, which connects to the Rouge Park.
	Consider a water's edge trail connecting the waterfront park at Beechgrove.	The trail will proceed along the top of the Bluffs through East Point Park and connect to the existing Port Union Waterfront Trail at Beechgrove Drive.
	Consider current waterfront trail location.	The current Waterfront Trail location has been considered as part of the Alternatives in Chapter 5.
	Consider decommissioning unofficial trails.	Please see Section 6.2.2 and 7.3.1.
	Consider doing nothing.	Comment noted. Please see Chapter 5 for the consideration of the Alternatives.
	Consider future needs.	Please see Chapter 3.
	Consider improving the Doris McCarthy trail with limited impact to natural environment.	Please see Section 6.2.
	Consider improving/protecting Grey Abbey Ravine.	Comment noted.
	Consider incorporating sand beaches wherever possible.	Comment noted.
	Consider Kingston Road as a trail location.	Please see Chapter 5 for the consideration of the Alternatives.
	Consider lookouts/views/vistas.	Comment noted.
	Consider maintaining natural look.	Comment noted.
	Consider natural shoreline work that still gives access to the lake.	Please see Chapter 5 for the consideration of the Alternatives.
	Consider not providing a continuous trail connection.	Please see Chapter 5 for the consideration of the Alternatives.
	Support of continuous shoreline trail.	Comment noted.
	Consider placing trail at top of Bluffs.	Please see Chapter 5 for the consideration of the Alternatives.
	Consider a trail similar to Port Union.	Please see Section 6.2 for a description of the Preferred Alternative.
	Consider a trail different to Port Union (with the Scarborough Bluffs as iconic feature).	Please see Section 6.2 for a description of the Preferred Alternative.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	Consider trail connectivity beyond Study Area.	The Project provides better connectivity to the Port Union trail network to the east.
	Consider not paving shoreline for a parking lot.	No parking lots are proposed along the shoreline.
	Consider that hardened shorelines are not good for wildlife.	Please see Section 7.3.1 for the assessment of positive and negative effects to the ecological system. The SWP results in a positive change for the aquatic and terrestrial ecology of the area.
	Consider that hardened structures create barriers to access the water.	Access to the water will still be available in several areas such as Bluffer's Park Beach and the cobble beaches proposed to the east. Refer to Section 7.3.3, the Project results in 3,200 m of shoreline with formal, direct access to the water.
	Consider there is no need for shoreline works.	The 'Do Nothing' Alternative was considered for all Segments in Chapter 5.
	Consider that hardened structures don't stand against mother nature.	During flooding and high water levels in Spring 2017, the headland beach structures along the Toronto shoreline withstood mother nature best and prevented costly damage and dangerous conditions.
	Consider planning for high lake levels.	All Project planning has been based on the 100-year high water levels.
	Consider that human intervention is not feasible/workable.	The 'Do Nothing' Alternative was considered for all Segments in Chapter 5.
	Consider that the outcome of this Project will bring increased traffic (people who want to get to the Bluffs) to the area that will not be supported by the infrastructure created. This will lead to more pollution, disturbance, etc.	Neither the City nor TRCA can control the number of people accessing the shoreline. People will come with or without the Project. The SWP provides for the management of this use to minimize problems from unmanaged use.
	Consider that the public does not want this Project.	Comment noted. EAs seek public input to Project decision-making, and a range of comments have been received. All comments have been considered.
	Consider wave model for Refined Preferred Alternative.	Refer to Appendix K. A wave model was undertaken for the West Segment.
	Consider 2012 resolution made at TRCA's Authority Board to make improvements to Waterfront Trail along Copperfield Road.	A study was undertaken to review potential trail alignments along Copperfield Road. The results of the study indicated that a trail was not possible in this area. A follow-up report was not finalized as the works quickly indicated that a trail was not possible in this area.
	Do not support the Preferred Alternative.	Comment noted.
	Consider ending the trail at Morningside Avenue.	Shoreline protection works are required at the bottom of Grey Abbey Park as the roadway and associated infrastructure is at risk from erosion within the planning timeframe of the Project.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	Appreciate the changes, but still not enough.	Comment noted.
	Consider not formalizing path in East Point Park.	The trail through East Point Park must be formalized to manage use and minimize the impact to vegetation communities of concern caused by informal trails and inappropriate uses.
	Consider that connectivity from the Central to East Segments is not needed.	Shoreline protection works are required at the bottom of Grey Abbey Park as the roadway and associated infrastructure is at risk from erosion within the planning timeframe of the Project.
	Consider that East Point Park is a bird sanctuary and should not be disturbed.	The impact on birds has been assessed; please see Section 7.3.1.
	Consider that the trail will be impacted shortly after built with events like high lake levels.	The trail will be built to withstand high lake levels and adverse coastal conditions.
	Save money by not doing Project.	Comment noted.
	The Refined Preferred Alternative meets the plans as set out in previous planning reports (i.e. Master Plan, Waterfront Regeneration Plan principles, etc.).	Comment noted.
	Reconsider the stone revetment to save the popular surf break.	Alternatives for the West Segment were evaluated in Section 5.4.2.
	Do not consider hardening of existing sandy beach.	Please see Section 5.4. Throughout the identification and evaluation of Alternatives, trade-offs between the preservation of Bluffer's Park Beach and other sandy shorelines, and achieving Project Objectives, were evaluated.
	How will the trail connection to the Port Union trail be made?	Section 6.2 details the location of the trail connection to the Port Union trail near Beechgrove Drive.
	Opposition to Preliminary Preferred Alternative.	Comment noted.
	Support for overall Preliminary Preferred Alternative.	Comment noted.
	Support of the Project and acknowledgement of challenges.	Comment noted.
	The current waterfront trail location is dangerous.	Comment noted.
	Support EA and proposed Project and agree with the combination of Alternatives presented.	Comment noted.
	What are the impacts of a headland-beach structure?	Section 7.3 details the positive and negative effects associated with the Preferred Alternative, which includes the headland beach structure.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	East Segment: Consider alternate route that will leave sand beach.	See Section 5.4.4.
	East Segment: Consider Do Nothing.	See Section 5.4.4.
	East Segment: Consider that if a section of the trail is narrow and bordered by fencing, that it would be reasonable/acceptable if it protects the sandy shoreline.	Comment noted.
	Consider installing a raised boardwalk along beach at East Point Park.	Comment noted. Softer shoreline treatments such as boardwalks are not possible along East Point Park as waves often reach the toe of the Bluffs, so this type of treatment is likely to be damaged or washed away.
	East Segment: Consider keeping current trail location.	Comment noted.
	East Segment: Consider keeping East Point Park natural/leave as is.	Comment noted.
	East Segment: Consider not having the trail run through East Point Park.	Comment noted.
	East Segment: Support for Preliminary Preferred Alternative.	Comment noted.
	East Segment: Will the proposed trail location be near the Metrolinx tracks?	Please see Chapter 6.
	East Segment: Will the public be able to access the sand beach?	Please see Chapter 6.
	Opposition to Central and East Segment Alternatives.	Comment noted.
	Project seeks balance in maintaining unique characteristic of the Bluffs while also meeting the five Project Objectives.	Comment noted.
	Reconsider asphalt surface for trail.	The surface of the trail will be determined in Detailed Design.
	Support of Overall Preferred Alternative.	Comment noted.
	West Segment: Consider improving surfing conditions at Bluffer's Park.	TRCA will continue to work with the surfing community during Detailed Design.
	West Segment: Consider surfing conditions/community at Bluffer's Park.	TRCA will continue to work with the surfing community during Detailed Design.
	West Segment: Support of Project.	Comment noted.
	West Segment: Consider Do Nothing.	Comment noted. See Section 5.4.2.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	West Segment: Consider bridge to make connection to Meadowcliffe.	See Section 5.4.2.
	West Segment: Consider top of Bluffs connection.	A connection along the top of the Bluffs was not considered, as the access issues in this Segment are along the shoreline. The public are currently trying to access east of the Bluffer's Park Beach, where risk to public safety exists.
	West Segment: How will the trail be connected to Meadowcliffe?	Please see Section 6.2.
	West Segment: Support of Preliminary Preferred Alternative.	Comment noted.
	What is the full rationale for the proposed hardening of the sand beach in the Central and East segments?	Shoreline protection structures are required at the bottom of Grey Abbey Park as the roadway and associated infrastructure is at risk from erosion within the planning timeframe of the Project.
	It has always been the vision of the local community to have a truly accessible water's edge experience (bottom of bluff's trail) that would complete a seamless trail system from Bluffers Park in the west to Rouge Beach in the east. One of the proposals is a top of bank (bluffs) option that would require tree removal in East Point Park, interfering with an environmentally sensitive forested and bird habitat area. This option would also severely restrict the community's access to the water's edge.	Please see Chapter 5 for the evaluation of Alternatives.
Construction & Implementation	Consider impacts to wildlife during construction.	Please see Section 7.3.1.
	Consider limited construction access along Guildwood Parkway.	Please see Section 6.4.
	Consider Clean Equipment Protocol during construction.	The use of Clean Equipment Protocol is standard practice for the TRCA.
	Concern regarding construction (materials, method, staging, trucks, etc.).	Please see Section 6.4.
	Consider monitoring post construction on water quality.	The City of Toronto is responsible for water quality monitoring at their intake locations.
	Consider infrastructure impacts during construction.	Please see Section 7.3.
	How will materials be brought down to the shoreline during construction?	Please see Section 6.4.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	Request for detailed construction plans to show angles of sandbanks to assess production of surfing waves.	This information will not be available until Detailed Design is completed.
	Consider construction that moves east to west (not west to east).	Comment noted.
	Consider other construction initiatives in the Guildwood area to lessen impact on local neighbourhood.	The effects of other projects has been assessed; please see Section 7.3.4.
	Consider impacts that construction will have on wildlife (i.e. noise, etc.).	Please see Section 7.3.1.
	What is the construction timeline?	The Project will take approximately 12 years to construct.
Consultation	Consider incorporating public feedback into the Alternatives.	Please see Chapter 10. Public comments have played a role in the identification and evaluation of Alternatives.
	What does 'agency input' mean?	Please see Chapter 10.
	Consider engaging with all stakeholders (TTC, Parks & Recreation, safety, etc.)	Please see Chapter 10.
	Support for EA process.	Comment noted.
	Encourage community participation with advance warning.	Comment noted.
	Consider hosting additional events about the Project.	Comment noted. Please see Chapter 10.
	Consider making presented information more accessible.	Comment noted.
	Consider plan submitted by the public.	Comment noted. See sensitivity analysis in Appendix G.
	Resident's summary of the PIC#3, stating people were not asking relevant questions, but rather grandstanding. Also thanked the support of local Councillors and their attendance.	Comment noted.
	Consider additional consultation.	Additional consultation will occur during Detailed Design if the EA is approved.
	Consider making all comments received on the Project public.	All comments received are provided in Appendix L9.
	Consider not having public meetings at the end of the school season.	Comment noted.
	Consider that you are only checking off consultation activities to get them done.	Comment noted.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	Recommend that at the public meeting attendees write down questions for the facilitator to read in an effort to extend respect to the panel team, politicians and all others taking their time to meet with the public.	Comment noted.
	Note the petition with some 1000 signatures of people who want to save the beach.	TRCA has been informed of this petition; however, it has not yet been submitted.
	Support that political members were present at public meeting.	Comment noted.
	Public meeting was taken over by public with one-sided view.	Comment noted.
	Thanks for the transparency used in sharing information and excited for the outcome.	Comment noted.
Development	Do not allow development to occur, only recreational opportunities.	This Project includes long-term protection for public infrastructure and recreational opportunities, not development.
	Will the Project help facilitate development along the Scarborough Bluffs later on?	This Project is mandated to provide for protection for public infrastructure and recreational opportunities.
Ecology	Consider educating users to limit impact to wildlife.	This is beyond the mandate of the Project. TRCA does however, provide stewardship opportunities.
	Consider Bank Swallow habitat.	Bank Swallow habitat has been an important consideration. Please see Section 7.3.1.
	Consider current sand beach is of ecological value.	The impacts to the entire ecological system are detailed in Section 7.3.1.
	What terrestrial/aquatic communities will be impacted/removed?	The impacts to the entire ecological system are detailed in Section 7.3.1.
	Consider posting habitat crossing signs where appropriate to protect wildlife from vehicles/cyclists.	This will be considered during Detailed Design.
	Consider less vegetation along the path.	Trail maintenance is the responsibility of the City of Toronto and will be done in accordance with their appropriate guidelines and requirements.
	Consider vegetation removal.	See Section 7.3.1, which details vegetation removal as a result of Project implementation.
	Consider methods to increase wildlife to the area (i.e. bat boxes, wetlands, etc.). Also how will they be maintained post installation?	Please see Section 7.3.1 for habitat enhancement opportunities.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	How will impacts of increased traffic be mitigated to protect the ecological diversity of the Bluffs?	Please see Section 7.3.1. By provision of managed access opportunities, it is anticipated that the impacts to ecological diversity to those access areas will be mitigated.
	What are the aquatic benefits of a headland system?	Please see Section 7.3.1.
	How will invasive species be managed?	Invasive species will be managed in accordance with City of Toronto and TRCA policies.
	Consider making improvements to aquatic habitat.	Comment noted. An improvement to aquatic habitat is one of the Project Objectives and is considered throughout Project planning.
	Consider sediment control at Bluffer's Park.	Comment noted. Please see Section 6.2. The Preferred Alternative will limit sediment accumulation in the harbour entrance.
	Which natural heritage communities will be affected by the Project?	Please see Section 7.3.1 for detailing of how ecology will be positively and negatively impacted by the Project.
	What are the species found in the Study Area?	Please see Section 3.2.
	Consider wildlife access to the water.	See Section 5.4. The ability of each Alternative to permit wildlife to access water was assessed.
	Consider habitat enhancement, protection, and creation.	Habitat protection takes many forms. Within urban areas, human effects to habitat are often managed as appropriate response to provide for habitat protection. Section 7.3.1 details how habitat will be negatively and positively impacted by this Project.
	Consider limited tree removal at East Point Park.	Comment noted. Please see Section 7.3.1.
	Consider balance between habitat loss and meeting accessibility standards.	Comment noted.
	Consider habitat restoration in addition to improving fish habitat.	Habitat restoration is a part of improving fish habitat.
	Consider incorporating what is documented in the 2012 TRCA report that calls for protecting the natural heritage system.	The 2012 report was a background study focused only on the terrestrial ecological character of the area and not long-term solutions for access to and along the waterfront. This report was used as background into the EA.
	Consider offshore break walls to improve fish habitat.	Comment noted.
	Support for the Project in terms of promoting environment for wildlife.	Comment noted.
	Consider enhancing terrestrial and aquatic linkages.	Comment noted.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	Vegetation blocks views of the lake.	Comment noted.
