111-56233-02

LAND SUITABILITY ANALYSIS

PORT WALLACE SECONDARY PLANNING STUDY AREA

Version 4.0

FEBRUARY 23, 2016

WSP

LAND SUITABILITY ANALYSIS

PORT WALLACE SECONDARY PLANNING STUDY AREA

Version 4.0

Project No: 111-56233-02
Date: February 23rd 2016

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February 23, 2016

Ms. Maureen Ryan
Senior Planner
Halifax Regional Municipality
Planning and Infrastructure
88 Alderney Drive, 3rd Floor
Dartmouth, Nova Scotia

Subject: Port Wallace Land Suitability Analysis

Dear Ms. Ryan:

On behalf of our clients, Port Wallace Holdings Limited, Conrad Brothers Ltd., W. Eric Whebby Ltd., M. Unia, Trustee & S. Unia, Trustee, and Armco Capital Inc., WSP Canada Inc. (WSP) is pleased to provide you with the final Land Suitability Analysis for the Port Wallace Secondary Planning Study Area lands.

This final draft was compiled after consideration of your comments and questions following your review of the report. It is our hope that you will find this document complete and informative. Thank you again for your input.

Yours truly,

WSP Canada Inc.

Greg Zwicker, MCIP, LPP
Manager, Planning
Provincial Director, Nova Scotia

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REVISION HISTORY

VERSION	DATE	DESCRIPTION
1.0	OCTOBER 31, 2014	First Draft Land Suitability Analysis
2.0	MARCH 31, 2015	Second Draft Land Suitability Analysis
3.0	DECEMBER 1, 2015	Final Report Land Suitability Analysis
4.0	FEBRUARY 23, 2016	Final Revised Draft Following HRM Review

SIGNATURES

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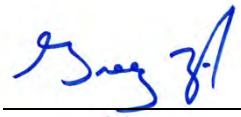


Greg Zwicker, MCIP, LPP
Manager, Planning / Provincial Director
WSP Canada Inc.

EXECUTIVE SUMMARY

On March 4, 2014, Regional Council passed a motion to proceed with the Port Wallace Secondary Planning Process. However, Regional Council directed that, before concept plans can be prepared for the Port Wallace Secondary Planning Study Area (PWSPSA), a Land Suitability Analysis (LSA) would be required in order to determine areas of environmental and cultural importance. The LSA process involved public consultation, background literature review, technical reporting, and field investigation in order to evaluate natural environmental and cultural landscape features critical to maintaining ecological functions within the PWSPSA. As such, the following six primary land features (layers) were assessed against a consistent evaluative framework designed to spatially explore where development should and should not occur:

- Layer 1: Forested Areas
- Layer 2: Watercourses
- Layer 3: Wetlands
- Layer 4: Slopes
- Layer 5: Contaminated Sites
- Layer 6: Heritage & Cultural Assets

The above listed primary land features (layers) were researched, investigated and examined at desktop and field reconnaissance levels. Desktop identification sources included municipal and provincial mapping databases and inventories, satellite and aerial photography, background studies, and reports and literature. Field reconnaissance identification sources included wetland delineations, tree stand delineations, public and stakeholder consultations, and ground-truthing exercises to identify natural habitats and areas of cultural and heritage significance.

Once land features were identified and catalogued within each layer, a consistent 0-4 score was applied to each land feature in order to determine their 'level of development constraint'. 'Constraint', in the context of this LSA, means a land feature's ability to respond to potential development pressures. In other words, the higher the constraint value (i.e. the higher a primary land feature scores on the 0-4 spectrum), the less suitable that area of land is for development. Once scored, each land feature, and associated score, was mapped as a visual representation of land constraint. The table below outlines the consistent scoring methodology applied throughout this LSA:

SCORE	DEFINITION	MAP COLOUR
0 = Not Constrained	means land where the primary function is intended to support development	White (opaque)
1 = Minor Constraints	means land suitable for development where the purpose of the land is to be developed in response to natural and cultural landscape features	Green
2 = Marginally Constrained	means land somewhat suitable for development where some environmental and cultural conservation or mitigation efforts may be required in order to preserve ecological function	Yellow
3 = Moderately Constrained	means land with features in support of ecological function and cultural value where additional studies are required to verify the presence of significant habitats prior to development	Orange
4 = Totally Constrained	means land where the primary function is intended to support environmental and cultural conservation efforts. Natural corridor, passive recreation, and some active recreation and infrastructure, such as bridges and roads, may be permitted where they do not undermine the ecological or cultural function of the land	Red

Following the evaluation of each primary land feature, the findings from each layer were accumulated on a single constraints map to visually represent areas of elevated environmental and cultural and heritage significance. Where scored primary land features overlapped on the map, the area of land impacted was then assessed on a new cumulative scoring approach with values totaling between 0-16. The 0-16 was then scaled into five classifications/definitions consistent with the '0-4' scoring methodology and definitions applied consistently for each layer. The table below outlines the cumulative scoring approach applied in this LSA, and the final results of the Cumulative Scoring Exercise are found in **Figure 4.1-1**:

CUMULATIVE SCORE (SCALED VALUES)	CLASSIFICATION
0-2	0 = Not Constrained
3-5	1 = Minor Constraints
6-8	2 = Marginally Constrained
9-11	3 = Moderately Constrained
12-16	4 = Totally Constrained

The results of this LSA suggest that Natural Corridors should be protected in order to preserve significant ecological and cultural landscape features. The findings - visually represented on the individual layer and cumulative maps - highlight key areas within the PWSPSA where development should and should not occur based on areas having been identified as having an augmented 'level of development constraint'. Moving forward through Secondary Planning, particular land uses being considered for development should pay attention and respond to the natural and culturally significant features identified through this LSA.

TABLE OF CONTENTS

FIGURES/ MAPS

Please refer to the ***Port Wallace Land Suitability Analysis Map Booklet*** for a complete set of all figures/maps.

CHAPTER 1: INTRODUCTION

FIGURE 1.3-1 **LAKE CHARLES SUB-WATERSHED AREA**

FIGURE 1.3-2 **LAND INTEREST BY PARTIES**

CHAPTER 2: METHODOLOGY (APPENDIX B: BACKGROUND FEATURES)

FIGURE 2.2-1 **SURFICIAL GEOLOGY AND BEDROCK FORMATION**

FIGURE 2.2-2 **BEDROCK GEOLOGY OF THE LAKE CHARLES SUB-WATERSHED AREAS (GOLDENVILLE AND HALIFAX FORMATION)**

FIGURE 2.2-3 **HALIFAX REGIONAL WATER COMMISSION WATERSHEDS, MAP 12 OVERLAY**

CHAPTER 3: EVALUATION

FIGURE 3.1-1 **FORESTED AREAS (VEGETATIVE COVER)**

FIGURE 3.1-2 **FORESTED AREAS (VEGETATIVE COVER) CONSTRAINTS MAP**

FIGURE 3.2-1 **WETLAND & WATERCOURSES DELINEATION MAP**

FIGURE 3.2-2 **WATERCOURSE CONSTRAINTS MAP**

FIGURE 3.3-1 **WETLAND CONSTRAINTS MAP**

FIGURE 3.4-1 **STEEP SLOPES CONSTRAINTS MAP**

FIGURE 3.5-1 **POTENTIAL CONTAMINATION (POTENTIAL IMPACTS FROM HISTORICAL USE) CONSTRAINTS MAP**

FIGURE 3.6-1 **CULTURAL AND HERITAGE LANDSCAPE CONSTRAINTS MAP**

CHAPTER 4: ANALYSIS: LAND SUITABILITY

FIGURE 4.1-1 **CUMULATIVE CONSTRAINTS MAP**

FIGURE 4.1-2 **NATURAL CORRIDORS MAP**

APPENDICES

APPENDIX A	**INTERIM BOUNDARIES: CONRAD LANDS**
APPENDIX B	**BACKGROUND FEATURES: NATURAL FEATURES, RESOURCES AND HAZARDS**
APPENDIX B-1	**NATURAL FEATURES: RESOURCES**
APPENDIX C	**HABITAT MODELLING METHODOLOGY AND RESULTS**
APPENDIX D-1	**PHOTOGRAPHIC LOG: FORESTED AREAS**
APPENDIX D-2	**PHOTOGRAPHIC LOG: WETLANDS AND WATERCOURSES**
APPENDIX D-3	**PHOTOGRAPHIC LOG: CONTAMINATED SITES**
APPENDIX E	**HERITAGE AND CULTURAL LANDSCAPE SCREENING**
APPENDIX F	**LAND SUITABILITY MATRIX**

STANDALONE REPORTS

PORT WALLACE LAND SUITABILITY ANALYSIS MAP BOOKLET

BASELINE INFRASTRUCTURAL ANALYSIS

ACRONYMS

AUTHORITIES:

HRM	**HALIFAX REGIONAL MUNICIPALITY (HΛLIFΛX)**
NSE	**NOVA SCOTIA ENVIRONMENT**

DOCUMENTS:

COS	**COST OF SERVICING STUDY (CBCL, 2009)**
LSA	**LAND SUITABILITY ANALYSIS**
RMPS	**REGIONAL MUNICIPAL PLANNING STRATEGY**
SARA	**SPECIES AT RISK ACT**
SWS	**SHUBENACADIE LAKES SUBWATERSHED STUDY (AECOM, 2013)**

OTHERS:

ACCDC	**ATLANTIC CANADA CONSERVATION DATA CENTRE**
AST	**ABOVE GROUND STORAGE TANK**
BMP	**BEST MANAGEMENT PRACTICE**
COSEWIC	**COMMITTEE ON THE STATUS OF ENDANGERED WILDLIFE**
ESA	**ENVIRONMENTAL SITE ASSESSMENT**
GIS	**GEOGRAPHIC INFORMATION SYSTEM**
LID	**LOW IMPACT DEVELOPMENT**
NDTS	**NORTH DARTMOUTH TRUCK SEWER**
PPP	**PUBLIC PARTICIPATION PROGRAM**
PWSPSA	**PORT WALLACE SECONDARY PLAN STUDY AREA**
UPA	**UNITS PER ACRE**
UST	**UNDERGROUND STORAGE TANK**

1 INTRODUCTION

1.1 PROJECT BACKGROUND

The Port Wallace Secondary Planning Study Area (PWSPSA) was identified as one of six areas under the *Regional Municipal Planning Strategy* (RMPS, 2006) to be serviced with municipal sewer and water services. Accordingly, on May 3, 2007, the former Harbour East Community Council passed a motion directing staff to initiate a Secondary Planning process for the PWSPSA.[1] Prior to being serviced, however, **Policy S-3** of the RMPS (2006) required an evaluation of costs of providing municipal services and transportation links to the Study Area. The RMPS also required the completion of a watershed study prior to moving to Secondary Planning.

On March 4, 2014, following the completion of the aforementioned studies – the *Cost of Servicing Study,* (COS, CBCL Ltd., 2009)*;* and, the *Shubenacadie Lakes Subwatershed Study – Final Report,* (SWS, AECOM, 2013), respectively – Regional Council passed a motion to proceed with the Port Wallace Secondary Planning Process[2]. This report – *The Port Wallace Land Suitability Analysis* – represents the third and fourth steps in the Port Wallace Secondary Planning Process:

1. Cost of Servicing Study – *Completed*
2. Sub-Watershed Study – *Completed*
3. **Land Suitability Analysis – *In Process***
4. **Pre-Design Baseline Reports – *In Process***
5. Public Participation Program *– Future Work*
6. Master Infrastructure Plan *– Future Work*
7. Capital Cost Contribution Study *– Future Work*
8. Draft Secondary Plan *– Future Work*
9. Phase 1 Development Agreement *– Future Work*

[1] Harbour East Community Council, *Information Report*, June 14, 2007
[2] HRM, *Halifax Regional Council Minutes,* March 4, 2014

1.2 WHAT IS A 'LAND SUITABILITY ANALYSIS'?

A Land Suitability Analysis (LSA) determines areas of environmental and cultural importance based on physical attributes inherent to a studied area of land. The process includes an assessment and mapping of natural systems and critical areas. The purpose is to identify, map and assess natural environmental features, cultural landscape features and engineered structures critical to maintaining natural ecological functions within a study area. The resulting analysis will help guide future secondary planning decisions.

1.3 STUDY AREA

The LSA analyzed the PWSPSA from two scales: **1)** high-level reconnaissance (literature review) was undertaken at the Sub-Watershed level, and; **2)** detailed analysis (field investigation) was undertaken directly within the PWSPSA.

1.3.1 SUB-WATERSHED

The Lake Charles/Dartmouth Lakes/Topsail Lake sub-watersheds, hereinafter referred to as the 'Lake Charles Sub-Watershed Area', were assessed at a desktop level in order to gain an understanding of how the environmental and cultural systems of the site connect to the surrounding area. Lake Charles is a headwater lake connecting to several lake systems within the former City of Dartmouth, influencing water quality downstream in a cumulative manner. Understanding the larger Lake Charles sub-watershed area is important, especially when considering stormwater management best-practices and natural corridor protection **(Figure 1.3-1)**.

1.3.2 PORT WALLACE SECONDARY PLANNING STUDY AREA

The PWSPSA consists of a concentration of properties located on either side of Forest Hills Extension / Highway 107 east of Lake Charles and Waverley Road in the community of Port Wallace. Collectively covering approximately 300 hectares, these properties extend over an area that measure approximately 4.7 kilometres long (northwest/southeast) by 1.6 kilometres wide (northeast/southwest). The Study Area is bounded on the north, west and south by residential neighbourhoods in the vicinity of Spider Lake Road, Waverley Drive/Route 318, Caledonia Road/Breeze Drive and Montague Road. The southern edge of the Study Area is also bounded by protected watershed lands around Lemont Lake and Topsail Lake. To the east, the Study Area is bounded by the Conrad Brothers quarry and the alignment of the Forest Hills Extension of Highway 107.

The individual properties within the Study Area are variously owned by Port Wallace Holdings Limited, Conrad Brothers Limited, Armco Capital Inc., W. Eric Whebby Ltd. / Frank Whebby Ltd., Mukund (Mark) and Sumitra Unia, Joyce Elizabeth Cooper, Pinnacle Properties Limited and the Crown **(Figure 1.3-2)**. While most of the PWSPSA is wooded, the northern end includes offices, yards and facilities associated

with the Conrad Brothers quarry based at 31 Cono Drive. The southern end includes the Whebby Racing Stable – a private horse stable and harness racing track located at 56 Lethbridge Avenue. A small part of the wooded eastern edge of the PWSPSA lies within the historic limits of the Montague Gold District.

The northern end of the Study Area is located only about 12 metres east of Lake Charles – a 3.4 kilometre long lake that flows northward to the Minas Basin at Maitland via the Shubenacadie River and a chain of other lakes, including Lake William, Lake Thomas, Fletchers Lake and Shubenacadie Grand Lake. Lake Charles is situated only about 1.2 kilometres north of Lake Micmac – a lake that is part of a separate watercourse that flows southward to Halifax Harbour via Lake Banook and Sullivan's Pond. These two natural watercourses, united by the canals and locks of the Shubenacadie Canal System, are together known as the Shubenacadie River System. Draining both northward and southward, Lake Charles is the high-point in this unified natural waterway. The central portion of the Study Area straddles Barry's Run. This stream flows westward from Loon Lake to Lake Charles and serves as a boundary between HRM Polling Districts 1 and 6.

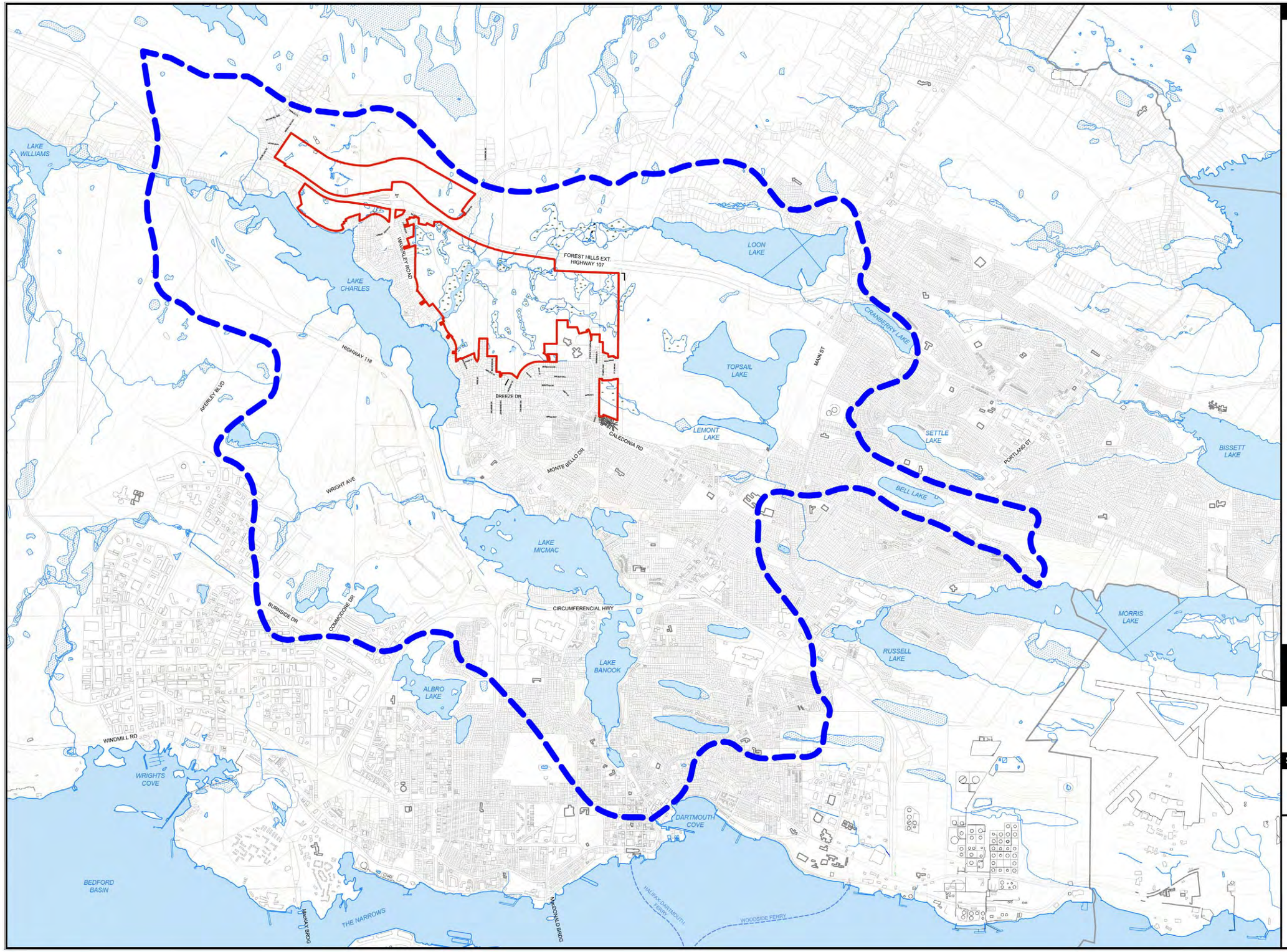
1.4 INTERIM BOUNDARIES

At the March 4, 2014 Public Hearing, Regional Council passed a motion to adopt an interim boundary for the PWSPSA (see **Figure 1.3-2**). Through the LSA and ensuing Port Wallace Secondary Planning Process, the exact limits of the PWSPSA may be altered and expanded.

Further to the adoption of the interim boundary, Regional Council passed a motion to consider including the Conrad Lands (approx. 222 acres) within the PWSPSA (see **Figure 1.3-2**). The request to consider including the Conrad Lands within the PWSPSA is consistent with *Policy S-2 (a)* of the RMPS (2014). The Conrad Lands are currently located outside of the 'Urban Settlement' designation[3] and an RMPS Amendment will be required to include these lands within the PWSPSA in order to be serviced with municipal sewer and water services.

Policy S-2 *Where requests are received to initiate secondary planning for Port Wallace, considerations shall be given to…the need for additional lands and the fiscal implications to HRM and Halifax Water and their capacity to meet additional financial commitment.*

[3] The "Urban Settlement" designation encompasses areas where development is, or is planned to be, serviced with municipal water and wastewater systems. While a portion of the interim Port Wallace Secondary Planning Area is designated "Rural Commuter" (the Conrad Lands), Port Wallace planning documents and servicing studies have historically included the Conrad Lands within the Secondary Plan area. **Appendix A** of this LSA briefly summarizes the planning history associated with the PWSPSA.



LEGEND

- Port Wallace Study Area
- Lake Charles Sub-Watershed Area

STUDY AREA

FIGURE 1.3-1
LAKE CHARLES SUB-WATERSHED AREA
DARTMOUTH, NOVA SCOTIA

PORT WALLACE SECONDARY PLANNING STUDY AREA

OCTOBER 26, 2015 B07057-127-LCS

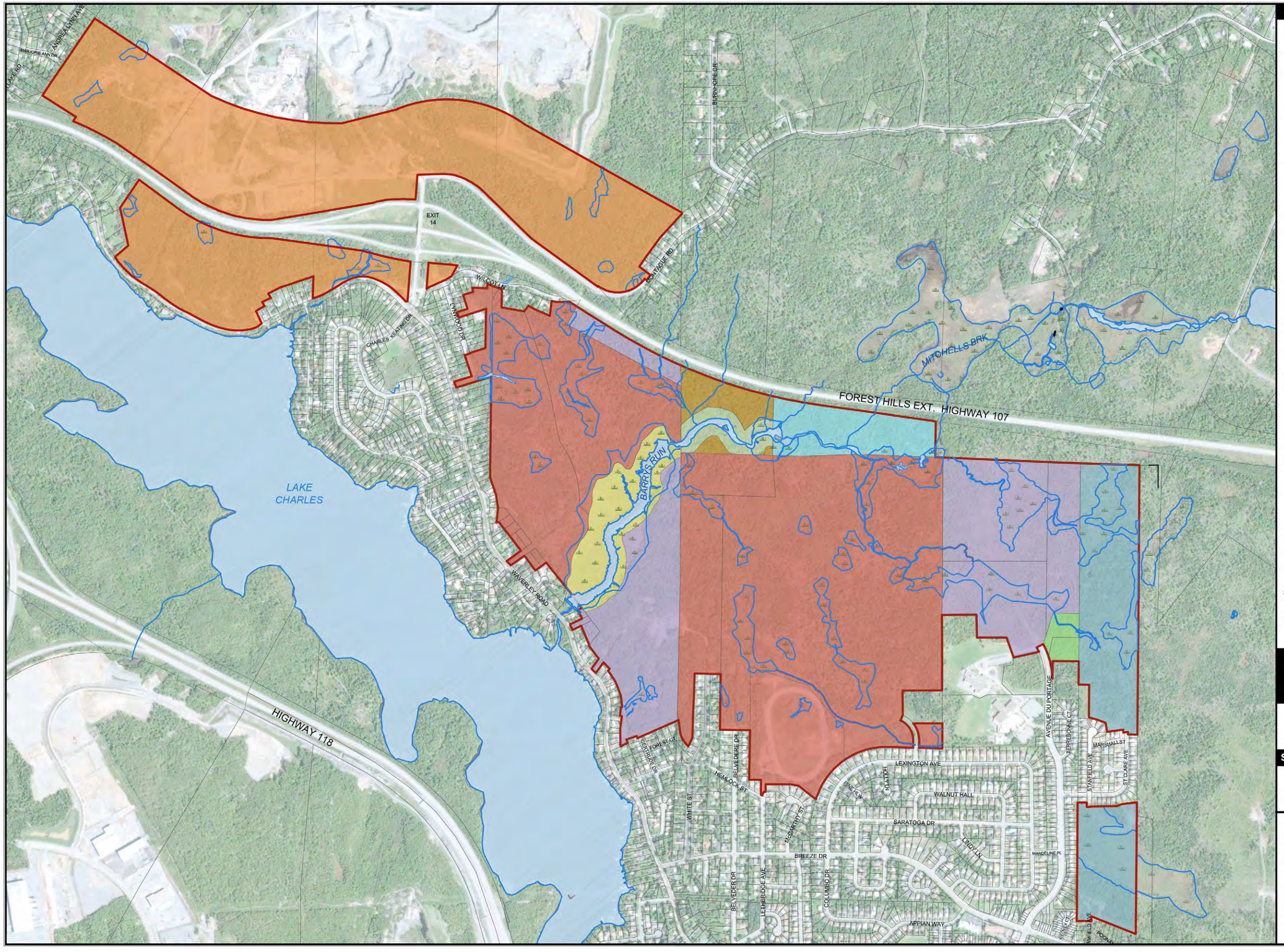
SCALE

600 400 200 0 1000 m

1 : 40,000

NORTH

WSP
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM



LEGEND

- Study Area Boundary
- Property Boundaries
- Watercourse
- Wetlands

LAND INTEREST BY PARTIES

- Conrad Brothers Ltd
- Unknown Owner
- Armco Capital
- Mukund & Sumitria Unia
- Port Wallace Holdings Ltd
- Pinnacle Properties Ltd
- Halifax County
- George & Roy Cooper
- Whebby
- Open Water

NOTES:

- Property lines approximate only. Site subject to survey

SOURCES:

- Service Nova Scotia and Municipal Relation Online Property Database
- Province of Nova Scotia Digital Topographic Series

STUDY AREA

FIGURE 1.3-2
LAND INTEREST BY PARTIES
DARTMOUTH, NOVA SCOTIA

PORT WALLACE SECONDARY PLANNING STUDY AREA

OCTOBER 26, 2015 B07057-127-OWNERS

SCALE 200 100 0 100 200 300 m

1 : 12,500

NORTH

WSP
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
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2 METHODOLOGY

2.1 LAND SUITABILITY ANALYSIS EVALUATION FRAMEWORK

The PWSPSA has been assessed using a Land Suitability Analysis (LSA), which determines the overall fitness (or suitability) of land for specific uses. Particular environmental and cultural land features have been organized, identified, summarized and evaluated based on their 'level of development constraint', meaning the land feature's ability to respond to potential development.

2.1.1 ORGANIZE

Land features were organized as either 'background' or 'primary' land features: 'background' land features provide baseline environmental or cultural context (refer to **Appendix B**), whereas 'primary' land features describe defined areas of land where important ecosystems or cultural assets may exist. Only 'primary' land features have a direct impact on land suitability scoring (evaluation). The sub-sections below outline how the primary land features have been organized into six distinct layers, which form the basis for evaluation and scoring.

Natural Features (Impact of Development on Nature)

Natural land features were organized for their ability to support or be an integral component of an ecological system. The following natural land features were evaluated:

- Layer 1: Forested Areas (Vegetation)
- Layer 2: Watercourses
- Layer 3: Wetlands

Natural Hazards (Impact of Nature on Development)

Natural hazard features were organized into areas with elevated risks associated with natural conditions and historic and ongoing human activities. The following natural hazard land features were evaluated:

- Layer 4: Slopes
- Layer 5: Contaminated Sites

Heritage and Cultural Landscape

Heritage and cultural features were organized to determine historic community value and how they should be recognized, preserved and, perhaps, enhanced through the refinement of a new development plan:

- Layer 6: Heritage and Cultural Landscape

2.1.2 IDENTIFY

Primary land features were researched, investigated and examined at desktop and field reconnaissance levels. Desktop identification sources included municipal and provincial mapping databases and inventories, satellite and aerial photography, background studies, and reports and literature. Field reconnaissance identification sources included wetland delineations, tree stand delineations, public and stakeholder consultations, and ground-truthing exercises to identify natural habitats and areas of cultural and heritage significance.

2.1.3 EVALUATE

Once identified and catalogued within each layer, primary land features were individually evaluated against a consistent 0-4 scoring system in order to determine their 'level of development constraint'. 'Constraint', in the context of this LSA, means a land feature's ability to respond to potential development pressures. In other words, the higher the constraint value (i.e. the higher a primary land feature scores on the 0-4 spectrum), the less suitable that area of land is for development. The individual scoring system provides a way of differentiating and comparing significant land features within the same layer (i.e. within Layer 3: Wetlands, 'Wetland A' is more significant than 'Wetland B' because it ranks higher on the 0-4 scale). **Table 2.1-1** below outlines the consistent scoring methodology applied to each primary land feature. Once scored, each land feature, and associated score, was mapped as a visual representation of land constraint.

Table 2.1-1: Land Suitability Scoring System

SCORE	DEFINITION	MAP COLOUR
0 = Not Constrained	means land where the primary function is intended to support development	White (opaque)
1 = Minor Constraints	means land suitable for development where the purpose of the land is to be developed in response to natural and cultural landscape features	Green
2 = Marginally Constrained	means land somewhat suitable for development where some environmental and cultural conservation or mitigation efforts may be required in order to preserve ecological function	Yellow
3 = Moderately Constrained	means land with features in support of ecological function where additional studies may be required to verify the presence of significant land features prior to development	Orange
4 = Totally Constrained	means land where the primary function is intended to support environmental and cultural conservation efforts. Natural corridor, passive recreation, and some active recreation and infrastructure, such as bridges and roads, may be permitted where they do not undermine the ecological function of the land	Red

2.1.3.1 CUMULATIVE SCORING

To assess the overall implications of the data, the findings from each layer were accumulated on a single constraints map to visually represent areas of elevated environmental and cultural and heritage significance. Where scored primary land features overlapped on the map, the area of land impacted was then assessed on a new cumulative scoring approach with values totally between 0-16. The 0-16 system was then scaled into five classifications/definitions consistent with the '0-4' scoring methodology and definitions applied consistently for each layer. For example, where a Forest Stand scored '2' overlaps with a Watercourse feature scored '1', a Wetland Feature scored '3', a Slope scored '0', a Contaminated Site scored '1' and a Heritage and Cultural Landscape feature scored '2', the new cumulative score for that particular area of land equals '9'; when applied to the consistent 0-4 scale, that '9' translates into a '2'. **Table 2.1-2** below outlines how the cumulative scoring approach correlates to the consistent LSA layered scoring system.

Table 2.1-2: Cumulative Scoring Methodology

CUMULATIVE SCORE (SCALED VALUES)	CLASSIFICATION
0-2	0 = Not Constrained
3-5	1 = Minor Constraints
6-8	2 = Marginally Constrained
9-11	3 = Moderately Constrained
12-16	4 = Totally Constrained

2.2 BASELINE INFRASTRUCTURAL ASSESSMENTS

In addition to the LSA reporting and mapping, Baseline Infrastructural Assessments, pertaining to 'Connectivity and Mobility' and 'Infrastructure Capacity', were completed in order to summarize where potential 'land suitability–infrastructure' conflicts may arise resulting from future development/infrastructural requirements. The **Baseline Infrastructural Analysis** (provided as a standalone document) provides an overview of the infrastructural opportunities and challenges that will need to be considered as the Port Wallace Secondary Planning Process proceeds to future planning phases, including Infrastructure Master Planning and Capital Costing. Future Secondary Planning phases will require additional study and reporting to confirm the key infrastructural understandings and assumptions.

2.3 KEY ASSUMPTION

This LSA is intended to identify and prioritize areas of elevated ecological and cultural significance so that future land use planning decisions can mitigate potentially adverse effects of development. The results of this LSA may be altered as Secondary Planning progresses, subject to additional field reporting, study, analysis and permitting requirements.

3 EVALUATION

The following Chapter summarizes the evaluative methodologies and results for the six (6) LSA features:

- Forested Areas
- Watercourses
- Wetlands
- Steep Slopes
- Contaminated Sites
- Heritage & Cultural Assets

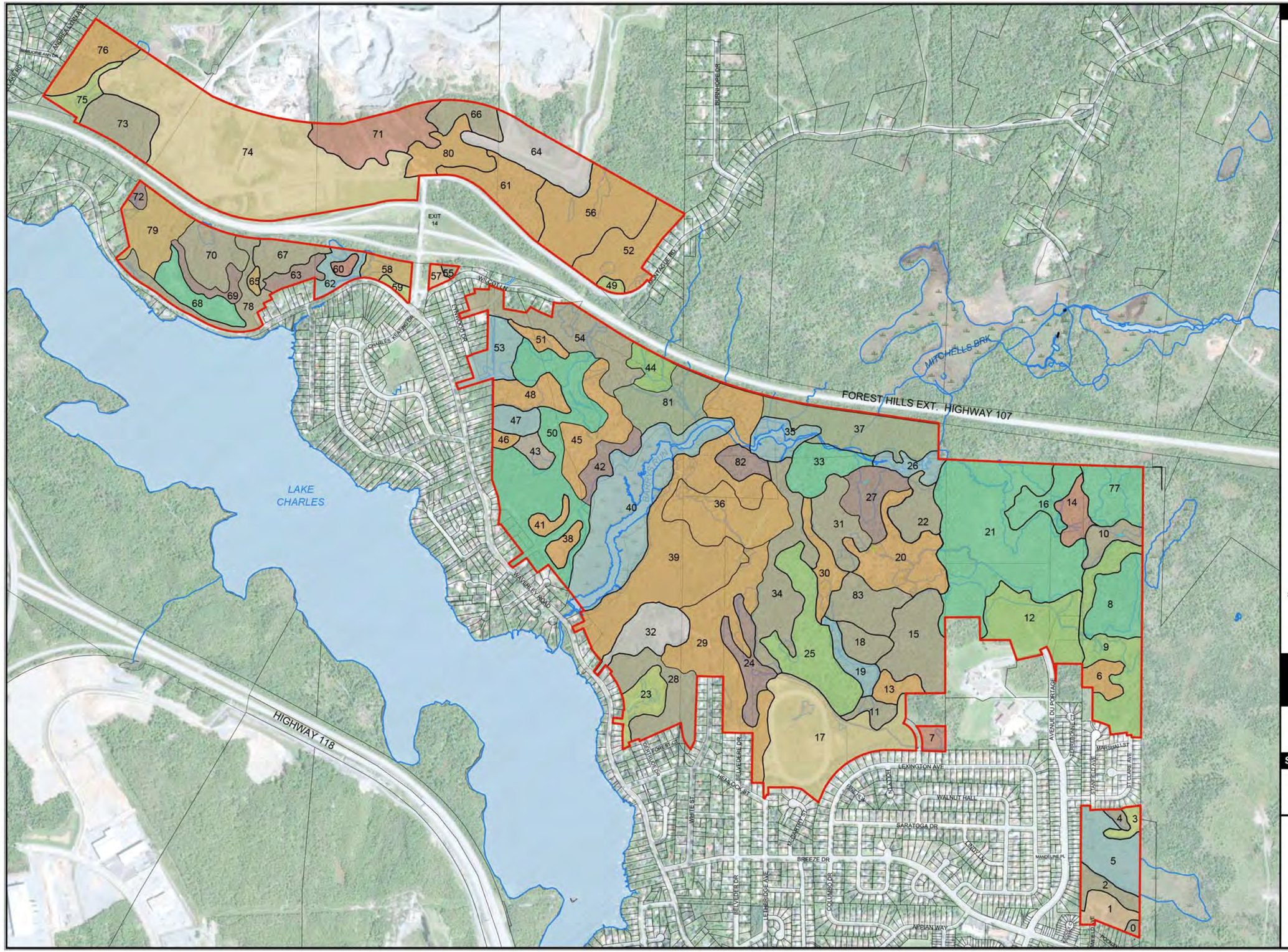
3.1 LAYER 1: FORESTED AREAS

3.1.1 METHODOLOGY

The forested areas within the project were assessed on a desktop level by using the provincial forest cover layer to create polygons representing eighty-four (84) individual forest stands (FIDs). Field work was completed in August 2014 by WSP's field biologists to confirm the vegetative composition of each stand. 2012 aerial photography was then analyzed to revise the stand boundaries **(Figure 3.1-1)**.