	Consider further naturalization at East Point Park.	Further naturalization at East Point Park will be considered as comprehensively as part of a future Revitalization Plan to be prepared at a later date.
	Consider mitigating wildlife disturbance from increased public access at East Point Park.	Generally, the wildlife found in East Point Park are accustomed to disturbances associated with living in an urban area. Further mitigation will be considered as part of a future Revitalization Plan to be prepared at a later date.
	Consider preserving the natural environment.	Comment noted. Improvements to the natural environment is one of the Project Objectives being considered throughout Project planning.
	How are habitats going to be protected?	Please see Section 6.2 and 7.3.1.
	Consider weighing preserving the natural environment more than creating a waterfront trail.	Comment noted.
	What areas are being kept natural?	Please see Section 6.2 and 7.3.1.
Erosion	Consider erosion solutions that are natural.	Comment noted.
	Educate public on the erosion of the Bluffs.	Comment noted.
	Erosion controls are not required/should not be considered at East Point Park.	See Section 6.2. Erosion controls at East Point Park are not part of the Preferred Alternative.
	Slumping is a major concern of the cliffs falling. This should be addressed.	Comment noted.
	If the bank is stabilized, will more construction take place on top?	Construction applications are considered through a separate process.
	Why is it okay for the erosion process to continue along the East Segment? (Why is it now okay to have the sand beach extended longer if erosion isn't being considered)?	Along the East Segment, east of Grey Abbey Ravine, public infrastructure is not at risk from erosion within the planning timeframe for the Project (approximately 60 years). While park land is at risk, this was considered an acceptable trade-off.
	Consider erosion to protect homes.	The SWP does not consider erosion protection for private property.
	Observation of damage as a result of Spring/Summer highwater levels and subsequent erosion to the bluffs near Grey Abbey appears that there is erosion in areas of shoreline stabilization, however no erosion observed at the Grey Abbey beach.	Landslides have occurred along the entire Bluffs including Grey Abbey. The erosion in areas with existing shoreline protection works was anticipated as part of crest migration until the bluff reaches a stable slope.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	Consider already completed erosion control measures for private properties along the Bluffs.	Comment noted.
	Erosion benefits wildlife.	Comment noted.
	Does vegetation help protect the cliffs from eroding?	Vegetation assists once the slope has stabilized.
ESAs / ANSIs / Species Protection	Consider protecting the bird observation in East Point Park.	Comment noted.
	Consider protecting Bank Swallow habitat.	Please see Section 7.3.1.
	Consider mitigating species impacts.	See Section 7.3.1.
	There are designated ANSI and ESA within the Project Area.	Comment noted. See Section 3.2.1.5.
	How will public access affect ESAs?	The public is currently accessing the ESAs within the Project Study Area. See Section 2.5.3
	Consider limiting public access in protected areas.	The SWP is seeking to manage existing public access in ESAs and ANSIs to minimize damage.
	Increased public access will negatively impact sensitive areas.	The SWP is seeking to manage existing public access in ESAs and ANSIs to minimize damage.
Evaluation of Alternatives	Who does the evaluation?	The evaluation was undertaken by the Project Team which includes staff from TRCA and the consulting team. The results were presented for review by the City of Toronto and interested Stakeholders in June 2016.
	Support for Effects Assessment Criteria.	Comment noted.
	Opposition to evaluation.	Comment noted.
	Support for evaluation.	Comment noted.
	Reconsider the evaluation so that "most preferred" isn't as common as it currently is.	Comment noted.
	Consider relevant reports as part of the evaluation (i.e. ESA/ANSI, TRCA 2012 Report, Toronto's Waterfront and the Sustainable City, etc.).	Comment noted. All of these reports have been considered.
Existing Conditions	Public often climbs down the Bluffs.	Please see Section 2.5. It is this informal access which the SWP is seeking to address.
	Bluffer's Park Beach sees a lot of disturbance (garbage, traffic, etc.) with the current ability to access it. Do not want to see the same thing occur within the East Segment.	Comment noted.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	Boulders have rolled down the Bluffs.	Comment noted.
	The shoreline at East Point Park is currently accessible.	Please see Section 3.3. The shoreline at East Point Park is currently not accessible. Those informally accessing this section of the shoreline are causing damage to sensitive bluff vegetation, potentially trespassing along private property, and/or putting themselves at risk from bluff failure and coastal processes.
	The public currently uses the construction road indicating the demand for a trail.	Agreed. Please see Section 6.2.
	Consider stormwater outfalls.	Comment noted.
	Consider managing trail use so that it is respected by all users.	Operations and maintenance of the new park space will be the responsibility of the City of Toronto.
	Consider safety of landslides.	Risk to public safety is an Objective of the SWP. Existing risk to public safety from bluff failure was considered in the development and evaluation of Alternatives.
	Consider impacts of harsh water conditions along the shore.	All Alternatives have been developed and assessed considering coastal conditions.
	Consider improving state of current wetlands (Bluffer's Park).	Comment noted.
	Consider improving previous shoreline protection works along Study Area.	Comment noted. Please See Section 6.2.
Funding / Cost	Consider current and future maintenance cost as part of the evaluation.	Comment noted.
	Consider funding for park maintenance/by-law enforcement.	City of Toronto is responsible for maintenance and by-law enforcement.
	Provide cost breakdown (construction costs, maintenance costs).	See Section 7.3.5.
	Consider cost/funding sources.	Comment noted.
	Consider directing funding to City needs (i.e. not trail).	The City of Toronto is responsible for directing funds.
	Consider multiple revenue sources.	Comment noted.
	What is the cost difference of the current Alternative at the East Segment compared to having the trail along the entire bottom of the Bluffs?	Relative costs are provided in Section 5.4.4.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	Request for costing breakdown for public meetings, consultant fees and report preparation.	Capital costs have been provided in Section 7.3.5.
	Are tipping fees a source of funding?	TRCA projects typically explore tipping fees to offset expenses associated with Project construction. Where possible, tipping fees are received, but they are not a significant source of funding.
	Concern that budget presented will increase dramatically later on.	Comment noted.
	Consider that this Project is a waste of taxpayers' dollars.	Comment noted.
	How will the Project be funded?	The Project will be looking for funding from all levels of government.
Management	Consider planning for increased usage of the trail.	Project planning has been undertaken considering future conditions including increased usage.
	Consider planning for future needs/environment.	Project planning has been undertaken considering future conditions.
Mandate	Consider TRCA's mandate to conserve.	See Chapter 2.
	What is the driver/purpose of this Project?	See Chapter 2.
Materials	Consider a smooth trail surface.	The multi-use trail must be paved or hardened in accordance with City Guidelines.
	Consider a natural trail surface.	The multi-use trail must be paved or hardened in accordance with City Guidelines.
	Concern regarding safety of infill material.	All infill material must meet MOECC's *Fill Quality Guide and Good Management Practices for Shore Infilling in Ontario* (2011).
	Considered granular material rather than asphalt in construction of multi-use path to promote infiltration.	The surface material for the trail will be determined during Detailed Design.
	Consider materials that have a long duration life.	Comment noted.
	Consider eco-friendly materials.	Comment noted.
	Consider materials that do not require ongoing maintenance.	Comment noted.
	What material will be used to fill in the beach?	See Section 6.2. Depending on the beach location, beach fill may be comprised of dredged sand, imported sand, and sand naturally deposited.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
Miscellaneous	Promote economic interests.	Comment noted.
	Consider classifying the Bluffs as a World Heritage site.	It is unlikely that the Bluffs will qualify as a World Heritage site. An application would be need to be prepared and submitted by Parks Canada.
	Consider nearby residential homes.	See Section 7.3.4. Affects to nearby homes have been considered.
	What is the history of the Bluffs?	See Chapter 3.
	Consider meaningful interaction between trail users and natural environment	Comment noted.
	Consider cultural heritage.	See Section 7.3.4.
	Consider international waterfront projects.	Comment noted.
	How do occurrences like the spring/summer 2017 high lake levels impact the Project planning and implementation?	The SWP is being planned to be resilient to high lake levels. Analysis of the Spring 2017 lake levels, which exceeded recorded high water levels, will be part of Detailed Design to ensure the Project is resilient.
	Consider employment and tourism opportunities.	Comment noted.
	Consider sustainable development options (i.e. solar).	Comment noted.
Other Initiatives	Consider coordinating with Metrolinx.	Comment noted. Metrolinx has been engaged with throughout the EA process.
	What is the future plan for GO Train service in the Study Area?	Information on the Metrolinx Lakeshore East rail corridor expansion (Don River to Scarborough) is available on their website.
	How will the GO Train expansion Project impact this Project?	The rail corridor expansion may constrain the off-road portion of the Waterfront Trail in the vicinity of Grey Abbey Ravine and will constrain the on-road portion as the frequency of trains every 7 minutes will make trail/rail crossings difficult.
	Consider that the GO Train expansion does not need to impact the current Waterfront Trail (does not need to displace the trail).	Comment noted.
	Consider 1989 East Point Park Master Plan.	The 1989 East Point Park Master Plan/EA was drafted but never submitted for approval due to changing policies.
	What was the purpose of the previous construction works at the base of Meadowcliffe?	Previous erosion protection structures along the Central Segment were implemented to address high priority areas at risk from erosion.
	Consider coordination with City of Toronto departments.	Appropriate City departments have been consulted with.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
Park Amenities	Consider access to view ship wreck (diving).	Comment noted.
	Consider incorporating washroom facilities along the trail.	Comment noted. Compostable washrooms may be investigated during Detailed Design.
	Consider adequate lighting along the trail.	In general, it is not anticipated the trail will have night-time lighting, or be maintained through the winter months.
	Consider building sport facilities.	There is not adequate space for sports facilities along the shoreline.
	Consider creating art/nature walk.	Comment noted.
	Consider creating a water park.	This is not within the Objectives of the Project.
	Consider placing picnic areas along the trail.	Comment noted.
	Consider incorporating smart technology to access information along the trail.	Comment noted.
	Consider access for dogs.	The City of Toronto by-laws permit dogs on-leash on multi-use trails.
	Consider off-leash access for dogs.	The City of Toronto by-laws permit dogs on-leash on multi-use trails. Programming will be further explored by the City of Toronto.
	Consider skating facility.	This is not within the Objectives of the Project.
	Consider fishing nodes.	Fishing is only permitted where it is signed and by those who have a valid license from the MNRF. A fishing node has been constructed at the Bluffer's Park boat launch area.
	Consider an interpretative station along the trail.	Comment noted.
	Consider limiting fishing.	Fishing is only permitted where it is signed and by those who have a valid license from the MNRF. Designated areas will be posted by the City of Toronto to reduce user conflicts.
	Consider placing benches along the trail.	Comment noted.
	Consider canoe/kayak launch.	A canoe/kayak launch currently exists at the Bluffer's Park boat launch area. The use of the cobble/sand will provide for additional informal access points for canoes/kayaks/etc.
	Consider boat marina.	A formalized marina/canoe launch is not a part of the Preferred Alternative. However, that does not preclude the use of the cobble/sand as an informal access point for canoes/kayaks/etc.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	Consider year round trail access.	The City of Toronto is responsible for the opening and closing of parks. In general, it is not anticipated the trail will have night-time lighting, or be maintained through the winter months.
	Consider quiet/nature escape nodes.	Comment noted.
	Consider multi-use trails.	One of the Objectives of the SWP was to provide a primary to high-capacity multi-use trail.
	Consider incorporating water recreational activities.	The Preferred Alternative allows for the continued informal use of the area for water-based recreation, such as non-motorized watercraft and swimming in appropriate areas.
	Consider surfing conditions at Bluffer's Park.	Comment noted. See Section 7.3.3. TRCA has committed to continue to work with the surfing community during Detailed Design to try to minimize changes to surfing conditions.
Parking	Consider increase in parking spaces.	The City of Toronto has responsibility for how parking lots are used.
	Consider free parking.	The City of Toronto has responsibility for how parking lots are used.
	Remove parking lot at Bluffer's Park and put at the top of the hill on the Seminary property. Provide access from the parking lot to the park via gondola, sidewalk or train. The area is too special to have parking lots.	The City is looking for all ways to decrease the amount of cars going to Bluffer's Park, including public transit. The Seminary lands are private property.
	Consider limiting parking spaces.	The City of Toronto has responsibility for how parking lots are used.
	Consider parking for those who wish to bring their boats down to the lake.	The City of Toronto has responsibility for how parking lots are used.
Private Landowners	Consider full public access along the entire shore.	The SWP lays the groundwork for any acquisition of private lands to allow for full public access along the entire shore.
	How is private property going to be transferred to public ownership?	Any transfer of private property can only be considered once the EA has been approved.
	Consider current property owners tranquil experience.	Comment noted.
	Consider construction impacts to local residents.	Comment noted. Please see Section 7.3.4.
Process	Consider speeding up process.	Comment noted.
	Consider limiting potential Alternatives.	Comment noted.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	Why are staff/consultants allowed to work on the Project if they have not been to the Bluffs? (How can they understand the uniqueness to protect if they haven't been there?)	All staff working on the Project have been to the publicly accessible portions of the Bluffs. TRCA does not allow staff or consultants to access private property without landowners' permission. All sections of the shoreline have also been viewed by boat from the water.
	What is the implementation process?	See Chapter 2.
	Consider engaging with appropriate experts.	Appropriate experts have been engaged as part of the Project Team.
	Consider releasing information prior to meetings to help the public evaluate them.	Comment noted.
	Reconsider the need for a waterfront trail.	See Chapter 2.
	Have the plans been made public?	See Chapter 10 for details of the extensive consultations that have been undertaken.
	It appears that the majority of the people attending this meeting don't want this Project. Why are you proceeding with this?	An EA is not a referendum. Often meeting attendees are opposed to the Project, and those who are supportive may not attend. Public events are not the sole determinants of the support for a Project. See Chapter 11 for the discussion of the Advantages and Disadvantages of the SWP. On balance, the advantages of proceeding with the Project outweigh the negative effects.
	Consider a slower, more informed process.	The process has been ongoing since 2014.
	Consider providing additional Alternatives.	See Chapter 5 for the extensive list of Alternatives considered.
Safety	Consider trail safety.	Comment noted.
	Consider safety at top of Bluffs.	Comment noted.
	Scarborough Bluffs are not a current risk.	See Section 3.1. Over the spring of 2017, there have been over 70 landslides along the Bluffs, and the Bluffs have been closed to public access. While this season has seen unusually high erosion activity, it is within the planning framework of the Project. This provides additional evidence for why safety along the Bluffs is a prime consideration.
	Consider that a nature experience isn't always safe.	Comment noted.
Signage	Consider educational signage.	Comment noted.
	Consider adequate signage at the top of the Bluffs where access to the Bluffs is not possible to avoid unnecessary traffic.	The City of Toronto is responsible for the operations and maintenance of the parks, including signage.