During the field assessment, stands were visited and data was collected for a single point within each stand, including the tree, shrub, herbaceous and moss species present, and the development stage of the tree species within the stand. The field data was assessed using the NSDNR Forest Ecosystem Classification (Forest Vegetation Types guide), and a Vegetation Type (VT) identification category was applied to each stand. A photo log showing examples of the classified forest areas is included in **Appendix D-1**. The VT categories represented within the PWSPSA include:

- Intolerant Hardwood Forest Group (IH6, IH7)
- Mixed Wood Forest Groups (MW1, MW2, MW4)
- Old Field Forest Group (OF3, OF5)
- Open Woodland Forest Group (OW2)
- Spruce Hemlock Forest Group (SH1, SH3, SH4, SH5, SH7, SH8)
- Spruce Pine Forest Group (SP4, SP5)
- Tolerant Hardwood Forest Group (TH5, TH7, TH8)
- Coastal Forest Group (CO2, CO6)
- Wet Coniferous Forest Group (WC1, WC7)



LEGEND

- Study Area Boundary
- Property Boundaries
- Watercourse
- Wetlands

Score Classification

- Active Quarry
- Coastal Forest
- Developed Area
- Disturbed Area
- Intolerant Hardwood
- Mixed Wood
- None
- Old Field
- Old Quarry
- Open Woodland
- Red Spruce Pine
- Spruce Hemlock
- Spruce Pine
- Tolerant Hardwood
- Wet Coniferous

NOTES:

- Property lines approximate only. Site subject to survey

SOURCES:

- Service Nova Scotia and Municipal Relation Online Property Database
- Province of Nova Scotia Digital Topographic Series
- Boreal Environmental forest cover assesment

NATURAL FEATURES

FIGURE 3.1-1
FORESTED AREAS
(VEGETATIVE COVER)
DARTMOUTH, NOVA SCOTIA

PORT WALLACE SECONDARY PLANNING STUDY AREA

OCTOBER 26, 2015 B07057-127-FRST

SCALE 200 100 0 100 200 300 m

1 : 12,500

NORTH

WSP
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM

In Nova Scotia, the age of a forest stand can determine criteria that can be attributed to its ecological importance. Stands that have mature wood generally provide a more diverse habitat for the overall number of species that can utilize food resources, and find suitable dwelling places (i.e. burrows, nest cavities, canopy, ground cover, etc.). The range of stand ages present within the study area includes tracts of land that were bare, to climax mature forest stands.

Interior forest is arguably the most important and diverse forested landscape in Nova Scotia. Interior forest is defined as continuous patches of mature forest greater than 10 ha and at least 100 m away from non-vegetated land such as roads, residential, industrial and agricultural lands as well as open water and wetlands.

3.1.1.1 FOREST STAND SCORING

Table 3.1-1 below outlines how forest stands are scored in the LSA. Defined scores are attributed to forest stands based on 'stand age'; 'habitat potential' is then applied as an additional value. The total score potential is 0-4.

Table 3.1-1: Forest Stand Scoring

FOREST AGE	OBSERVED	DEFINED SCORE
i. No Stand Present	Yes/No	0
ii. Young	Yes/No	1
iii. Mature	Yes/No	2
iv. Old Growth	Yes/No	3
HABITAT	**MODEL RESULTS**	**ADDITIONAL SCORE**
i. Habitat Potential	No	0
ii. Habitat Potential	Yes	1
TOTAL SCORE POTENTIAL:		**0-4**
DEFINITIONS:		
Young	A young forest represents non merchantable timber. Young forests are generating biomass volume rapidly. This category includes forest stands that are classed as regenerating and sapling. Sapling refers to trees less than 3 m in height. Even though some species nest here, and some actually rely on this rapidly growing forest as a food resource, this age category generally provides less habitat quality or potential due to lack of certain food supplies and suitable dwelling habitat.	
Mature	A mature forest is most easily noted by the size of merchantable timber that is present in the forest. The overall volume growth of the stand has slowed or is stable (growth and mortality about equal). This layer includes immature merchantable timber stands which are still growing, but much slower than young stands. Mature stands have an increased potential for diverse wildlife communities and are a part of a healthy ecosystem.	
Old Growth	An old growth forest is most often associated with high wildlife diversity (i.e. number of species) and representative of a healthy landscape. The merchantable timber located in these stands are starting to die back leaving large openings for young forest, and the increased light to the forest floor produces chances for various species to flourish in the sunlight. It is true that the total forest biovolume is declining due to natural mortality, but this age class is preferred by many species due to the number of foraging and dwelling opportunities, habitat diversity and food supply that is available. Old growth, or 'overmature', stands are frequented by cavity nesting birds and small mammals.	
Habitat Potential	The habitat for species at risk potential is built from the habitat modelling exercise **(Appendix C)** and is an estimate of the likelihood of species at risk being present in a particular forest stand.	

3.1.2 RESULTS

It is important to understand the forest types that reside in the PWSPSA in order to limit the loss of valuable old growth or mature forest stands within the region. Large stands of mature forests free of edge effects are not present within the PWSPSA, which means there are no interior forests located on the site. There is also an absence of Old Growth forest stands on the site resulting in no risk for the loss of these high wildlife diversity areas.

Blowdown on the edge of the PWSPSA, primarily the Unia Lands in the eastern boundary, represents habitat degradation. Although not a complete loss of habitat, changes to abiotic conditions and blowdown can make the edge habitat unusable or less desirable to some plant and wildlife species.

Table 3.1-2 below outlines the scores assigned to each FID, and **Figure 3.1-2** maps the results of the Forest Stand scoring. Of the 84 individual forest stands, 16 have been ranked as 'Moderately Constrained' (value of '3'); 34 are 'Marginally Constrained' (value of '2'); and the remaining 34 are ranked between 'Not Constrained' (value of '0') and 'Minor Constraints' (value of '1').

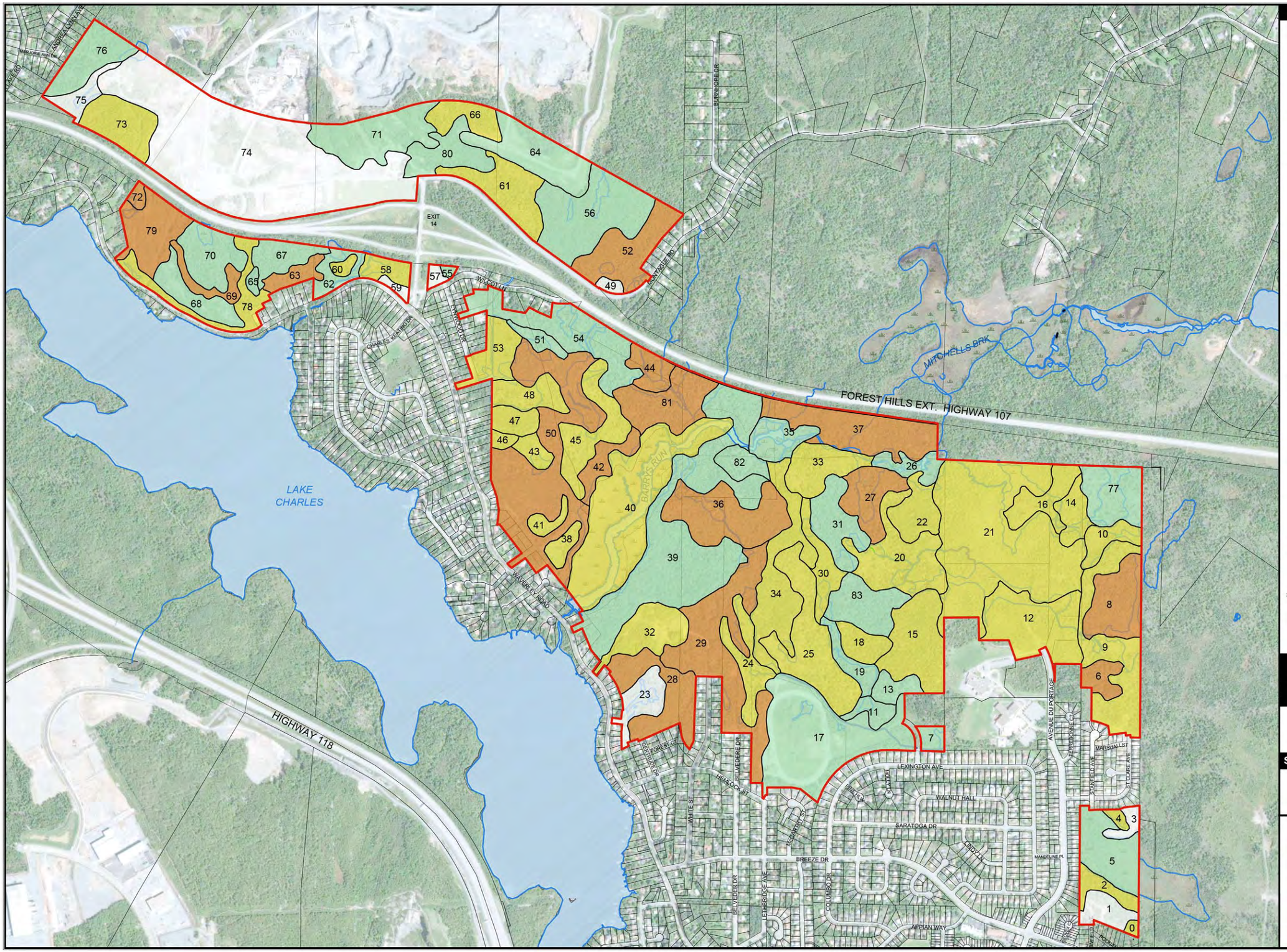
Table 3.1-2: Forest Stand Scoring Results

FID	FOREST VEGETATION TYPE	FOREST VEGETATION TYPE SUBCLASS	AGE CLASS	FOREST SIZE (M^2)	NONE (0)	YOUNG FOREST (1)	MATURE FOREST (2)	OLD GROWTH FOREST (3)	HABITAT POTENTIAL (+1)	TOTAL
0	Spruce Hemlock	SH5	Mature	2150			2			**2**
1	Disturbed Area	None	None	16354	0					**0**
2	Spruce Hemlock	SH5	Mature	12692			2			**2**
3	Disturbed Area	None	None	6833	0					**0**
4	Spruce Hemlock	SH5	Mature	3363			2			**2**
5	Wet Coniferous	WC7	None	39024	0				1	**1**
6	Mixed Wood	MW2	Immature to Mature	13101			2		1	**3**
7	Coastal Forest	C06	Sapling	6918		1				**1**
8	Spruce Pine	SP5	Mature	41148			2		1	**3**
9	Intolerant Hardwood	IH6	Regenerating to Mature	62180		1			1	**2**
10	Spruce Hemlock	SH5	Mature	16061			2			**2**

FID	FOREST VEGETATION TYPE	FOREST VEGETATION TYPE SUBCLASS	AGE CLASS	FOREST SIZE (M^2)	NONE (0)	YOUNG FOREST (1)	MATURE FOREST (2)	OLD GROWTH FOREST (3)	HABITAT POTENTIAL (+1)	TOTAL
11	Spruce Hemlock	SH5	Immature	10165		1				**1**
12	Intolerant Hardwood	IH6	Sapling	64425		1			1	**2**
13	Mixed Wood	MW2	Regenerating to Immature	11909		1				**1**
14	Coastal Forest	C06	Immature	17091			2			**2**
15	Spruce Hemlock	SH5	Mature	52717			2			**2**
16	Spruce Pine	SP4	Young	24320		1			1	**2**
17	Developed Area	None	None	114519	0				1	**1**
18	Spruce Hemlock	SH1	Mature	16527			2			**2**
19	Wet Coniferous	WC1	None	14766	0				1	**1**
20	Mixed Wood	MW1	Sapling to Mature	57347		1			1	**2**
21	Spruce Pine	SP5	Sapling	188125		1			1	**2**
22	Spruce Hemlock	SH5	Immature to Mature	24558			2			**2**
23	Old Quarry	None	None	21669	0					**0**
24	Tolerant Hardwood	SP8	Regenerating to Mature	26771		1			1	**2**
25	Intolerant Hardwood	IH6	Sapling	68148		1			1	**2**
26	Wet Coniferous	WC1	None	14669	0				1	**1**
27	Tolerant Hardwood	TH7	Mature	31850			2		1	**3**
28	Spruce Hemlock	SH3	Immature to Mature	46086			2		1	**3**
29	Mixed Wood	MW2	Immature to Mature	96065			2		1	**3**
30	Mixed Wood	MW2	Immature to Mature	20489			2			**2**
31	Spruce Hemlock	SH4	Young to Immature	34134		1				**1**
32	Active Quarry	None	None	34141		1			1	**2**
33	Spruce Pine	SP4	Regenerating to Mature	32029		1			1	**2**
34	Spruce Hemlock	SH5	Mature	59957			2			**2**
35	Wet Coniferous	WC1	None	22736	0				1	**1**
36	Mixed Wood	MW2	Immature to Mature	64056			2		1	**3**
37	Red Spruce	None	Mature	63699			2		1	**3**

FID	FOREST VEGETATION TYPE	FOREST VEGETATION TYPE SUBCLASS	AGE CLASS	FOREST SIZE (M^2)	NONE (0)	YOUNG FOREST (1)	MATURE FOREST (2)	OLD GROWTH FOREST (3)	HABITAT POTENTIAL (+1)	TOTAL
	Pine*									
38	Mixed Wood	MW1	Regenerating to Mature	9224		1			1	**2**
39	Mixed Wood	MW2	Immature to Mature	163345			2			**1**
40	Wet Coniferous	WC1	None	128581		1			1	**2**
41	Mixed Wood	MW1	Regenerating to Mature	7584		1			1	**2**
42	Tolerant Hardwood	SP8	Immature	16551			2		1	**3**
43	Open Woodland	OW2	Regenerating	9604		1			1	**2**
44	Intolerant Hardwood	IH7	Immature	16239			2		1	**3**
45	Mixed Wood	MW1	Regenerating to Mature	41152		1			1	**2**
46	Mixed Wood	MW1	Regenerating to Mature	4437		1			1	**2**
47	Wet Coniferous	WC7	None	13762		1			1	**2**
48	Mixed Wood	MW1	Regenerating to Mature	22712		1			1	**2**
49	Disturbed Area	None	None	3742	0					**0**
50	Spruce Pine	SP5	Mature	121540			2		1	**3**
51	Mixed Wood	MW4	Sapling	8860		1				**1**
52	Mixed Wood	MW4	Immature to Mature	46796			2		1	**3**
53	Wet Coniferous	WC1	None	15541		1			1	**2**
54	Spruce Hemlock	SH8	Young to Mature	54453		1				**1**
55	Spruce Hemlock	SH5	Young to Mature	1777		1				**1**
56	Mixed Wood	MW2	Young	76881		1				**1**
57	None	None	None	3711	0					**0**
58	Old Field	OF5	Immature	12497			2			**2**
59	Disturbed Area	None	None	3546	0					**0**
60	Coastal Forest	C06	Immature to Mature	4109			2			**2**
61	Mixed Wood	MW4	Regenerating to Mature	40923		1			1	**2**
62	Wet Coniferous	WC1	None	13937	0				1	**1**
63	Tolerant Hardwood	TH5	Immature	11792			2		1	**3**

FID	FOREST VEGETATION TYPE	FOREST VEGETATION TYPE SUBCLASS	AGE CLASS	FOREST SIZE (M^2)	NONE (0)	YOUNG FOREST (1)	MATURE FOREST (2)	OLD GROWTH FOREST (3)	HABITAT POTENTIAL (+1)	TOTAL
64	Active Quarry	None	None	49678	0				1	**1**
65	Old Field	OF5	Sapling to Immature	3037		1				**1**
66	Spruce Hemlock	SH7	Mature	21319			2			**2**
67	Spruce Hemlock	SH5	Young to Mature	21102		1				**1**
68	Spruce Pine	SP4	Regenerating	24794		1				**1**
69	Tolerant Hardwood	SP8	Mature	12609			2		1	**3**
70	Spruce Hemlock	SH5	Young to Mature	34214		1				**1**
71	Coastal Forest	C06	Sapling	54581		1				**1**
72	Tolerant Hardwood	SP8	Mature	3973			2		1	**3**
73	Spruce Hemlock	SH5	Mature	35357			2			**2**
74	Developed Area	None	None	272996	0					**0**
75	Disturbed Area	None	None	13492	0					**0**
76	Mixed Wood	MW2	Sapling to Immature	33590		1				**1**
77	Spruce Pine	SP5	Regenerating	37436		1				**1**
78	Spruce Hemlock	SH4	Immature	29852			2			**2**
79	Old Field	OF5	Immature	40012			2		1	**3**
80	Mixed Wood	MW4	Young	30477		1				**1**
81	Red Spruce Pine	None	Mature	44342			2		1	**3**
82	Tolerant Hardwood	SP8	Regenerating to Mature	14094		1				**1**
83	Spruce Hemlock	SH4	Young to Immature	35357		1				**1**



LEGEND

- Study Area Boundary
- Property Boundaries
- Watercourse
- Wetlands

Score Classification

- Not Constrained (Score 0)
- Minor Constraints (Score 1)
- Marginally Constrained (Score 2)
- Moderately Constrained (Score 3)
- Totally Constrained (Score 4)

NOTES:

- Property lines approximate only. Site subject to survey

SOURCES:

- Service Nova Scotia and Municipal Relation Online Property Database
- Province of Nova Scotia Digital Topographic Series
- Boreal Environmental forest cover assesment

NATURAL FEATURES

FIGURE 3.1-2
FORESTED AREAS (VEGETATIVE COVER) CONSTRAINTS MAP
DARTMOUTH, NOVA SCOTIA

PORT WALLACE SECONDARY PLANNING STUDY AREA

OCTOBER 26, 2015 B07057-127-FRST

SCALE 200 100 0 100 200 300 m — 1 : 12,500

NORTH

WSP
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM

3.2 LAYER 2: WATERCOURSES

3.2.1 METHODOLOGY

Watercourses within the PWSPSA were field delineated either during previous wetland and watercourse delineations or during the field work completed in August 2014 by WSP's environmental team. The field delineated watercourses (and wetlands) are shown on **Figure 3.2-1**. Watercourses were then classified and evaluated based on 'Stream Order'.

3.2.1.1 WATERCOURSE CLASSIFICATION SYSTEM

The Strahler stream classification system (Strahler, 1952) [1] is a method of classifying watercourses where an 'order' is given according to the number of additional tributaries associated with each watercourse portion. This system provides a measure of system complexity: the theory is that the higher the order number, the higher the potential for both fish presence, and good fish habitat.

Image 3.2-1 indicates the Strahler stream ordering process. Numbering begins at the top of a catchment with headwater flow paths being assigned the number '1', or a first order stream. Where two flow paths of a first order stream join, the section downstream of the junction is referred to as a second order stream. Where two second order streams join, the waterway downstream of the junction is referred to as a third order stream, and so on. Where a lower order stream (e.g. first order) joins a higher order stream (e.g. third order), the area downstream of the junction will retain the higher number (i.e. it will remain a third order stream).

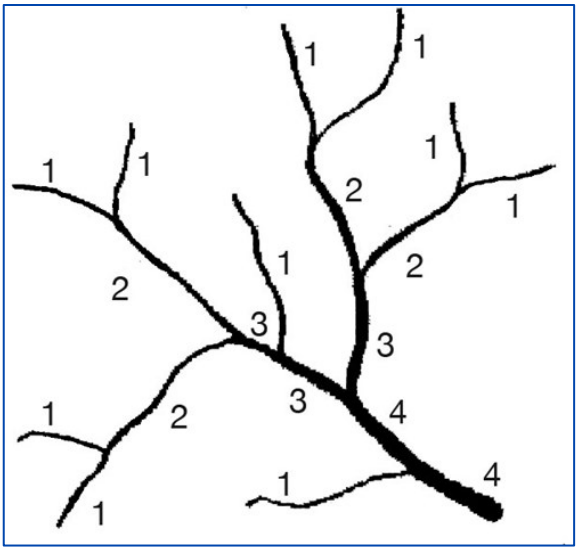
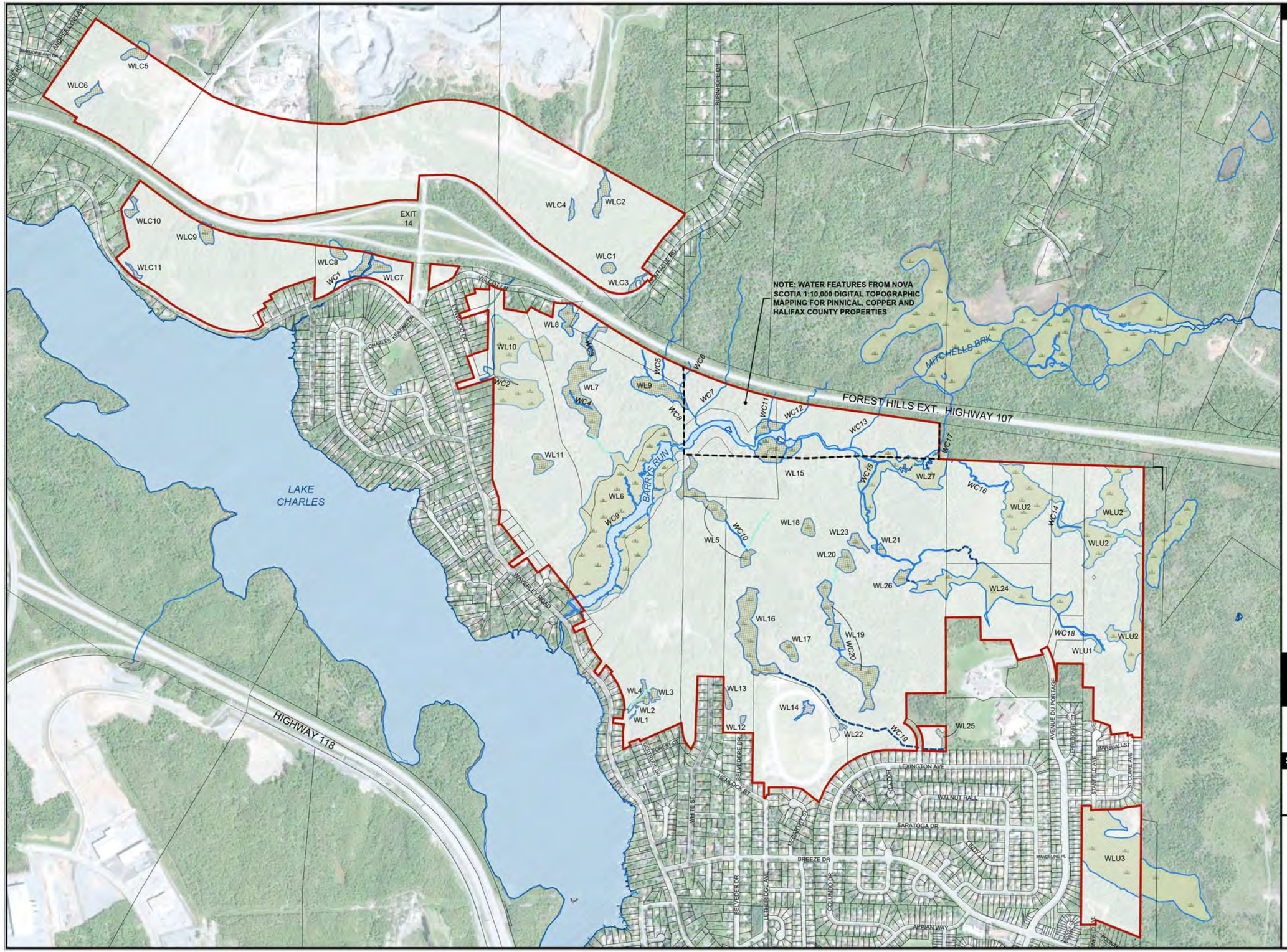


Image 3.2-1: http://www.geography-fieldwork.org/rivers/river-variables.aspx

It is likely that third order streams and above are a better indicator of fish habitat, and hence could support viable fish populations. As a result, any alteration or fish passage barriers located on third order and above watercourses should be avoided.



LEGEND

- Study Area Boundary
- Property Boundaries
- Watercourse
- Watercourse (Further Investigation)
- Drain
- Wetlands Over 2 Hectares
- Wetlands Under 2 Hectares
- Riparian Buffer (20m)

NOTES:

- Property lines approximate only. Site subject to survey

SOURCES:

- Service Nova Scotia and Municipal Relation Online Property Database
- Nova Scotia Digital Topographic Series
- WSP Wetland and Watercourse Delineation, Port Wallis, August 2014
- GENIVAR Wetland and Watercourse Delineation, Port Wallis, January 2013
- Strum Field Identified Wetlands and Watercourse, June 2008
- Clayton Developments Port Wallace Watercourse Determination Map, September 15, 2014
- NSE Compliance letter (email) received, via Clayton Developments, September 29, 2014, conforming drainage channels and watercourses requiring further investigation

NATURAL FEATURES

FIGURE 3.2-1
WETLAND AND WATERCOURSES DELINEATION MAP
DARTMOUTH, NOVA SCOTIA

PORT WALLACE SECONDARY PLANNING STUDY AREA

OCTOBER 26, 2015 B07057-127-R1

SCALE 200 100 0 100 200 300 m
1 : 12,500

NORTH

WSP
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM

Although some exceptions apply, stream order will also correspond with the watercourse classification number with respect to characterization of the watercourse, its potential for fish and fish habitat, and the recommended crossing structures. The watercourse classification system described below is taken from (Fairfull and Witheridge 2003), with Class 4 waterways generally being 1st and 2nd order streams (and some 3rd order streams), while Class 3 will generally be 3rd order streams. Class 1 and 2 will be 3rd order or above streams.

Based on some work in New South Wales, Australia, a system to classify some streams for their fish potential was used and is based on the Strahler stream ordering. A basic 'Class' system assigns aquatic habitat values to waterways. As mentioned above, overlap exists between Class and Strahler's stream ordering system; however, specific waterway characteristics feature more prominently in Class definitions. **Table 3.2-1** below outlines the characteristics of each waterway class. Waterway Class was one of the criteria used to prioritize road crossing sites in New South Wales as part of Bringing Back the Fish project.

Table 3.2-1: Watercourse classification of fish habitat in watercourses and recommended crossing type, if any (Fairfull and Witheridge 2003) [2].

CLASSIFICATION	CHARACTERISTICS OF WATERWAY TYPE	MINIMUM [1] RECOMMENDED CROSSING TYPE
CLASS 1 Major fish habitat (Fifth Order Streams or higher)	Major permanently or intermittently flowing waterway (e.g. river or major creek); habitat of a threatened fish species or 'critical habitat'.	Bridge, arch structure or tunnel.
CLASS 2 Moderate fish habitat (Fourth Order Streams)	Named permanent or intermittent stream, creek or waterway with clearly defined bed and banks with semi-permanent to permanent waters in pools or in connected wetland areas. Marine or freshwater aquatic vegetation is present. Known fish habitat and/or fish observed inhabiting the area.	Bridge, arch structure, culvert [2] or ford.
CLASS 3 Minimal fish habitat (Third Order Streams)	Named or unnamed waterway with intermittent flow and potential refuge, breeding or feeding areas for some aquatic fauna (e.g. fish, yabbies). Semi-permanent pools form within the waterway or adjacent wetlands after a rain event. Otherwise, any minor waterway that interconnects with wetlands or recognised aquatic habitats.	Culvert [3] or ford.
CLASS 4 Unlikely fish habitat. (First and Second Order Streams)	Named or unnamed waterway with intermittent flow following rain events only, little or no defined drainage channel, little or no flow or free standing water or pools after rain events (e.g. dry gullies or shallow floodplain depressions with no permanent aquatic flora present).	Culvert [4], causeway or ford.
[1] In all cases, bridges are preferred to arch structures, culverts, fords and causeways (in that order). [2] High priority is given to the "high flow design" procedures for the design of these culverts – refer to Design Considerations in Fairfull & Witheridge (2003) or engineering guidelines (Witheridge, 2002). [3] Minimum culvert design using the "low flow design" procedures; however, "high flow design" and "medium flow design" should be given a priority where affordable (refer Witheridge, 2002). [4] Fish friendly waterway crossing designs possibly unwarranted. Fish passage requirements should be confirmed with the local fisheries department/authority.		

3.2.1.2 WATERCOURSE SCORING

Table 3.2-2 below defines how watercourses are scored in the LSA. Based on the system described above, defined scores are attributed to watercourses, including their riparian buffers, based on 'Stream Order' first, and then 'habitat potential' for species at risk is applied as an additional value. Fourth order steams and above are automatically assigned a score of Totally Constrained' (value of '4'). The total score potential is 0-4. As per RMPS policy, a 20 metre riparian buffer was also applied to the scoring results for all watercourses.

Table 3.2-2: Watercourse Stand Scoring

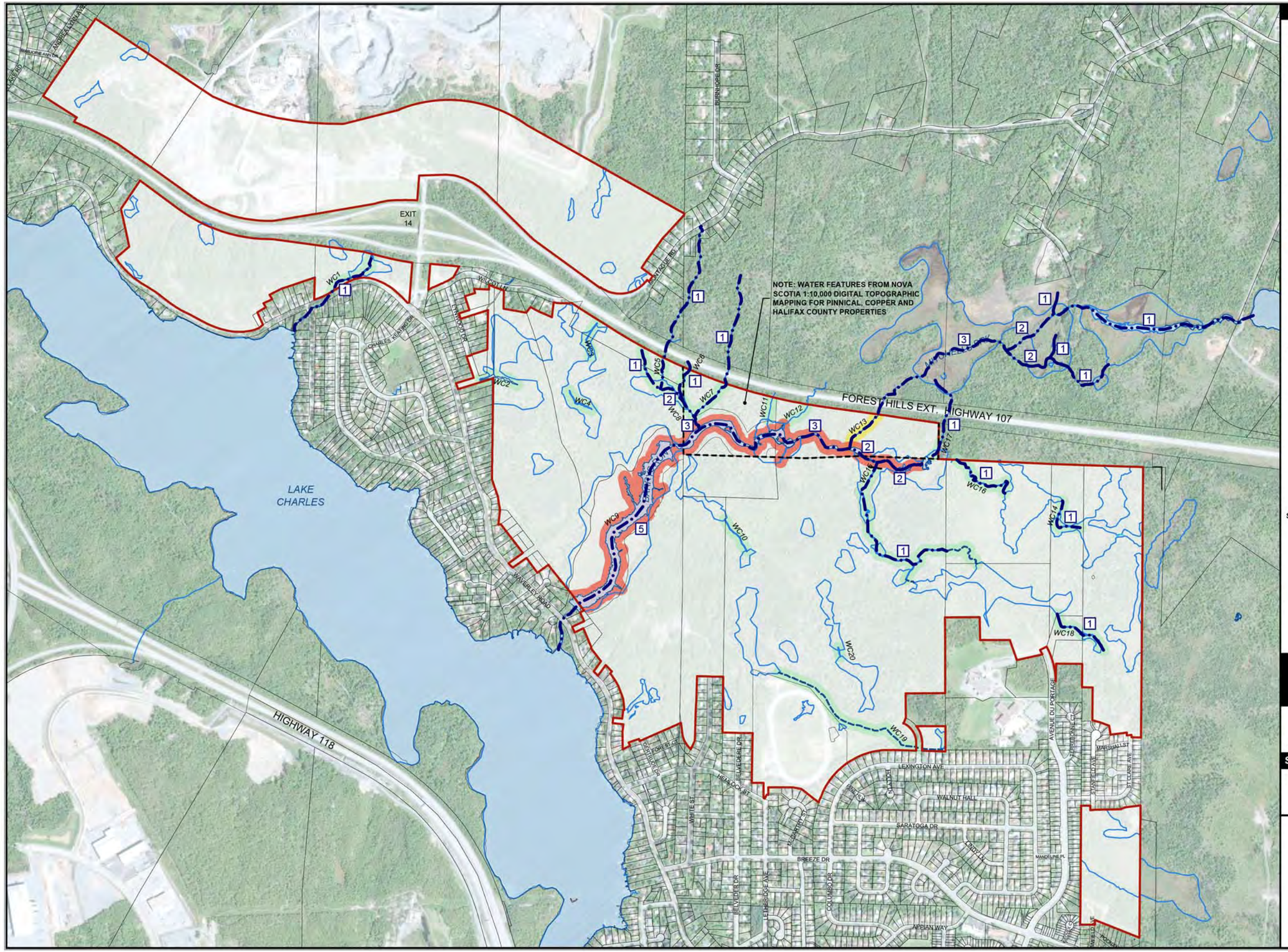
STREAM ORDER	OBSERVED	DEFINED SCORE
i. First Order Stream	Yes/No	1
ii. Second Order Stream	Yes/No	2
iii. Third Order Stream	Yes/No	3
HABITAT	**MODEL RESULTS**	**ADDITIONAL SCORE**
i. Habitat Potential	No	0
ii. Habitat Potential	Yes	1
TOTAL SCORE POTENTIAL:		**0-4**
DEFINITIONS:		
First Order Stream	A first order stream is the smallest of the study area streams and consists of small tributaries. These are the streams that flow into and "feed" larger streams but do not normally have any water flowing into them. In addition, first and second order streams generally form on steep slopes and flow quickly until they slow down and meet the next order watercourse. First through third order streams are also called headwater streams and constitute any waterways in the upper reaches of the watershed. It is estimated that over 80% of the world's waterways are these first through third order, or headwater streams.	
Second Order Stream	A second order stream is a combination of two first order streams. These watercourses are still very small, and present little fish habitat.	
Third Order Stream (and up)	Strictly speaking, a third order stream is a watercourse combined from two second order streams. This size watercourse does not have much size or strength. Going up in size and strength, streams that are classified as fourth through sixth order are medium streams while anything larger (up to 12th order) is considered a river. For example, to compare the relative size of these different streams, the Ohio River in the United States is an eighth order stream while the Mississippi River is a tenth order stream. The world's largest river, the Amazon in South America, is considered a 12th order stream.	
Habitat Potential	The habitat for species at risk potential is built from the habitat modelling exercise **(Appendix C)** and is an estimate of the likelihood of species at risk being present in a particular watercourse.	

3.2.2 RESULTS

Table 3.2-3 below outlines the scores assigned to each watercourse, and **Figure 3.2-2** maps the results of the combined Wetland and Watercourses scoring. Of the 20 identified watercourses, only one (WC9) was identified as being 'Totally Constrained' (value of '4'). Three other watercourses in the PWSPSA were identified as being 'Moderately Constrained' (value of '3') to 'Marginally Constrained' (value of '2'). The remaining sixteen are considered to have 'Minor Constraints' (value of '1').

Table 3.2-3: Watercourse Scoring Results

WATERCOURSE	OVERALL STREAM ORDER	FIRST ORDER (1)	SECOND ORDER (2)	THIRD ORDER (+) (3)	HABITAT POTENTIAL (+1)	TOTAL
WC1	1	1				**1**
WC2	1	1				**1**
WC3	1	1				**1**
WC4	1	1				**1**
WC5	1	1				**1**
WC6	1	1				**1**
WC7	1	1				**1**
WC8	2		2			**2**
WC9	3			3	1	**4**
WC10	1	1				**1**
WC11	1	1				**1**
WC12	1	1				**1**
WC13	3			3		**3**
WC14	1	1				**1**
WC15	2		2			**2**
WC16	1	1				**1**
WC17	1	1				**1**
WC18	1	1				**1**
WC19	1	1				**1**
WC20	1	1				**1**



LEGEND

- Study Area Boundary
- Property Boundaries
- Watercourse
- Watercourse (Further Investigation)
- Extent of Nova Scotia Topographic Water Features within Study Area
- 1 — WC Stream Order

Score Classification

- Not Constrained (Score 0)
- Minor Constraints (Score 1)
- Marginally Constrained (Score 2)
- Moderately Constrained (Score 3)
- Totally Constrained (Score 4)

NOTES:

- Property lines approximate only. Site subject to survey

SOURCES:

- Service Nova Scotia and Municipal Relation Online Property Database
- Nova Scotia Digital Topographic Series
- WSP Wetland and Watercourse Delineation, Port Wallis, August 2014
- GENIVAR Wetland and Watercourse Delineation, Port Wallis, January 2013
- Strum Field Identified Wetlands and Watercourse, June 2008
- Clayton Developments Port Wallace Watercourse Determination Map, September 15, 2014
- NSE Compliance letter (email) received, via Clayton Developments, September 29, 2014, conforming drainage channels and watercourses requiring further investigation

NATURAL FEATURES

FIGURE 3.2-2
WATERCOURSE CONSTRAINTS MAP
DARTMOUTH, NOVA SCOTIA

PORT WALLACE SECONDARY PLANNING STUDY AREA

OCTOBER 26, 2015 B07057-127-R1

SCALE 200 100 0 100 200 300 m — 1 : 12,500

NORTH

WSP
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM

3.3 LAYER 3: WETLANDS

3.3.1 METHODOLOGY

Within the PWSPSA, wetlands were identified by reviewing previous wetland delineations and completing new wetland delineations where required. With the exception of two small parcels along Highway 107 (Cooper and Pinnacle Properties), all wetlands were field verified. For these two parcels, Provincial mapping and aerial photography interpretation were used to identify wetland areas **(Figure 3.2/3-1)** (previous section).

Site visits were carried out in August 2014. The presence/absence of wetlands was evaluated in accordance with the *U.S. Army Corps of Engineers Wetlands Delineation Manual* and the *Northcentral and Northeastern Interim Regional Supplement*. During the field work, the site was traversed in transects in search of areas showing typical wetland characteristics. The vegetation, soil and hydrology of any perspective wetland areas were assessed in order to determine whether or not the present conditions constitute a wetland. When a wetland was identified, a boundary determination was made, the position of this boundary was recorded using a differential GPS unit, and marked in the field with pink flagging tape. Data sheets for the individual wetlands are available in the property owners' wetland and watercourse delineation reports. These reports have been made available to HRM. A photo log showing examples of the classified wetlands is included in **Appendix D-2**.

3.3.1.1 WETLAND SCORING

Under the *Nova Scotia Environment Act* (amended, 2011) any alteration to a wetland or watercourse, including the construction of a road crossing, requires approval by NSE prior to construction. In addition to providing important natural functions, wetland areas are often less suitable for development due to permitting requirements, the cost of compensation, suitability of soils, and the requirement to engineer water management solutions, as required.

Any proposed wetland alteration falls under provincial jurisdiction. Wetlands less than 2 hectares (20,000m2) in area are assessed under the Nova Scotia Wetland Conservation Policy and those more than 2 hectares (20,000m2) in area require an environmental impact assessment to be reviewed under the Environmental Assessment Act. However, through the RMPS (Policy E-15), it is HRM's intent to prohibit the development of wetlands greater than 2,000m2 until such time as they are made suitable for development in accordance with provincial requirements.

The size of a wetland conveys a regulatory change, and it may also, in some ways, determine many other ecological functions. Wetlands were, therefore, evaluated on two scales: wetlands greater than and less

than 2,000m2. Three other factors were considered to rank wetlands within the land suitability study, including: a wetland connected to a watercourse; a wetland that functions in groundwater recharge; and a wetland that has potential habitat for a species at risk. In the PWSPSA, there are no wetlands less than 2,000m^2 connected to a watercourse or that have ground water recharge potential.

Wetlands less than 2,000m2 are scored between 0-2. For example, a wetland that is present and is less than 2,000m2 would score a 1, and if there was potential for species at risk in that wetland, as identified in the habitat modelling exercise, the final score would be 2. Wetlands greater than 2,000m2 are scored between 1-4. Wetlands greater than 2,000m2 have a score of 1, plus one if it is connected to a watercourse, plus 1 if it is considered to be a wetland that has groundwater recharge as a function, and plus 1 if it is a wetland that has potential for species at risk, as identified in the habitat modelling exercise. **Table 3.3-1** below defines how wetlands are scored in the LSA.

Table 3.3-1: Wetland Scoring

WETLANDS < 2,000M2	**OBSERVED**	**SCORE**
v. Size < 2,000m2	Yes/No	1
vi. Habitat Potential	Yes/No	1
TOTAL SCORE POTENTIAL:		**0-2**
Wetlands > 2,000m2	**Observed**	**Score**
i. Size > 2,000m2	Yes/No	1
ii. Connected to a Watercourse	Yes/No	1
iii. Ground Water Recharge	Yes/No	1
iv. Habitat Potential	Yes/No	1
TOTAL SCORE POTENTIAL:		**0-4**
DEFINITIONS:		
Size	The size of a wetland is a significant contributor to its ability to have and maintain ecological functions in the environment. The official size limit for EA applications is 2 hectares, or 20,000 m^2. However, according to HRM Policy E-15, all wetlands greater than 2,000m^2 are viewed as having higher value.	
Connected to a Watercourse	Having a watercourse connection is a feature of some wetlands that increases their ecological value. Wetlands that have permanent watercourse connections increase the opportunity for exchange of water, nutrients, and species, increasing the diversity and ecological health of the wetland. Small, intermittent watercourses are likely to have decreased.	
Ground Water Recharge	Groundwater recharge is a characteristic of some wetlands. A groundwater recharge situation exists in specific situations when wetlands hold water long enough such that some of the water is recharged directly into an underground aquifers. These wetlands are important features within the hydrological cycle.	
Habitat Potential	The habitat for species at risk potential is built from the habitat modelling exercise **(Appendix C)** and is an estimate of the likelihood of species at risk being present in a particular wetland.	

3.3.2 RESULTS

In the study area, small isolated wetlands (wetlands less than 2,000m2 and not connected to a watercourse or that have ground water recharge potential) are not considered as valuable as wetlands that are larger and connected to a watercourse or ones that have habitat for species at risk. Proposed alterations to larger wetlands may require review under the Environmental Assessment Act. Provincial policies and protocols will govern alteration application and approval processes. Proposed alterations to smaller wetlands will be assessed under the NS Wetland Conservation Policy. The scored wetlands are illustrated on **Figure 3.2/3-2** (previous section) and in **Table 3.3-2** below.

Several of the areas identified as wetlands and shown on **Figure 3.2/3-2** (previous section), including WLC-5, WLC-10 and WLC-11, are not natural wetlands; instead, they were created by Conrad's quarrying operations as storm water management and siltation control features. As quarrying proceeds it is Conrad's practice to relocate their run off management ponds. Therefore, these specific areas should not be considered the same as natural wetlands, but instead may be modified as permitted under Conrad's Industrial Permit for their quarry operations.

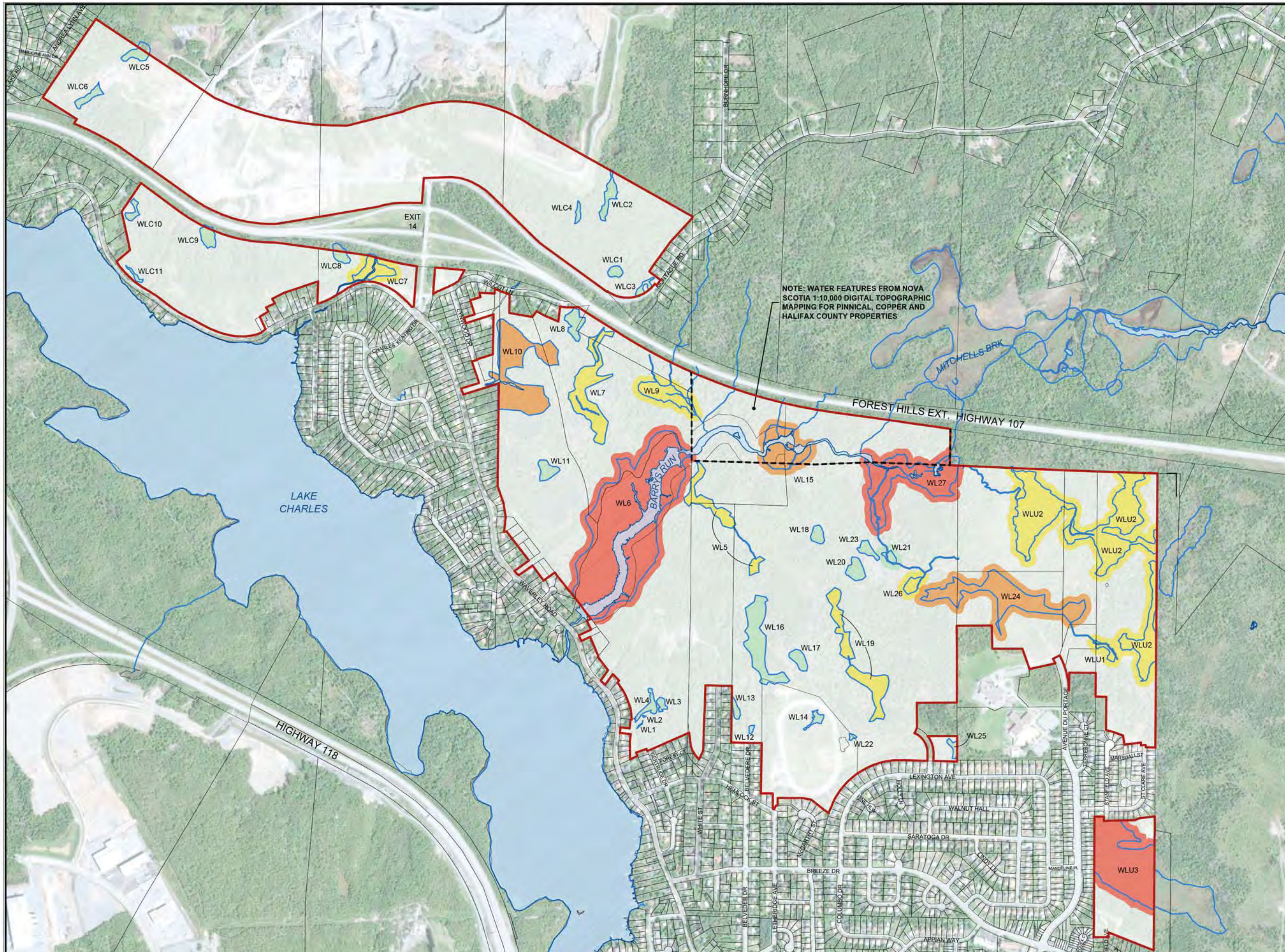
Of the 41 wetland areas, three (WLU3, WL6 and WL27) have been scored 'Totally Constrained' (value of 4). Both WL6 and WL27 have watercourse connections, ground water recharge potential, as well as habitat potential. WLU3 is classified as an emergency water supply area by Halifax Water and an exclusionary criterion has been applied to this wetland, resulting in a score of 4. Thirteen of the wetland areas are 'Marginally' to 'Moderately Constrained' (values of 2 to 3) and may require further investigation before land development occurs. Of the remaining 39 wetland areas, 27 are considered to have 'Minor Constraints' (value of 1).

Table 3.3-2: Wetland Scoring Results

WETLAND	AREA (HA)	< 2000 M2 (+1)	>2000 M2 (+1)	WATERCOURSE CONNECTION (+1)	GROUND WATER RECHARGE (+1)	HABITAT POTENTIAL (+1)	TOTAL
Conrad land							
WLC1	0.15	1	0	0	0	0	**1**
WLC2	0.36	0	1	0	0	0	**1**
WLC3	0.13	0	1	0	0	0	**1**
WLC4	0.09	1	0	0	0	0	**1**
WLC5	0.33	0	1	0	0	0	**1**
WLC6	0.23	0	1	0	0	0	**1**
WLC7	0.6	0	1	1	0	0	**2**

WLC8	0.35	0	1	0	0	0	**1**
WLC9	0.3	0	1	1	0	0	**2**
WLC10	0.14	1	0	0	0	0	**1**
WLC11	0.06	1	0	0	0	0	**1**
Unia land							
WLU1	0.16	1	0	1	0	0	**2**
WLU2	1.3	0	1	1	1	0	**3**
WLU3	3.1	0	1	0	1	0	**4***
Clayton Development and Whebby land							
WL1	0.007	1	0	0	0	0	**1**
WL2	0.004	1	0	0	0	0	**1**
WL3	0.1	1	0	0	0	0	**1**
WL4	0.22	0	1	0	0	0	**1**
WL5	1.0	0	1	1	0	0	**2**
WL6	12.1	0	1	1	1	1	**4**
WL7	1.96	0	1	1	1	0	**3**
WL8	0.4	0	1	1	0	0	**2**
WL9	0.87	0	1	1	0	0	**2**
WL10	3.25	0	1	1	1	0	**3**
WL11	0.30	0	1	0	0	0	**1**
WL12	0.04	1	0	0	0	0	**1**
WL13	0.12	1	0	0	0	0	**1**
	0.13	1	0	0	0	0	**1**
WL15	0.10	1	0	1	0	1	**3**
WL16	1.77	0	1	1	0	0	**2**
WL17	0.26	0	1	0	0	0	**1**
WL18	0.32	0	1	1	0	0	**2**
WL19	1.66	0	1	0	1	0	**2**
WL20	0.52	0	1	1	0	0	**2**
WL21	0.12	1	0	1	0	0	**2**
WL22	0.03	1	0	0	0	0	**1**
WL23	0.21	0	1	0	0	0	**1**
WL24	2.74	0	1	1	1	1	**4**
WL25	0.11	1	0	0	0	0	**1**
WL26	0.21	0	1	1	0	0	**2**
WL27	2.85	0	1	1	1	1	**4**

*WLU3 is determined to be an emergency water supply and is shown as ‘totally constrained’ on figures 3.3-1 and 4.1-1 due to the application of an exclusionary criterion.



LEGEND

- Study Area Boundary
- Property Boundaries
- Watercourse
- Extent of Nova Scotia Topographic Water Features within Study Area

Score Classification

- Not Constrained (Score 0)
- Minor Constraints (Score 1)
- Marginally Constrained (Score 2)
- Moderately Constrained (Score 3)
- Totally Constrained (Score 4)

NOTES:

- Property lines approximate only. Site subject to survey

SOURCES:

- Service Nova Scotia and Municipal Relation Online Property Database
- Nova Scotia Digital Topographic Series
- WSP Wetland and Watercourse Delineation, Port Wallis, August 2014
- GENIVAR Wetland and Watercourse Delineation, Port Wallis, January 2013
- Strum Field Identified Wetlands and Watercourse, June 2008
- Clayton Developments Port Wallace Watercourse Determination Map, September 15, 2014
- NSE Compliance letter (email) received, via Clayton Developments, September 29, 2014, conforming drainage channels and watercourses requiring further investigation

NATURAL FEATURES

FIGURE 3.3-1

WETLAND CONSTRAINTS MAP

DARTMOUTH, NOVA SCOTIA

PORT WALLACE SECONDARY PLANNING STUDY AREA

OCTOBER 26, 2015 B07057-127-R1

SCALE 200 100 0 100 200 300 m — 1 : 12,500

NORTH

WSP

1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM

3.4 LAYER 4: STEEP SLOPES

3.4.1 METHODOLOGY

Slope gradient is a key factor in influencing the relative stability of a landscape. It determines the degree to which gravity acts upon a soil mass. Slopes are often irregular and complex, with gradients varying greatly over large areas. Slopes are an important LSA factor when considering what lands are most suitable for development, as well as when considering where to locate roads and other infrastructure. The general gradient of the land will dictate the location of stormwater, sewer and water infrastructure, coinciding in large part, of course, with road layout. Transit and Active Transportation (AT) networking must also be developed in consideration of steeper slopes.

Desktop analysis was used in order to determine slopes: WSP used Provincial LIDAR data from the Province of Nova Scotia Digital Topographic Series to create a map surface that display varying slope gradients.

3.4.1.1 SLOPE SCORING

Table 3.4-1 below outlines how slopes are scored in the LSA, as recommended by the Port Wallace LSA Steering Committee. Defined scores are attributed to slopes based on 'slope gradient'. The total score potential is 0-4.

Table 3.4-1: Slope Scoring

SLOPES	OBSERVED	DEFINED SCORE
i. 0-10%	Yes/No	0
ii. 11-20%	Yes/No	1
iii. 21-30%	Yes/No	2
iv. 30% +	Yes/No	3
v. Vertical Cliff Face	Yes/No	4
TOTAL SCORE POTENTIAL:		**0-4**

3.4.2 RESULTS

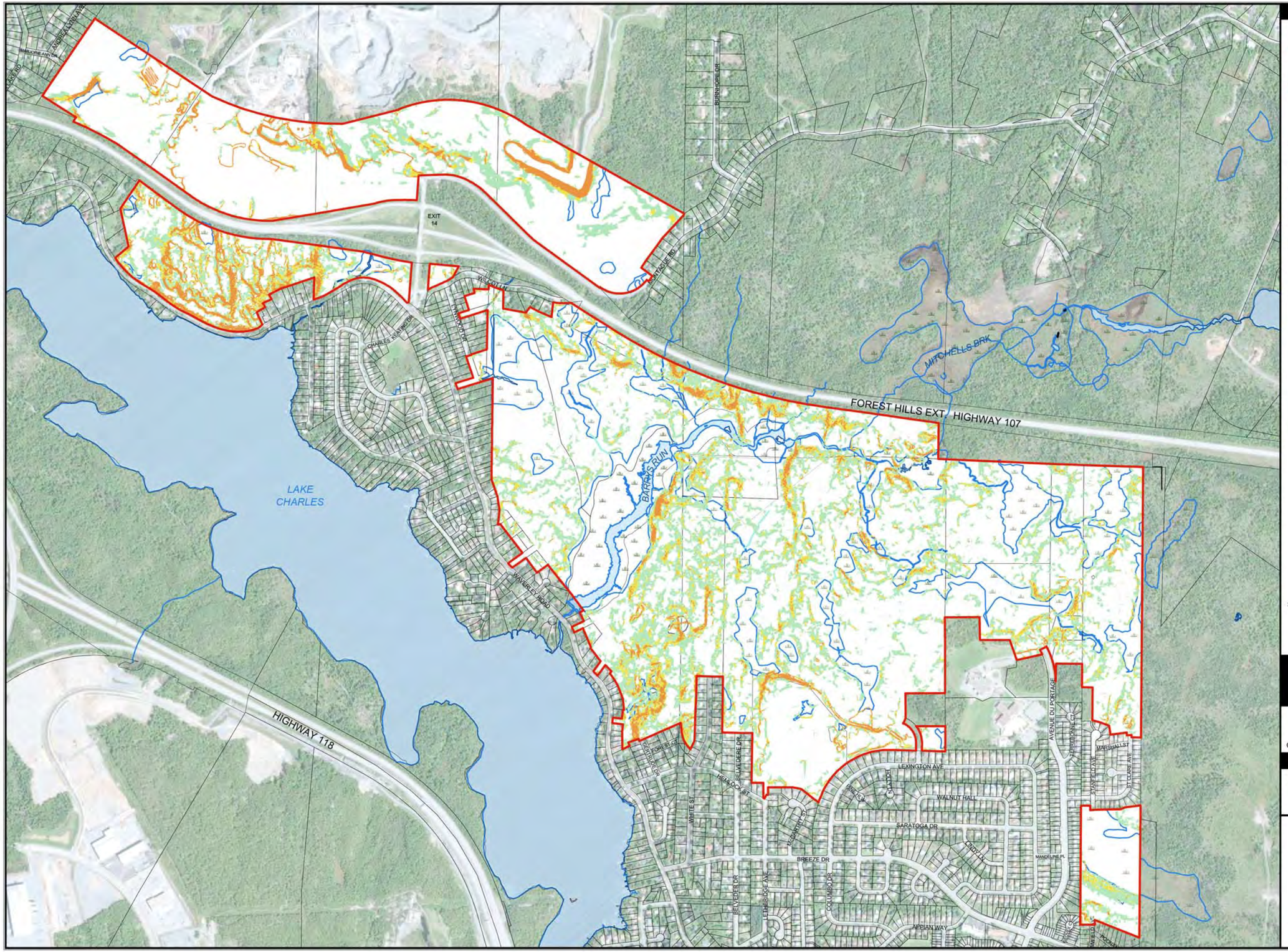
The results of the Slope Scoring are displayed on **Figure 3.4-1**. Although the constraint guidelines of this nature may be appropriate for development in areas of clay soil which is highly erodible, there are a number of valid reasons why they should not be applied rigidly within the PWSPSA. The following paragraphs elaborate.

The steep slopes shown in **Figure 3.4-1** on Conrad's lands outside of the Highway 107 Bypass were acquired for or created by quarrying operations. Their operating plan is to grade the site appropriately for future development as part of the quarry reclamation which is required under their Industrial Permit from NSDOEL; therefore, slope constraints should not apply to these lands.

Similarly, many of the steep slopes shown on Conrad's former quarry site inside the 107 Bypass were created by past quarrying operations. These operations were voluntarily moved to outside of the 107 bypass, prior to site reinstatement, at the request of the City of Dartmouth, with the understanding that necessary grading to allow servicing and development to Municipal standards would be permitted in the future when sanitary sewer capacity was expanded for the Waverley Road area. Some of the steep slopes and large piles of oversized boulders on this site would not be safe in a residential area, where children may play, and should be modified.

It should also be pointed out that a number of relatively short but steep slopes occur on the front of the Port Wallace Developments property at the edge of a borrow pit used during construction of the 107 Highway Bypass, and the steep slope near the edge of the Whebby racetrack property is the edge of a fill storage pile placed to store surplus material from past construction jobs for use on future jobs.

The soil throughout the site is comprised of "Burnside Till" (primarily coarse sand, gravel, etc.) which is stable at steep slopes and bedrock.



LEGEND

- Study Area Boundary
- Property Boundaries
- Watercourse
- Wetlands

Score Classification

- Slope 0 - 10%
  Not Constrained (Score 0)
- Slope 11 - 20%
  Minor Constraints (Score 1)
- Slope 21 - 30%
  Marginally Constrained (Score 2)
- Slope 31% +
  Moderately Constrained (Score 3)
- Vertical Cliff
  Totally Constrained (Score 4)

NOTES:

- Property lines approximate only. Site subject to survey

SOURCES:

- Service Nova Scotia and Municipal Relation Online Property Database
- Province of Nova Scotia Digital Topographic Series

NATURAL HAZARDS

FIGURE 3.4-1
STEEP SLOPES CONSTRAINTS MAP
DARTMOUTH, NOVA SCOTIA

PORT WALLACE SECONDARY PLANNING STUDY AREA

OCTOBER 26, 2015 B07057-127-SLP

200 100 0 100 200 300 m

1 : 12,500

WSP

1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM

3.5 LAYER 5: POTENTIAL CONTAMINATION

3.5.1 METHODOLOGY

Contaminants may pose a threat to human health or the environment. Their potential effects on humans may range from minor physical symptoms to life-threatening diseases such as cancer. A site may not pose a threat to people, however it can still be an environmental hazard. Soil, water, and sediment at a site may contain substances that can be detrimental to fish or mammals and can accumulate in the food chain. These effects can be severe enough to impair, or cause imbalance in, ecological functions or systems.

Based on field investigations, there were six (6) hazards identified to be of concern for development in terms of impacts from historic use and the potential for contamination. These hazards have been labelled A through F on **Figure 3.2-2**, and include impacts from: **A)** Conrad Brothers' Quarry; **B)** a small dump site; **C)** an excavation pit; **D)** the Whebby horse track; **E)** abandoned mine sites; and, **F)** impacts from historic gold mining. A photo log showing further examples of the above mentioned sites is included in **Appendix D-3**.

A. Conrad Brothers Quarry

A quarry began operating in the 1950s and operations were originally closer to the lake within the section of property directly east of Lake Charles (see photo **3.5-A**). Through field investigation and informed interviews, potential for soil and groundwater impacts were identified. The Conrad Lands that currently fall within the PWSPSA were previously more heavily used in the quarry operation; however, the smaller parcels directly adjacent to Lake Charles are no longer used in the operations. The larger parcel of the Conrad Lands to the northeast are currently utilized as active thoroughfare for the quarry operations, a transportation operation, and storage rental for vehicles.

There is an active quarry immediately adjacent to the northeast of the Conrad Lands which may impact soil and groundwater in the area. Potential for impacts include several underground storage tanks (UST), an aboveground storage tank (AST), heavy equipment, as well as storage of old equipment which is rusting, and previously used ASTs (which have been steam cleaned as noted from Conrad interview). The site also has active asphalt and concrete plants, a soil remediation operation, and various machines for crushing and blasting in the area. A Phase I Environmental Site Assessment (ESA) should be performed on both parcels of the Conrad Lands to determine the extent of potential contamination. A Phase I ESA may find that further study is needed in the form of a Phase II ESA, however if after a Phase I ESA is performed and no further investigation in recommended, the Conrad Lands should pose no further constraints to development in this area based on potential contamination.

Image 3.5-1: Aerial photograph from 1974 showing extent of past excavation on Conrad Lands

B. Dump site

A minor dumping site of mostly household waste and one empty oil drum was found during wetland delineation and was confirmed by further field investigation.

C. Excavation Pit

Through field investigation, aerial photography and informed interviews, an excavation pit off White Street was identified as having potential impacts. The site was once used as an excavation pit for fill during the construction of Highway 107. Dumping of several hundred cubic meters of Halifax Slate was found. Special consideration of how best to dispose of Halifax Slate needs to be considered in terms of preventing potential acid rock drainage.

D. Horse track

On the W. Eric Whebby lands, there is a horse track which was built in the 1950s. From field investigation and informed interviews, several potential impacts were identified including an AST, a building fire several years ago adjacent to an older AST, and the storage of heavy equipment.

Image 3.5-2: Site of building fire several years ago, next to an AST, August 26, 2014

A Phase I Environmental Site Assessment (ESA) should be performed on the grounds of the race track prior to development. If a Phase I ESA is performed and no further investigation is recommended, the Whebby Racing Stable should pose no further constraints to development in this area.

E. Abandoned Mine Sites

Abandoned Mine Openings (AMO) were identified in the Project Area using the DNR AMO database. Mine openings can range from extremely dangerous to no significant hazard depending on the type of opening. Through field investigations, several AMO were discovered ranging from a shallow trench to a deep shaft. Backfilling of these openings would be required in order to proceed with development.

F. Historic Gold Mining

The historic Montague Gold District is located east of the subject property and may pose significant environmental risk from mine tailings, which in the past were slurred directly into local rivers, swamps and lakes with little consideration of their impacts on the receiving environments. Hg amalgamation was the primary method used in gold extraction, however other potentially toxic elements (e.g. As, Cu, Pb, Sb) also occur naturally in the ore, and may be present at relatively high concentrations in the mine wastes.

In 1976, the initial investigation of human health risks associated with these wastes took place, when it was found that a resident living near the past-producing gold district was diagnosed with chronic arsenic intoxication. The patient's well was examined and it was established that their tap water contained 5000 µg/L arsenic – 500 times the present-day drinking water guideline of 10 µg/L (Parsons et al., 2012).

In addition, Brooks et al. (1982) noted high levels of arsenic levels in stream waters, stream sediments and ashed alder Alnus rugosa twigs adjacent to the Montague Gold District, and the waters that flow from Mitchell's Brook into Barry's Run. The *Nova Scotia Environment (NSE) Tier 1 Environmental Quality Standards* (2013) for surface water and sediments in freshwater for Arsenic is 5.0 ug/L and 17 mg/kg, respectively; therefore, all metal concentrations for arsenic exceeded the Tier 1 guideline at all locations tested by Brooks et al. (1982) for both surface water and sediments in freshwater. There is, however, a relatively high (37 ng/ml) background level of arsenic at the outflow of Lake Loon that can account for some of the high levels of arsenic measured.

Field investigation identified significant size of tailings present, with a strong metallic odour at the historic Montague Gold District, which is east of the PWSPSA. However, there is a large wetland area next to the tailings which is connected to Mitchell's Brook and potentially brings a large concentration of metals into the wetland/watercourse system within the PWSPSA. It is likely that the wetland feature and Barry's Run may contain certain plant species that could affect the retention capacity of wetlands for metals. It is therefore important to maintain Mitchell's Brook and Barry's Run with the required 20 meter buffer.

Image 3.5-3: Wetland and watercourse next to a gold mine flowing towards PWSPSA

3.5.1.1 CONTAMINATION SCORING

Table 3.5-1 below defines how contaminated sites are scored in the LSA. Each of the six (6) identified hazardous sites were assigned scores based on potential human and environmental health impacts. The cumulative score defines each site's total level of contamination constraint. Overall contamination, in the context of this LSA, is defined as areas in which the soil or groundwater contains hazardous waste or substances in an amount or concentration that exceeds provincial environmental quality standards; and, where a site is unsuitable for specific uses of land, water and sediment, where they pose a threat to human health.

Table 3.5-1: Potential Contamination Scoring

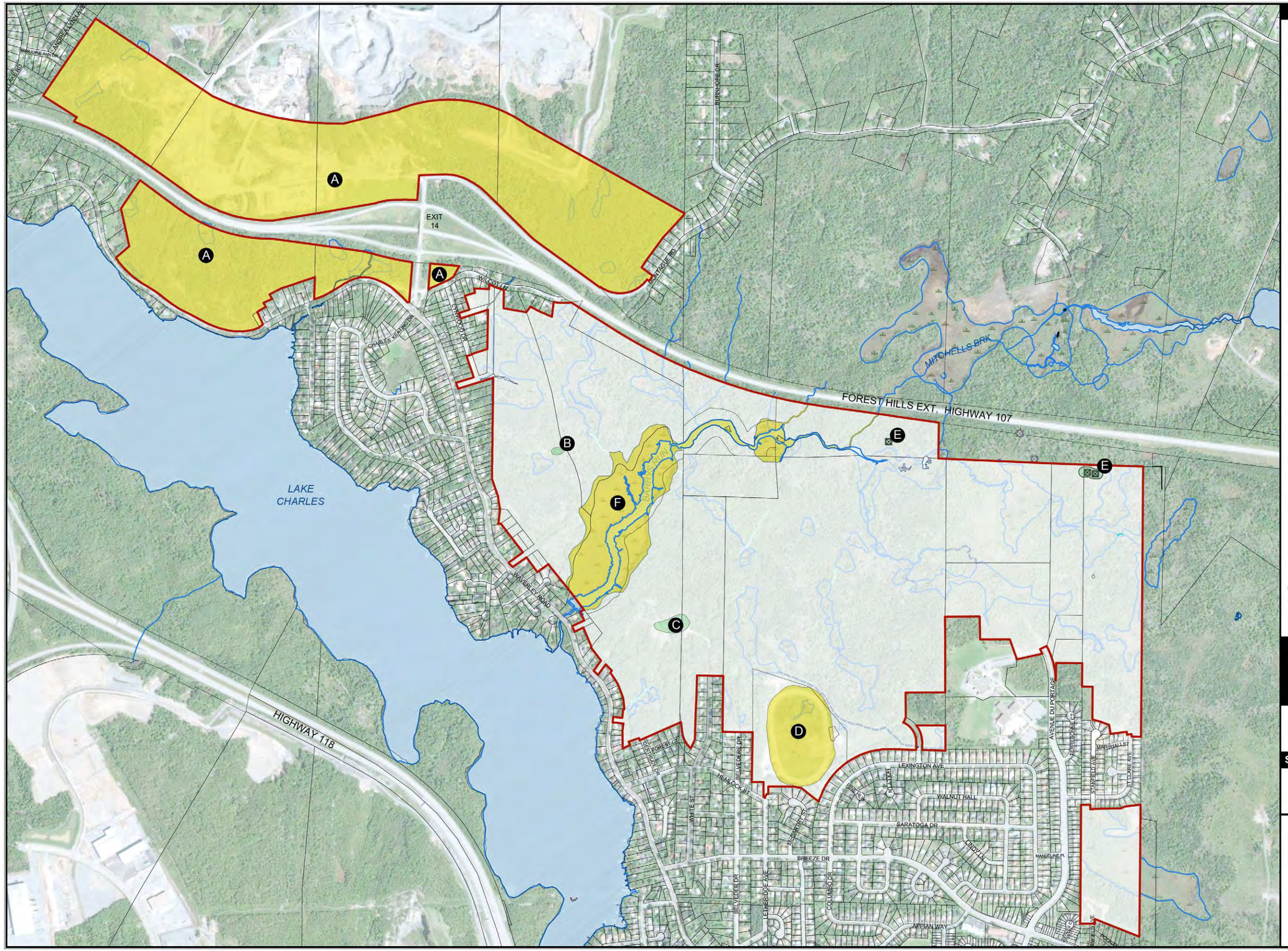
LEVEL OF CONTAMINATION	OBSERVED	ADDED SCORES
i. ASTs / USTs	Yes/No	1
ii. Known Industrial Uses	Yes/No	1
iii. Contamination	Yes/No	1
iv. Area Dangerous to Human Health	Yes/No	1
TOTAL SCORE POTENTIAL:		**0-4**
DEFINITIONS:		
ASTs / USTs	Unknown or suspected underground storage tanks (USTs) or above ground storage tanks (ASTs). Contamination can occur not just from leaking storage tanks, but also from spills and overfills that occurred when the tanks were in use.	
Known Industrial Uses	Past industrial or commercial uses and/or heavy equipment operation. Such activities often resulted in chemicals and other toxic materials being spilled or deposited on land	
Contaminated Soils	Geologically influenced contamination, due to leaching of potentially toxic metal ions from disturbed rock or past mining activities, into soils or groundwater. Contaminated soils or groundwater contain total concentrations of elements which exceed the natural background levels. They may or may not pose a health hazard, depending on the amount and type of contamination. However, if concentrations of an element exceed regulatory guidance levels, it may impair human or environmental health. Dumping of household and other waste may also contain harmful chemicals that can leach out and contaminate groundwater, or be spread by wind and rain.	
Area Dangerous to Human Health	Dangerous area may posed a threat to human health (ex. Abandoned Mine Openings (AMO) hazards range from extremely dangerous to no significant hazard).	