Table 10-12: Summary of Comments and Comment Consideration

Theme	Comments and Questions Received	Comment Consideration
	Consider signage for fishing.	Comment noted.
	Consider directional signage (along trail and nearby neighbourhoods).	Comment noted.
	Consider safety signage.	Comment noted.
Traffic	Consider current and future traffic/congestion.	A traffic study was conducted. Please see Section 7.3 and Appendix J.
	Request for confirmation of duration of construction to include in a report being prepared to manage traffic in the Guild area.	Cannot be confirmed until Detail Design.
	Consider alternate transportation modes to alleviate traffic.	The City of Toronto recognizes the existing congestion issues at Bluffer's Park and is exploring alternate modes of access outside of SWP.
Water Quality	Consider water quality.	As part of this study, regional water quality modeling was undertaken to understand the impact of the Project on water quality. Please see Appendix I.
	Consider ongoing water quality testing/sampling for water-users.	City of Toronto is responsible for ongoing water quality monitoring.
	Consider improvements to current water quality.	As part of this study, regional water quality modeling was undertaken to understand the impact of the Project on water quality. Please see Appendix I.
	Consider mitigating algae.	Algae is an issue throughout the Great Lakes and many factors such as nutrient loading influence this. The Project will not be addressing the issue of algae in the Great Lakes.

10.5 Indigenous Consultation

Ontario, as the Crown, has a legal obligation to consult with Indigenous peoples where it contemplates decisions or actions that may adversely impact asserted or established Aboriginal or Treaty Rights. As the proponent of this EA, the Project Team has been delegated with a third party role to consult with potentially affected Aboriginal communities as required.

Indigenous communities were engaged for the Project in order to provide opportunities to comment on and participate in the EA. Engagement with communities with an existing or historical interest in the Project Study Area allows the proponent to identify Indigenous interests or concerns related to Aboriginal or Treaty Rights or interests. Consultation also provides Indigenous and Métis communities with the opportunity for meaningful input in the decision-making process throughout the course of the EA. By identifying concerns, interests and opportunities raised by First Nations and Métis communities, the proponent can address how potential adverse effects will be managed, mitigated, and/or avoided.

10.5.1 Potentially Interested Indigenous Communities

In the ToR phase of the Project, the contact list for the Project was established by searching the Aboriginal and Treaty Rights Information System (ATRIS), contacting the Ministry of Aboriginal Affairs (MAA) and through community contact lists from the City of Toronto and TRCA. At the start of the EA phase the MOECC was contacted to determine if the ToR list was still up to date, and if any additional community contacts should be considered. Communities that were contacted had established rights and/or interests in the Project Study Area, and are listed below.