3.5.2 RESULTS

The results of the Potential Contamination Scoring are displayed in **Table 3.5-2** below and on **Figure 3.5-1**. Of the six potentially contaminated areas, three (Conrad's Quarry, Whebby Horse Track and Barry's Run/Mitchell's Brook) are scored 'Marginally Constrained' (value of '2'), while the remaining three (Dump Site, Excavation Pit and the Abandoned Mine Sites) are considered to have 'Minor Constraints' (value of '1'). Almost all of the contaminated sites identified in this report may be restored to either 'Not Constrained' or 'Minor Constraints' through environmental and engineering mitigative strategies.

Table 3.5-2: Potential Contamination Scoring Results

CONTAMINATED SITE	ASTS / USTS (+1)	KNOWN INDUSTRIAL USES (+1)	CONTAMINATED SOILS (+1)	DANGER TO HUMAN HEALTH (+1)	TOTAL SCORE
A - Conrad Brothers Quarry	1	1			2
B - Dump Site			1		1
C - Excavation Pit			1		1
D - Whebby Horse Track	1	1			2
E - Abandoned Mine Sites				1	1
F - Historic Gold Mining (Barry's Run/Mitchell's Brook)			1	1	2



LEGEND

- Study Area Boundary
- Property Boundaries
- Watercourse
- Wetlands
- Abandon Mine (On-Site)
- Abandon Mine (Off-Site)

Score Classification

- Not Constrained (Score 0)
- Minor Constraints (Score 1)
- Marginally Constrained (Score 2)
- Moderately Constrained (Score 3)
- Totally Constrained (Score 4)

NOTES:

- Property lines approximate only. Site subject to survey

SOURCES:

- Service Nova Scotia and Municipal Relation Online Property Database
- Province of Nova Scotia Digital Topographic Series

NATURAL HAZARDS

FIGURE 3.5-1
POTENTIAL CONTAMINATION (FROM HISTORICAL USE) CONSTRAINTS MAP
DARTMOUTH, NOVA SCOTIA

PORT WALLACE SECONDARY PLANNING STUDY AREA

OCTOBER 26, 2015 B07057-127-R1

SCALE 200 100 0 100 200 300 m
1 : 12,500

NORTH

WSP
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM

3.6 HERITAGE AND CULTURAL LANDSCAPE

The goal of the Heritage and Cultural Landscape Screening (HCLS) was to identify any areas of heritage and cultural importance within the PWSPSA that might impact its suitability and capacity for future development. To achieve this objective, the study involved background research, communication with area residents and heritage personnel, as well as field investigation. Results of these investigations were then analyzed to delineate specific areas of heritage or cultural landscape concern. The following section outlines the main findings uncovered during the *Heritage and Cultural Landscape Screening* (refer to **Appendix E**).

3.6.1 METHODOLOGY

Identification of specific areas of potential Heritage and Cultural Landscape assets was undertaken through analysis of the historic, consultative and physical evidence gathered on the basis of background research, public consultation and engagement, and field investigation.

The Heritage component of the investigation noted the locations of known archaeological sites (whether known previously or identified during the study), cemeteries/burial plots, areas ascribed archaeological potential, and registered/designated heritage features (municipal, provincial or federal). Areas of archaeological potential were designated on the basis of observed ground conditions and proximity to the following:

- registered archaeological sites
- cemeteries or individual burial plots
- registered or designated heritage features (municipal, provincial or federal)
- suspected heritage feature locations as indicated by research (historic documents, oral history) or fieldwork (personal observation)
- margins of significant water bodies or watercourses
- known or suspected early travel-ways (waterways, portage routes, trails, roads, railways)
- strategic vantage points or curious landforms
- key sources of valuable natural resources

Following the *Standards and Guidelines for the Conservation of Historic Places in Canada* (2010) in accordance with Policy CH-14 of the RMPS (2014), the Cultural component of the investigation noted the locations of evidence of the following, if present:

- Land Use (e.g. fields, tree lines, hedgerows, managed wood lots)
- Traditional Practices (e.g. beliefs, wisdom, activities, traditions and skills derived from extended observation of the land, creatures, cycles & spiritual associations; includes cemeteries)

- Land Patterns (e.g. patterning of the arrangement of the landscape as revealed especially by aerial photographs & maps)
- Spacial Organization (the arrangement of spaces in a cultural landscape)
- Visual Relationships (between the observer and a landscape feature; scale is an important factor)
- Circulation (e.g. paths, roads, railways, canals, portages; accessibility – grade and water level may be an important consideration)
- Ecological Features (e.g. natural elements such as a marshes, ponds or stands of trees)
- Vegetation (e.g. sentinel trees, designed groupings, wind/sun control, planted crops)
- Landforms (e.g. hills, valleys, berms & ditches)
- Water Features (e.g. canals, ponds, lakes, rivers, streams)
- Built Features (e.g. buildings, dams, bridges, fences, boundary markers, grave markers)

It was recognized that, regardless of age and depending on their level of recognition and significance (locally and regionally), these character-defining elements might warrant documentation, recognition, preservation, enhancement or mitigation if they exist within an area being considered for development.

It should be noted that the present delineation and scoring of Heritage and Cultural Landscape assets could change based on the results of future investigation, and may ultimately have little bearing upon the suitability of land for future development. For example, an area of high archaeological potential, once subjected to a program of archaeological assessment consisting of shovel testing, may be cleared of constraints for development if no archaeological resources are found. Conversely, an assessment could reveal archaeological resources of a highly significant nature that might be impossible or impractical to mitigate through further excavation. The same might be true of cultural landscape features. Their ranking as obstacles to future land use will depend on their perceived significance in the eye of regulators and the public, as well as their suitability for mitigation.

3.6.1.1 HERITAGE AND CULTURAL LANDSCAPE SCORING

To contribute to the overall LSA, the results of the *Heritage and Cultural Landscape Screening* (**Appendix E**) were tabulated in the form of a Cultural Assets/Resources Matrix **(Table 3.6-1)**. As indicated in the Matrix, a score of “0” and a determination of “Not Constrained” were applied to areas that exhibited either no or low potential for Cultural Assets/Resources. A score of “3” and a determination of “Moderately Constrained” were applied to areas that exhibited high potential for Cultural Assets/Resources. A score of "4" and a determination of “Totally Constrained” were reserved for areas confirmed as having Cultural Assets/Resources.

3.6.2 RESULTS

The results of the Cultural Assets/Resources Matrix **(Table 3.6-1)** were translated onto **Figure 3.6-1** for visual representation. The HCLS screening identified a total of 12 areas containing potentially significant Heritage and Cultural Landscape features: three features have been scored 'Totally Constrained' (value of '4'), including Barry's Run (Area 1), the William Kennedy farm site (Area 2) and an engineered area containing a portion of Shubenacadie Canal System National Historic Civil (Area 3); and, eight have been scored 'Moderately Constrained' (value of '3'). Apart from the areas outlined above, the remaining PWSPSA consists of zones containing Low Heritage and Cultural Landscape potential, or 'Not Constrained' (value of '0'). Refer to the *Heritage and Cultural Landscape Screening* **(Appendix E)** for a complete review of the results.

Table 3.6-1: Cultural Assets/Resources Matrix

Cultural Resource	Research and Engagement ["Data Source" and "Indicator" as referenced in current CRM table]	Outstanding Research	Findings and Resource Profile	Character Defining Elements	Level of Constraint 0 = Not Constrained 1 = Minor Constraints 2 = Marginally Constrained 3 = Moderately Constrained 4 = Totally Constrained	Next Steps	Potential Measures for Mitigation and Inclusion in Design Phase
Area 1: Barrys Run Stillwater/Summit Reservoir (Formerly HH10 & CH1) Registered Historic Site (part of Shubenacadie Canal System National Historic Civil Engineering Site) Water Feature *(Figure 12); CRM Group Report Sections 4.2.2 & 5.0)*	**Data Source:** National Historic Site Registry; Various archival documents; Reconnaissance **Indicator:** Historic Record/Physical Evidence	Consultation is recommended to be undertaken with the Shubenacadie Canal Commission, the Heritage Property Program of the Nova Scotia Department of Communities Culture and Heritage, the Historic Sites and Monuments Board of Canada and representatives of the local community to determine any requirements for mitigation or protection.	Former reservoir within PWSPSA, where natural stillwater was enlarged and deepened by 1826 construction of dam near Waverly Road. Was part of Shubenacadie Canal System (regulated elevation of water level within Lake Charles, at summit of system). Also served as millpond for Hague & O'Connor sawmill from ca. 1841 to 1870s or 1880s. Considered well-preserved, although water level subsided and naturalized long ago, when maintenance of dam ceased. (*CRM Group Report Sections 4.2.2 & 5.0)*	**Standards & Guidelines Category:** Water Features part of a waterway that includes Barrys Run Stillwater and its surrounding fringe bog part of the Shubenacadie Canal System National Historic Civil Engineering Site	4 Totally Constrained due to being a component of a National Historic Civil Engineering Site	Consultation is recommended to be undertaken with the Shubenacadie Canal Commission, the Heritage Property Program of the Nova Scotia Department of Communities Culture and Heritage, the Historic Sites and Monuments Board of Canada and representatives of the local community to determine any requirements for mitigation or protection. This investigation should begin before the engagement and design phases of the secondary planning process.	Totally constrained. Recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.
Area 2: William Kennedy Farm Site (Formerly HH9) Area of High Archaeological Potential; Likely to become a registered archaeological site *(Figures 12 & 13; CRM Group Report Sections 4.2.5 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance and any requirements for mitigation or protection. Such requirements are to be decided in consultation with the Special Places Program of the Nova Scotia Department of Communities Culture and Heritage and representatives of the local community.	Includes remains of a historic field, driveway and outbuilding within the PWSPSA associated with a farm established *ca.* 1842 on Caledonia Road. Not associated with the Shubenacadie Canal System. Condition of the surviving remains has yet to be investigated by sub-surface archaeological testing. *CRM Group Report Sections 4.2.5 & 5.0)*	**Standards & Guidelines Categories:** Built Features and Landforms Presence of built features (building pad & former driveway) Evidence of land use (levelled ground) Archival documentation Possibly within 100 metres of a historic transportation route (Lake Micmac/Lake Major trail)	4 Totally Constrained due to presence of archaeological resources	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance and any requirements for mitigation or protection. The archaeological fieldwork should occur before the engagement and design phases of the secondary planning process.	Totally constrained. Recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.
Area 3 (Formerly HH1) Area of High Archaeological Potential Includes a dyke or dam extension that was part of the Shubenacadie Canal System National Historic Civil Engineering Site; Likely to become a registered archaeological site *(Figures 12, 14 & 15; CRM Group Report Sections 4.2.5 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance; Archaeological shovel testing **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	Requirements for mitigation or protection are to be decided in consultation with the Special Places Program of the Nova Scotia Department of Communities Culture and Heritage and representatives of the local community.	Includes a linear mound of earth and stone within the PWSPSA that was an extension of Summit Reservoir Dam - a dam established *ca.* 1826 to make Barrys Run Stillwater a reservoir for the Shubenacadie Canal System. The reservoir also served as the millpond for Hague & O'Connor sawmill from *ca.* 1841 to 1870s or 1880s. The dam was rebuilt in 1856, during the second phase of canal construction. (*CRM Group Report Sections 4.2.5 & 5.0)*	**Standards & Guidelines Category:** Built Features Within 100 metres of a waterway (Barrys Run Stillwater/Summit Reservoir) Within 100 metres of historic transportation routes (Waverley road & Caledonia Road) Within 100 metres of an archaeological site (the Hague/O'Connor Sawmill Relatively flat Relatively dry Presence of built feature (a dam extension that was associated with the Shubenacadie Canal) Strategic view	4 Totally Constrained within a 10 metre buffer of the Summit Reservoir Dam due to the presence of archaeological/ built heritage resources associated with a National Historic Civil Engineering Site.	Consultation is recommended to be undertaken with the Shubenacadie Canal Commission, the Heritage Property and Special Places Programs of the Nova Scotia Department of Communities Culture and Heritage, the Historic Sites and Monuments Board of Canada and representatives of the local community to determine any requirements for mitigation or protection. This investigation should begin before the engagement and design phases of the secondary planning process.	Totally Constrained within a 10 metre buffer of the Summit Reservoir Dam in accordance with recommendations in an archaeological report on file with the Special Places Program (Green 2015: 28). Recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.
Area 4 (Formerly HH3) Area of High Archaeological Potential *(Figure 12; CRM Group Report Sections 4.2.5 &*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage	Located within the PWSPSA and within 100 metres of the Summit Reservoir of the Shubenacadie Canal System. (*CRM Group Report Sections 4.2.5 & 5.0)*	**Standards & Guidelines Category:** Visual Relationships (potentially) Within 100 metres of a waterway	3 Moderately Constrained due to high potential to contain archaeological resources.	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance and any requirements for mitigation or protection.	Moderately constrained. If cultural resources are found during archaeological assessment, those resources may require additional site-specific research/archaeological testing to determine whether

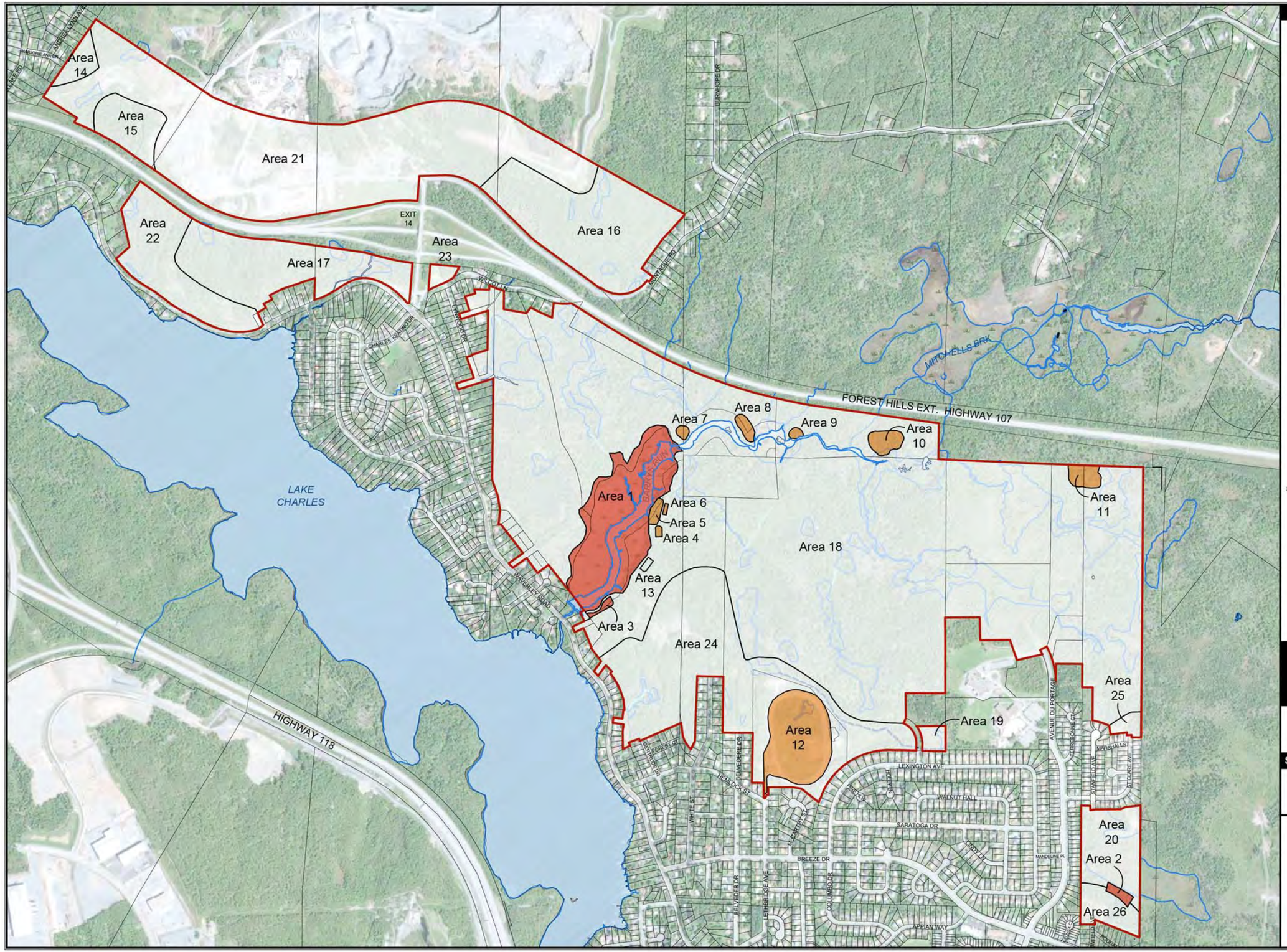
Cultural Resource	Research and Engagement ["Data Source" and "Indicator" as referenced in current CRM table]	Outstanding Research	Findings and Resource Profile	Character Defining Elements	Level of Constraint 0 = Not Constrained 1 = Minor Constraints 2 = Marginally Constrained 3 = Moderately Constrained 4 = Totally Constrained	Next Steps	Potential Measures for Mitigation and Inclusion in Design Phase
5.0)	Conditions/Physical Evidence/Community Input	significance. If cultural resources are found, any requirements for mitigation or protection are to be decided in consultation with the Special Places Program of the Nova Scotia Department of Communities Culture and Heritage and representatives of the local community.		(Barrys Run Stillwater/Summit Reservoir) Elevated topography Relatively flat Relatively dry Strategic view		The archaeological fieldwork should occur before the engagement and design phases of the secondary planning process.	recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.
Area 5 (Formerly HH4) Area of High Archaeological Potential *(Figures 12 & 16; CRM Group Report Sections 4.2.5 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance. If significant cultural resources are found, any requirements for mitigation or protection are to be decided in consultation with the Special Places Program of the Nova Scotia Department of Communities Culture and Heritage and representatives of the local community.	Located within the PWSPSA and within 100 metres of the Summit Reservoir of the Shubenacadie Canal System. (*CRM Group Report Sections 4.2.5 & 5.0)*	**Standards & Guidelines Categories:** Visual Relationships (potentially) Within 100 metres of a waterway (Barrys Run Stillwater/Summit Reservoir) Relatively flat Relatively dry Presence of built feature (building foundation of undetermined age) Strategic view	3 Moderately Constrained due to high potential to contain archaeological resources.	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance and any requirements for mitigation or protection. The archaeological fieldwork should occur before the engagement and design phases of the secondary planning process.	Moderately constrained. If significant cultural resources are found during archaeological assessment, those resources may require additional site-specific research/archaeological testing to determine whether recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.
Area 6 (Formerly HH5) Area of High Archaeological Potential *(Figure 12; CRM Group Report Sections 4.2.5 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance. If cultural resources are found, any requirements for mitigation or protection are to be decided in consultation with the Special Places Program of the Nova Scotia Department of Communities Culture and Heritage and representatives of the local community.	Located within the PWSPSA and within 100 metres of the Summit Reservoir of the Shubenacadie Canal System. (*CRM Group Report Sections 4.2.5 & 5.0)*	**Standards & Guidelines Categories:** Built Features and Visual Relationships (potentially) Within 100 metres of a waterway (Barrys Run Stillwater/Summit Reservoir) Elevated topography Relatively flat Relatively dry Strategic view	3 Moderately Constrained due to high potential to contain archaeological resources.	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance and any requirements for mitigation or protection. The archaeological fieldwork should occur before the engagement and design phases of the secondary planning process.	Moderately constrained. If cultural resources are found during archaeological assessment, those resources may require additional site-specific research/archaeological testing to determine whether recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.
Area 7 (Formerly HH6) Area of High Archaeological Potential *(Figure 12; CRM Group Report Sections 4.2.5 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance. If cultural resources are found, any requirements for mitigation or protection are to be decided in consultation with the Special Places Program of the Nova Scotia Department of Communities Culture and	Located within the PWSPSA and within 100 metres of the Summit Reservoir of the Shubenacadie Canal System (*CRM Group Report Sections 4.2.5 & 5.0)*	**Standards & Guidelines Category:** Visual Relationships (potentially) Within 100 metres of a waterway (Barrys Run Stillwater/Summit Reservoir) Relatively flat Relatively dry Strategic view	3 Moderately Constrained due to high potential to contain archaeological resources.	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance and any requirements for mitigation or protection. The archaeological fieldwork should occur before the engagement and design phases of the secondary planning process.	Moderately constrained. If cultural resources are found during archaeological assessment, those resources may require additional site-specific research/archaeological testing to determine whether recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.

Cultural Resource	Research and Engagement ["Data Source" and "Indicator" as referenced in current CRM table]	Outstanding Research	Findings and Resource Profile	Character Defining Elements	Level of Constraint 0 = Not Constrained 1 = Minor Constraints 2 = Marginally Constrained 3 = Moderately Constrained 4 = Totally Constrained	Next Steps	Potential Measures for Mitigation and Inclusion in Design Phase
		Heritage and representatives of the local community.					
Area 8 (Formerly HH7) Area of High Archaeological Potential *(Figure 12; CRM Group Report Sections 4.2.5 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance. If cultural resources are found, any requirements for mitigation or protection are to be decided in consultation with the Special Places Program of the Nova Scotia Department of Communities Culture and Heritage and representatives of the local community.	Located within the PWSPSA and within 100 metres of the Summit Reservoir of the Shubenacadie Canal System. (*CRM Group Report Sections 4.2.5 & 5.0)*	**Standards & Guidelines** **Category:** Visual Relationships (potentially) Within 100 metres of a waterway (Barrys Run Stillwater/Summit Reservoir) Relatively flat Relatively dry Strategic view	3 Moderately Constrained due to high potential to contain archaeological resources.	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance and any requirements for mitigation or protection. The archaeological fieldwork should occur before the engagement and design phases of the secondary planning process.	Moderately constrained. If cultural resources are found during archaeological assessment, those resources may require additional site-specific research/archaeological testing to determine whether recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.
Area 9 (Formerly HH8) Area of High Archaeological Potential *(Figure 12; CRM Group Report Sections 4.2.5 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance. If cultural resources are found, any requirements for mitigation or protection are to be decided in consultation with the Special Places Program of the Nova Scotia Department of Communities Culture and Heritage and representatives of the local community.	Located within the PWSPSA and within 100 metres of the Summit Reservoir of the Shubenacadie Canal System. (*CRM Group Report Sections 4.2.5 & 5.0)*	**Standards & Guidelines** **Category:** Visual Relationships (potentially) Within 100 metres of a waterway (Barrys Run Stillwater/Summit Reservoir) Relatively flat Relatively dry Strategic view	3 Moderately Constrained due to high potential to contain archaeological resources.	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance and any requirements for mitigation or protection. The archaeological fieldwork should occur before the engagement and design phases of the secondary planning process.	Moderately constrained. If cultural resources are found during archaeological assessment, those resources may require additional site-specific research/archaeological testing to determine whether recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.
Area 10 (Formerly CH2) Exploratory Gold Mining Pit g740sh in Abandoned Mine Openings Database Cultural Landscape Feature *(Figure 12; CRM Group Report Sections 4.2.6 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Physical Evidence/Community Input	Requirements for mitigation or protection are to be decided on the basis of public communication/engagement.	Cluster of exploratory gold mine pits and/or shafts established sometime between 1860 and 1940 within Montague Gold District. Located within the PWSPSA. Not associated with the Shubenacadie Canal System. Partially infilled and flooded. (*CRM Group Report Sections 4.2.6 & 5.0)*	**Standards & Guidelines** **Category:** Landforms (potentially) Presence of pits and mounds	3 Moderately Constrained due to potential desire for mitigation or protection.	Public engagement is recommended to determine any requirements for mitigation or protection. This action should occur during the engagement phase of the secondary planning process and could influence the design phase of the secondary planning process.	Public engagement will decide whether or not these mining features warrant provision of mitigation and/or conservation measures in the design phase of the secondary planning process.
Area 11 (Formerly CH3) Exploratory Gold Mining Pit MON-1-228 in Abandoned Mine Openings Database Cultural Landscape Feature *(Figure 12; CRM Group Report Sections 4.2.6 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Physical Evidence/Community Input	Requirements for mitigation or protection are to be decided on the basis of public communication/engagement.	Cluster of exploratory gold mine pits and/or shafts established sometime between 1860 and 1940 within Montague Gold District. Located within the PWSPSA. Not associated with the Shubenacadie Canal System. Partially infilled and flooded. (*CRM Group Report Sections 4.2.6 & 5.0)*	**Standards & Guidelines** **Category:** Landforms (potentially) Presence of pits and mounds	3 Moderately Constrained due to potential desire for mitigation or protection.	Public engagement is recommended to determine any requirements for mitigation or protection. This action should occur during the engagement phase of the secondary planning process and could influence the design phase of the secondary planning process.	Public engagement will decide whether or not these mining features warrant provision of mitigation and/or conservation measures in the design phase of the secondary planning process.

Cultural Resource	Research and Engagement ["Data Source" and "Indicator" as referenced in current CRM table]	Outstanding Research	Findings and Resource Profile	Character Defining Elements	Level of Constraint 0 = Not Constrained 1 = Minor Constraints 2 = Marginally Constrained 3 = Moderately Constrained 4 = Totally Constrained	Next Steps	Potential Measures for Mitigation and Inclusion in Design Phase
Area 12 (Formerly CH4) Whebby Racing Stable & associated harness racing track 56 Lethbridge Avenue Cultural Landscape Feature *(Figure 12; CRM Group Report Sections 4.2.6 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Physical Evidence/Community Input	Requirements for mitigation or protection are to be decided on the basis of public communication/engagement.	Private horse stable and harness racing track established in 1957. Situated in the PWSPSA, but not in association with the Shubenacadie Canal System. Still in operation. (*CRM Group Report Sections 4.2.6 & 5.0)*	**Standards & Guidelines Category:** Built Features (potentially) Presence of buildings and a racing track	3 Moderately Constrained due to potential desire for mitigation or protection.	Public engagement is recommended to determine any requirements for mitigation or protection. This action should occur during the engagement phase of the secondary planning process and could influence the design phase of the secondary planning process.	Public engagement will decide whether or not this feature warrants provision of mitigation and/or conservation measures in the design phase of the secondary planning process.
Area 13 (Formerly HH2) Initially identified as an area of High Archaeological Potential, but cleared of any requirement for further archeological investigation following archaeological assessment involving shovel testing in 2014 *(Figure 12; CRM Group Report Sections 4.2.5 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance; Archaeological shovel testing **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	Located within the PWSPSA and within 100 metres of the Summit Reservoir of the Shubenacadie Canal System. (*CRM Group Report Sections 4.2.5 & 5.0)*	**Standards & Guidelines Category:** None Within 100 metres of a waterway (Barrys Run Stillwater/Summit Reservoir) Elevated topography Relatively flat Relatively dry Strategic view	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 14 (Formerly HL1) Area intact, but lacking any indication of cultural resources *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Area intact, but lacking any indication of cultural resources	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 15 (Formerly HL2) Area intact, but lacking any indication of cultural resources *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Area intact, but lacking any indication of cultural resources	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 16 (Formerly HL3) Area intact, but lacking any indication of cultural resources *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Area intact, but lacking any indication of cultural resources	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 17 (Formerly HL4) Area intact, but lacking any indication of cultural	**Data Source:** Various archival documents; Informed interviews; Reconnaissance	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.

Cultural Resource	Research and Engagement ["Data Source" and "Indicator" as referenced in current CRM table]	Outstanding Research	Findings and Resource Profile	Character Defining Elements	Level of Constraint 0 = Not Constrained 1 = Minor Constraints 2 = Marginally Constrained 3 = Moderately Constrained 4 = Totally Constrained	Next Steps	Potential Measures for Mitigation and Inclusion in Design Phase
resources *(Figure 12; CRM Group Report Section 5.0)*	**Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input			Area intact, but lacking any indication of cultural resources			
Area 18 (Formerly HL5) Area intact, but lacking any indication of cultural resources *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; **Data Source:** Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Area intact, but lacking any indication of cultural resources	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 19 (Formerly HL6) Area intact, but lacking any indication of cultural resources *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Area intact, but lacking any indication of cultural resources	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 20 (Formerly HL7) Area intact, but lacking any indication of cultural resources *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Area intact, but lacking any indication of cultural resources	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 21 (Formerly HN1) Area of modern ground impact *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Ground impacted to subsoil by modern quarrying activity	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 22 (Formerly HN2) Area of modern ground impact *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Ground impacted to subsoil by modern quarrying activity	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 23 (Formerly HN3) Area of modern ground impact *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Ground impacted to subsoil by modern quarrying activity	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.

Cultural Resource	Research and Engagement ["Data Source" and "Indicator" as referenced in current CRM table]	Outstanding Research	Findings and Resource Profile	Character Defining Elements	Level of Constraint 0 = Not Constrained 1 = Minor Constraints 2 = Marginally Constrained 3 = Moderately Constrained 4 = Totally Constrained	Next Steps	Potential Measures for Mitigation and Inclusion in Design Phase
Area 24 (Formerly HN4) Area of modern ground impact *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Ground impacted to subsoil by modern quarrying activity	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 25 (Formerly HN5) Area of modern ground impact *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Ground impacted to subsoil by modern quarrying activity	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 26 (Formerly HN6) Area of modern ground impact *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Ground impacted to subsoil by modern quarrying activity	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.



LEGEND

- Study Area Boundary
- Property Boundaries
- Watercourse
- Wetlands Under 2 Hectares

Score Classification

- Not Constrained (Score 0)
- Minor Constraints (Score 1)
- Marginally Constrained (Score 2)
- Moderately Constrained (Score 3)
- Totally Constrained (Score 4)

NOTES:

- Property lines approximate only. Site subject to survey

SOURCES:

- Cultural Resource Management Group Ltd., Port Wallace Land Suitability and Capacity Analysis, Heritage Potential, September 2014.
- Service Nova Scotia and Municipal Relation Online Property Database
- Nova Scotia Digital Topographic Series
- WSP Wetland and Watercourse Delineation, Port Wallis, August 2014
- GENIVAR Wetland and Watercourse Delineation, Port Wallis, January 2013
- Strum Field Identified Wetlands and Watercourse, June 2008
- Clayton Developments Port Wallace Watercourse Determination Map, September 15, 2014
- NSE Compliance letter (email) received, via Clayton Developments, September 29, 2014.

HERITAGE AND CULTURAL LANDSCAPE

FIGURE 3.6-1
HERITAGE AND CULTURAL LANDSCAPE CONSTRAINTS MAP
DARTMOUTH, NOVA SCOTIA

PORT WALLACE SECONDARY PLANNING STUDY AREA

OCTOBER 26, 2015 B07057-127-R1

SCALE 200 100 0 100 200 300 m
1 : 12,500

NORTH

WSP
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM

FILE: K:\DARTMOUTH\2007\B07057_KLD PORT WALLIS\DWG\CONCEPT\B07057-127-R1.DWG Sheet HERT-CULT

4 ANALYSIS: LAND SUITABILITY

4.1 CUMULATIVE VALUES

Chapter 3 of this LSA has described how each land feature has been individually evaluated against a consistent 0-4 scale, with '4' indicating total constraint and '0' having no constraint at all. While each of the six primary land features (or 'mapping layers') are of individual importance to the surrounding environment, as well as to the values of the Port Wallace community, it is also important to understand how they collectively influence the PWSPSA. This chapter, therefore, describes the methodology and framework to provide an accumulative score for overall levels of constraint against all identified primary LSA features.

4.1.1 METHODOLOGY

As reiterated above, each land feature has been scored on a 0-4 scale with '4' indicating total constraint and '0' having no constraint at all. Theoretically, when combining all layers together, the highest score a primary land feature (or map polygon, or piece of a polygon) can have is 24 (assuming that all six layers of the same area have been assigned a score of '4'). In reality, however, few polygons were scored 'Totally Constrained' for each individual feature, and no area (or piece of an area) (e.g. having a score of 24).

In order to create a scaled ranking system for the cumulative scores, a benchmark was created and set to the most constrained area of land within the PWSPSA: Barry's Run. Barry's Run is the PWSPSA's benchmark land features as it was regularly scored among the highest in all the individual layers. The intrinsic values of Barry's Run have also been regularly communicated through public consultation processes; as such, Barry's Run has been evaluated as the most highly constrained feature (from a development stand point). **Table 4.1-1** below establishes the benchmark score (16) by accumulating the individual layer scores attributed to Barry's Run:

Table 4.1-1: Accumulative Scoring Benchmark: Barry's Run

LAYER NUMBER	FEATURE: BARRY'S RUN	SCORE
1	Forest	2
2	Watercourse	4
3	Wetland	4
4	Slope	0
5	Potential Contamination	2
6	Heritage & Cultural Landscape	4
Cumulative Total		**16**

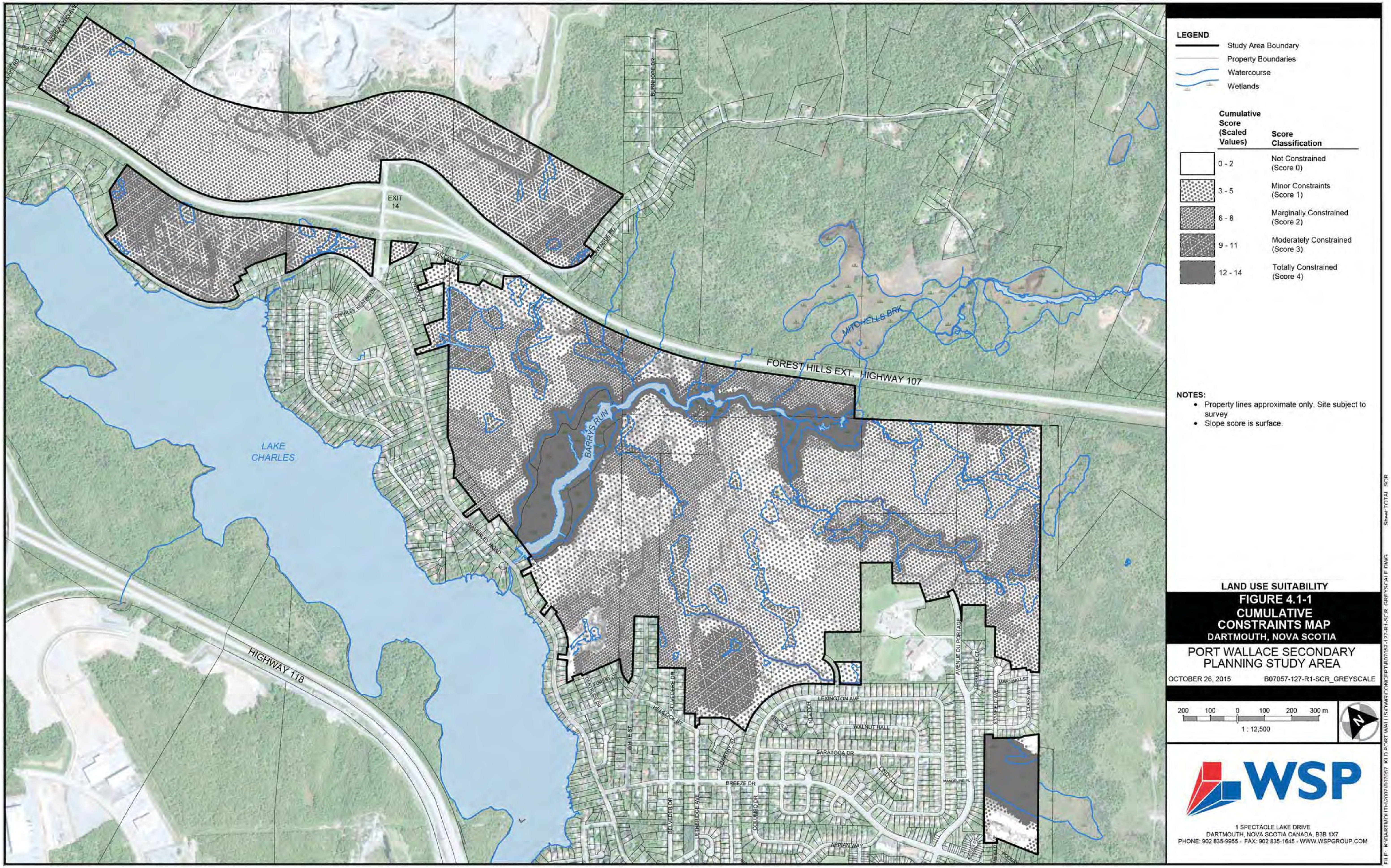
With a new 'benchmark' established (16), a new scaled/cumulative scoring approach was developed: any primary land feature (or map polygon, or piece of a polygon) has the potential to be scored between 0-16, which is scaled into five classifications/definitions consistent with the '0-4' scoring methodology and definitions applied throughout this LSA. **Table 4.1-2** below outlines the cumulative scoring approach that was used to evaluate and score the entire PWSPSA

Table 4.1-2: Accumulative Scoring Benchmark: Barry's Run

CUMULATIVE SCORE (SCALED VALUES)	CLASSIFICATION	DEFINITION	MAP COLOUR
0-2	0 = Not Constrained	means land where the primary function is intended to support development	White (opaque)
3-5	1 = Minor Constraints	means land suitable for development, where the purpose of the land is to be developed in response to natural and cultural landscape features	Green
6-8	2 = Marginally Constrained	means land somewhat suitable for development, where some environmental and cultural conservation or mitigation efforts may be required in order to preserve ecological function and cultural value	Yellow
9-11	3 = Moderately Constrained	means land with features in support of ecological or cultural function where additional studies may be required to verify the presence of significant land features prior to development	Orange
12-16	4 = Totally Constrained	means land where the primary function is intended to support environmental and cultural conservation efforts. Natural corridor, passive recreation, and some active recreation and infrastructure, such as bridges and roads, may be permitted where they do not undermine the ecological function of the land	Red

4.1.2 RESULTS

Based on the Cumulative Values approach described above, our team overlaid each mapping layer (primary land feature) on a single map **(Figure 4.1-1)** in order to visually represent the PWSPSA's overall level of development constraint. The following subsections analyze the results of the LSA, particularly how they relate to natural corridor identification and future land use considerations.