- Beausoleil First Nation
- Chippewas of Georgina Island First Nation
- Chippewas of Rama-Mnjikaning First Nation
- Conseil de la Nation Huronne-Wendat
- Curve Lake First Nation
- Haudenosaunee Confederacy Chiefs Council c/o Haudenosaunee Development Institute
- Hiawatha First Nation
- Kawartha Nishnawbe First Nation
- Métis Nation of Ontario
- Mississaugas of Alderville First Nation
- Mississaugas of the New Credit First Nation
- Mississaugas of Scugog Island First Nation
- Six Nations of the Grand River
- Williams Treaties First Nation Claims Coordinator

10.5.2 Identification of Indigenous and Treaty Rights within the Study Area

The Study Area is located on lands originally surrendered as part of the 1787 Johnson-Butler Purchase. However, in 1794 the Crown acknowledged that the Johnson-Butler Purchase was not valid due to a number of irregularities in the treaty document. The lands within the Study Area were therefore not formally surrendered until 1923 as part of the Williams Commission. Specifically, the Study Area is found within the Clause 2 Williams Treaty lands. The seven First Nation signatories of the Williams Treaties include the Mississaugas of Scugog Island, the Mississaugas of Alderville, Hiawatha, Curve Lake, Chippewas of Rama-Mnjikaning, the Chippewas of Georgina Island, and Beausoleil First Nation.

In addition to the Williams Treaties signatories, other Indigenous and Métis communities may have an interest in the Project related to potential Project effects to traditional land and/or Treaty Rights and land claims.

Ongoing claims within the Study Area were also reviewed. TRCA is aware of the 'Aboriginal Title to Water' submitted by Mississaugas of the New Credit First Nation to the Governments of Canada and Ontario in September, 2016.

10.5.3 Correspondence with Indigenous and Métis Communities

10.5.3.1 Indigenous Communities Outreach/Communication

A summary of the correspondence sent to Indigenous and Métis communities is outlined in **Table 10-13**. In all correspondence to Indigenous communities, the SWP Project Team extended an open invitation to meet and discuss the Project in greater detail, and provided the SWP website as another source of information.

Table 10-13: Outgoing Consultation with Indigenous Communities

Notification	Initial Outreach Date
1. Notice of Commencement and PIC #1 Included Terrestrial Archaeology Stage 1 Report and Marine Archaeology Report	Mail: January 7, 2016 Email: January 7, 2016 and January 8, 2016
2. PIC#2	Mail: June 8, 2016 Email: June 9, 2016
3. PIC#3 Included Marine Archaeology Technical Memo	Mail: June 12, 2017 Email: June 9, 2017
4. Notice of Submission of Draft EA	Mail: August 16, 2017 Email: August 17, 2017
5. Notice of Submission of Final EA	Mail: June 14, 2018 Email: June 15, 2018

Examples of each notification can be found in **Appendix L10**.

Indigenous communities were contacted a total of five times throughout the SWP EA process. Each letter and/or email was followed up with at least one phone call to confirm receipt of the Notice. All

letters were sent via tracked priority mail (unless otherwise advised). The complete Record of Consultation for engagement with Indigenous communities is included at the end of **Appendix L10**.

The communication process that was followed for each Notification was as follows:

- Initial Outreach sent by mail and email (unless requested otherwise by community).
- For Notice of PIC#1 to Notice of PIC#3:
  - An email was sent a few days after the PIC with a link to PIC materials and a request to provide comment.
  - If there was no communication received from the community, a courtesy call was made one week after this email to make sure the materials were received and to confirm whether the community had any questions. If a voicemail was left on this courtesy call, a follow-up email was sent.

10.5.3.2 Additional Indigenous Communities Outreach/Communication

10.5.3.2.1 Curve Lake First Nation

On November 25, 2015, TRCA Archaeology staff met with a representative of Curve Lake First Nation to speak to all active TRCA projects and discuss the process of engagement. The SWP was quickly mentioned in this meeting to notify them that an EA would be initiated in the near future. A quick description of the purpose of the Project was provided. Curve Lake First Nation's concern was with fish spawning areas and asked whether TRCA performed studies related to fish spawning habitat in the Study Area.

10.5.3.2.2 Mississaugas of the New Credit First Nation BBQ Open House

Project staff participated as presenters at the Mississaugas of the New Credit First Nation Department of Consultation and Accommodation Open House, held on Thursday, September 24, 2015 from 4:00 p.m. to 7:00 p.m. Information regarding the SWP was on display, and Project staff were on hand to discuss the Project and answer any questions. Approximately 50 members of the community stopped by the Project display throughout the event. There were no concerns regarding the Project raised, and all comments received were positive in nature.

A summary of this event is included in **Appendix L10**.

10.5.3.2.3 Mississaugas of the New Credit First Nation Meeting

Project staff met with Mississaugas of the New Credit First Nation on Friday, April 7, 2017 from 9:00 a.m. to 5:00 p.m. to provide an update on the SWP alongside additional TRCA projects. The update included a Project overview (Project Vision and Objectives in addition to the planning context), work undertaken (consultation, evaluation, Preferred Alternatives, natural environment opportunities and access), and next steps.

As a follow up to the meeting, Mississaugas of the New Credit First Nation staff requested to be sent the bat survey results for informational purposes, which was provided on July 24, 2017. They also requested a tour of the Project Area be organized.

The presentation and meeting summary are provided in **Appendix L10**.

10.5.3.2.4 Mississaugas of the New Credit First Nation Project Area Tour

Project staff met with three representatives of the Mississaugas of the New Credit at Bluffer's Park Marina on Monday, October 2, 2017 from 11:00 a.m. to approximately 1:00 p.m. The tour was done by boat. General questions were raised about archaeological sites and assessments as well as fish habitats and populations within the Project Area. No Project specific concerns were raised.

A summary of this event is included in **Appendix L10**.

Records of communication made with Indigenous Communities during the ToR stage can be found in the ToR Record of Consultation.

10.5.4 Summary of Indigenous and Métis Comments

A summary of comments received by Indigenous and Métis communities during the EA are provided in **Table 10-14**.

Table 10-14: Responses from Indigenous Communities

Indigenous or Métis Community	Comments	Comment Consideration
Conseil de la Nation Huronne-Wendat	▪ Noted some Huron-Wendat archaeological sites near the study zone and therefore quite interested by Project. ▪ Consider including historical information/commemorative sites in Study Area. ▪ Requested if any resources were available for a Conseil de la Nation Huronne-Wendat implication.	▪ TRCA commits to continue engagement with the Conseil de la Nation Huronne-Wendat community and the City of Toronto during the Detailed Design phase of the Project, with respect to including historical/commemorative sites.
Curve Lake First Nation	▪ Concern around potential archaeological resources in the Study Area and their protection. ▪ Concern around the protection of the water and water sources with fish habitat and/or spawning areas. ▪ Expressed an interest in opportunities to create interpretive signage related to First Nations history in the area.	▪ TRCA has a shared interest/commitment with respect to the natural environment. The positive impacts the SWP will have on the natural environment, and the mitigation measures to be implemented to minimize impacts, are detailed in Section 7.3.1 and Appendix H. ▪ TRCA commits to continue engagement with the Curve Lake First Nation community during the Detailed Design phase of the Project, providing updates on additional archaeological work undertaken, as well as with respect to including interpretive signage (in partnership with the City of Toronto).

Indigenous or Métis Community	Comments	Comment Consideration
Hiawatha First Nation	▪ Support of Preliminary Preferred Alternatives for three Segments. ▪ Some concerns lay around aquatic and terrestrial life during construction and a request of the steps being taken to ensure there will be very little to no loss to aquatic and terrestrial life. ▪ Some concern about changes to access to/use of the land/resources.	▪ TRCA has a shared interest/commitment with respect to the natural environment. The positive impacts the SWP will have on the natural environment, and the mitigation measures to be implemented to minimize impacts, are detailed in Section 7.3.1 and Appendix H. ▪ TRCA commits to continue engagement with the Hiawatha First Nation community during the Detailed Design phase of the Project to discuss any further concerns associated with changes in access or impacts on the natural environment.
Mississaugas of Scugog Island First Nation	▪ Consider educating the public on the history of the lakefront from the First Nation perspective.	▪ TRCA commits to continue engagement with the Mississaugas of Scugog Island First Nation community and the City of Toronto during the Detailed Design phase of the Project, with respect to incorporation public education pieces associated with the history of the lakefront from the First Nation perspective.
Six Nations of the Grand River Territory	▪ No comments thus far.	▪ TRCA commits to continue engagement with the Six Nations of the Grand River Territory community during the Detailed Design phase of the Project, as more information becomes available.
Beausoleil First Nation	▪ No comments thus far.	▪ TRCA commits to continue engagement with the Beausoleil First Nation community during the Detailed Design phase of the Project, as more information becomes available.
Chippewas of Georgina Island First Nation	▪ No previous concerns with Project. ▪ Main area of interest is archaeology.	▪ TRCA commits to continue engagement with the Chippewas of Georgina Island First Nation community during the Detailed Design phase of the Project, as more information becomes available.
Mississaugas of the New Credit First Nation	▪ Would like to have monitors on site for all environmental and archaeological assessments. ▪ Expressed concern about impacts to fish habitat. ▪ Interested in archaeological potential in the Study Area.	▪ TRCA has a shared interest/commitment with respect to the natural environment. The positive impacts the SWP will have on the natural environment, and the mitigation measures to be implemented to minimize impacts, are detailed in Section 7.3.1 and Appendix H. ▪ The request for on site monitors was received after the terrestrial Stage 1 and marine archaeological work had been completed. TRCA commits to continue engagement with the Mississaugas of the Credit First Nation community during the Detailed Design phase of the Project, providing updates on additional archaeological work undertaken.

10.6 Agency Consultation

Throughout the EA, regulatory bodies and interested agencies at the municipal, provincial, and federal levels were invited to participate in a comprehensive agency consultation program. The objectives of the EA agency consultation were to consult with all potentially interested agencies about the EA and to ensure coordination between the EA and the broader local and regional planning context.

10.6.1 Agency Contact List

The Project Team endeavoured to consult with any and all interested agencies during the development of the EA. As such, a contact list of regulatory and interested agencies was developed through an identification of all applicable provincial and federal regulatory agencies, other provincial and federal agencies, as well as municipal and regional departments with a potential or stated interest in the Project and/or Project Study Area. Any agency that noted during the ToR that continued consultation was not required was removed from the contact list (Hydro One Networks, Transport Canada, and Ministry of Transportation). **Table 10-15** documents those agencies contacted during the EA.

Table 10-15: Agencies and Working Groups Contacted During the EA

Agency/Working Group	Participating Agencies/Agency Department(s)
Aquatic Habitat Toronto (Working Group)	▪ City of Toronto ▪ Environment Canada ▪ Fisheries and Oceans Canada ▪ Ministry of Natural Resources & Forestry ▪ Toronto and Region Conservation Authority ▪ Waterfront Toronto
Bank Swallow Working Group	▪ Beacon Environmental ▪ Bird Studies Canada ▪ Environment Canada and Climate Change ▪ Ministry of Natural Resources and Forestry ▪ Nature Canada ▪ Ontario Power Generation ▪ rare Charitable Research Reserve ▪ Toronto and Region Conservation Authority ▪ Trent University
City of Toronto	▪ Parks, Forestry and Recreation ▪ Toronto Water ▪ Transportation Services ▪ City Planning/Waterfront Secretariat ▪ Community Disability Steering Committee ▪ Urban Forestry Operations ▪ Waste Facility Management ▪ Toronto Fire Services ▪ Toronto Paramedic Services ▪ Toronto Police Services
Fisheries and Oceans Canada (DFO)	▪ Fisheries Protection Program, Central and Arctic Region ▪ Lands Department
GO Transit/Metrolinx	▪ Capital Project Group
Ministry of the Environment and Climate Change (MOECC)	▪ Environmental Assessment Services
Ministry of Natural Resources and Forestry (MNRF)	▪ Aurora District ▪ Lake Ontario Management Unit
Ministry of Tourism, Culture and Sport (MTCS)	▪ Heritage Program Unit ▪ Central Region
Toronto Transit Commission (TTC)	▪ Service Planning
Waterfront Toronto (WT)	▪ Planning and Design

10.6.2 Technical Advisory Committee (TAC)

The TAC was established during the ToR to provide a forum for agency consultation.

Membership included representatives from:

- City of Toronto
- Metrolinx
- Ministry of Environment and Climate Change
- Ministry of Natural Resources and Forestry
- Ministry of Tourism, Culture & Sport
- Toronto Transit Commission

Only one meeting was held January 18, 2016 with 21 members to present a Project update and the draft Alternatives and Evaluation Criteria. The committee was then disbanded in favour of individual meetings. On June 10, 2016, an update email was distributed to TAC members in place of a meeting, and the Project Team offered to meet with TAC members individually.

Again in 2017, the Project Team offered to meet with agencies individually to provide a forum for open communication on topics directly relevant to the various agencies.

10.6.3 Agency Meetings

In addition to consultation through the TAC, a number of individual agency consultation meetings were held.

10.6.3.1 Agency Working Groups

Throughout the EA, the Project Team met with two agency working groups: Aquatic Habitat Toronto (AHT) and the Bank Swallow Working Group. The purpose was to seek input from agencies that have a vested interest in the improvement of aquatic habitat along the Toronto waterfront (AHT) and the protection and recovery of Bank Swallows and their habitat (Bank Swallow Working Group).

AHT consists of agency partners including DFO, Environment Canada, MNRF, Waterfront Toronto, and TRCA in consultation with the City of Toronto. The Bank Swallow Working Group includes representatives from Environment Canada, Nature Canada, MNRF, Bird Studies Canada, Ontario Power Generation, rare Charitable Research Reserve, Trent University, Beacon Environmental and TRCA.

In addition to the broader Project updates provided to AHT that focused on the aquatic habitat components of the Project, and to the Bank Swallowing Working Group that focused on mitigation measures to avoid impacts on Bank Swallows during Project construction, individual meetings with the City of Toronto (see **Section 10.6.3.2**), DFO (see **Section 10.6.3.3**) and MNRF (see **Section 10.6.3.6**) were also held to discuss specific topics related to the Project. **Table 10-16** provides an overview of consultation activities held with the two agency working groups.

Table 10-16: Consultation Activities with Agency Working Groups

Date	Agency Working Group	Purpose
April 24, 2017	Bank Swallow Working Group	Provide an overview on Project to-date, focusing on mitigation measures to avoid impacts to Bank Swallows during Project construction.
July 14, 2016	Aquatic Habitat Toronto	Provide a Project update and discuss aquatic habitat conditions and opportunities the Preliminary Preferred Alternatives provides to improve these conditions.
June 1, 2017	Aquatic Habitat Toronto	Provide Project update and discuss aquatic habitat enhancement, construction mitigation and potential habitat compensation.

10.6.3.2 City of Toronto

In addition to participating as part of the TAC, staff from City of Toronto's Parks, Forestry and Recreation; Transportation Services; Toronto Water; Waterfront Secretariat; Planning; and Waste Management have participated in internal technical workshops for the Project. Five technical workshops were held during the EA phase. In addition, Emergency Services (First Responders) were sent Stakeholder Committee meeting information and were engaged with individually.

Table 10-17 provides an overview of the consultation activities undertaken with the City of Toronto outside of regular TAC and internal Technical Workshops for the Project.

Additionally, throughout the EA, various political representatives were engaged with to keep them apprised of Project update/status.

Table 10-17: City of Toronto Consultation

Date	Purpose
June 9, 2015	Discuss and review available technical information and reports regarding the former Brimley Road landfill site.
September 14, 2015	Provide an update on Project status and seek input on Preliminary Draft Alternatives.
April 21, 2016	Project update with First Responders.
June 21, 2016	Boat tour of the SWP Study Area with the City of Toronto General Manager.
July 7, 2016	Project update with Waterfront Secretariat.
July 8 & 11, 2016	Project updates with City of Toronto First Responders.
October 3, 2016	Discuss current Bluffer's Park Operations and Maintenance strategies in relation to SWP.
October 19, 2016	Project update with Urban Forestry staff to review the proposed habitat enhancements.
October 25, 2016	Site tour with Urban Forestry staff to review the early proposed access concepts for East Point Park and the Guild construction access route.
October 27, 2016	Meeting with Transportation Services and Toronto Water staff to discuss potential improvements to Brimley Road.
January 20, 2017	Review of the proposed approach for Brimley Road improvements with Transportation Services and Toronto Water.
February 15, 2017	Provide Project update and seek feedback from City of Toronto's Community Disability Steering Committee.

Table 10-17: City of Toronto Consultation

Date	Purpose
March 27, 2017	Project update with Parks, Forestry and Recreation, and Transportation Services and review of proposed approach for construction access, phasing, and staging for the Project.
March 27, 2017	Project update with Urban Forestry on access opportunities, options and constraints at East Point Park off Copperfield Road.
May 11, 2017	Page-turn review of the preliminary Draft EA with representatives from all applicable City divisions.
June 13, 2017	Project update with First Responders.
June 22, 2017	Provide Project update and seek feedback from City of Toronto's Community Disability Steering Committee.
July 21, 2017	Meeting with Urban Forestry to discuss comments on the preliminary Draft EA.
August 10, 2017	Project update with Parks Development & Capital Projects.
October 4, 2017	Page-turn review of the submitted Draft EA with representatives from all applicable City divisions.

10.6.3.3 Fisheries and Oceans Canada (DFO)

Throughout the EA, the Project Team met with DFO to seek input. A webinar was held on July 11th, 2016 to provide DFO with an update on the Project and present and discuss the Preferred Alternative for the West Segment.

10.6.3.4 GO Transit/Metrolinx

Throughout the EA, the Project Team met with Metrolinx/GO Transit to seek input. In addition, communication with Metrolinx was ongoing throughout the EA as part of the broader TRCA and Metrolinx co-ordination meetings on their Lakeshore East rail corridor expansion project, and these meetings are not reflected in **Table 10-18**.

In addition to GO Transit/Metrolinx TAC participation, the Project Team provided regular updates. **Table 10-18** provides an overview of consultation activities held with the GO Transit/Metrolinx.

Table 10-18: Consultation Activities with GO Transit/Metrolinx

Date	Purpose
November 25, 2016	Provide Project update, public and agency consultation, and the Overall Preferred Alternative, with a focus on the Preferred Alternative for the East Segment.
April 26, 2017	Specific meeting held to update and discuss Metrolinx's Lakeshore East rail corridor expansion in the vicinity of Manse Road and Copperfield Road in direct relation to the SWP only.

10.6.3.5 Ministry of Environment and Climate Change (MOECC)

The Project Team initiated communication with the MOECC at the commencement of the EA phase, and maintained an open line of communication throughout the EA. Communication mechanisms

included email status updates, teleconferences, and in-person meetings. **Table 10-19** provides an overview of consultation activities held with the MOECC.

Table 10-19: Consultation Activities with MOECC

Date	Purpose
July 13, 2016	Project update.
August 18, 2016	Project update.
September 21, 2016	Boat tour of the SWP Study Area.
November 17, 2016	Project update.
April 21, 2017	Project update and discussion of proposed approach for East Segment.
June 15, 2017	Project update.
October 25, 2017	Project update and discussion of comments on the Draft EA.

10.6.3.6 Ministry of Natural Resources and Forestry (MNRF)

In addition to participating as part of the TAC, and as part of the AHT meetings, individual meetings were held to discuss specific topics. Communication mechanisms included email status updates, teleconferences and in-person meetings. **Table 10-20** provides an overview of consultation activities held with the MNRF.

Table 10-20: Consultation Activities with MNRF

Date	Purpose
March 1, 2016	Provide an update on Project status and present the draft Alternatives.
July 6, 2016	Project update.
August 24, 2016	Project update.
September 16, 2016	Walking tour of the SWP Study Area
June 8, 2017	Project update and present and discuss the Refined Preferred Alternative.
October 26, 2017	Project update and discussion of comments on the Draft EA.

10.6.3.7 Ministry of Tourism, Culture and Sport (MTCS)

In addition to meetings with the broader technical team, the Project Team met with MTCS on April 18, 2017 to provide a Project update and discuss archaeological resources in the Project Study Area.

10.7 TRCA Authority Meeting

On July 28, 2017, the Scarborough Waterfront Team made a presentation to the TRCA Authority Board. The intent of the presentation was to receive endorsement of the SWP's Refined Preferred Alternative, and direction to proceed to City of Toronto Council for approval to submit the Final EA Report to the MOECC. A copy of the meeting Agenda and presentation is provided in **Appendix L11**.

The Project Lead made a presentation to the Authority Board that summarized the EA process to-date and the Preferred Alternative. The presentation of the SWP to the Authority Board Meeting was met with 14 requests for delegation. Delegates were given the standard allotted 5 minutes to address the Board at the meeting. A copy of the meeting resolution sent to delegates can be found in **Appendix L11**. After discussion and questions the TRCA Authority Board endorsed the Refined Preferred Alternative and approved the Project to proceed to City of Toronto Council for approval to submit the Final EA Report to the MOECC. All comments received in relation to the Authority meeting are included in **Appendix L11**.