LEGEND
Study Area Boundary
Property Boundaries
Watercourse
Wetlands
Cumulative Score (Scaled Values)
Score Classification
0 - 2
Not Constrained (Score 0)
3 - 5
Minor Constraints (Score 1)
6 - 8
Marginally Constrained (Score 2)
9 - 11
Moderately Constrained (Score 3)
12 - 14
Totally Constrained (Score 4)
NOTES:
• Property lines approximate only. Site subject to survey
• Slope score is surface.
LAND USE SUITABILITY
FIGURE 4.1-1
CUMULATIVE CONSTRAINTS MAP
DARTMOUTH, NOVA SCOTIA
PORT WALLACE SECONDARY PLANNING STUDY AREA
OCTOBER 26, 2015
B07057-127-R1-SCR_GREYSCALE
200 100 0 100 200 300 m
1 : 12,500
WSP
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM
LAKE CHARLES
FOREST HILLS EXT. HIGHWAY 107
HIGHWAY 118
EXIT 14
MITCHELLS BRK
BARRYS RUN
LEXINGTON AVE
WALNUT HALL
SARATOGA DR
BREEZE DR
APPIAN WAY

4.1.2.1 NATURAL CORRIDORS

The Cumulative Values assessment resulted in the delineation of several natural corridors, as higher constraint areas – containing significant environmental and cultural-heritage landscape features – are visibly contiguous within the PWSPSA, as is shown on **Figure 4.1-1**. These contiguous areas have high capacity to foster on-going connectivity and conservation efforts, ecological biodiversity, natural landscape beauty, and active and passive recreational opportunities: key themes which are supported by Policy E-9 of the RMPS:

Policy E-9 *Where HRM is considering approval of new secondary planning strategies or amendments to existing secondary planning strategies to allow new developments, natural corridors shall first be delineated, consistent with the Greenbelting and Public Open Space Priorities Plan approach, to identify areas to be retained for natural areas and natural corridors.*

Although the *Greenbelting and Public Open Space Priorities Plan* and its corresponding approach have yet to be published, the results of the LSA have confidently delineated one primary natural corridor within the PWSPSA, as is shown on **Figure 4.1-2**. Future PSWPSA land use concepts should consider integrating this natural corridor into the design of the neighbourhood in an effort to promote and support ecological function and the interconnectivity of natural resources within the future development. For the purpose of this report, only one natural corridor has been identified.

1. **Barry's Run/Mitchell's Brook Natural Corridor**

   This corridor consists of a greenway through and along Barry's Run and Mitchell's Brook, and extending through the northeast of the PWSPSA. The Barry's Run/Mitchell's Brook Natural Corridor consists of a primary stream system that flows westward from Loon Lake to Lake Charles, which connects the Shubenacadie Lakes water system. Much of this corridor has been scored as 'Totally Constrained', meaning that no development should be proposed in this area, and that it should be primarily retained for conservation efforts. This corridor extends across the PWSPSA, and contains a variety of different habitats including forests, watercourses, and wetlands, which will support biodiversity across the site. In addition to the constraints scoring, existing Port Wallace community members have identified Barry's Run/Mitchell's Brook as a significant cultural landmark, as it possesses an intrinsic cultural beauty and value.

The Barry's Run natural corridor is arguably the most ecologically and culturally significant feature within the PWSPSA; however, Barry's Run literally divides the PWSPSA into two distinct areas: east and west. In order to support the development of a complete, connected and accessible community, a water crossing of some sorts is likely. This crossing will need to be designed so as not to detrimentally impact the ecological function of Barry's Run, and should be designed to enhance the feature's heritage and cultural landscape.

Additional environmental study will be required in order to determine and monitor wetland and watercourse alteration impacts.

4.1.2.2 FUTURE LAND USE

When imagining future development of the PWSPSA, apparent land use themes begin to emerge when considering the results of the Cumulative Scoring Results **(Figure 4.1-1)**: key natural corridors are delineated; areas of elevated potential for cultural and heritage significance are scattered throughout the site; and, places of intrinsic natural beauty are spread throughout the land. In this light, it is clear that the PWSPSA should be developed as a community rooted to the landscape with connections to the past.

The following subsections outline several land use themes and best practices that have emerged through this process. Although it is too early in the Secondary Planning process to finalize land uses, this subsection introduces concepts that may be carried though the future planning phases for the Port Wallace lands. Additionally, the **Land Suitability Matrix (Appendix F)** should be referred to when making future land use planning decisions within the PWSPSA. The Matrix helps prioritize which development categories are most suitable for development (or conservation) when evaluated against the levels of development constraint as depicted on **Figure 4.1-1**.

The PWSPSA should generally incorporate a variety of housing options, commercial and industrial uses, open spaces, and public amenity facilities. These land use types should be organized within a planned roadway, trail, and park and open space system to promote connectivity and access to daily services.

1. **Low Density Residential**

   Low Density Residential uses should include single detached and semi-detached housing, and a minor degree of row and town housing. To accommodate transition between the edges of existing residential properties adjacent to the PWSPSA, only single detached and semi-detached housing should be considered. Low Density Residential housing should accommodate a variety of lot and house sizes, price ranges and architectural treatments.

2. **Medium Density Residential**

   Medium Density Residential uses should provide a range of housing types to residents and accommodate building forms ranging from townhomes to clustered housing and from mixed-use development to multi-unit residential buildings (including higher density housing options) at a variety of sizes. Distributed throughout the PWSPSA, Medium Density Residential uses should be located in proximity to public amenities, retail and employment areas, and transit routes, and should be generally located away from the existing Port Wallace residential communities.

3. **Commercial Retail**

   Commercial Retail uses should include retail amenities that service the surrounding residential communities. These uses may include food stores, restaurants, banks, fitness centres, offices, service

centres and general retail stores. These uses are intended to complement the transportation infrastructure requirements by providing future and existing residents with direct access to commercial centres from major collector roads and highways.

4. **Neighbourhood Commercial**

Neighbourhood Commercial uses should be permitted in most areas, including residential areas. These uses generally include convenience stores, small restaurants and pubs, service establishments, and small offices. Envisioned as a self-contained, family-friendly development, the PWSPSA should be developed with essential services and amenities nearby.

5. **Light-Industrial & Business Park**

Light-Industrial uses provides the opportunity for the Municipality to help decrease the industrial and business park land deficit expected in the next twenty years. This area, exclusively reserved for the Conrad Quarry Land area abutting Highway 107, is envisioned to consist of light-industrial uses which do not adversely affect the surrounding community uses through the generation of emissions, noise, odors, vibrations, heat, bright light, or dust. Service-based businesses may also locate in this area.

6. **Institutional**

Institutional lands, including school blocks, places of worship, and emergency services should be developed as valuable community and neighbourhood amenities. These amenities should be permitted in any of the areas referenced above. Assessment of Public Amenities for the PWSPSA should require future consultation with authorities such as the Halifax Regional School Board and Emergency Services divisions.

7. **Street Network, transportation and Transit**

A street network should be implemented in-keeping with standards of best practice and the Municipality's current design guidelines. Transportation planning for the area should consider providing fiscally and environmentally sustainable options for mobility including active and public transportation which efficiently connect the area internally and with the rest of the municipality. A road network featuring complete streets which are accessible to a variety of transportation modes should be created which makes best use of topography and provide a level of connectedness which is conducive to a healthy and active community.

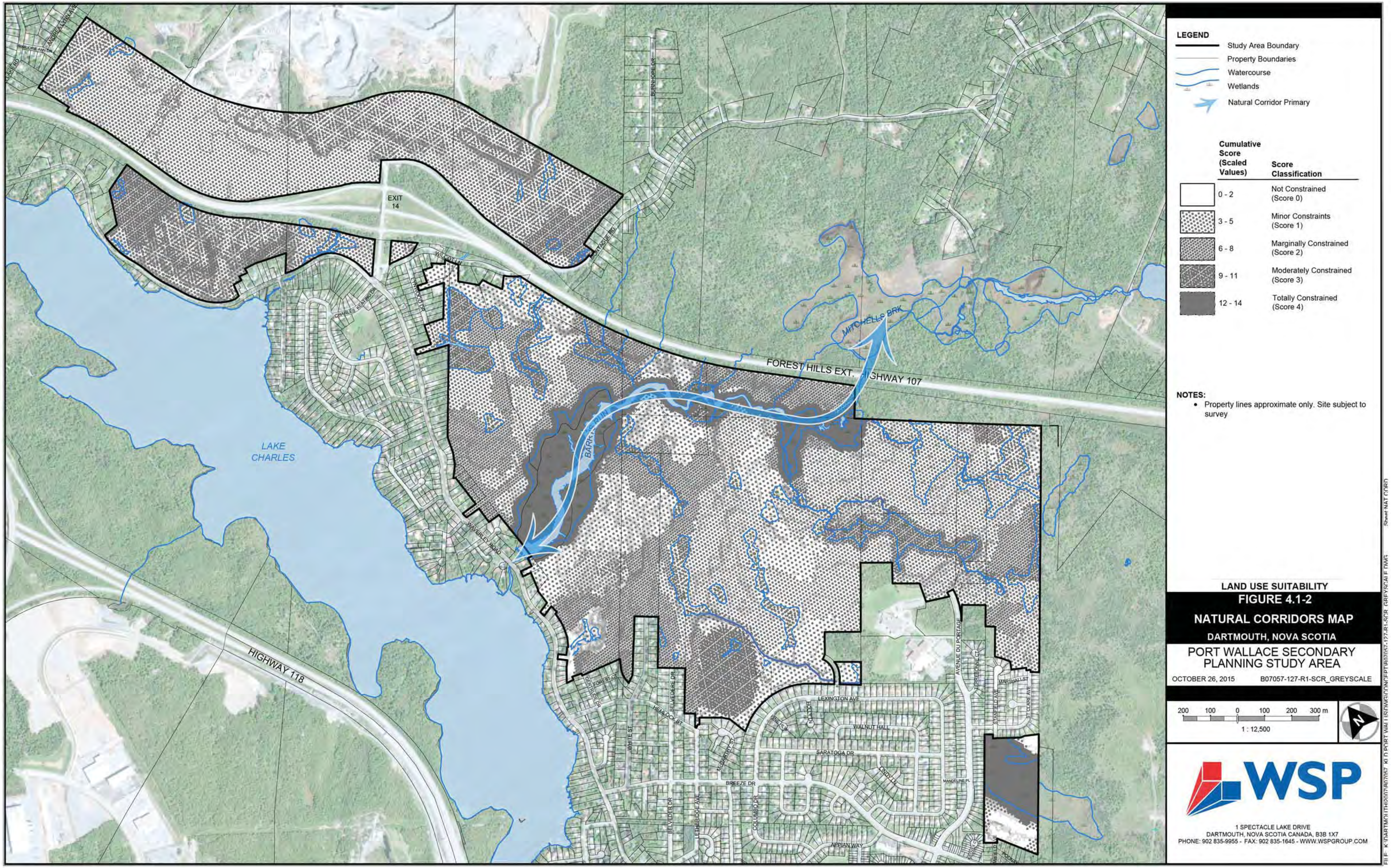
8. **Open Spaces**

Future development should consider respecting conservation areas by designating these areas for park and open space uses. The PWSPSA should incorporate a multi-functional open space system to accommodate the active and passive recreational needs of current and future residents. This system should provide a comprehensive network of pedestrian and non-vehicular linkages throughout the

community, allowing access to and from existing adjacent communities. All parks should consider providing year-round recreational options that promote social interaction.

Barry's Run should be positioned as a centrally-located community open space: "where the corridors meet". Barry's Run is identified for the creation of a natural corridor with special cultural and heritage features. Barry's Run is envisioned to provide central active and passive recreation opportunities for the residents of Port Wallace and its surrounding communities. It is expected that decisions about the specific uses for Barry's run will be identified at the conceptual design stage, and options will need to be thoroughly investigated.

In addition to the open space network, a series of trail networks should be implemented throughout the PWSPSA. All trails should be used to link residential areas to natural features – as well as to commercial nodes and surrounding communities – and they should incorporate interpretive signage to inform residents about the area's local history and ecological systems that comprise the open space. The trail networks should be accessible to pedestrians and bicyclists, and should be incorporated within the right-of-way design, as well as through parks and natural open space corridors.


LEGEND
Study Area Boundary
Property Boundaries
Watercourse
Wetlands
Natural Corridor Primary
Cumulative Score (Scaled Values)
Score Classification
0 - 2
Not Constrained (Score 0)
3 - 5
Minor Constraints (Score 1)
6 - 8
Marginally Constrained (Score 2)
9 - 11
Moderately Constrained (Score 3)
12 - 14
Totally Constrained (Score 4)
NOTES:
• Property lines approximate only. Site subject to survey
LAKE CHARLES
EXIT 14
FOREST HILLS EXT. HIGHWAY 107
HIGHWAY 118
MITCHELLS BRK
LEXINGTON AVE
WALNUT HALL
SARATOGA DR
BREEZE DR
APPIAN WAY
AVENUE DU PORTAGE
LAND USE SUITABILITY
FIGURE 4.1-2
NATURAL CORRIDORS MAP
DARTMOUTH, NOVA SCOTIA
PORT WALLACE SECONDARY PLANNING STUDY AREA
OCTOBER 26, 2015
B07057-127-R1-SCR_GREYSCALE
200 100 0 100 200 300 m
1 : 12,500
N
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM

5 CONCLUSION

As a result of the combined background research, field investigation, and land suitability scoring and evaluation (including all background reporting and the **Baseline Infrastructure Analysis**), the PWSPSA contains lands suitable for a variety of uses. Of particular note, the cumulative LSA scoring results have clearly identified Barry's Run/Mitchell's Brook as an important natural corridor, containing several land features identified as having elevated potential for cultural and heritage significance. When considering future development within the PWSPSA, significant effort should be made to ensure that this corridor is protected as a natural landscape feature, used possibly for passive and active recreation activities. Any infrastructural developments potentially impacting this corridor should be planned and designed with careful thought to the natural environment, and should incorporate mitigative techniques to ensure the long-term sustainability of the corridor.

A number of other important natural and heritage & cultural landscapes are scattered throughout the site, including several places of intrinsic natural beauty. Land development opportunities must respond to these features in an ecologically sensitive manner so as not to detrimentally impact the landscape. As such, when moving forward through Secondary Planning, the particular land uses being considered for development should pay attention to, and respond to, the natural and culturally significant features identified through this LSA. Development concepts should be designed in such a way to respect the PWSPSA land features which will result in a high-quality, ecologically and culturally responsive development. The Land Suitability Matrix, as described under Section 4.1.2.2, should be considered in conjunction with **Figure 4.1-1** when making future land use planning decisions.

Additionally, as this LSA represents the first step in the ensuing Secondary Planning Process, ongoing stakeholder and community consultation should be considered as an integral component of the project. Ongoing consultation activities will preserve or enhance important landscapes within the PWSPSA.

The results of this LSA should be considered when determining where development should and should not occur; and, when considering what types of development is appropriate for particular landscapes. However, the results of this LSA may alter or be reconsidered, at a later date, subject to further detailed analysis and/or site investigation.

APPENDICES

APPENDIX A

Interim Boundaries: Conrad Lands

THE FOLLOWING APPENDIX WAS COMPLETED BY: TOM SWANSON, P. ENG., EAST POINT ENGINEERING LTD.

The Lands of Conrad Brothers Ltd. (Conrad Lands) are currently located within the Rural Commuter designation boundary. This means that in order to extend water and sanitary services to these lands, a Regional Planning Amendment will be required. However, the Conrad's Port Wallace lands present a unique case, where by historical planning intent, existing water quality objectives, and future industrial development opportunities, suggest that a portion of the Conrad Lands should indeed be considered for Servicing and Secondary Planning. As indicated in the Staff Report to March 4, 2014 Regional Council meeting. "There may be merit in including some of the Conrad Lands within the Port Wallace Secondary Planning and Servicing Area". This is supported by Regional Planning **Policy S-2**:

Policy S-2	Where requests are received to initiate secondary planning for *Port Wallace*, considerations shall be given to: a) The need for additional lands and the fiscal implications to HRM and Halifax Water and their capacity to meet additional financial commitment; an b) The implications for achieving the HRM growth targets.

This Appendix, therefore, expands upon and clarifies the request to include a portion of the Conrad Lands within the Secondary Planning Process, and for an extension of the servicing boundary. It outlines the benefits to HRM and its residents from granting the request.

BACKGROUND AND CURRENT USAGE

Background

Based on former County of Halifax and City of Dartmouth planning approaches, the Conrad Lands were intended to be included for future development since 1975. It was not until the 2006 *Regional Plan*, with the adoption of the 'Urban Settlement' designation, when the Conrad Lands were omitted from future

planned development. Even still, the *Cost of Servicing Study* (2009) and *Sub-Watershed Study* (2013) included the entirety of the Conrad Lands when considering future development opportunities. A number of other events have occurred which support the inclusion of a portion of the Conrad Lands within the Secondary Plan and Servicing Area and a rezoning to industrial for the Conrad quarry lands. These include:

1. The construction of the 107 Bypass severed the Conrad Lands and consequently left small strips of R-1 zoning within the Dartmouth Planning District beyond the 107 Bypass which are no longer appropriate;
2. The various 'Greenfield Sites' identified in Regional Planning exercises from 2004 through 2009 identified all of the Conrad Lands as being within the Port Wallace Secondary Planning Area. The 2009 cost of servicing study by CBCL Ltd. indicated that the inclusion of the area A outside of the 107 Bypass (Conrad Lands) would significantly decrease the per acre cost for the provision of trunk services;
3. In deliberations leading to RP+5 Amendments to the Municipal Planning Strategy Regional Council decided that within the current planning time horizons allowing serviced residential development beyond the 107 Bypass could lead to urban sprawl and would be contrary to the plan objective of increasing residential density within serviced residential areas in order to lower municipal costs;
4. Conrad's understand and respect this decision, and it is not their intent to allow residential development on their quarry lands (lands beyond the 107 bypass). However these lands have over two kilometers of frontage along the Highway 107 bypass right of way and direct access to the 100 series highways via the Montague Road/Waverley Road interchange. Conrad's are confident that they will be able to generate significant increases in commercial/industrial employment and assessments through expansion of existing tenant businesses on their lands and sale of sites to interested third parties, if municipal water and sewer services and industrial zoning are extended to the front portion of their quarry lands;
5. HRM Development regulations have been tightened so it is no longer possible for Conrad's to build buildings associated with and necessary for the quarry and related industrial operations in the residentially zoned portion of their quarry lands. This has resulted in a deferral of planned new construction and prevents the most effective operation of their facilities;
6. An application to rezone all of Conrad's quarry lands, outside of the Lake Major Protected Water Supply zone to industrial has been made via separate application to HRM;
7. When Halifax Regional Council authorized proceeding with a secondary planning for the Port Wallace area Greenfield site, requests were made by WSP on behalf of the land owners to incorporate the Conrad Lands between the Waverley Road and Highway 107 Bypass, approximately 22 hectares

within the servicing boundary with the area to be planned and developed for residential development. A further request was made to extend the servicing boundary to include a portion of Conrad's quarry lands fronting along the 107 Highway Bypass and a section of Montague Road to facilitate development of industrial and highway commercial uses.

Current Zoning

The Conrad Lands fall within three different planning districts and are covered by seven different zones, as shown on the **Existing Zoning Plan** and listed below:

1. The lands between the Waverley Road and the 107 Bypass and a small portion of lands across the Bypass are in the Dartmouth Planning District and are zoned R-1. About two-thirds of the remaining lands are in Planning District 14 and 17, the Shubenacadie Lakes plan area. About 20 percent of these lands in turn closest to the 107 Bypass and either abutting it or the R-1 Dartmouth zoning are zoned I-3, light industrial and contain most of the offices and other buildings associating with the businesses described later in this appendix. The remainder of the lands in districts 14 and 17 are zoned R-1b comprising about 70 percent with PWS (Protected Water Supply) covering about 10%;
2. The remainder of the Conrad Lands fall within the Cole Harbour Westphal Planning District with the front portion nearest to Highway 107 and the Montague Road zoned R-1 and R-7 and the back portion zoned PWS.

As mentioned above a separate application has been made to HRM Planning on behalf of Conrad Brothers Ltd. to amend the planning district boundaries so that all of Conrad's quarry lands all fall within Planning District 14-17 and to rezone all of the non-watershed lands to industrial.

Current Usage

The Conrad family acquired the first parcel of the lands which currently make up the Conrad Brothers Limited lands within the Port Wallace Greenfield Site in 1951. They started their quarry operations in 1963, and shortly thereafter acquired additional adjacent parcels so that they now own approximately 237 hectares (585 acres); 22 hectares (55 acres) between the Waverley Road and the 107 Bypass and 215 hectares (530 acres) outside of the Bypass. The original quarry operations were based on Waverley Road access and located on the parcel currently inside of the 107 Bypass. After this highway was constructed, Conrad's moved their operations to outside of the Bypass at the request of the Dartmouth City engineer. However the former quarrying operations have left a few site issues which we propose should be dealt with through the secondary planning and development process. These include:

1. A few near vertical rock faces were left which should be modified in the interests of public safety.

2. A few large piles of oversized boulders were left which should be removed or modified in the interest of public safety.
3. Some man made settling ponds were created which are no longer used and have essentially dried up but which show up as wetlands on some older mapping. These should either be restored if they are useful as water management features or infilled with the sites integrated into the development.

Over the years as the quarry business expanded a number of related and complementary businesses have been developed on the Conrad Lands. Notwithstanding some seasonal fluctuations, about 200 people are currently employed by the businesses located on the Conrad Lands. These include:

1. The Quarry Operation;
2. Trucking and Transportation businesses (these were originally related to the quarry but have expanded into heavy hauling, container handling and related services including warehousing and load consolidation);
3. An Asphalt and Ready Mix Concrete Company;
4. Contractor Equipment Storage and Repair;
5. Soil Treatment and Remediation;
6. Firewood Processing and Delivery;
7. Car Dealer Excess Vehicle Storage;
8. RV Parking and Storage; and,
9. Offices related to each of the above.

All of these businesses operate within the present quarry site outside of the 107 Bypass.

ZONING
R-1b

ZONING
R-1

ZONING
I-3

PLANNING DISTRICTS 14 & 17

ZONING
PWS

COLE HARBOUR / WESTPHAL
PLANNING DISTRICT

ZONING
PWS

ZONING
R-1b

ZONING
R-1

ZONING
I-3

ZONING
R-1

ZONING
PWS

DARTMOUTH PLANNING DISTRICT

Lake Charles
WATER LEVEL 28.8

COLE HARBOUR / WESTPHAL
PLANNING AREA

ZONING
R-7

ZONING
R-1

ZONING
R-1

ZONING
R-1

Towers

SPIDER LAKE RD
WAVERLEY RD
LAKE CHARLES DR
CRAIGBURN DR
MC GOONAN LN
EXIT 14
WILCOX DR
BURNHOPE DR
CRAIGBURN DR
BURNHOPE DR

N

SITE

KEY PLAN — SCALE = 1:50,000

LEGEND	ZONING	PLANNING DISTRICT
	R-1	CITY OF DARTMOUTH
	I-3	14 & 17
	R-1b	14 & 17
	PWS	14 & 17
	R-7	COLE HARBOUR WESTPHAL
	R-1	COLE HARBOUR WESTPHAL
	PWS	COLE HARBOUR WESTPHAL

No.	Date	Revision Description	Appr'd

Summit Rock Developments Ltd.
DEVELOPMENT CONSULTANTS
1801 HOLLIS ST. SUITE 1500
Halifax, Nova Scotia Tel: (902)420-0293
Canada B3J 3N4 Fax: (902)422-1919

EastPoint ENGINEERING LTD.
1801 HOLLIS ST. SUITE 1500
Halifax, Nova Scotia Tel: (902)422-2000
Canada B3J 3N4 Fax: (902)422-1919

PREPARED FOR
CONRADS BROTHERS
Waverley, Nova Scotia

EXISTING ZONING PLAN

Date Sept. 2014	Drawn K.N.WILTON	Project No. 140701
Scale Horz. 1:400	Engineer T.SWANSON	Plan No. 140701-001
Reference	Approved	Mun. No. 00000000
Surveyed	Sheet OF	

LANDS BETWEEN THE WAVERLEY ROAD AND THE 107 BYPASS

We request the sanitary sewer and water servicing boundary be extended to incorporate all of Conrad's lands between the Waverley Road and the 107 Bypass; and that these lands be designated for development within the Port Wallace Secondary Plan.

RATIONALE FOR REQUEST TO INCLUDE LANDS WITHIN SECONDARY PLAN

1. Historically these lands have been within the City of Dartmouth and designated and zoned (R-1) for residential development whenever servicing was extended to the area.
2. A 350 mm diameter waterline passes along the Waverley Road along the entire frontage of these lands and a sewage lift station near the end of Lake Charles Drive, constructed by the city of Dartmouth, is actually located on Conrad's land. Conrad's lands have not been developed to date because of inadequate downstream sanitary sewer capacity in the Waverley Road system beyond the civic 390 Waverley Road pumping station. When the lift station was installed on Conrad's property they were told that serviced residential development rights would be granted for these lands as soon as sanitary sewer servicing capacity was provided through construction of connections to the north Dartmouth trunk sewer, which is necessary to service the Port Wallace Secondary Planning area;
3. The current R-1 zoning permits development of these lands on wells and septic tanks; however there are several valid reasons for facilitating serviced development of these lands instead. These include:
   - **a.** The *Shubenacadie Lakes Subwatershed Study* (2013) indicated that to allow these lands to be developed based on or site services in lieu of central sewer services will negatively impact the Lake Charles water quality.
   - **b.** The 107 Bypass provides a logical barrier separating serviced and un-serviced residential development.
   - **c.** If Regional Council deems the benefits to HRM of allowing serviced industrial development of the front portion of Conrad's quarry lands are desirable, these may be achieved at lower costs both to Conrad's with lower ongoing operating costs to Halifax Water via a gravity rather than pumped sewer service. This may only be achieved by installing gravity sewers through Conrad's front lands; and,
4. Furthermore, developing these lands presents a logical extension of the type and scale of development which is experienced in this neighbourhood already. Serviced residential development will help better connect the Portobello residential area with the Waverley Road residential areas. Also, servicing these lands will provide an opportunity to introduce small neighbourhood commercial uses as a central node to the community, at the gateway to the Highway 107 interchange from the Waverley.

BENEFITS TO HRM

Although this request should be granted to fulfill long term commitments, it will also benefit HRM as indicated below:

1. It will provide better utilization of existing water and sanitary sewer services adjacent to the property which have been sized to service these lands;
2. Servicing of the lands will provide a parallel loop to a portion of the single feed Waverley Road water line thereby increasing reliability;
3. Servicing of the lands will greatly reduce the risk of contaminated runoff into Lake Charles (serviced development versus on-site septic systems); and,
4. Servicing of these lands will increase the acreage to be developed in the Port Wallace capital cost contribution area, thereby allowing for a decrease in the average cost per acre for the infrastructure for the remaining Port Wallace Greenfield site and reducing capital costs to HRM/Halifax Water for their portion of infrastructure upgrades.

LANDS ABUTTING THE 107 BYPASS AND MONTAGUE ROAD

In general these are the lands shown on the previous submission by WSP (See **Image A-1**: Original request to include Conrad Lands (approx. 222 acres), Letter to the Community Design Advisory Committee, June 20, 2013. below); however, this submission, as part of the LSA, has been modified to request that the back-boundary line be amended slightly for two reasons. First we have proposed a slight increase in depth back from the 107 Bypass. This has been done because to utilize these lands most effectively it is necessary to have an internal loop street system both for emergency vehicle movement and to provide appropriate water service looping. With this in mind and to provide appropriate average lot depths for industrial lots, of 90 meters more or less with two 20 meter road ways we are requesting a depth of serviced land of approximately 400 meters from the highway. This is slightly more than shown on the previous sketch and after Parkland dedication will allow approximately 80 hectares (200 acres) of usable serviced land including streets. A second requested change is that rather than the servicing boundary following a series of curves shown on the original submission **Image A-1**: Original request to include Conrad Lands (approx. 222 acres), Letter to the Community Design Advisory Committee, June 20, 2013. we are now proposing three straight lines to make up the back boundary of the serviced area so that they may be more easily laid out in the field. This amended request is contained herein as **Image A-2**: Sketch showing request to include Conrad Lands with modified alignment of back boundary on quarry lands (Approximately 222 usable acres)., showing amended servicing boundary for Conrad Lands.

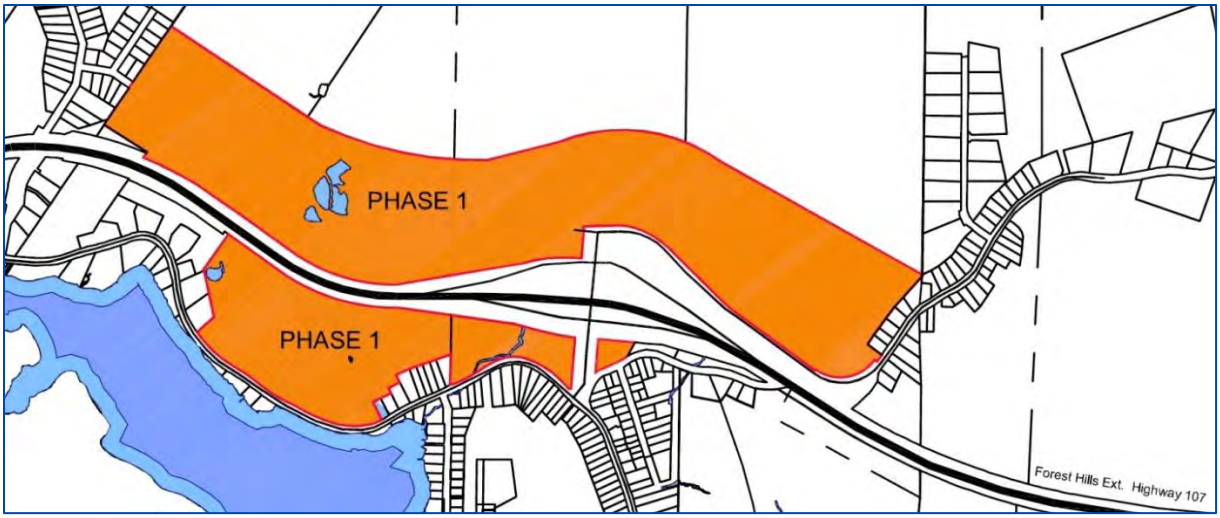


Image A-1: Original request to include Conrad Lands (approx. 222 acres), Letter to the Community Design Advisory Committee, June 20, 2013.