10.8 Draft Environmental Assessment Report Review

Notification of the Submission of the Draft EA Report was announced through:

- Social media (Twitter and Facebook)
- Mail drop (Canada Post mail service)
- E-newsletter
- Newspaper article
- Email

Details on each of the above listed mechanisms of communication are discussed in more detail in **Section 10.3**. Consultation Mechanisms and the Notice of Submission can be found in **Appendix L1**.

Hard copies of the Draft EA Report and Appendices were made available at eight review locations from August 17, 2017 to October 2, 2017. Locations included two TRCA offices, the City Clerk's Office, three local libraries, and two MOECC offices (locations listed on Notice of Submission provided in **Appendix L1**). The Draft EA was also available for download on the TRCA website.

Appendix L12 includes a series of tables that disposition all comments received from review of the Draft EA, as well as a response to each of the comments. **Appendix L12** consists of three tables:

1. Public Comments including General Public, Stakeholder Committee Page-Turn, Landowners, and Community Organizations. None of the utilities submitted comments.
2. Agency Comments from MOECC, MNRF, MTCS and the City of Toronto. DFO, GO Transit/Metrolinx, TTC and WT did not submit comments.
3. Indigenous Communities Comments.

10.9 Future Consultation Activities

As described throughout this Chapter, public involvement has been a key element of the SWP EA process. There is an involved community associated with the SWP who expect to remain involved throughout the remainder of the Project.

Should the SWP EA receive Ministry approval, it is recommended that the following public consultation mechanisms occur during the Detailed Design, construction and operation/establishment phases of the Project:

1. During the formal Detailed Design process for each Segment, a PIC be held to review the SWP and seek public input on any new information that is available to feed into the process, including similar engagement with other agencies, Indigenous communities and landowners;
2. A PIC for each Study Area Segment be held to provide construction details and schedules when the information is available;
3. A working group composed of local stakeholders who will be involved during the Detailed Design and construction phases of each Segment;
4. Continued engagement with the surfing community during the Detailed Design phase of the West Segment.
5. On-going consultation with Stakeholders in the East Segment through the Detailed Design phase of the East Segment, with respect to refinements.
6. Discussions with Rohm and Haas Canada LP/Dow Chemical Company to address safety concerns east of Grey Abbey Ravine during the Detailed Design phase of the West Segment.
7. A mechanism be established to ensure the reporting and investigation of complaints arising from construction activities;
8. Regular Project updates continue to be posted to the Project webpage; and,
9. SWP newsletter updates to be provided summarizing progress on Detailed Design and construction-related work.

Information gathered from the public and Stakeholders through these mechanisms will be incorporated into the overall Adaptive Environmental Management (AEM) cycle, as would other sources of monitoring data, as described in Chapter 8.

11. Advantages and Disadvantages

In concluding the EA, the overall advantages and disadvantages of the SWP need to be articulated and assessed. Advantages are positive net effects to the natural and human environment, and disadvantages are negative net effects. The purpose of this section is to provide an overall conclusion as to whether, in comparison to the "Do Nothing" Alternative, the negative net effects of the SWP are acceptable, based on a balanced assessment against the positive benefits. The *EA Act* requires this final comparison of the undertaking to the "Do Nothing" Alternative to develop final conclusions.

Table 11-1 summarizes the key advantages and disadvantages of the SWP.

A review of **Table 11-1** clearly illustrates that the outcomes of the SWP are strongly beneficial for all aspects of the environment, resulting in improvements to aquatic and terrestrial habitat, improved public access to the shoreline which is removed from the risk associated with bluff erosion and wave uprush/overtopping, a better waterfront experience accessible to more people including people with disabilities, and a Project compatible with local, regional and lakewide plans and policies related to the natural and human environment.

The SWP will achieve the Objectives set out in the ToR and reaffirmed in the EA by:

- Protecting and enhancing terrestrial and aquatic natural features and linkages;
- Managing public safety and property risk;
- Providing an enjoyable waterfront experience including public access to areas not currently accessible;
- Being consistent with and coordinating with the goals and objectives of related plans and policies in the area; and,
- Achieving value for cost.

The disadvantages of the SWP will primarily occur during construction. Temporary negative effects include minimal nuisance effects (i.e., air, noise and traffic) to recreational users and residents, which will be minimized by BMPs (**Appendix H**). The permanent loss or alteration of low quality habitat will be offset by large gains in higher quality and higher functioning habitat, as described above. The loss of publicly inaccessible sandy shoreline below Grey Abbey Park is offset by a substantial increase in overall water's edge access including transformation of private shorelines to public. Furthermore, Greyabbey Trail (road and associated infrastructure) is protected from erosion risk.

In addition, the SWP supports the goals and objectives outlined in *Ontario's Five Year Climate Change Action Plan 2016-2020* (MOECC, 2016b). The resilient and adaptive approach to the Project's design considers potential increases in extreme weather events associated with climate change (more frequent storms, higher waves, more intense rainfall). The Project will also contribute to reductions in GHG emissions by promoting cycling and walking through implementation of a primary to high-capacity multi-use trail. As well, the Project will result in substantial enhancements to terrestrial and aquatic habitats.

Table 11-1: Advantages and Disadvantages of the SWP

Project Objective	Advantages	Disadvantages
Protect and enhance terrestrial and aquatic natural features and linkages	▪ Creation of up to 17.6 ha of terrestrial habitat including meadow, beach/dune, successional, wetland and forest habitat; ▪ Enhancement of nearshore open coast aquatic habitat; ▪ Increase in the irregularity and diversity of shoreline types including an overall increase in shoreline length and substrate diversity; ▪ Decommissioning of approximately 8 km of informal trails in East Point Park and over 1 km of informal trails through Bluffer's Park, which will reduce fragmentation, trampling, and other effects from unmanaged use; ▪ Improvement to land-water interface; ▪ Management of human use within sensitive ecosystems to reduce effects associated with unmanaged use; ▪ Relocation and enhancement of wetland area at the base of the Guild construction access route; ▪ No direct impacts to Species at Risk; and, ▪ Enhancements to the quality of the East Point ESA.	▪ Approximately 2.90 ha of existing terrestrial habitat will be removed; ▪ Land creation will result in the loss of 20 ha and alteration of 16 ha of nearshore open coast aquatic habitat which currently lacks shoreline and substrate diversity to provide optimal habitat for native species; and, ▪ Relocation of the artificially-created wetland area at the base of the Guild construction access route.
Manage public safety and property risk	▪ Improve pedestrian and cycling safety along Brimley Road; ▪ A new shoreline Waterfront Trail connection removed from the risk line and 10-year Crest Risk Line linking Bluffer's Park to East Point Park and then to the existing Port Union Waterfront Trail; and, ▪ Long-term protection of public property and infrastructure from toe erosion from Bluffer's Park to the east side of Grey Abbey Ravine.	
Provide an enjoyable waterfront experience	▪ Addition of approximately 1,250 m (or 1,100 linear metres) of publicly accessible shoreline; ▪ Addition of formal access to the water's edge for an additional ~2,300 m; ▪ Provision of AODA compliant access for 11 km along the waterfront, and to the waterfront at the Guild construction access route and at the east side of Grey Abbey Ravine; and, ▪ SWP does not preclude the continued enjoyment of waterfront activities.	▪ Replacement of 1,250 m (or 1,100 linear metres) of sandy shoreline with headland beach system of which 100% is currently publicly inaccessible, and ~490 m has been previously modified; and, ▪ Negative impact to one area currently used by surfers under southwest wave conditions.

Table 11-1: Advantages and Disadvantages of the SWP

Project Objective	Advantages	Disadvantages
Consistency and coordination with other initiatives	▪ Consistent with City of Toronto Official Plan and TRCA's The Living City Policies; ▪ Consistent with the Management Plan for Guild Park and Gardens; ▪ Consistent with the Fish Community Objectives for Lake Ontario; ▪ Avoids potential constraints posed by the widening of the Metrolinx Lakeshore East rail corridor and changes to rail service for both the on-road and off-road portions of the Waterfront Trail; and, ▪ No impact to identified archaeological resources.	▪ Potential for cumulative traffic impacts to the Guildwood neighbourhood as a result of this Project in combination with several other projects in the area.
Achieve value for cost	▪ Long-term protection of public infrastructure, including parks, road, and sanitary and water infrastructure; and, ▪ Long-term protection results in overall reduced cost and public investment, which would be required to relocate infrastructure on an ongoing basis as erosion continues.	▪ Preliminary estimate of $170 million capital investment, which includes property acquisition; ▪ Acquisition of 28 ha of water lots and 14 ha of private property; and, ▪ Estimated renewal costs of approximately $2,500 per linear metre of new shoreline protection works, as required, after approximately 25 years.

In conclusion, the negative net effects of the SWP, most of which occur during construction and are considered to be temporary or negligible, are more than offset by the much greater positive contributions of the SWP, including naturalization and recreational opportunities, coordination with other planning initiatives and management of risk. The SWP will transform an area that is currently inaccessible to most people into a spectacular publicly accessible trail and greenspace. The final outcome of the SWP is an environment far superior to existing conditions.

12. References and Works Cited

Aquafor Beech. 2010. City of Toronto – Scarborough Waterfront CSO and Stormwater Outfalls Control Class EA and Flood Protection Study. Prepared for City of Toronto by Aquafor Beech Ltd.

Aquatic Habitat Toronto. 2003. Toronto Waterfront Aquatic Habitat Restoration Strategy (TWAHRS). Accessible at: https://trca.ca/conservation/aquatic-habitat-toronto/strategy/

Atria. 1993. Eastern Beaches Stage II. Unpublished report prepared for Metropolitan Toronto and Region Conservation Authority (MTRCA) by Atria Hydraulics Inc.

Butt, S., Ramprasad, P., and Fenech, A. 2005. Paper 6: Changes in the Landscape of Southern Ontario, Canada since 1750: Impacts of European Colonization. In Fenech, A., MacIver, D., Auld, H., and Hansell, R. (eds.), *Integrated Mapping Assessment* (pp. 83-92). Toronto, Ontario: Environment Canada.

City of Toronto. 2002; consolidated 2015. Toronto Official Plan, Office Consolidation, June 2015. Accessible at: https://www.toronto.ca/city-government/planning-development/official-plan-guidelines/official-plan/

City of Toronto. 2003. Wet Weather Flow Master Plan (WWFMP).