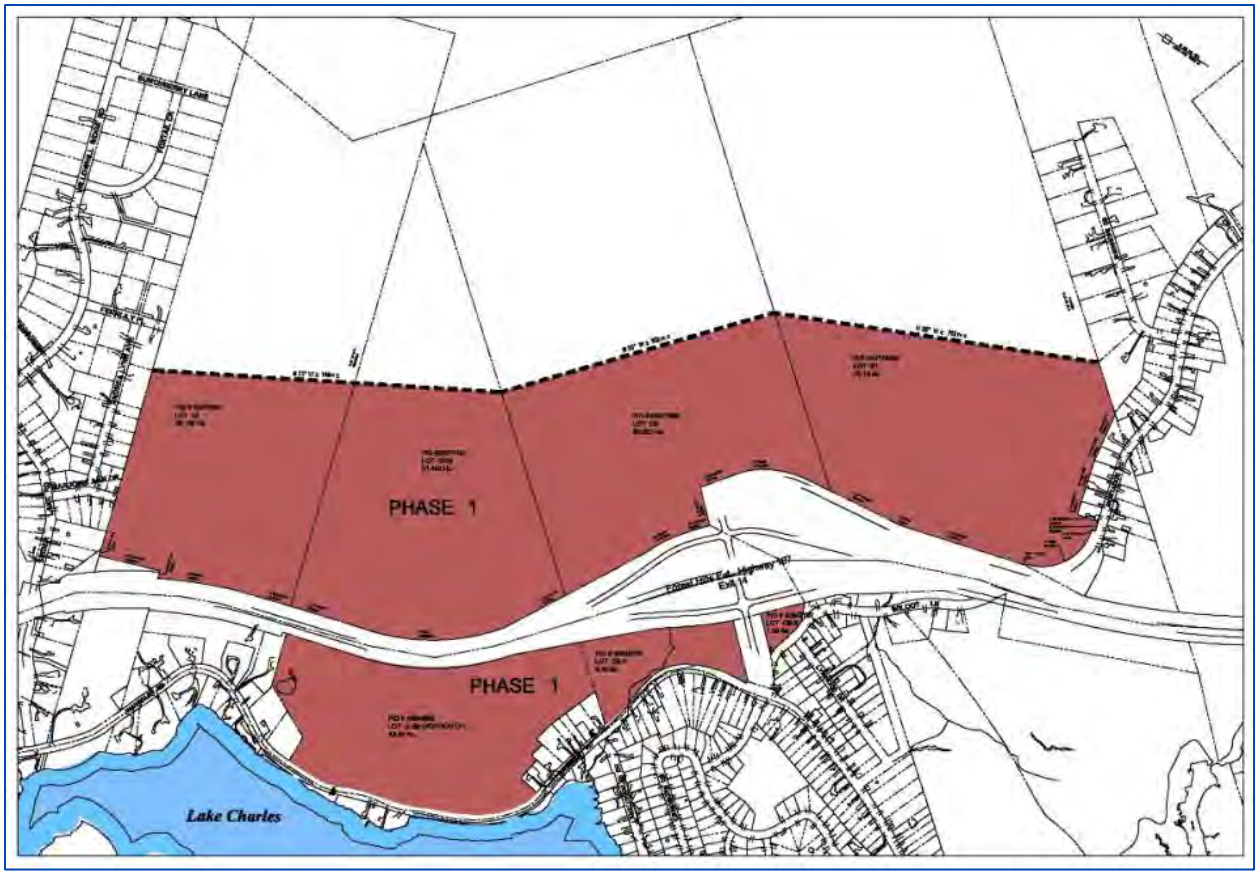


Image A-2: Sketch showing request to include Conrad Lands with modified alignment of back boundary on quarry lands (Approximately 222 usable acres).

RATIONALE FOR REQUEST TO INCLUDE LANDS WITHIN SERVICING BOUNDARY

Based on earlier discussions with Dartmouth and Halifax County officials, Conrad's have understood that they would eventually be permitted to carry out serviced development on all of their lands in this area. They do not object to the Council's decision to prohibit residential development beyond the Highway 107 Bypass. However, because of the fact that the Conrad Lands have approximately 2 km of frontage with excellent visibility along the Highway 107 Bypass, with a major access point to the 100 Series Highways opening directly on to their land, a light industrial/commercial strip running parallel to the 107 Bypass would provide significant benefits to the existing businesses operating from these lands and new businesses interested in the area, which in turn will have significant benefits to HRM. The majority of these benefits may only be realized if central servicing is provided to these lands.

The reasons for this are that businesses operating on the Conrad Lands are currently restrained from expanding due to:

1. Current zoning which prohibits new or expanded industrial buildings on all except the small portion of the site currently zoned I-3. This is currently being dealt with under a separate application to HRM Planning.
2. Businesses are reluctant to locate in this area or expand unless they have a reliable potable water supply for their employees, operations and fire protection. Ground water supplies in adjacent residential subdivisions on Montague Road and the Spider Lake area were of such poor quality that Halifax Water and its predecessors considered it necessary to extend municipal water to them. Complicating the well water option even more is the fact that Conrad's intent to continue operating their quarry business for a significant period of time which could further interfere with well water supply.
3. Fire risk and fire insurance costs without an adequate public water supply are excessive.
4. The area adjacent to the 107 Bypass which Conrad's propose to use for development is quarried over land which is particularly ill suited for on-site sewage disposal systems. This drives up the cost for such systems and as pointed out in the AECOM watershed report for Conrad's R-1 lands, such systems could ultimately lead to deterioration of water quality in Lake Charles, compared to disposing of sewage via modern central services.
5. Most new and expanding business finance at least a portion of their capital costs via mortgage on their land and buildings. This can only be done following subdivision of lands into parcels allowing individual ownership. Generally, constructing streets to facilitate subdivisions of industrial lots, without central services, due to the excessive lot sizes and low lot values, is not a viable business.
6. Un-serviced industrial developments generally attract low budget operations which will not create the attractive image or level of employment which are appropriate for this highly visible site, close to an expanding residential community.

HRM has indicated that:

> *"Land suitable for industrial use is in limited supply. HRM has only one business park (Burnside) with land available for industrial development and, at the current rate of development, this capacity will be exhausted in less than ten years."*[1]

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[1] HRM, *RFP #14-304,*

Providing services to the Conrad Lands abutting the 107 bypass for industrial development will open up medium and long term development opportunity for much needed industrial development in Halifax.

BENEFITS TO HRM

Numerous and diverse benefits will accrue to HRM and its citizens through the granting of this request, including:

1. Create new serviced land for Industrial Development – adjacent to existing highway infrastructure with excellent access to the 100 Series Highways, Burnside, Halifax International Airport and Halifax Harbour – where there is currently an identified shortage within the Municipality;
2. A significant increase in local employment close to the developing Port Wallace area residential community. Conrad's estimate, based on their own plans and discussions with current tenants, that within a few years of water and sewer services being made available to their lands and their being permitted to construct streets and services, and subdivide lots on the front portion of their quarry land, that employment within the area would at least triple (200 employees to 600 employees). After this initial spurt, growth is expected to continue with one or two new businesses or expansions per year;
3. Associated with the business expansion would be a significant increase in industrial and commercial assessments and taxes;
4. Looping present water lines from where the Montague Road water supply crosses under the 107 Bypass to the existing water distribution system on Spider Lake Road, which are both fed from a single Waverley Road supply line would result in a significant increase in water system reliability and fire flow capacity. This will be further enhanced upon completion of water distribution lines through the remainder of the Port Wallace Secondary Plan Area;
5. Fuller utilization of existing sanitary sewer infrastructure. An existing 450 mm gravity sanitary sewer extends from the intersection of Wilcot Lane and Lynwood Drive adjacent to the Conrad's property, for which we have requested residential zoning, along the Waverley Road to the pumping station at civic 390 Waverley Road. A preliminary analysis has confirmed that this existing gravity pipe has adequate capacity to service the 80 Hectares of requested industrial zoning (at a sewage generation rate of $35m^3$/Hectare/day as suggested by NSDOE for lands with light industrial zoning, plus the Conrad's residential lands). Further preliminary design investigation indicates that these lands with the exception of a small portion of residential lands immediately abutting the Waverley Road may all be serviced to the 390 Waverley Road pumping station by gravity. A new pumping station and force mains are proposed at the 390 Waverley Road pumping station location to move the sanitary sewage from that location to the north Dartmouth trunk sewer. Upon approval in principal Conrad's consultants will work with Halifax Water engineering staff to confirm sanitary sewer alignments and capacities and appropriate water system design details. It should further be pointed out that allowing

serviced development of 80 hectares at 35m3/HA/day will utilize less than 50 percent of the sanitary sewer capacity allocated to the Port Wallace Greenfield area “A” in the *Cost of Servicing Study* (CBCL, 2009);

6. By allowing 200 acres of serviced industrial zoned lands on the Conrad property the Port Wallace Greenfield site serviced area would be increased resulting in a reduction to the costs per acre for the Port Wallace infrastructure through spreading the cost over a larger base. This in turn will reduce cost both to other developers and for the portion which HRM/HW would absorb for their share to be allocated to existing residences;
7. Provide a potential site for public infrastructure and facilities, such as Park and Ride Bus Terminal to support the Port Wallace area, which was recommended in the 2009 Cost of Servicing Study;
8. Provide a potential community commercial service area for the growing Port Wallace residential community thereby lessening highway traffic; and,
9. If desired, parkland on the Montague Road end of the Conrad’s lands could provide a location for additional active recreation fields for the community, away from the immediate residential neighbourhoods.

SUMMARY

Expanding the service boundary to include the requested portion of the Conrad Lands as part of the Port Wallace Secondary Planning Process should have no negative impacts or consequences to HRM. On the other hand they should result in better utilization of existing services; provide increased employment opportunities; significantly increase industrial and commercial assessments and developable areas; provide reduced capital costs to HRM/HW in relation to the existing resident’s share of capital costs for the infrastructure upgrades needed to facilitate the overall development of the Port Wallace Secondary Plan Area; and, facilitate reduced per acre development costs.

APPENDIX B

Background Features: Natural Features, Resources and Hazards

NATURAL FEATURES

SURFICIAL GEOLOGY

GLACIAL TILL

The Beaver River Till is a diamicton with loose, sandy matrix and locally derived clasts, which covers the majority of the PWSPSA, and is derived from subglacial erosion and melt out processes. Much of the property is underlain by flat to undulating glacial till; the thickness of the glacial till typically averages a few metres, but may exceed 20 m where there is a drumlin hill to the south (Utting, 2011). The central and southern part of the PWSPSA (ca. 37% of the area) is covered by hummocky till, whereas most of the northern portion and some of the southern portion of the PWSPSA (ca. 30% of the area) is covered by a till veneer less than 5 m thick **(Figure 2.2-1)**.

LACUSTRINE

Patches of sand, silt, clay and organic deposits, typically 1-5 m thick, are present within the larger portion of the property to the south and east. These are composed of sediments deposited from suspension in freshwater lakes, ponds and wetlands; including shoreline material deposited or reworked by wave action. Lacustrine deposits cover approximately 11 percent of the PWSPSA mainly found within wetland areas.

ALLUVIAL DEPOSITS

Alluvial deposits are found within the floodplains of Barry's Run and its tributaries within the PWSPSA. These were deposited during flood cycles when past flow rates were much higher due to glacial meltwater. They consist of fine to medium grained sands, silt and minor clay; the finer materials indicate more quiet-water depositional environments.

ANTHROPOGENIC

There are two areas within the PWSPSA where artificial or geological material has been disrupted and redistributed by human activity. To the north of the property there is a large quarry and to the south there is a race track.

BEDROCK GEOLOGY

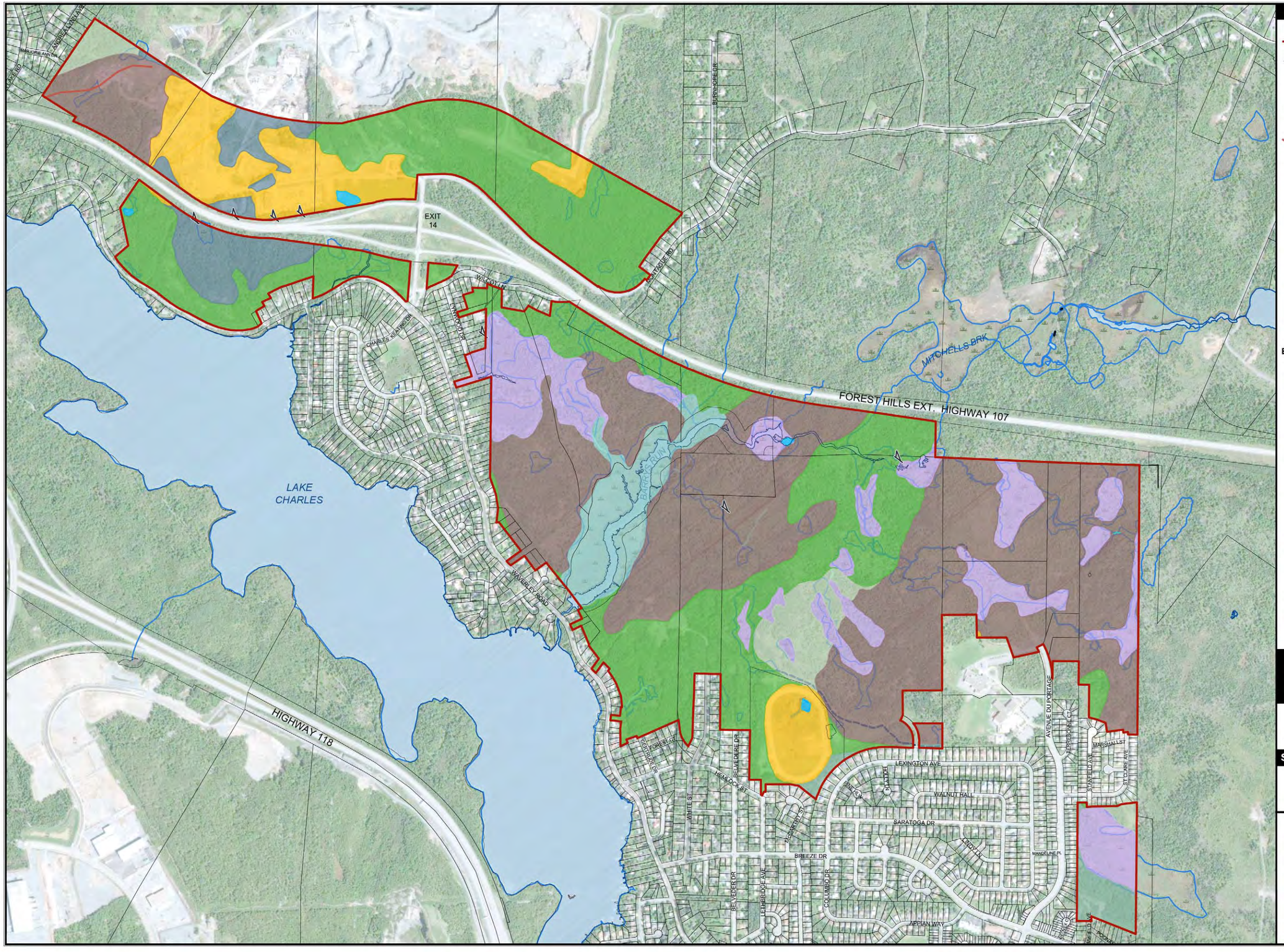
The Lake Charles sub-watershed area is underlain by metamorphic rocks of the Meguma Group, which have been further metamorphosed by a younger Devonian-age granite intrusion. The Meguma Group is made up of the Halifax Formation, which is generally composed of slate and the Goldenville Formation which generally is composed of quartzite. The Halifax Formation is the younger formation of the Meguma Group, lying directly on top of the older quartzite. The protolith of the Halifax Formation are fine-grained mud-rich shales, originally deposited in a deep marine environment, which have been metamorphosed into dense compact fractured slate. The Goldennville Formation, on the other hand, was originally composed of sandstone and silty sandstone, and formed a durable quartzite after undergoing metamorphism. There is one layer of Halifax Formation slate that crosses the southern portion of the Lake Charles PWSPSA in a northeast – southwest trending band. The underlying Goldenville quartzite is present beneath the majority of the Lake Charles sub-watershed area and is found exclusively in the PWSPSA boundary **(Figure 2.2-2)**. The historic gold mineralization in the Waverley area is associated with repeated metamorphic events and is responsible for the arsenic sulphide (arsenopyrite), which results in elevated arsenic concentrations in groundwater.

GROUNDWATER

The PWSPSA is within the Shubenacadie/Stewiacke Primary Watershed. This watershed has an estimated average recharge of 188 mm/year (NS Groundwater Toolkit). This rate of recharge is relatively low and is consistent with the soil texture associated with the observed cover of till and lacustrine sediments. The majority of the area is expected to be a recharge area with potential for discharge along stream courses and surrounding wetland areas. Some stream and wetland areas may also be recharge zones where the infiltration of water is controlled by underlying fine-grained soils. Review of the available mapping does not indicate that there are areas that will have a significantly higher recharge. Closed topographic depressions in hummocky areas, areas of more sandy soils and thin soil cover may promote more recharge.

At this stage, the surface water features are the most significant expression of groundwater recharge and discharge, and measures are recommended to maintain the form and function of these features. Groundwater recharge can be assessed in greater detail as access improves and site-specific information is available to describe soil types and textures and the influence of topography. Measures can be put in

place as part of the development design to achieve a post-development condition that replicates or enhances the pre-development recharge.



LEGEND

- Study Area Boundary
- Property Boundaries

Surficial Geology

- Rock Outcrop
- Moraine
- Anthropogenic
- Bedrock
- Alluvial (Estimated Thickness 1-10m)
- Drumlin (Estimated Thickness > 30m)
- Hummocky Till (Estimated Thickness 1-10 m)
- Lacustrine (Estimated Thickness 1-5m)
- Lacustrine (Lake)
- Till Blanket (Estimated Thickness 5-10m)
- Till Veneer (Estimated Thickness > 5m)

Bedrock Aggregate Potential:

- Quartzite with varying amounts of interbedded siltstone and minor slates of the Cambro-Ordovician Formation; green-grey to medium grey; slaty to schistose cleavage in the finergrained rock; scattered to locally abundant sulphide minerals (e.g. pyrite)

NOTES:

- Property lines approximate only. Site subject to survey

SOURCES:

- Service Nova Scotia and Municipal Relation Online Property Database
- Nova Scotia digital topographic series
- NS Department of Natural Resources Digital Surficial Geological Data of the Halifax Metropolitan and Surrounding Areas, NS; DP ME 447, Version 1, 2011
- NS Department of Natural Resources Minerals and Energy Branch Map of Bedrock Aggregate in the Halifax-Dartmouth Metropolitan Area; Open File Map ME 2001-1.

NATURAL FEATURES

FIGURE 2.2-1
SURFICIAL GEOLOGY AND BEDROCK FORMATION
DARTMOUTH, NOVA SCOTIA

PORT WALLACE SECONDARY PLANNING STUDY AREA

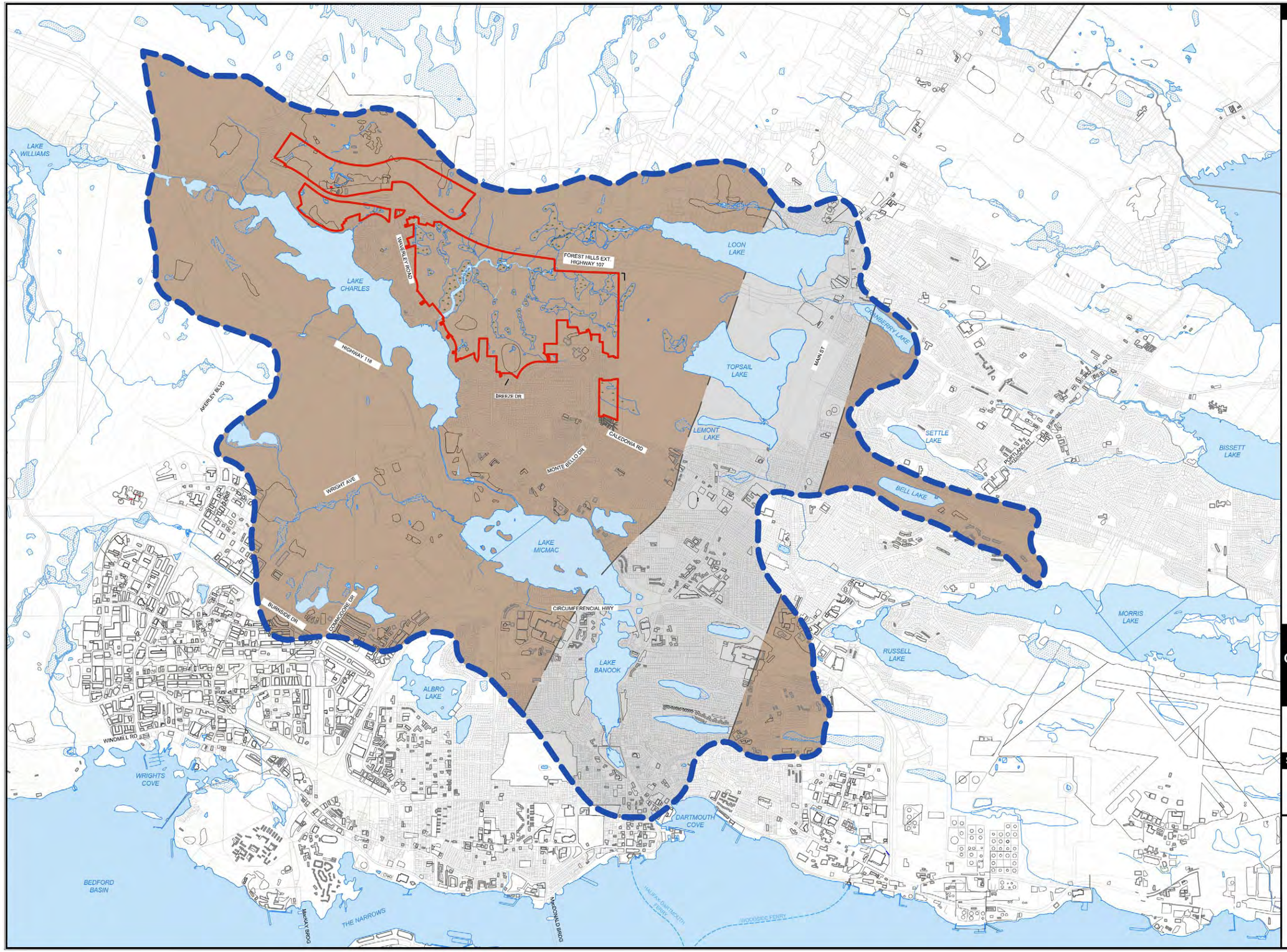
OCTOBER 26, 2015 B07057-127-R1

SCALE 200 100 0 100 200 300 m

1 : 12,500

NORTH

WSP
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM



LEGEND

- Port Wallace Study Area
- Lake Charles Study Area

Bedrock Aggregate Potential

- Goldenville Formation
- Halifax Formation

SOURCES:

- Map of Bedrock Aggregate Potential in the Halifax-Dartmouth Metropolitan Area, Open File Map 'ME 2001-1'

NATURAL FEATURES

FIGURE 2.2-2
BEDROCK GEOLOGY OF THE LAKE CHARLES SUB-WATERSHED AREAS (GOLDENVILLE AND HALIFAX FORMATION)
DARTMOUTH, NOVA SCOTIA

PORT WALLACE SECONDARY PLANNING STUDY AREA

OCTOBER 26, 2015 B07057-127-BED_RCK

SCALE

600 400 200 0 1000 m

1 : 40,000

NORTH

WSP
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM

NATURAL RESOURCES

Provincial and municipal reports and mapping were reviewed to determine if natural resources, including agriculture, fishery, water supply, mining and forestry, are present within the PWSPSA. No records of agriculture, commercial fisheries or commercial forestry were discovered.

WATER SUPPLY

Map 12 from the RP+5 draft indicates that the PWSPSA is included in three Halifax Water watershed boundaries. The wetland portion of the south parcel of the PWSPSA (Unia property) is included in the watershed for the Topsail/Lamont emergency water supply. The rest of the PWSPSA is part of the watersheds for the Collin's Park and Fletcher Lake water supplies. Additionally, the watershed for the Lake Major water supply is located to the north and west of the PWSPSA. The PWSPSA is overlain on HRM Map 12 **(Figure 2.2-3)**.

The Topsail/Lamont, Fletcher Lake and Collin's Park watersheds are defined and mapped by HRM, but are not provincially designated under the NS Environment Act. There are no land use restrictions applicable to the Port Wallace project due to the presence of these watershed areas. These lands should be protected, and no development, including highway infrastructure, should impede these lands.

MINING

There are current and historical resource extraction projects within the PWSPSA. Gold mining took place historically around the eastern corner of the PWSPSA and within the Montague Gold District east of the property. There are several abandoned mine sites and new mineral claims along the eastern edge of the project. Additionally, aggregate/crushed stone resources are identified within the PWSPSA under W. Eric Whebby Ltd. & Conrad Brothers Ltd. Onsite bedrock with aggregate potential includes Greywacke.

There are two exploration licenses found within the PWSPSA: EL 50197 (includes Conrad Lands) and EL 06719 (along eastern study boundary).

NATURAL HAZARDS

ACID ROCK DRAINAGE

Acid Rock Drainage (ARD) occurs when sulphide minerals are exposed to the air, oxidize and produce sulphuric acid. ARD can cause severe ecological impacts to aquatic habitats, as well as cause risk to human health through drinking water in wells being contaminated via groundwater flow (Trudell & White, 2013).

Sulphide-bearing rocks in the area are largely the slates of the Halifax Formation, which host sulphide minerals in the form of pyrite and pyrrhotite. When these rocks become exposed through excavation the sulphide minerals will oxidize rapidly.

The only Halifax slate in the PWSPSA was found in the excavation pit used for fill for Highway 107. However, slate is not a local rock type and was likely dumped on site. Since there in no natural presence of Halifax slate within the PWSPSA, no map was created for this feature.

RADON

Radon is a naturally occurring tasteless, odourless, and invisible gas that has been identified as a lung cancer risk. Outdoors, when radon gas seeps from the ground, it mixes with fresh air and is not a health risk. But in confined spaces, it can get trapped, grow to higher levels and become a health hazard. The Department of Natural Resources produced a radon risk map for Nova Scotia showing areas of low, medium and high risk of potential radon accumulation. This map was accessed and used to determine if there was an impact to development within the PWSPSA. The entire PWSPSA was found to have low radon potential, and because there is no risk present, a map was not created for this feature.

FLOODPLAINS

As described in RP+5:

> *"HRM shall restrict development and prohibit the placement of fill or alteration of grades in association with development that restricts the capacity of flow or increases flood levels within the 1 in 100 year and 1 in 20 year floodplains for designated watercourses, under secondary planning strategies and land use by-laws. Water control structures, boardwalks and walkways, conservation uses, historic sites and monuments and wastewater, stormwater and water infrastructure shall be permitted within floodplains. Within the 1 in 100 year floodplain, HRM may, through secondary planning strategies and land use by-laws, permit development which has been adequately flood-proofed."*

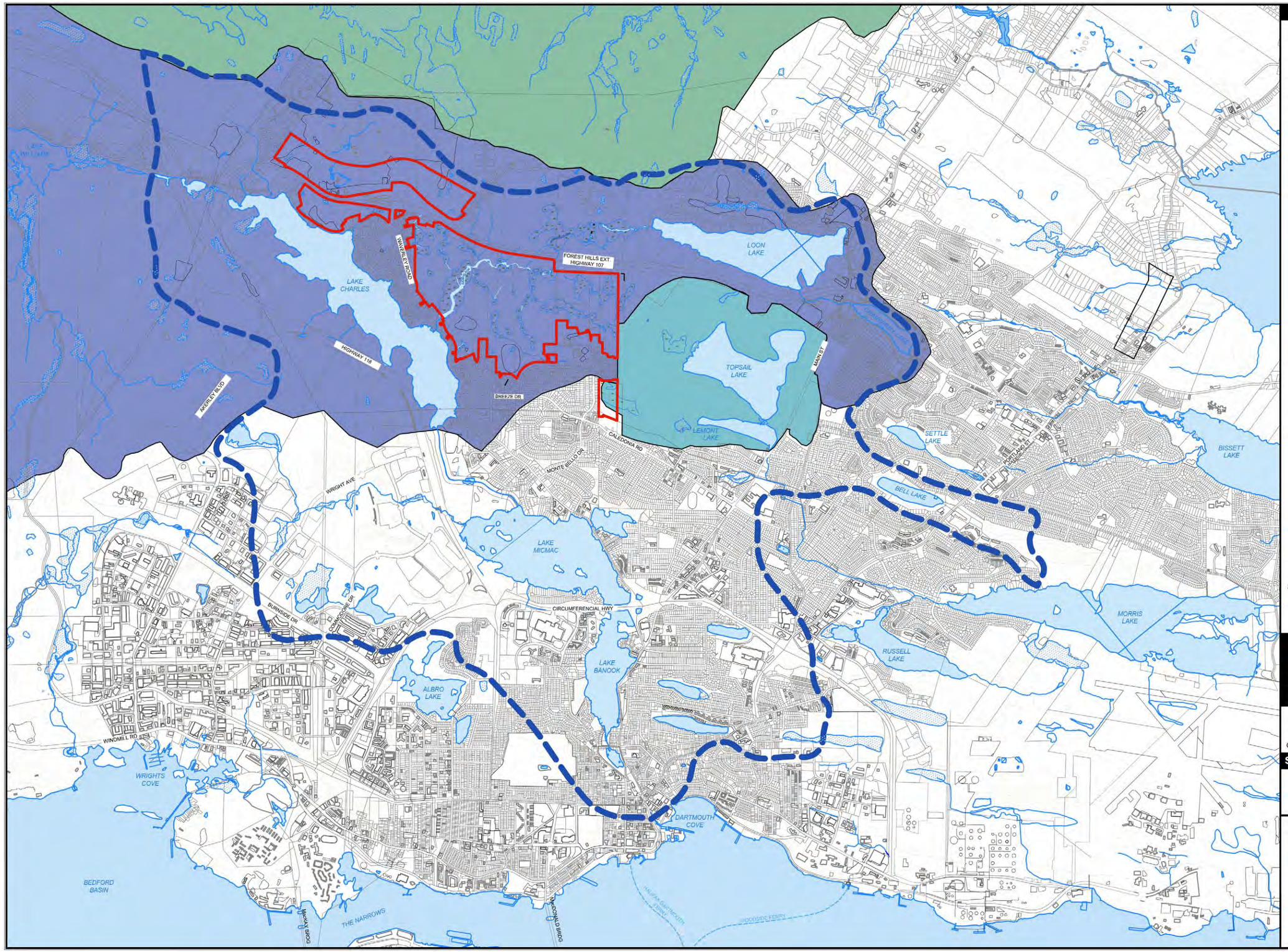
Hydraulic modeling to determine the 1 in 100 and 1 in 20 floodplains has not been completed for the PWSPSA. The SWS includes the following references to the Port Wallace/Lake Charles areas:

> ***P.7 General Description of the Shubenacadie Lakes Subwatershed*** *Lake Charles is the headwater lake of the Shubenacadie Lakes subwatershed but discharges both north and south due to the presence of the Shubenacadie Canal control structures at its north and south ends. Historical reports suggest that approximately 60% of its discharge flows north to Lake William and on to Lakes Thomas, Fletcher and Grand…The remaining 40%*

of the discharge from Lake Charles flows south to Lakes Micmac and Banook, and ultimately to Dartmouth Cove in Halifax Harbour… water level control structures of the historic Shubenacadie Canal are found at the south end of Lake Charles (Locks 2 and 3 in Shubie Park, Dartmouth), at the north end of Lake Charles (the Portobello Inclined Plane).

P.27 Port Wallace Lands *The southern portion of the property is traversed by a significant watercourse, which receives discharge from a series of creeks or small streams, including the outlet from Loon Lake upstream of the Port Wallace land. This central watercourse and its tributaries contribute flow to a large fen wetland that drains southwest, beneath Waverley Road and into Lake Charles. In addition to the fen wetland, there are several other wetland types on the property, including several marshes and swamps as well as a bog, partially infilled by a sports field, located between Waverley Road and Craigburn Drive.*

While the 1 in 100 year and 1 in 20 floodplain areas are not identified at this time, the protection of natural riparian buffers, watercourses and wetlands within the Project Area will more than likely protect the project from flood risk. In particular, the protection of the wetlands and buffers around the larger watercourses mentioned above (Barry's Run and Mitchell's Brook) offer protection from flood risk associated with these watercourses. The ability of Lake Charles to discharge water from either the north or the south locks contributes to the flood resiliency of this water body.



LEGEND

- Port Wallace Study Area
- Lake Charles Sub-Watershed Area

HRWC Watersheds

- Colin's Park/Fletcher Lake
- Lemont Lake
- Lake Major

SOURCE:

- Map 12, RMPS, 2014

NATURAL FEATURES

FIGURE 2.2-3
HALIFAX REGIONAL WATER COMMISSION WATERSHEDS, MAP 12 OVERLAY
DARTMOUTH, NOVA SCOTIA

PORT WALLACE SECONDARY PLANNING STUDY AREA

OCTOBER 26, 2015 B07057-127-RP5-MAP12

SCALE 600 400 200 0 1000 m

1 : 40,000

NORTH

WSP
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
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APPENDIX B-1

Natural Features: Resources

INDICATOR	SOURCE(S) REVIEWED	RESULTS
Natural Landscapes of NS (NSGOV)	http://www.novascotia.ca/nse/protectedareas/ecoframe.asp	Central Quartzite Hills and Plains (Shubenacadie Lake) landscape
NS GOV Protected areas: Heritage Rivers (CND Heritage Rivers System)	http://www.novascotia.ca/nse/protectedareas/heritagerivers.asp	Shubenacadie not a heritage river, however NSE currently conducting background study
NS GOV Protected areas: Wilderness Areas (NSGOV)	http://www.novascotia.ca/nse/protectedareas/map.asp	Waverley-Salmon River Long Lake Wilderness Area near greater Lake Charles Sub-watershed area
NS GOV Protected areas: Nature Reserves	http://www.novascotia.ca/nse/protectedareas/map.asp	None in area
Trails	http://www.halifax.ca/trails/index.php	Shubie Canal Greenway Corridor within Lake Charles Sub-watershed area
Historical gold mining	Parsons et al. 2012	Montague historic gold mine east of property
Exploration & Mineral Activity	http://novascotia.ca/natr/meb/geoscience-online/interactive-map-mra1.asp	Conrad Brothers Quarry, new mineral claims, abandoned mine sites
Mineral Occurrences and Deposits	http://novascotia.ca/natr/meb/geoscience-online/interactive-map-mra2.asp	Gold occurrences in area
Aggregate Resources	http://novascotia.ca/natr/meb/geoscience-online/interactive-map-mra3.asp	Conrad Brothers Quarry, Bedrock with aggregate potential: Greywacke
Mineral Rights	http://novaroc.novascotia.ca/novaroc/page/flex/index.html	EL: 50197; EL: 06719
Industrial Mineral Commodities	http://novascotia.ca/natr/meb/download/mg/map/htm/map_1985-001.asp	Crushed stone; W. Eric Whebby Ltd. & Conrad Brothers Ltd.
Potential for Radon	http://gis3.natr.gov.ns.ca/Radon/index.html	Low potential for whole property
Ecological Land Classifications	http://novascotia.ca/natr/forestry/gis/elcdata.asp	
Old Growth Forest	http://novascotia.ca/natr/forestry/programs/ecosystems/oldgrowth.asp	Used to assess potential for old growth
Forest Ecosystem Classification	http://novascotia.ca/natr/forestry/veg-types/	Used to classify forest stands
NSDNR Special Management Practices	http://novascotia.ca/natr/wildlife/habitats/terrestrial/	No Special Management Zones or Occurrences within Project Area
Wildlife Sanctuaries	http://novascotia.ca/natr/wildlife/habitats/sanctuaries/existing.asp	Waverley Game Sanctuary to the NE of property
Significant Habitats Map	http://novascotia.ca/natr/wildlife/habitats/hab-data/	No significant habitats mapped within Project Area
Wet Areas & Flow Accumulation mapping	http://novascotia.ca/natr/forestry/gis/wamdownload.asp	Used to predict potential wetland areas
Groundwater Atlas	http://gis4.natr.gov.ns.ca/website/nsgroundwater/viewer.htm	Utilized for groundwater recharge assessment
Species at Risk in NS guide	http://www.speciesatrisk.ca/SARGuide/	Reviewed for Habitat & Wildlife assessment
HRM specific guidelines	Regional Municipal Planning Strategy, 2014	Reviewed and referenced in applicable sections

APPENDIX C

Habitat Modelling Methodology and Results

HABITAT MODELLING

METHODOLOGY

The PWSPSA area is comprised of a wide range of habitats, including wetland, forests, disturbed, developed and various aged forest stands. Within this range of habitats are potential living spaces for a wide range of species, including those that are rare or uncommon.

A data request for all rare and uncommon species was made to the Atlantic Canada Conservation Data Centre (ACCDC), a data warehouse for records of uncommon species. Elemental occurrences of species within Nova Scotia are listed by national (Species at Risk Act), provincial (Nova Scotia Endangered Species Act), provincial Status rank (S-rank) and Nova Scotia general status ranks.

The report was narrowed down to a 5 km radius around the PWSPSA and within that 5 km radius, 38 species were identified on any of the lists mentioned above. Those species ranged from Threatened under SARA to Green listed secure species under the Nova Scotia general status ranks. A species at risk may be considered as such if it has been assessed under the Committee on the Status of Wildlife in Canada (COSEWIC) but not yet assigned to official protection under SARA. WSP proposed that only species that are listed under provincial or federal protection would constitute a high level of constraint. Therefore, of those 38 species, only 7 species are defined as ‘species at risk’ and therefore any habitat that they may be found in will have a higher criteria score.

This project conducted a desktop analysis to cross-match referenced habitat requirements for each of these 38 species with the habitat present within the study area. Available desktop data from the Province were field assessed for the forest stand information and for wetlands and watercourses. The referenced habitat requirements for each of the 38 species were matched with type habitat as described from field verifications. Based on this cross-match, selected forest stands and specific wetlands or watercourses

may be the residence of one of more of the listed species. Further field verification surveys in 2016 will be completed for the specific habitats that may house species at risk prior to construction (only for the 7 species listed below). The following species are included in the final list:

- Black Ash (Fraxinus nigra) – an uncommon tree species that is listed as threatened in Nova Scotia;
- Whip-poor-will (Caprimulgus vociferus) – uncommon crepuscular aerial insectivore that is listed as Threatened under SARA;
- Barn Swallow (Hirundo rustica) – an Endangered insectivore species in Nova Scotia that is listed as Threatened under COSEWIC;
- Canada Warbler (Wilsonia canadensis) – an Endangered Species in Nova Scotia and listed as Threatened under SARA;
- Common Nighthawk (Chordeiles minor) – another crepuscular aerial insectivore that is listed as a Threatened species in Nova Scotia under the NSESA and SARA;
- Eastern Wood-Pewee (Contopus virens) – a woodland insectivore species that is listed as Vulnerable under NSESA and Special Concern by COSEWIC; and
- Snapping Turtle (Chelydra serpentine) – a large turtle that usually inhabits lakes and slow moving rivers and is listed as Vulnerable in Nova Scotia and Special Concern under SARA.

Each environmental feature (forest habitat, wetlands, and watercourses) includes a score for whether the feature has potential for species at risk. This score may be adjusted following field verifications for the presence of these species. The entire ACCDC list and habitat modelling exercise forms part of this Appendix.

APPENDIX C:
HABITAT MODELLING: PORT WALLACE SECONDARY PLANNING STUDY AREA

WSP Canada Inc.
Sept. 24, 2015

LEGEND

Defined as 'Species at Rick' based on Provincial and Federal Definitions (species considered in Environmental Scoring)
Not defined as 'Species at Rick' based on Provincial and Federal Definitions (species excluded in Environmental Scoring)

	Listed Species Within 5 km[1]		Conservation Status[2]					Habitat Potential										
	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	Species Habitat[3]	non-referenced habitat	Potential for habitat in PW (details in Table 2)	Potential Forest Habitat within Study Area		Potential Wetland Habitat within Study Area		Habitat Potential Within Study Area	Field Verified *	Observed	Actually Observed in Study Area?[4]	Rationalle/Notes
											Y/N	Forest Area ID [4]	Y/N	Wetland ID [5]	Y/N	Y/N	Y/N/NA	Y/N	
								Flora											
1	**Fraxinus nigra**	**Black Ash**[6]			Threatened	S2S3	3 Sensitive	Swamp/floodplain		Swamp/floodplain	Yes	5, 19, 26, 35, 40, 47, 53, 62	Yes	WL 6, WL 15, WL27	Yes			No	Common habitat for Black Ash are swamps and/or floodplains. As such, forrests classified as "wet coniferous " and wetlands classified as "swamps" have been selected as potential habitat.
2	**Eleocharis olivacea**	**Yellow Spikerush**				S2S3	3 Sensitive	Wetland Obligate, shore habitat		Wetland Obligate, shore habitat	No	-	No	WL 6, WL 15, WL27	Yes			No	Yellow Spikerush is a wetland obligate commonly found in wetlands along shore habitats, no wetlands within the project area would be classified as shore habitats
3	**Agalinis neoscotica**	**Nova Scotia Agalinis**				S3	4 Secure	Shore; saltmarsh (upper); disturbance areas		Shore; saltmarsh (upper); disturbance areas	Yes	3, 49, 59, 75	No	WL 6, WL 15, WL27	No			No	Nova Scotia Agalinis is often found in wetlands along the shore and upper saltmarshes; it can also be found in disturbance areas. No project area wetlands are classified as shore habitat or saltmarshes, however distrubed forest areas are included as potential habitat.
4	**Corallorhiza trifida**	**Early Coralroot**				S3	4 Secure	Swamp; seep		Swamp; seep	Yes	5, 19, 26, 35, 40, 47, 53, 62	Yes	WL3, WL4, WL5, WL7, WL8, WL9, WL10, WL12, WL13, WL14, WL16, WL17, WL18, WL19, WL21, WL23, WL25, WL26, WL27, WLC1, WLC2, WLC3,WLC4, WLC5, WLC7,WLC8, WLC9, WLC10, WLC11, WLU1, WLU2, WLU3	Yes			No	Early Coralroot is often found in swamps and seep areas. Forrests classified as "wet coniferous " and wetlands classified as "swamps" have been selected as potential habitat.
5	**Equisetum variegatum**	**Variegated Horsetail**				S3	4 Secure	Shore seep; disturbance		Shore seep; disturbance	Yes	3, 49, 59, 75	Yes	WL 6, WL 15, WL27	Yes			No	Variegated Horsetail is often found within shore seep and disturbed areas. No project area wetlands are classified as shore habitat or saltmarshes, however distrubed forest areas are included in the table as potential habitat.
6	**Carex foenea**	**Fernald's Hay Sedge**				S3?	4 Secure	Anthropogenic (man-made or disturbed habitats), cliffs, balds, or ledges, meadows and fields, woodlands		Anthropogenic (man-made or disturbed habitats), cliffs, balds, or ledges, meadows and fields, woodlands	Yes	3, 17, 43, 49, 58, 65, 59, 74, 75, 79	No	-	Yes			No	Fernald's Hay Sedge is listed as an upland species in Nova Scotia, therefore no wetlands were listed as potential habitats. Developed and distrubed areas, old field lands, and open woodlands are listed as potential habitats within the project area.
								Fauna											
1	**Caprimulgus vociferus**	**Whip-Poor-Will**	Threatened	Threatened	Threatened	S1?B	1 At Risk	Mainly decidious and mixed forest to mixed and evergreen forests and woodland	semi-open forest with exposed rock outcrops, grasslands, pastures, and habitats with exposed mineral soils.	Mainly decidious and mixed forest; evergreen forests and woodlands	Yes	5, 6, 8, 9, 12, 16, 20, 21, 24, 27, 28 29, 33, 36, 37, 38, 41, 45, 46, 48, 50, 52, 61, 69, 72, 81	No	-	yes			No	Mixed wood, open woodland, red spruce pine, spruce pine, and tolerand and intolerant hardwood forests are listed as potential habitats within the project area. Evergreen forests and woodlands are also possible habitats.
2	**Hirundo rustica**	**Barn Swallow**	Threatened		Endangered	S3B	1 At Risk	Agriculture lands, suburban areas, marshes and lakeshores	Agriculture lands, suburban areas, marshes and lakeshores	Agriculture lands, suburban areas, marshes and lakeshores	No	-	Yes	WL6, WL15, WL24	yes			No	Agriculture lands, suburban areas, marshes and lakeshores are listed as common habitats for the Barn Swallow. Potential habitats which match that description within the project area are wetlands listed as marshes.
3	**Wilsonia canadensis**	**Canada Warbler**	Threatened	Threatened	Endangered	S3B	1 At Risk	Forest: cool moist woodlands with abundant undergrowth	Cool moist woodlands with abundant undergrowth	Cool moist woodlands with abundant undergrowth	Yes	19, 26, 33, 35, 37, 40, 44, 53, 62, 81	No	-	yes			No	Common habitat for the Canada Warbler is listed as forest; cool moist woodlands. Potential habitat within the project area includes forested areas listed as Wet Confierous, and Open Woodland
4	**Chordeiles minor**	**Common Nighthawk**	Threatened	Threatened	Threatened	S3B	1 At Risk	Open habitats such as sand dunes, beaches, recently logged areas, recent burn areas, pastures, open forests, peatbogs, marshes, lakeshores, gravel roads, and quarries	Brush clearings, gravel roofs	Woodlands, suburbs, towns; roosts on ground, branches, posts or roofs	Yes	8, 9, 12, 17, 29, 32, 43, 64,	No	-	yes			No	Common habitat for the Common Nighthawk is listed as woodlands, suburbs, towns; roosts on ground, branches, posts or roofs. Potential habitat within the project area includes forested areas listed as open woodland, active quarry, and old quarry areas. Potential wetland habitats include marshes and peatbogs.
5	**Contopus virens**	**Eastern Wood-Pewee**	Special Concern		Vulnerable	S3S4B	3 Sensitive	Most common in deciduous forest and woodland, but as migrants these pewees can occur in nearly any woodlot or other treed area	forests, orchards, parks, roadsides, and suburban areas	Most common in deciduous forest and woodland,	Yes	9, 12, 24, 25, 27, 42, 43, 44, 63, 69, 72, 79	No	-	yes			No	Likely habitat of the Eastern Wood-Pewee includes deciduous forest and woodlands. Potential habitat in the project area includes open woodland forrested areas, and tolerant and intolerant hardwood - but the Eastern Wood-Pewee may
6	**Chelydra serpentina**	**Snapping Turtle**	Special Concern	Special Concern	Vulnerable	S5	4 Secure	Freshwater habitats: slow moving water with soft mud or sand (lakes or rivers); small wetlands; ponds and ditches	freashwater lake and streams	Freshwater habitats: slow moving water with soft mud or sand (lakes or rivers); small wetlands; ponds and ditches	No	-	Yes	WL 6, WL 15, WL27	yes			No	Potential habitat for the Snapping Turtle are freshwater habitats with slow moving water and may include lakes, rivers, small wetlands and ponds and ditches. Wetlands contiguous with watercourses were highlighted as potential areas of habitat within the project area (some wet coniferous forested areas may also apply but should overlap with the wet areas already selected as potential habitat)
7	**Hemidactylium scutatum**	**Four-toed Salamander**	Not At Risk			S3	4 Secure	Sphagnum bogs; bog-based streams and flood plains in woodland areas; forage in nearby forests and hibernate in forest soils	sphagnum bogs, grassy areas surrounding beaver ponds and deciduous or mixed forests rich with mosses	Sphagnum bogs; bog-based streams and flood plains in woodland areas; forage in nearby forests and hibernate in forest soils	Yes	5, 19, 26, 35, 40, 47, 53, 62	Yes	WL11, WL20, WLU3	yes			No	Four-toed salamander typically inhabit sphagnum bogs; bog-based streams and flood plains in woodland areas and often forage in nearby forests and hibernate in forest soils. Wet coniferous forrest and wetlands classified as bogs were selected for habitat potential, however the habitat description is vague and may include any forest.
8	**Gavia immer**	**Common Loon**	Not At Risk			S3B,S4N	2 May Be At Risk	Quiet, remote freshwater lakes	Forested lakes and rivers	Quiet, remote freshwater lakes	No	-	No	-	No			No	Preferred habitat for the Common Loon is quiet, remote, freshwater lakes. There is one nearby lake, Lake Charles, however it is outide of the study area and would not be classified as a quiet or remote lake.
10	**Accipiter gentilis**	**Northern Goshawk**	Not At Risk			S3S4	4 Secure	Various forest types, especially mature forest	Dense coniferious and deciduous forest	Various forest types, especially mature forest	Yes	0, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 50, 51, 52, 53, 54, 56, 60, 61, 62, 63, 66, 67, 68, 69, 70, 71, 72, 73, 76, 77, 78, 80, 81, 82, 83	No	-	yes			No	Preferred habitat for the Northern Goshawk is mature forest, however they may inhabitat various forrest types. Potential habitat within the project area may include any of the forested areas (coastal forest, intolerant hardwood, mixed wood, open woodland, red spruce pine, spuce hemlock, spruce pine, tolerant hardwood and wet coniferous forest).
11	**Puma concolor pop. 1**	**Cougar - Eastern pop.**	Data Deficient			SH	5 Undetermined	Undisturbed forest habitat; forested mountains	forested mountains	Undisturbed forest habitat; forested mountains	No	-	No	-	No			No	The preffered habitat for the Eastern Cougar is undisturbed forest habitat and forested mountains. It is unlikely to be found within the project area.
12	**Vireo gilvus**	**Warbling Vireo**				S1?B	5 Undetermined	Deciduous forest; mixed coniferous and deciduous habitats	deciduous woodlands, near streams and shade trees	Deciduous forest; mixed coniferous and deciduous habitats	Yes	6, 9, 12, 13, 20, 24, 25, 27, 29, 30, 36, 38, 39, 41, 42, 44, 45, 46, 48, 51, 52, 56, 61, 63, 69, 72, 76, 80, 82	No	-	yes			No	The preffered habitat for the Warbling Vireo is deciduous and mixed coniferous forests. Potential habitats within the project area may include mixed wood, tolerant and intolerant hardwood

APPENDIX C:
HABITAT MODELLING: PORT WALLACE SECONDARY PLANNING STUDY AREA

WSP Canada Inc.
Sept. 24, 2015

	Listed Species Within 5 km[1]		Conservation Status[2]					Habitat Potential											
	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	Species Habitat[3]	non-referenced habitat	Potential for habitat in PW (details in Table 2)	Potential Forest Habitat within Study Area		Potential Wetland Habitat within Study Area		Habitat Potential Within Study Area	Field Verified *	Observed	Actually Observed in Study Area?[6]	Rationalle/Notes
											Y/N	Forest Area ID [4]	Y/N	Wetland ID [5]	Y/N	Y/N	Y/N/NA	Y/N	
13	**Empidonax traillii**	**Willow Flycatcher**				S2B	3 Sensitive	Breeds in moist shrubby areas (marsh or swamps), often with standing or running water; winters in shrubby clearings and early successional growth	Swampy thickets, upland pastures, wooded lakeshores and streams	Breeds in moist shrubby areas (marsh or swamps), often with standing or running water; winters in shrubby clearings and early successional growth	Yes	5, 19, 26, 35, 40, 47, 53, 58, 62, 65, 79	Yes	WL3, WL4, WL5, WL6, WL7, WL8, WL9, WL10, WL12, WL13, WL14, WL15, WL16, WL17, WL18, WL19, WL21, WL23, WL24, WL25, WL26, WL27, WLC1, WLC2, WLC3,WLC4, WLC5, WLC6, WLC7,WLC8, WLC9, WLC10, WLC11, WLU1, WLU2, WLU3	yes			No	The Willow Flycatcher breeds in moist shrubby areas (marsh or swamps), often with standing or running water and winters in shrubby clearings and early successional growth. Potential habitat within the project area may include wet coniferous, or old field forests and wetlands classified as marshes or swamps.
14	**Myiarchus crinitus**	**Great Crested Flycatcher**				S2B	2 May Be At Risk	Woodlots and open woodland - particularly among deciduous trees	Canopy of open woods	Woodlots and open woodland - particularly among deciduous trees	Yes	9, 12, 24, 25, 27, 42, 43, 44, 63, 69, 72, 82	No	-	yes			No	The preferred habitat of the Great Crested Flycatcher is woodlots and open woodlands, particularily among deciduous trees. Potential habitat within the project area includes tolerant and intolerant hardwood forests, and open woodland forests.
15	**Piranga olivacea**	**Scarlet Tanager**				S2B	5 Undetermined	Deciduous and mixed deciduous-evergreen forests; shrubby habitats and backyards during migration	Deciduous forest, pine oak woodlands, parks and suburban areas with large trees	Deciduous and mixed deciduous-evergreen forests; shrubby habitats and backyards during migration	Yes	6, 9, 12, 13, 17, 20, 24, 25, 27, 29, 30, 36, 38, 39, 41, 42, 44, 45, 46, 48, 51, 52, 56, 61, 63, 69, 72, 74, 76, 80, 82	No	-	yes			No	The Scarlet Tanager often inhabits deciduous and mixed deciduous-evergreen forests; shrubby habitats and backyards during migration. Potential habitat within the project area includes tolerant and intolerant hardwoods, and mixed wood forests, as well as developed areas.
16	**Bucephala clangula**	**Common Goldeneye**				S2B,S5N	4 Secure	Breeds along lakes and rivers bordered by forest; winters primarily in marine waters, bays and harbors, as well as in large inland lakes and rivers	Open water, wooded lakes and ponds	Breeds along lakes and rivers bordered by forest; winters primarily in marine waters, bays and harbors, as well as in large inland lakes and rivers	No	-	No	-	NO			No	The Common Goldeneye often breeds along lakes and rivers bordered by forest; winters primarily in marine waters, bays and harbors, as well as in large inland lakes and rivers. It is unlikely to be found within the project area.
17	**Cathartes aura**	**Turkey Vulture**				S2S3B	3 Sensitive	Open areas such as roadsides, suburbs, farm fields, countryside, and food sources such as landfills, trash heaps, and construction sites	Decisuous forest, woodlands, and scrublands	Open areas such as roadsides, suburbs, farm fields, countryside, and food sources such as landfills, trash heaps, and construction sites	Yes	17, 74	No	;-	yes			No	The Turkey Vulture is often found in open areas such as roadsides, suburbs, farm fields, countryside, and food sources such as landfills, trash heaps, and construction sites. Potential habitat within the project area would be developed areas.
18	**Dendroica tigrina**	**Cape May Warbler**				S3?B	3 Sensitive	Breeds in coniferous forest. Winters in various habitats, including settled areas	Open spruce forests, evergreen or deciduous woodlands, parks and suburban yards	Breeds in coniferous forest. Winters in various habitats, including settled areas	Yes	0, 2, 4, 5, 8, 10, 11, 15, 16, 18, 19, 21, 22, 26, 28, 31, 33, 34, 35, 37, 40, 47, 50, 53, 54, 62, 66, 67, 68, 70, 73, 77, 78, 81, 83	No	-	yes			No	The Cape May Warbler breeds in coniferous forest and winters in various habitats, including settled areas futher south then NS. Potential forest habitat within the project area includes wet coniferous, red spruce pine, spruce hemlock, and spruce pine forests.
19	**Pinicola enucleator**	**Pine Grosbeak**				S3?B,S5N	2 May Be At Risk	Breeds in open coniferous forests; wintering areas determined by food availability, so found in wider variety of habitats, including urban areas	Mixed forests	Breeds in open coniferous forests; wintering areas determined by food availability, so found in wider variety of habitats, including urban areas	Yes	0, 2, 4, 5, 8, 10, 11, 15, 16, 17, 18, 19, 21, 22, 26, 28, 31, 33, 34, 35, 37, 40, 43, 47, 50, 53, 54, 62, 66, 67, 68, 70, 73, 74, 77, 78, 81, 83	No	-	yes			No	The Pine Grosbeak breeds in open coniferous forests, but winters in a wider varoety of habitats including urban areas, and is more likely to winter in NS than breed. Potential habitats within the project area include open woodland, and coniferous forests as well as developed areas.
20	**Podilymbus podiceps**	**Pied-billed Grebe**				S3B	3 Sensitive	Small, quiet ponds and marshes where thick vegetation grows out of the water; in winter they occur on larger water bodies	Marshes, streams,and ponds	Small, quiet ponds and marshes where thick vegetation grows out of the water; in winter they occur on larger water bodies	No	-	Yes	WL6, WL15, WL24, WLC6	yes			No	The Pied-billed Grebe summers in Nova Scotia (among other places) and breeds in quiet ponds and marshes. Potential habitats within the project area are wetlands which have been classified as marshes.
21	**Anas discors**	**Blue-winged Teal**				S3B	2 May Be At Risk	Calm bodies of water from marshes to small lakes; they thrive in grassy habitats intermixed with wetlands	Wetland habitats, lakes, streams, ponds	Calm bodies of water from marshes to small lakes; they thrive in grassy habitats intermixed with wetlands	No	-	Yes	WL6, WL15, WL24, WLC6	yes			No	The Blue-winged Teal prefers calm bodies of water from marshes to small lakes; they thrive in grassy habitats intermixed with wetlands. Potential habitats identified within the project area are marsh identified wetlands.
22	**Dumetella carolinensis**	**Gray Catbird**				S3B	2 May Be At Risk	Dense tangles of shrubs, small trees, and vines, along forest edges, streamside thickets, old fields, and fencerows	low dense veg in forest edges, marshes and streams	Dense tangles of shrubs, small trees, and vines, along forest	Yes	35, 40, 58, 62, 65, 79	No	_	yes			No	The preferred habitat of the Gray Catbird includes dense tangles of shrubs, small trees, and vines, along forest edges, streamside thickets, old fields, and fencerows. Potential habitat within the project area may include areas identified as old field forests and wet coniferous forests with wetlands contiguous with a watercourse.
23	**Cardinalis cardinalis**	**Northern Cardinal**				S3S4	4 Secure	Inhabited areas such as backyards, parks, woodlots, and shrubby forest edges; nest in dense tangles of shrubs and vines	Edges of woods, streamside thickets, suburban areas	Inhabited areas such as backyards, parks, woodlots, and shrubby forest edges; nest in dense tangles of shrubs and vines	Yes	17, 74	No	-	yes			No	Northern Cardinals prefer inhabited areas, and likely habitat within the project area may include developed areas.

APPENDIX C:
HABITAT MODELLING: PORT WALLACE SECONDARY PLANNING STUDY AREA

WSP Canada Inc.
Sept. 24, 2015

	Listed Species Within 5 km[1]		Conservation Status[2]					Habitat Potential											
	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	Species Habitat[3]	non-referenced habitat	Potential for habitat in PW (details in Table 2)	Potential Forest Habitat within Study Area		Potential Wetland Habitat within Study Area		Habitat Potential Within Study Area	Field Verified *	Observed	Actually Observed in Study Area?[6]	Rationalle/Notes
											Y/N	Forest Area ID [4]	Y/N	Wetland ID [5]	Y/N	Y/N	Y/N/NA	Y/N	
24	**Charadrius vociferus**	**Killdeer**				S3S4B	3 Sensitive	Open ground with low vegetation (or no vegetation at all), including lawns, golf courses, driveways, parking lots, and gravel-covered roofs, as well as pastures, fields, sandbars and mudflats	Open areas, plowed fields, golf courses	Open ground with low vegetation (or no vegetation at all), including lawns, golf courses, driveways, parking lots, and gravel-covered roofs, as well as pastures, fields, sandbars and mudflats	Yes	1, 17, 23, 57, 74,	No	-	yes			No	Killdear prefer open ground with low (or no) vegetation. Within the project area, potential habitat may include developed areas, old quarries, and areas with no forrest
25	**Actitis macularius**	**Spotted Sandpiper**				S3S4B	3 Sensitive	Anywhere near water—along streambanks, rivers, ponds, lakes, and beaches, particularly on rocky shores	Ponds, streams, other waterways	Anywhere near water—along streambanks, rivers, ponds, lakes, and	Yes	26, 35, 40, 62	Yes	WL3, WL4, WL5, WL6, WL7, WL9, WL10, WL14, WL15, WL19, WL21, WL24, WL26, 27, WLC7, WLU1, WLU2	yes			No	The Spotted Sandpiper habits anywhere near water—along streambanks, rivers, ponds, lakes, and beaches, particularly on rocky shores. Wetlands contiguous with a watercourse, and wet coniferous forests contiguous with a watercourseare are considered potential habitat within the project area.
26	**Vermivora peregrina**	**Tennessee Warbler**				S3S4B	3 Sensitive	Breeds in boreal forest, in open areas containing grasses, dense shrubs, and young deciduous trees	Open mixed woodlands	Breeds in boreal forest, in open areas containing grasses, dense shrubs, and young deciduous trees	Yes	43	No	-	yes			No	The Tennessee Warbler breeds in open areas containing grasses, dense shrubs, and young deciduous trees. Potential habitat within the project site may be open woodland forest.
27	**Wilsonia pusilla**	**Wilson's Warbler***				S3S4B	3 Sensitive	Shrub thickets of riparian habitats, edges of beaver ponds, lakes, bogs, and overgrown clear-cuts of montane and boreal zone	Moist thickets in woodlands and along streams	Shrub thickets of riparian habitats, edges of beaver ponds, lakes, bogs, and overgrown clear-cuts of montane and boreal zone	No	-	Yes	WL11, WL20, WLU3	yes			Yes	Common habitat for Wilson's Warbler is shrub thickets of riparian habitats, edges of beaver ponds, lakes, and bogs. Potential habitat within the project area may be wetlands identified as bogs.
28	**Pheucticus ludovicianus**	**Rose-breasted Grosbeak**				S3S4B	3 Sensitive	Breed in eastern forests; deciduous trees and conifers; common in regenerating woodlands and often concentrate along forest edges and in parks	Moist woodlands, open fields, and old overgrown orchards	Breed in eastern forests; deciduous trees and conifers; common in regenerating woodlands and often concentrate along forest edges and in parks	Yes	0, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 50, 51, 52, 53, 54, 56, 58, 60, 61, 62, 63, 65, 66, 67, 68, 69, 70, 71, 72, 73, 76, 77, 78, 79, 80, 81, 82, 83	No	-	yes			No	The Rose-breasted Grosbeak breeds in eastern forests amoung deciduous trees and conifers and is common in regenerating woodlands and often concentrates along forest edges and in parks. Potential habitats within the project area includes most of the forested areas (coastal, intolerant hardwood, tolerant hardwood, mixed wood, old field, open woodland, red spruce pine, spruce hemlock, spruce pine, and wet coniferous forests).
29	**Carduelis pinus**	**Pine Siskin**				S3S4B,S5N	3 Sensitive	Prefer coniferous or mixed coniferous and deciduous forests with open canopies; will forage in weedy fields, scrubby thickets, or backyards and gardens	Coniferous/deciduous forests, woodlands, parks, alder thickets and pastures	Prefer coniferous or mixed coniferous and deciduous forests with open canopies; will forage in weedy fields, scrubby thickets, or backyards and	Yes	0, 2, 4, 5, 6, 8, 9, 10, 11, 12, 13, 15, 16, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 50, 51, 52, 53, 54, 56, 58, 61, 62, 63, 65, 66, 67, 68, 69, 70, 72, 73, 76, 77, 78, 79, 80, 81, 82, 83	No	-	Yes			No	Pine Siskin prefer coniferous or mixed coniferous and deciduous forests with open canopies; will forage in weedy fields, scrubby thickets, or backyards and gardens. Potential habitats within the project area include forested areas: intolerant hardwood, tolerant hardwood, mixed wood, old field, open woodland, red spruce pine, spruce hemlock, spruce pine, and wet coniferous forests.
30	**Amblyscirtes hegon**	**Pepper and Salt Skipper**				S2	4 Secure	Breeds in open coniferous forrests; also found in mixed coniferous-deciduous tree associations; parks and cemeteries		Breeds in open coniferous forrests; also found in mixed coniferous-deciduous tree associations; parks and	Yes	0, 2, 4, 5, 6, 8, 10, 11, 13, 15, 16, 18, 19, 20, 21, 22, 26, 28, 29, 30, 31, 33, 34, 35, 36, 37, 38, 39, 40, 41, 45, 46, 47, 48, 50, 51, 52, 53, 54, 56, 61, 62, 66, 67, 68, 70, 73, 76, 77, 78, 80, 81, 83	No	-	Yes			No	The Pepper and Salt Skipper breeds in open coniferous forrests and is also found in mixed coniferous-deciduous tree associations, parks and cemeteries. Potential forested habitats within the project area include mixed wood, red spruce pine, spruce hemlock, spruce pine, and wet coniferous forests
31	**Erynnis juvenalis**	**Juvenal's Duskywing**				S2S3	4 Secure	Woodlands and woodland edges where oaks the larval host plants grow.		Woodlands and woodland edges where oaks the larval host plants grow.	Yes	43	No	-	Yes			No	The preferred habitat of the Juvenal's Duskywing is woodland and woodland edges; potential habitat within the project area is identified as open woodland areas.
32	**Alasmidonta undulata**	**Triangle Floater**				S2S3	4 Secure	Streams and Rivers in sand and gravel; can tolerate standing water in ponds, lakes and canals		Streams and Rivers in sand and gravel; can tolerate standing water in ponds, lakes and canals	Yes	26, 35, 40, 62	Yes	WL3, WL4, WL5, WL6, WL7, WL9, WL10, WL14, WL15, WL19, WL21, WL24, WL26, 27, WLC7, WLU1, WLU2	Yes			No	Triangle Floaters are often found in streams and rivers in sand and gravel. They can tolerate standing water in ponds, lakes and canals. Forested areas and wetlands contiguous with a watercourse may be considered potential habitat for this species within the project area.
33	**Polygonia interrogationis**	**Question Mark**				S3B	4 Secure	In or near woodlands; downtown parks; etc		In or near woodlands; downtown parks; etc	Yes	43	No	-	Yes			No	The Question Mark Butterfly is often found in or near woodlands, downtown parks, etc. Within the project area only open woodlands fits that description.

NOTES

[1&2] Species list and conservation status provided by the Atlantic Canada Conservation Data Centre (ACCDC) from Data Report 5249: Port Wallace, Nova Scotia - Section 4: Rare Species List within 5 km of the Study Area; Report dated July 23, 2014)

[3] Summary of species' habitat from miscelleneous sources

[4] Forested area identification codes from WSP Figure 3.1-5 [DRAFT]Forested Areas (Vegetative Cover) Port Wallace Secondary Planning Study Area, Dartmouth, NS, dated March 10, 2015

[5] Wetland identification codes from WSP Figure 3.1-7 [DRAFT]Wetland and Watercourses (with Riparian Buffers) Port Wallace Secondary Planning Study Area, Dartmouth, NS, dated March 10, 2015

Species actually observed taken from ACCDC Report, Map 2: Known observations of rare and/or protected flora and fauna within 5 km of the study area

[6] As listed in Section 4.3 of the ACCDC Report, the Department of Natural Resources considers a number of species "location sensitive". Black Ash (*Fraxinus nigra*) is listed as a "location sensitive" species known within 5 km of the study site.

* Only species listed as _ _ _ or _ waranted field investigation

This list is meant to provide forested and wetland areas with potential for habitat of listed species. Unless specified, species have not been encountered in the project area

APPENDIX C:
HABITAT MODELLING: PORT WALLACE SECONDARY PLANNING STUDY AREA

WSP Canada Inc.
Sept. 24, 2015

Listed Species Within 5 km[1]		Conservation Status[2]					Habitat Potential											
Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	Species Habitat[3]	non-referenced habitat	Potential for habitat in PW (details in Table 2)	Potential Forest Habitat within Study Area		Potential Wetland Habitat within Study Area		Habitat Potential Within Study Area	Field Verified *	Observed	Actually Observed in Study Area?[6]	Rationalle/Notes
										Y/N	Forest Area ID [4]	Y/N	Wetland ID [5]	Y/N	Y/N	Y/N/NA	Y/N	

DEFINITIONS

COSEWIC Committee on the Status of Endangered Wildlife in Canada; an independent body of experts reponsible for identifying and assessing wildlife species at risk in Canada

SARA Species at Risk Act

Extinct	A wildlife species that no longer exists.
Extirpated	A wildlife species that no longer exists in the wild in Canada, but exists elsewhere.
Endangered	A wildlife species facing imminent extirpation or extinction.
Threatened	A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
Special Concern	A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.
Data Deficient	A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.
Not at Risk	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.

Prov Legal Prot Provincial Legal Protection - protected species under the NS Endangered Species Act

Endangered	A wildlife species facing imminent extirpation or extinction.
Threatened	A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
Vulnerable	A species of special concern because of the characteristics that make it particularly sensitive to human activities or natural events.
Extirpated (Provincial)	A wildlife species that no longer exists in the wild in the province, but exists elsewhere.
Extinct	A species that no longer exists

Provincial Rarity Rank Sub-national (provincial) ranks (S-ranks). Individual CDCs are responsible for developing sub-national ranks for their area. The ACCDC works with provincial and federal experts to develop rarity ranks for species in each of the following provinces: New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland & Labrador. Factors considered when ranking include: number of element occurrences, distribution, population size, abundance trends, and threats.

SX	Presumed Extirpated - Species or community is believed to be extirpated from the province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
S1	Critically Imperiled - Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
S2	Imperiled - Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
S3	Vulnerable - Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4	Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5	Secure - Common, widespread, and abundant in the province.
SNR	Unranked - Nation or state/province conservation status not yet assessed.
SU	Unrankable - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA	Not Applicable - A conservation status rank is not applicable because the species is not a suitable target for conservation activities
S#S#	Range Rank - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
Not Provided	Species is not known to occur in the province.
H	
B	Breeding - Conservation status refers to the breeding population of the species in the province.
N	Nonbreeding - Conservation status refers to the non-breeding population of the species in the province.
M	Migrant - Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the province.
?	Inexact or Uncertain - Denotes inexact or uncertain numeric rank. (The ? qualifies the character immediately preceding it in the S-rank.)

Provincial GS Rank The National General Status Working Group, composed of members from every province and territory, Environment Canada and the AC CDC (as of 2013), has published a Wild Species document summarizing the status of wild species in Canada every five years since 2000. The Wild Species reports list species' status nationally and in every province and territory in which each species occurs, and each iteration of the reports having included a broader range of species. General Status ranks provide a measure of extinction risk and an indication of the overall state of biodiversity in Canada. Wild Species reports from 2000 to 2010 used their own ranking system (below), but the 2015 and future reports will use the S-rank system in use at the AC CDC and all other conservation data centres. The Wild Species 2015 report is in preparation and will be published in 2016.

0.2 Extinct
0.1 Extirpated
1 At Risk
2 May Be At Risk
3 Sensitive
4 Secure
5 Undetermined
6 Not Assessed
7 Exotic
8 Accidental

Atlantic Canada Conservation Data Centre
Centre de données sur la conservation du Canada Atlantique

DATA REPORT 5249: Port Wallace, NS

Prepared 23 July 2014
by J. Churchill, Data Manager

CONTENTS OF REPORT

Map 1. A 100 km buffer around the study area

1.0 PREFACE

The Atlantic Canada Conservation Data Centre (ACCDC) is part of a network of NatureServe data centres and heritage programs serving 50 states in the U.S.A, 10 provinces and 1 territory in Canada, plus several Central and South American countries. The NatureServe network is more than 30 years old and shares a common conservation data methodology. The ACCDC was founded in 1997, and maintains data for the jurisdictions of New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador. Although a non-governmental agency, the ACCDC is supported by 6 federal agencies and 4 provincial governments, as well as through outside grants and data processing fees. URL: www.ACCDC.com.