City of Toronto. 2004. City of Toronto Accessibility Design Guidelines. Accessible at: https://www.toronto.ca/wp-content/uploads/2017/08/8fcf-accessibility_design_guidelines.pdf

City of Toronto. 2005; updated 2015. Toronto Strong Neighborhoods Strategy 2020. Accessible at: https://www.toronto.ca/wp-content/uploads/2017/11/9112-TSNS2020actionplan-access-FINAL-s.pdf

City of Toronto. 2009. Toronto Beaches Plan, January 2209. Accessible at: https://www.toronto.ca/legdocs/mmis/2009/ex/bgrd/backgroundfile-18573.pdf

City of Toronto. 2011. Birds of Toronto – A Guide to their Remarkable World. City of Toronto Biodiversity Series.

City of Toronto. 2012. Fishes of Toronto – A Guide to their Remarkable World. City of Toronto Biodiversity Series.

City of Toronto. 2012. Bikeway Trails Implementation Plan.

City of Toronto. 2013a. Parks Plan, 2013-2017. Accessible at: https://web.toronto.ca/wp-content/uploads/2017/08/9645-parks-plan-2013-17.pdf

City of Toronto. 2013b. Sustaining and Expanding the Urban Forest: Toronto's Strategic Forest Management Plan. Accessible at: https://www.toronto.ca/data/parks/pdf/trees/sustaining-expanding-urban-forest-management-plan.pdf

City of Toronto. 2014. Scarborough Bluffs Featured Parks. Accessible at: http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=0519dada600f0410VgnVCM10000071d60f89RCRD

City of Toronto. 2015a. Amendment No. 262 to the Official Plan of the City of Toronto. Accessible at: https://www.toronto.ca/legdocs/mmis/2015/pg/bgrd/backgroundfile-84146.pdf

City of Toronto. 2015b. Density of Cycling Collisions Mapping. Accessible at: https://www1.toronto.ca/City%20Of%20Toronto/Transportation%20Services/Cycling/Files/pdf/M/Safety%20Area%20Citywide.pdf.

City of Toronto. 2015c. Toronto Multi-use Trail Design Guidelines. Accessible at: https://www.toronto.ca/wp-content/uploads/2017/11/96a5-TORONTO_TRAIL_DESIGN_GUIDELINES.pdf

City of Toronto. 2016. Cycling Network Ten Year Plan. Accessible at: https://www.toronto.ca/services-payments/streets-parking-transportation/cycling-in-toronto/cycle-track-projects/cycling-network-10-year-plan/

City of Toronto. 2017. Toronto Ravine Strategy. Accessible at: https://www.toronto.ca/wp-content/uploads/2017/10/9183-TorontoRavineStrategy.pdf

City of Toronto and Toronto and Region Conservation Authority. 2014. Management Plan for Guild Parks and Gardens. Accessible at: https://www.toronto.ca/wp-content/uploads/2017/11/9920-edc-guild-park-management-plan.pdf

Cole, D.N. 1995. Experimental Trampling of Vegetation. II. Predictors of Resistance and Resilience*. *Journal of Applied Ecology*, 32(1): 215-244.

Coker, G.A., Portt, C.B., and Minns, C.K. 2001. Morphological and Ecological Characteristics of Canadian Freshwater Fishes. *Canadian Manuscript Report of Fisheries and Aquatic Sciences 2554*, 89 pp. Burlington, Ontario: Fisheries and Oceans Canada.

CTC Source Protection Committee. 2015a. Approved Updated Assessment Report: Toronto and Region Source Protection Area. Accessible at: https://ctcswp.ca/the-science/toronto-and-region-spa-assessment-report/#

CTC Source Protection Committee. 2015b. Approved Source Protection Plan: CTC Source Protection Region. Accessible at: https://ctcswp.ca/protecting-our-water/the-ctc-source-protection-plan/

Dickens, S.J.M., Gerhardt, F., and Collinge, S.K. 2005. Recreational Portage Trails as Corridors Facilitating Non-Native Plant Invasions of the Boundary Waters Canoe Area Wilderness (USA). *Conservation Biology*, 19(1): 1653-1657.

Dietrich, J.P., Hennyey, A.M., Portiss, R., MacPherson, G., Montgomery, K., and Morrison, B.J. 2008. The Fish Communities of the Toronto Waterfront: Summary and Assessment 1989-2005.

Dillon. 2015. Scarborough Waterfront Project Environmental Assessment Terms of Reference from Bluffer's Park to East Point Park in the City of Toronto. Prepared for the Toronto and Region Conservation Authority (TRCA) by Dillon Consulting Ltd.

eBird. 2015. eBird: An online database of bird distribution and abundance [web application]. eBird, Ithaca, New York. Accessible at: http://www.ebird.org

Environics Analytics. 2014. Executive Trade Area Report Prepared for the Scarborough Bluffs as Provided for Use by TRCA.

Falconer, M., Richardson, K., Heagy, A., Tozer, D., Stewart, B., McCracken, J., and Reid, R. 2016. Bank Swallow (*Ripara riparia*) in Ontario – Ontario Recovery Strategy Series. Recovery strategy prepared under the *Endangered Species Act,* 2007.

Fenco MacLaren Inc., Shoreplan Engineering Ltd., EDA Collaborative Inc., Tarandus Associated Ltd., Ecorp Inc.1996. Integrated Shoreline Management Plan – Tommy Thompson Park to Frenchman's Bay.

Fisheries and Oceans Canada (DFO). 2013. Ontario Restricted Activity Timing Windows for the Protection of Fish and Fish Habitat. Accessible at: http://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/on-eng.html

Fisheries and Oceans Canada (DFO). 2016. Measures to Avoid Causing Harm to Fish and Fish Habitat Including Species at Risk. Accessible at: http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html

Fowle, C.D., Collishaw, G., and Lewis, M.F. 1978. Vegetation and Erosion on Scarborough Bluffs, Lake Ontario. Proceedings: Second Workshop on Great Lakes Coastal Erosion and Sedimentation, Burlington, Ontario, pp. 33-36.

Geocon. 1982. Erosion Control Study, Stage 2, Scarborough Bluffs. Prepared for the Metropolitan Toronto and Region Conservation Authority (MTRCA) by Geocon Ltd.

Golder. 1991. Investigation and Phase I Remediation of the Brimley Road Landslide, Scarborough, Ontario. Prepared for the City of Scarborough by Golder Associates Ltd.

Google Earth Pro. 2014. Various mapping and aerials.

Google Earth Pro. 2015. Various mapping and aerials.

Google Earth Pro. 2016. Various mapping and aerials.

Google Earth Pro. 2017. Various mapping and aerials.

Government of Canada. 1985a. *Fisheries Act*, amended 2013. Accessible at: http://laws-lois.justice.gc.ca/eng/acts/f-14/

Government of Canada. 1985b. *Navigation Protection Act*, amended 2014. Accessible at: http://laws-lois.justice.gc.ca/eng/acts/N-22/

Government of Canada. 1985c. *Railway Safety Act*. Accessible at: http://laws-lois.justice.gc.ca/eng/acts/R-4.2/

Government of Canada. 1994. *Migratory Birds Convention Act*. Accessible at: http://laws-lois.justice.gc.ca/eng/acts/m-7.01/

Government of Canada. 2002. *Species at Risk Act (SARA)*. Accessible at: http://laws-lois.justice.gc.ca/eng/acts/s-15.3/

Government of Canada. 2012. *Canadian Environmental Assessment Act (CEAA)*. Accessible at: http://laws-lois.justice.gc.ca/eng/acts/c-15.21/index.html

Government of Canada. 2013. About Committee on the Status of Endangered Wildlife in Canada (COSEWIC) – Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the Species at Risk Act. Accessible at: http://www.cosewic.gc.ca/default.asp?lang=en&n=50619BC6-1

Government of Canada. 2016. Species at Risk Public Registry. Accessible at: http://www.registrelep-sararegistry.gc.ca/sar/index/default_e.cfm.

Government of Ontario. 1990a. *Conservation Authorities Act*. Accessible at: https://www.ontario.ca/laws/statute/90c27

Government of Ontario. 1990b. *Environmental Assessment Act (EA Act)*. Accessible at: https://www.ontario.ca/laws/statute/90e18

Government of Ontario. 1990c. *Ontario Heritage Act*. Accessible at: https://www.ontario.ca/laws/statute/90o18

Government of Ontario. 1990d. *Ontario Regulation (O. Reg.) 166/06*: Toronto and Region Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses, under *Conservation Authorities Act, R.S.O 1990, c. C.27*. Accessible at: https://www.ontario.ca/laws/regulation/060166

Government of Ontario. 1990e. *Ontario Regulation (O. Reg.) 387/04*: Water Taking and Transfer, under *Ontario Water Resources Act, R.S.O. 1990, c. O.40*. Accessible at: https://www.ontario.ca/laws/regulation/040387

Government of Ontario. 1990f. *Public Lands Act*. Accessible at: https://www.ontario.ca/laws/statute/90p43

Government of Ontario. 1990g. *Ontario Water Resources Act*. Accessible at: https://www.ontario.ca/laws/statute/90o40

Government of Ontario. 1997a. *Endangered Species Act*. Accessible at: https://www.ontario.ca/laws/statute/07e06

Government of Ontario. 1997b. *Fish and Wildlife Conservation Act*. Accessible at: https://www.ontario.ca/laws/statute/97f41

Government of Ontario. 2005a. *Accessibility for Ontarians with Disabilities Act.* Accessible at: https://www.ontario.ca/laws/statute/05a11

Government of Ontario. 2005b. *Ontario Regulation (O. Reg.) 191/11:* Integrated Accessibility Standards, under *Accessibility for Ontarians with Disabilities Act, 2005, S.O. 2005, c. 11*. Accessible at: https://www.ontario.ca/laws/regulation/110191

Government of Ontario. 2014. Ontario's Parks and Protected Areas. Accessible at: https://www.ontario.ca/page/ontarios-parks-and-protected-areas.

Government of Ontario. 2015. How Species at Risk are Protected. Accessible at: https://www.ontario.ca/page/how-species-risk-are-protected

Government of Ontario. 2016. Ontario's Five Year Climate Change Action Plan (2016-2020). Accessible at: http://www.applications.ene.gov.on.ca/ccap/products/CCAP_ENGLISH.pdf

Hemson Consulting Ltd. 2012. Greater Golden Horseshoe Growth Forecast to 2041. Technical Report. November 2012.

Holm, E., Mandrak, N.E., and Burridge, M.E. 2009. The ROM Field Guide to Freshwater Fishes of Ontario. Toronto, Ontario: Royal Ontario Museum.

Kuss, F.R. 1986. A Review of Major Factors Influencing Plant Responses to Recreation Impacts. *Environmental Management*, 10(5): 637-655.

Lake Ontario Bi-national Biodiversity Conservation Strategy Working Group. 2009. The Beautiful Lake: A Bi-national Biodiversity Conservation Strategy for Lake Ontario. Prepared in cooperation with the U.S. – Canada Lake Ontario Lakewide Management Plan. Accessible at: https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/michigan/Documents/LOBCS%20Report.pdf

Lane, J.A., Portt, C.B., and Minns, C.K. 1996. Spawning Habitat Characteristics of Great Lakes Fishes. *Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 2368*, 48 pp. Burlington, Ontario: Fisheries and Oceans Canada.

Lee, H.T., Bakowsky, W.D., Riley, J., Bowles, J., Puddister, M., Uhlig, P., and McMurray, S. 1998. Ecological Land Classification for South Ontario: First Approximation and Its Application. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guid GF-02.

Lin, L., Demirbilek, Z., Mase, H., Zheng, J., and Yamada, F. 2008. CMS-Wave: A Nearshore Spectral Processes Model for Coastal Inlets and Navigation Projects. ERDC/CHL TR-08-13. US Army Corps of Engineers Engineer Research and Development Centre. August 2008.

Lofgren, B.M., Quinn, F.H., Clites, A.H., Assel, R.A., Eberhardt, A.J., and Luukkonen, C.L. 2002. Evaluation of Potential Impacts on Great Lakes Water Resources Based on Climate Scenarios of Two GCMs. *Journal of Great Lakes Research*, 28(4):537-554. International Association for Great Lakes Research.

LVM. 2015. Slope Stability Analysis and Slope Monitoring, Brimley South Slope Landfill (West Slope), Toronto, Ontario. Unpublished report prepared for the City of Toronto.

MacCulloch, R.D. 2002. The ROM Field Guide to Amphibians and Reptiles of Ontario. Toronto, Ontario: Royal Ontario Museum.

Metropolitan Toronto Planning Department. 1967. The Waterfront Plan for the Metropolitan Toronto Planning Area. Accessible at: http://trca.on.ca/trca-user-uploads/TheWaterfrontPlanfortheMetropolitanTorontoPlanningArea-Dec1967.pdf

Metropolitan Planning Department. 1994. Metropolitan Waterfront Plan. Accessible at: http://trca.on.ca/trca-user-uploads/MetropolitanWaterfrontPlan.pdf

Metropolitan Toronto and Region Conservation Authority (MTRCA). 1980. Lake Ontario Waterfront Development Program. Accessible at: http://trca.on.ca/trca-user-uploads/LakeOntarioWaterfrontDevelopmentProgram.pdf

Metropolitan Toronto and Region Conservation Authority (MTRCA). 1987. Waterfront Erosion Control Site Report – Scarborough Sector.

Ministry of Culture, Tourism and Sport (MTCS). 2011. Standards and Guidelines for Consultant Archaeologists.

Ministry of the Environment (MOE). 2011. Fill Quality Guide And Good Management Practices for Shore Infilling in Ontario. Accessible at: https://www.ontario.ca/page/fill-quality-guide-and-good-management-practices-shore-infilling-ontario.

Ministry of Environment and Climate Change (MOECC). 2014. Code of Practice: Preparing and Review Environmental Assessments in Ontario. Accessible at: https://www.ontario.ca/document/preparing-and-reviewing-environmental-assessments-ontario-0

Ministry of Environment and Climate Change (MOECC). 2015. Air Quality Ontario. Accessible at: http://www.airqualityontario.com.

Ministry of Environment and Climate Change (MOECC). 2016a. Management of Excess Soil – A Guide for Best Management Practices. Accessible at: https://www.ontario.ca/page/management-excess-soil-guide-best-management-practices

Ministry of Environment and Climate Change (MOECC). 2016b. Ontario's Five Year Climate Change Action Plan 2016-2020. Accessible at: http://www.applications.ene.gov.on.ca/ccap/products/CCAP_ENGLISH.pdf

Ministry of Environment and Climate Change (MOECC). 2017. Consideration of Climate Change in Environmental Assessment in Ontario. Accessible at: https://www.ontario.ca/page/considering-climate-change-environmental-assessment-process

Ministry of Municipal Affairs. 2017. Places to Grow – Growth Plan for the Greater Golden Horseshoe (2017). Accessible at: http://placestogrow.ca/images/pdfs/ggh2017/en/growth%20plan%20%282017%29.pdf

Ministry of Municipal Affairs and Housing. 2014. Provincial Policy Statement (PPS), under the *Planning Act*. Accessible at: http://www.mah.gov.on.ca/AssetFactory.aspx?did=10463

Ministry of Natural Resources (MNR). 1989. Great Lakes Flood Levels and Water Related Hazards. Unpublished report prepared by Conservation Authorities and Water Management Branch, Ontario Ministry of Natural Resources, February 1989.

Ministry of Natural Resources (MNR). 2001. Understanding Natural Hazards: Great Lakes – St. Lawrence River System and Large Inland Lakes, River and Stream Systems and Hazardous Sites: An Introductory Guide for Public Health and Safety Policies 3.1, Provincial Policy Statement.

Ministry of Natural Resources (MNR). 2010. Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005 (Second Edition).

North-South Environmental Inc. 2009. Review of Provincially Significant Wetlands in the City of Toronto, Final Report August 2009. Prepared for the City of Toronto, City Planning in association with Dougan & Associates.

North-South Environmental Inc. 2012a. Environmentally Significant Areas (ESAs) in the City of Toronto – Volume 1. Prepared for the City of Toronto, City Planning in association with Dougan & Associates and Beacon Environmental.

North-South Environmental Inc. 2012b. Environmentally Significant Areas (ESAs) in the City of Toronto – Volume 2: Scarborough Bluffs Sequence Fact Sheet. Prepared for the City of Toronto, City Planning in association with Dougan & Associates and Beacon Environmental.

North-South Environmental Inc. 2012c. Environmentally Significant Areas (ESAs) in the City of Toronto – Volume 2: Bellamy Ravine/Sylvan Park Fact Sheet. Prepared for the City of Toronto, City Planning in association with Dougan & Associates and Beacon Environmental.

North-South Environmental Inc. 2012d. Environmentally Significant Areas (ESAs) in the City of Toronto – Volume 2: Guild Woods Fact Sheet. Prepared for the City of Toronto, City Planning in association with Dougan & Associates and Beacon Environmental.

North-South Environmental Inc. 2012e. Environmentally Significant Areas (ESAs) in the City of Toronto – Volume 2: East Point Fact Sheet. Prepared for the City of Toronto, City Planning in association with Dougan & Associates and Beacon Environmental.

North-South Environmental Inc. 2012f. Environmentally Significant Areas (ESAs) in the City of Toronto – Volume 2: Stephenson's Swamp/Highland Creek East Fact Sheet. Prepared for the City of Toronto, City Planning in association with Dougan & Associates and Beacon Environmental.

Ontario Breeding Bird Atlas. 2001. Ontario Breeding Bird Atlas Guide for Participants.

Ontario Ministry of Finance. 2016. Ontario Population Projections Update, 2016-2041. Accessible at: http://www.fin.gov.on.ca/en/economy/demographics/projections/

Park People. 2016. Making Connections – Planning Parks and Open Space Networks in Urban Neighbourhoods. Accessible at: http://parkpeople.ca/wp-content/uploads/2016/02/Making-Connections_web-2.pdf

Parks and Recreation Ontario. 2014. Pathways to Recreation: Learning About Ontario's Accessibility Standard for the Design of Public Spaces Guidebook. Accessible at: http://www.prontario.org/index.php/ci_id/9179.htm

Peach, G. 2006. Management of Lake Huron's Beach and Dune Ecosystems: Building Up from the Grassroots. *The Great Lakes Geographer,* 13(1): 39-49.

Royal Commission on the Future of the Toronto Waterfront. 1992. Regeneration: Toronto's Waterfront and the Sustainable City: Final Report. Accessible at: http://publications.gc.ca/collections/collection_2014/bcp-pco/Z1-1988-1-1992-1-eng.pdf

Shoreplan. 2014. Ashbridges Bay Erosion and Sediment Control Project Existing Conditions Report. Unpublished report prepared for Toronto and Region Conservation Authority (TRCA) by Shoreplan Engineering Ltd.

Stewart, T.J., Todd, A., and LaPan, S. 2013. Fish Community Objectives for Lake Ontario. Great Lakes Fishery Commission Special Publication. 13-? 23 p.

Terraprobe. 1989. Slope Stabilization Study: Greyabbey Trail, Scarborough Bluffs. Prepared for Metropolitan Toronto and Region Conservation Authority (MTRCA) by Terraprobe Ltd.

Toronto and Region Conservation Authority (TRCA). 1988. Environmental Study Report: Guildwood Parkway Erosion Control Project.

Toronto and Region Conservation Authority (TRCA). 1994. Environmental Study Report: Sylvan Avenue Shoreline Regeneration Project.

Toronto and Region Conservation Authority (TRCA). 2004. Environmental Study Report: The Guild Inn Shoreline Regeneration Project, City of Toronto.

Toronto and Region Conservation Authority (TRCA). 2004. Environmental Study Report: Guildwood Parkway Erosion Control Project – Phase 2.

Toronto and Region Conservation Authority (TRCA). 2010. Environmental Study Report: Meadowcliffe Drive Erosion Control Project.

Toronto and Region Conservation Authority (TRCA). 2012. Scarborough Shoreline Terrestrial Biological Inventory and Assessment.

Toronto and Region Conservation Authority (TRCA). 2013a. Building The Living City: 10-year Strategic Plan, 2013-2022. Accessible at: http://www.trca.on.ca/dotAsset/164987.pdf

Toronto and Region Conservation Authority (TRCA). 2013b. Highland Creek Watershed Report Card 2013. Accessible at: https://trca.ca/wp-content/uploads/2016/04/2173_WatershedReportCards_HighlandCreek_rev11_forWeb.pdf

Toronto and Region Conservation Authority (TRCA). 2014. The Living City Policies for Planning and Development in the Watersheds of the Toronto and Region Conservation Authority.

Walden-Schreiner, C., and Leung, Y.F. 2013. Spatially Characterizing Visitor Use and its Association with Informal Trails in Yosemite Valley Meadows. *Environmental Management*, 52(1): 163-178.

Waterfront Regeneration Trust (WRT). 1995. Lake Ontario Greenway Strategy. Toronto, Ontario: Waterfront Regeneration Trust.

Waterfront Regeneration Trust (WRT). 2014. Accessible at: https://www.waterfronttrail.org/maps/interactive-map

Weaver, R.K. 1979. A Volumetric Analysis of Erosion Using Photogrammetric Contour Maps – Scarborough Bluffs, Lake Ontario. Fisheries and Oceans, Research and Development Division,

Ocean and Aquatic Sciences, Central Region. Accessible at: http://www.dfo-mpo.gc.ca/library/79623.pdf

Wimpey, J., and Marion, J.L. 2011. A Spatial Exploration of Informal Trail Networks within Greater Falls, VA. *Journal of Environmental Management*, 92(3): 1012-1022.