Upon request and for a fee, the ACCDC queries its database and produces customized reports of the rare and endangered flora and fauna known to occur in or near a specified study area. As a supplement to that data, the ACCDC includes locations of managed areas with some level of protection, and known sites of ecological interest or sensitivity.

1.1 DATA LIST

Included datasets:

Filename	Contents
PtWallaceNS_5249ob.xls	All Rare and legally protected *Flora and Fauna* within 5 km of your study area
PtWallaceNS_5249ob100km.xls	A list of Rare and legally protected *Flora and Fauna* within 100 km of your study area
PtWallaceNS_5249ma.xls	All *Managed Areas* in your study area

1.2 RESTRICTIONS

The ACCDC makes a strong effort to verify the accuracy of all the data that it manages, but it shall not be held responsible for any inaccuracies in data that it provides. By accepting ACCDC data, recipients assent to the following limits of use:

a) Data is restricted to use by trained personnel who are sensitive to landowner interests and to potential threats to rare and/or endangered flora and fauna posed by the information provided.
b) Data is restricted to use by the specified Data User; any third party requiring data must make its own data request.
c) The ACCDC requires Data Users to cease using and delete data 12 months after receipt, and to make a new request for updated data if necessary at that time.
d) ACCDC data responses are restricted to the data in our Data System at the time of the data request.
e) Each record has an estimate of locational uncertainty, which must be referenced in order to understand the record's relevance to a particular location. Please see attached Data Dictionary for details.
f) ACCDC data responses are not to be construed as exhaustive inventories of taxa in an area.
g) The absence of a taxon cannot be inferred by its absence in an ACCDC data response.

1.3 ADDITIONAL INFORMATION

The attached file DataDictionary 2.1.pdf provides metadata for the data provided.

Please direct any additional questions about ACCDC data to the following individuals:

Plants, Lichens, Ranking Methods, All other Inquiries
Sean Blaney, Botanist, Executive Director (effective 10 June, 2014)
Tel: (506) 364-2658
sblaney@mta.ca

Animals (Fauna)
John Klymko, Zoologist
Tel: (506) 364-2660
jklymko@mta.ca

Plant Communities
Sarah Robinson , Community Ecologist
Tel: (506) 364-2664
srobinson@mta.ca

Data Management, GIS
James Churchill, Data Manager
Tel: (902) 679-6146
jlchurchill@mta.ca

Billing
Cindy Spicer
Tel: (506) 364-2665
cspicer@mta.ca

Questions on the biology of Federal Species at Risk can be directed to ACCDC: (506) 364-2657, with questions on Species at Risk regulations to: Samara Eaton, Canadian Wildlife Service (NB and PE): (506) 364-5060 or Julie McKnight, Canadian Wildlife Service (NS): (902) 426-4196.

For provincial information about rare taxa and protected areas, or information about game animals, deer yards, old growth forests, archeological sites, fish habitat etc., in New Brunswick, please contact Stewart Lusk, Natural Resources: (506) 453-7110.

For provincial information about rare taxa and protected areas, or information about game animals, deer yards, old growth forests, archeological sites, fish habitat etc., in Nova Scotia, please contact Sherman Boates, NSDNR: (902) 679-6146. To determine if location-sensitive species (section 4.3) occur near your study site please contact a NSDNR Regional Biologist:

Western: Duncan Bayne
(902) 648-3536
baynedz@gov.ns.ca

Western: Donald Sam
(902) 634-7525
samdx@gov.ns.ca

Central: Shavonne Meyer
(902) 893-6353
meyersj@gov.ns.ca

Central: Kimberly George
(902) 893-5630
georgeka@gov.ns.ca

Eastern: Mark Pulsifer
(902) 863-7523
pulsifmd@gov.ns.ca

Eastern: Donald Anderson
(902) 295-3949
andersdg@gov.ns.ca

Eastern: Terry Power
(902) 563-3370
powertd@gov.ns.ca

For provincial information about rare taxa and protected areas, or information about game animals, fish habitat etc., in Prince Edward Island, please contact Rosemary Curley, PEI Dept. of Agriculture and Forestry: (902) 368-4807.

2.0 RARE AND ENDANGERED SPECIES

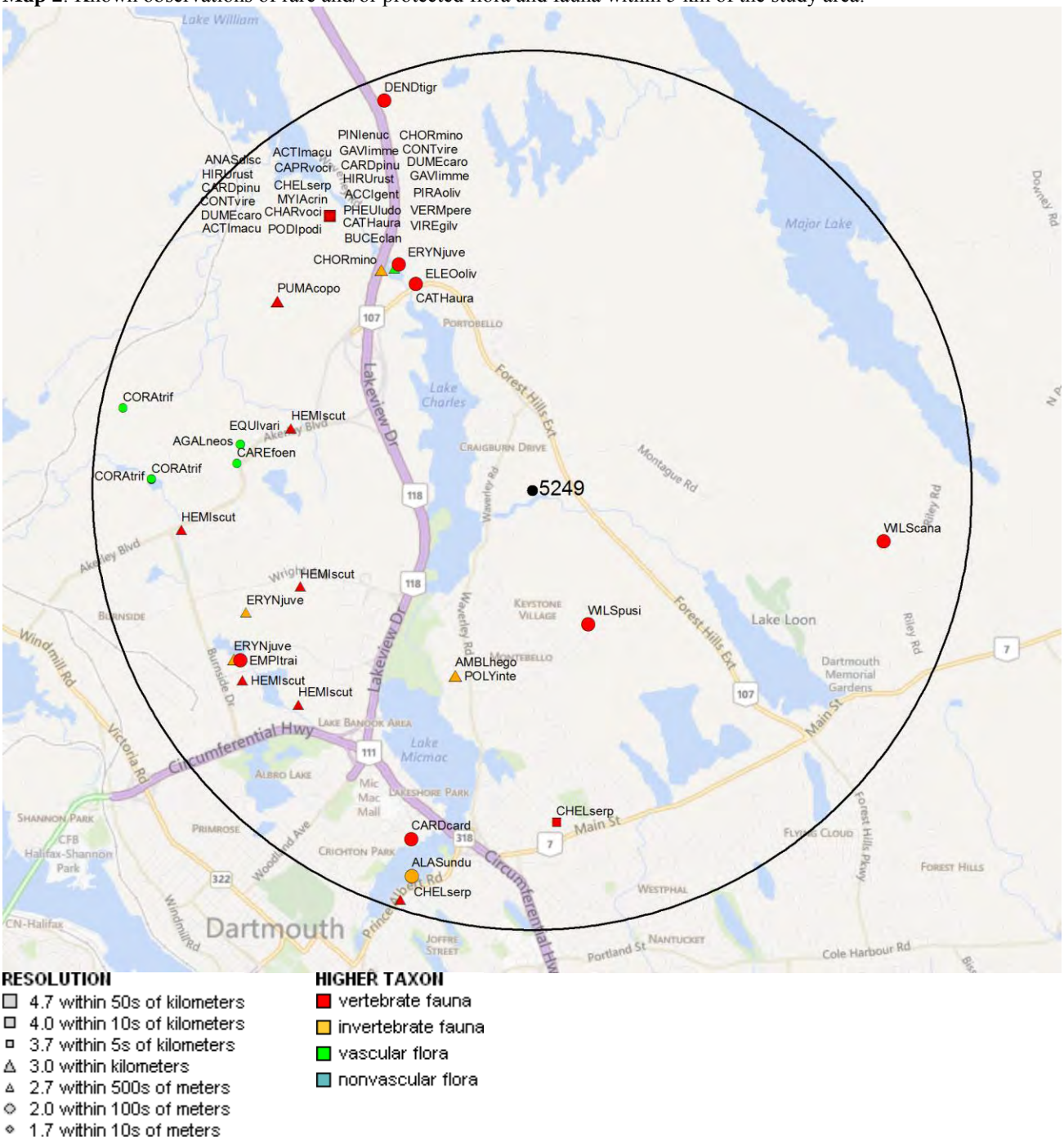
2.1 FLORA

A 5 km buffer around the study area contains 7 records of 5 vascular, no records of nonvascular flora (Map 2 and attached: *ob.xls).

2.2 FAUNA

A 5 km buffer around the study area contains 58 records of 28 vertebrate, 7 records of 4 invertebrate fauna (Map 2 and attached data files - see 1.1 Data List). Please see section 4.3 to determine if "location-sensitive" species occur near your study site.

Map 2: Known observations of rare and/or protected flora and fauna within 5 km of the study area.

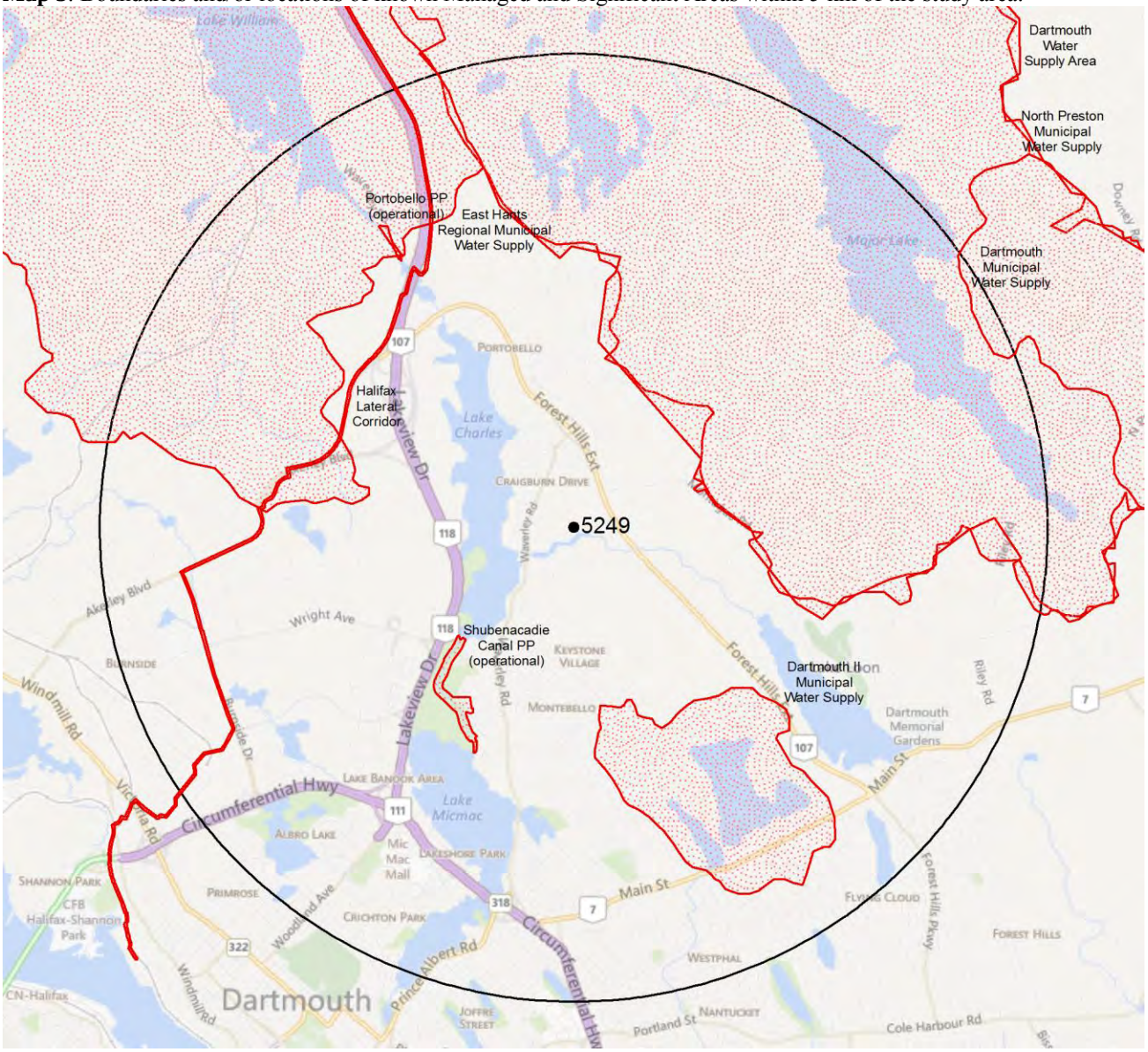


3.0 SPECIAL AREAS

3.1 MANAGED AREAS
The GIS scan identified 8 managed area in the vicinity of the study area (Map 3 and attached file: *ma*.xls)

3.2 SIGNIFICANT AREAS
The GIS scan identified no biologically significant sites in the vicinity of the study area (Map 3)

Map 3: Boundaries and/or locations of known Managed and Significant Areas within 5 km of the study area.



4.0 RARE SPECIES LISTS

Rare and/or endangered taxa within the 5 km-buffered area listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation. [P] = vascular plant, [N] = nonvascular plant, [A] = vertebrate animal, [I] = invertebrate animal, [C] = community.

4.1 FLORA

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
P	*Eleocharis olivacea*	Yellow Spikerush				S2S3	3 Sensitive	1	3.0 ± 0.25
P	*Agalinis neoscotica*	Nova Scotia Agalinis				S3	4 Secure	1	3.4 ± 0.01
P	*Corallorhiza trifida*	Early Coralroot				S3	4 Secure	3	4.7 ± 0.01
P	*Equisetum variegatum*	Variegated Horsetail				S3	4 Secure	1	3.4 ± 0.01
P	*Carex foenea*	Fernald's Hay Sedge				S3?	4 Secure	1	3.4 ± 0.01

4.2 FAUNA

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
A	*Caprimulgus vociferus*	Whip-Poor-Will	Threatened	Threatened	Threatened	S1?B	1 At Risk	1	3.9 ± 7.07
A	*Hirundo rustica*	Barn Swallow	Threatened		Endangered	S3B	1 At Risk	2	3.9 ± 7.07
A	*Wilsonia canadensis*	Canada Warbler	Threatened	Threatened	Endangered	S3B	1 At Risk	1	4.0 ± 0.15
A	*Chordeiles minor*	Common Nighthawk	Threatened	Threatened	Threatened	S3B	1 At Risk	2	3.9 ± 7.07
A	*Contopus virens*	Eastern Wood-Pewee	Special Concern		Vulnerable	S3S4B	3 Sensitive	6	3.9 ± 7.07
A	*Chelydra serpentina*	Snapping Turtle	Special Concern	Special Concern	Vulnerable	S5	4 Secure	10	3.9 ± 10.0
A	*Hemidactylium scutatum*	Four-toed Salamander	Not At Risk			S3	4 Secure	5	2.9 ± 0.5
A	*Gavia immer*	Common Loon	Not At Risk			S3B,S4N	2 May Be At Risk	3	3.9 ± 7.07
A	*Accipiter gentilis*	Northern Goshawk	Not At Risk			S3S4	4 Secure	1	3.9 ± 7.07
A	*Puma concolor pop. 1*	Cougar - Eastern pop.	Data Deficient			SH	5 Undetermined	1	3.6 ± 1.0
A	*Vireo gilvus*	Warbling Vireo				S1?B	5 Undetermined	1	3.9 ± 7.07
A	*Empidonax traillii*	Willow Flycatcher				S2B	3 Sensitive	1	3.8 ± 0.15
A	*Myiarchus crinitus*	Great Crested Flycatcher				S2B	2 May Be At Risk	1	3.9 ± 7.07
A	*Piranga olivacea*	Scarlet Tanager				S2B	5 Undetermined	1	3.9 ± 7.07
A	*Bucephala clangula*	Common Goldeneye				S2B,S5N	4 Secure	1	3.9 ± 7.07
A	*Cathartes aura*	Turkey Vulture				S2S3B	3 Sensitive	4	3.9 ± 7.07
A	*Dendroica tigrina*	Cape May Warbler				S3?B	3 Sensitive	1	4.7 ± 0.15
A	*Pinicola enucleator*	Pine Grosbeak				S3?B,S5N	2 May Be At Risk	1	3.9 ± 7.07
A	*Podilymbus podiceps*	Pied-billed Grebe				S3B	3 Sensitive	1	3.9 ± 7.07
A	*Anas discors*	Blue-winged Teal				S3B	2 May Be At Risk	1	3.9 ± 7.07
A	*Dumetella carolinensis*	Gray Catbird				S3B	2 May Be At Risk	3	3.9 ± 7.07
A	*Cardinalis cardinalis*	Northern Cardinal				S3S4	4 Secure	2	4.2 ± 0.15
A	*Charadrius vociferus*	Killdeer				S3S4B	3 Sensitive	1	3.9 ± 7.07
A	*Actitis macularius*	Spotted Sandpiper				S3S4B	3 Sensitive	2	3.9 ± 7.07
A	*Vermivora peregrina*	Tennessee Warbler				S3S4B	3 Sensitive	1	3.9 ± 7.07
A	*Wilsonia pusilla*	Wilson's Warbler				S3S4B	3 Sensitive	1	1.7 ± 0.15
A	*Pheucticus ludovicianus*	Rose-breasted Grosbeak				S3S4B	3 Sensitive	1	3.9 ± 7.07
A	*Carduelis pinus*	Pine Siskin				S3S4B,S5N	3 Sensitive	2	3.9 ± 7.07
I	*Amblyscirtes hegon*	Pepper and Salt Skipper				S2	4 Secure	1	2.3 ± 1.0
I	*Erynnis juvenalis*	Juvenal's Duskywing				S2S3	4 Secure	4	3.5 ± 0.5
I	*Alasmidonta undulata*	Triangle Floater				S2S3	4 Secure	1	4.6 ± 0.3
I	*Polygonia interrogationis*	Question Mark				S3B	4 Secure	1	2.3 ± 1.0

4.3 LOCATION SENSITIVE SPECIES

The Department of Natural Resources in each Maritimes province considers a number of species "location sensitive". Concern about exploitation of location-sensitive species precludes inclusion of precise coordinates in this report. Those intersecting your study area are indicated below.

Nova Scotia

Scientific *Name*	Common Name	SARA	Prov Legal Prot	Known within 5 km of Study Site?
Fraxinus nigra	Black Ash		Threatened	Yes
Glyptemys insculpta	Wood Turtle	Threatened	Threatened	No
Emydoidea blandingii	*Blanding's Turtle - Nova Scotia pop.*	Endangered	Vulnerable	No
Falco peregrinus pop. 1	Peregrine Falcon - anatum/tundrius pop.	Special Concern	Vulnerable	No
Bat Hibernaculum			[Endangered][1]	No

1 *Myotis lucifugus* (Little Brown Myotis), *Myotis septentrionalis* (Long-eared Myotis), and *Perimyotis subflavus* (Tri-colored Bat or Eastern Pipistrelle) are all Endangered under the NS Endangered Species Act.

4.4 SOURCE BIBLIOGRAPHY

The recipient of these data shall acknowledge the ACCDC and the data sources listed below in any documents, reports, publications or presentations, in which this dataset makes a significant contribution.

# recs	CITATION
31	Lepage, D. 2014. Maritime Breeding Bird Atlas Database. Bird Studies Canada, Sackville NB, 400,000 recs.
11	Erskine, A.J. 1992. Maritime Breeding Bird Atlas Database. NS Museum & Nimbus Publ., Halifax, 82,125 recs.
10	Scott, F.W. 2002. Nova Scotia Herpetofauna Atlas Database. Acadia University, Wolfville NS, 8856 recs.
8	Staff, DNR 2007. Restricted & Limited Use Land Database (RLUL).
6	LaPaix, R.W.; Crowell, M.J.; MacDonald, M. 2011. Stantec rare plant records, 2010-11. Stantec Consulting, 334 recs.
5	Benjamin, L.K. (compiler). 2001. Significant Habitat & Species Database. Nova Scotia Dept of Natural Resources, 15 spp, 224 recs.
3	Klymko, J.J.D. 2014. Maritimes Butterfly Atlas, 2012 submissions. Atlantic Canada Conservation Data Centre, 8552 records.
2	Layberry, R.A. & Hall, P.W., LaFontaine, J.D. 1998. The Butterflies of Canada. University of Toronto Press. 280 pp+plates.
1	Benjamin, L.K. (compiler). 2007. Significant Habitat & Species Database. Nova Scotia Dept Natural Resources, 8439 recs.
1	Benjamin, L.K. (compiler). 2012. Significant Habitat & Species Database. Nova Scotia Dept Natural Resources, 4965 recs.
1	Klymko, J.J.D. 2012. Maritimes Butterfly Atlas, 2010 and 2011 records. Atlantic Canada Conservation Data Centre, 6318 recs.
1	Scott, Fred W. 1998. Updated Status Report on the Cougar (Puma Concolor couguar) [Eastern population]. Committee on the Status of Endangered Wildlife in Canada, 298 recs.

DATA DICTIONARY: revised May 4, 2012

I. Observation Records

The following fields of data may be included (and may or may not be populated) in occurrence records.
Text field lengths given as TXT+ are 255 char max. (and may truncate text).

TAXONOMY	*type*	*definition*
MCODE	TXT 8	8 character 'Museum Code' (1 to 4 = genus, 5 to 8 = sp+ssp)
ELCODE	TXT 10-12	Unique IIdentifier of taxon[1]
SCINAME	TXT+	Global Scientific Name of taxon[1]
COMNAME	TXT+	English Common Name of taxon[1]
NOMCOMMUN	TXT+	French Common Name

LOCATION		
SURVEYSITE	TXT+	General locality of occurrence (not necessarily protected)
DIRECTIONS	TXT+	Specific locality: e.g. bearings and distance from enduring landmark
SUBNAT	TXT 2	Province/State: 2 character ISO code
COCODE	TXT 6	County Code (2 chars for province + 4 chars for county name)
MAPCODE	TXT 7	Map number: NTS identifier in Canada
UTME20	NUM 6	UTM[3] Easting reprojected as Zone 20
UTMN20	NUM 7	UTM[3] Northing reprojected as Zone 20
LONDEC	DEC 12,6	Decimal Longitude (6 decimal places, negative for west of Greenwich)
LATDEC	DEC 12,6	Decimal Latitude (6 decimal places)
LOCUNCM	NUM 5	Precision in meters, i.e. geospatial resolution or lack thereof
PREC	DEC 3,1	Precision in meters by power of 10 (e.g. 3 = 10 to the 3rd = 1000m = 1km)

prec	*common speech*	*example*	*unit size*	*literal range (m)*
6.0	within province	province	1000.0km	562.3 - 1778.3
5.7	in part of province	'NW NB'	500.0km	281.2 - 889.1
5.0	within in county	county	100.0km	56.2 - 177.8
4.7	within 50s of kilometers		50.0km	28.1 - 88.9
4.0	within 10s of kilometers	BBA grid	10.0km	5.6 - 17.8
3.7	within 5s of kilometers		5.0km	2.8 - 8.9
3.0	within kilometers	topo grid	1.0km	0.6 - 1.8
2.7	within 500s of meters		500.0m	281.2 - 889.1
2.0	within 100s of meters	ball field	100.0m	56.2 - 177.8
1.7	within 50s of meters		50.0m	28.1 - 88.9
1.0	within 10s of meters	boxcar	10.0m	5.6 - 17.8
0.7	within 5s of meters		5.0m	2.8 - 8.9
0.0	within meters ***NOT USED***	pace	1.0m	0.6 - 1.8
-1.0	within 10s of centimeters	fingernail	0.1m	0.1 - 0.2

RARITY STATUS

NRANK	TXT 5	National Rarity Rank of taxon (in Canada)[1]
NPROT	TXT+	National Protection Status of taxon (= COSEWIC in Canada)

code	*rank and short definition*
X	Extinct in Canada and elsewhere
XT	Extirpated in Canada but surviving elsewhere
E	Endangered in Canada
T	Threatened in Canada
V	Vulnerable in Canada
SC	Special Concern in Canada
DD	Data Deficient: data inadequate for assessment
NAR	Not At Risk in Canada

SRANK**	TXT 5	Subnational (Provincial) Rarity Rank of taxon[1]

code	*rank and short definition*
SX	Extinct or extirpated in province
SH	Historically occuring but currently undetected in province
S1	Extremely rare in province
S2	Rare in province
S3	Uncommon in province
S4	Widespread, common and apparently secure in province
S5	Widespread, abundant and demonstrably secure in province
SE	Exotic in province
SA	Accidental, infrequent and outside of range within province
SNA	Ranking not applicable in province
SNR	Not yet assessed in province

SPROT**	TXT+	Provincial rank/status of taxon; cf provincial websites

DATASENS	TXT 5	Data sensitivity index; indicates blurred[2] export coordinates
IUCN	TXT+	International Union of Conservation Naturalists rarity rank; cf IUCN website

code	*rank and short definition*
EX	Extinct: no individuals remaining
EW	Extinct in the Wild: only captive or naturalised survivors
CR	Critically Endangered: extreme risk of extinction in wild
EN	Endangered: high risk of extinction in wild
VU	Vulnerable: high risk of endangerment in wild
NT	Near Threatened: likely to become endangered soon
LC	Least Concern: lowest risk, widespread and abundant
DD	Data Deficient: data inadequate for assessment
NE	Not Evaluated, not yet assessed against criteria

OBSERVATION

OBSERVER	TXT+	Person or persons collecting specimen, in bibliographic form
OBDATE	TXT 10	Date of specimen collection as YYYY MM DD
OBDATA	TXT+	Concatenation of fields below, relating to specimen (EODATAEVID, EODATACNT etc)
OBEVID	TXT+	Type of evidence (specimen, photo etc)
OBCOUNT	TXT+	Number of individuals at location
OBABUN	TXT+	Relative rarity of taxon at location, e.g. 'common', 'scattered'
OBSIZE	TXT+	Size of specimen
SIZE	TXT+	Size of occurrence 'patch' (in m2, ha or acres)
OBDESC	TXT+	Details of specimen appearance
OBPHEN	TXT+	Lifestage of specimen (bud, flowering etc)
OBSEX	TXT+	Male/female if relevant
OBACTIV	TXT+	Activity of taxon when observed (nesting, crossing road etc)
OBASSP	TXT+	Other taxa associated with specimen
NOTETAX	TXT+	Identifier's note on taxonomic issues
GENDESC	TXT+	Concatenation of fields below, relating to site (HABITAT, ECOL etc)
HABITAT	TXT+	Habitat characterisation of location
ECODIST	NUM 4	National Ecological Framework EcoDistrict identifier
WSCODE	TXT 10	Quaternary Watershed identifier
GCOM	TXT+	General Comments: concatenation of Notes (NOTE1, NOTE2, NOTE3)

COLLECTION

OWNER	TXT+	Landowner or owner type (Federal, Provincial, Private, etc)
ACCNUM	TXT+	Museum/Herbarium Accession number
COLLNUM	TXT+	Collectors' number
COLLECTION	TXT+	Herbarium acronym(s) with specimen
CITATION	TXT+	Primary source of data

DATA MANAGEMENT

IDNUM	TXT+	Field Office Number: Internal ACCDC record reference (not the EONUM)
EDITION	TXT 14	Last editor's initials and date as YYYY MM DD
OB	TXT 2	Mapping shape: PN=polygon, BF=buffer, LN=line, PT=point
DB	TXT 2	Database, e.g. Ob=observations, Ff=freshwater fish, Bp=birds, pelagic
IN	TXT 2	GIS search flag for observation within buffer
IX	TXT 2	GIS search flag for observation intersects buffer
EONUMLAST	NUM 3	Map labeling flag for most recent taxon observation in area
RARENS	NUM 1	Inclusion flag for extraprovincial records in NS 100km GIS scans

Notes:

[1] Methodology of NatureServe, Arlington, VA

[2] Easting and Northing rounded to 5, 10 or 50km grid location.

[3] Universal Transverse Mercator.

** Field name followed by 2-character ISO provincial abbreviation.

II. Managed or Special Areas

The following fields of data may be included (and may or may not be populated) for Protected Areas and Ecologically Significant Areas.

IDENTITY

MACODE	TXT 14	Unique identifier for Managed Area[1] with some level of protection
SACODE	TXT 14	Unique identifier for Ecologically Special Area[1] with or without protection
MANAME	TXT+	Name of Protected Area containing occurrence
SANAME	TXT+	Name of Ecologically Special Area containing occurrence
SITECODE	TXT+	External agency site identity code

JURISDICTION / OWNERSHIP

LOCALJURIS	TXT+	Abbreviation for mandated agency
OWNER	TXT+	Short name or category of title holder
OWNERCOM	TXT+	Short detail of multiparty arrangements
OWNERCODE	TXT+	Canadian Conservation Area DB ownercodes (modified)

group	*code*	*designation*
Owner	GN	government, national (federal)
	GS	government, subnational (prov., state)
	GM	government, municipal
	IN	international
	NG	non-governmental organisation
	OR	organisational
	CO	corporate
	PR	private

CLASSIFICATION

PROTSTAT	TXT+	Activities permitted or restricted (when known)
LEGALACT	TXT+	Short title of enabling legislation
LEGALDATE	TXT+	Year of enabling legislation
ESTABDATE	TXT+	Year of site designation
IBP	TXT+	International Biological Program identity number (Y=unknown)
IBPSTATUS	TXT+	International Biological Program status: proposed or declared
IUCN	TXT+	IUCN protection level, e.g. I very restricted, VI few restrictions
LEVEL1	TXT 3	Canadian Conservation Area DB type
LEVEL2	TXT+	Canadian Conservation Area DB subtype(s)

group	*code*	*designation*
Conservation	CEP	Conservation Easement Property
	ESA	Environmentally Sensitive Area
	NAC	Nature Conservancy
	NAT	Natural Area
	NCA	NCC Conservation Land
	PCA	Private Conservation Area
	PRA	Protected Area
	PRB	Protected Beach
	RER	Representative Area Ecological Reserve
	TRA	Nature Trail
Heritage	ARS	Archaeological Site
	HEA	Heritage Area or Park
	HEC	Heritage Canal
	HEP	Heritage Park
	HER	Heritage River
	HIA	Historic Area or Park
	NHP	National Historic Park
	NHS	National Historic Site
	PEP	Provincial Heritage Property
	PHP	Provincial Historic/Heritage Park
	PHS	Provincial Heritage Site
	WHS	World Heritage Site
Parks	CMG	Campground
	CMP	Community Park
	DUP	Day Use Park
	MUP	Municipal Park
	NAP	National Park
	NEP	Natural Environment Park
	NTP	Nature Park
	PKW	Parkway
	PNS	Picnic Site
	PVP	Provincial Park
	WAP	Wayside Park

group	*code*	*designation*
Wilderness	ECR	Ecological Reserve
	NTA	Nature Trust Area
	NTR	Nature Reserve
	SES	Significant Ecological Area
	WDA	Wilderness Area
	WDR	Wilderness Reserve
Wildlife	BSR	Bird Sanctuary
	EHJ	Eastern Habitat Joint Venture
	GAS	Game Sanctuary
	MBS	Migratory Bird Sanctuary
	NWA	National Wildlife Area
	PWA	Provincial Wildlife Area
	SBS	Sea Bird Sanctuary
	WHR	Western Hemispheric Shorebird Reserve
	WLP	Wildlife Park
	WLR	Wildlife Reserve
	WLS	Wildlife Sanctuary
	WMA	Wildlife Management Area
	WPA	Wildlife Protection Area
	WRF	Wildlife Refuge
Other	AGF	Agreement Forest
	ASI	Area of Scientific Interest
	DUN	Ducks Unlimited Canada
	EDA	Education Area
	FCP	Federal Community Pasture
	IBP	International Biological Program
	NCC	National Capital Commission
	NSA	Natural Scenic Area
	PLS	Palaeontological Site
	PSL	Public Safety Lands: watershed protection
	RAM	Ramsar Wetland Site
	RTA	Research and Teaching Area
NS SigHab	380	wetland habitat
	381	saltmarsh habitat
	382	deer/moose wintering
	383	other significant habitats

APPENDIX D-1

Photographic Log: Forested Areas

August 19 -20, 2014

Photo 1: Intolerant Hardwood Forest (IH7)

Photo 2: Mixed Wood Forest (MW4)

Photo3: Old Field Forest (OF3)

Photo 4: Open Woodland Forest (OW2)

Photo 5: Spruce Hemlock Forest (SH8)

Photo 6: Spruce Pine Forest (SP5)

Photo 7: Tolerant Hardwood Forest (TH7)

Photo 8: Coastal Forest (CO6)

Photo 9: Wet Deciduous Forest (WD2)

Photo 10: Wet Coniferous Forest (WC1)

APPENDIX D-2

Photographic Log: Wetlands and Watercourses

Photo 1: Barry's Run looking east, August 24, 2014

Photo 2: Wooded area along Barry's Run, August 24, 2014

Photo 3: Visible channel connecting wetlands, August 25, 2014

Photo 4: Wetland conifer dominated swamp, with a high percentage of moss covering the forest floor, August 25, 2014

Photo 5: Marsh, Wetland WL6 from previous delineation, October 18, 2012

Photo 6: Treed Swamp, Wetland WL19 from previous delineation, November 1, 2012

Photo 7: Watercourse WC10 from previous delineation, November 5, 2012

Photo 8: Mitchell's Brook previous delineation, November 5, 2012

APPENDIX D-3

Photographic Log: Contaminated Sites

A: Conrad Brothers

Photo 1: Conrad Brother's Quarry

Photo 2: Conrad Brother's Quarry

Photo 3: Old aboveground storage tanks at Conrad Brother's adjacent to Study Area

Photo 4: Unused equipment stored at Conrad Brother's adjacent to Study Area

B. Dump site

Photo 5: Oil drum dumped in wooded area

C. Excavation Pit

Photo 6: In the past pit used for fill, currently Halifax slate dumped on site

D. Horse Racing Stable

Photo 7: AST for diesel next to site of building fire

Photo 8: Storage of heavy equipment

E. Abandoned Mine Sites

Photo 9: Abandoned mine trench, within Study Area

Photo 10: Abandoned mine shaft, adjacent to Study Area

G. Montague Mine Tailings – Adjacent to Project Area

Photo 11: Arsenic rich mine tailings

Photo 12: Arsenic rich mine tailings next to wetland area

APPENDIX E

Heritage and Cultural Landscape Screening

WSP CANADA INC.

PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS CULTURAL ASSETS/RESOURCES SCREENING PORT WALLACE, NOVA SCOTIA

DRAFT REPORT VERSION 3.0

Submitted to:
WSP CANADA INC.

Prepared by:
Cultural Resource Management Group Limited
6040 Almon Street
Halifax, Nova Scotia
B3K 1T8

Consulting Archaeologist: Mike Sanders
Report Preparation: Mike Sanders

Heritage Research Permit Number: A2014NS051

CRM Group Project Number: 2014-0006-01

NOVEMBER 2015

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF PLATES

APPENDICES

PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS
CULTURAL ASSETS/RESOURCES SCREENING
PORT WALLACE, NOVA SCOTIA

1.0 INTRODUCTION

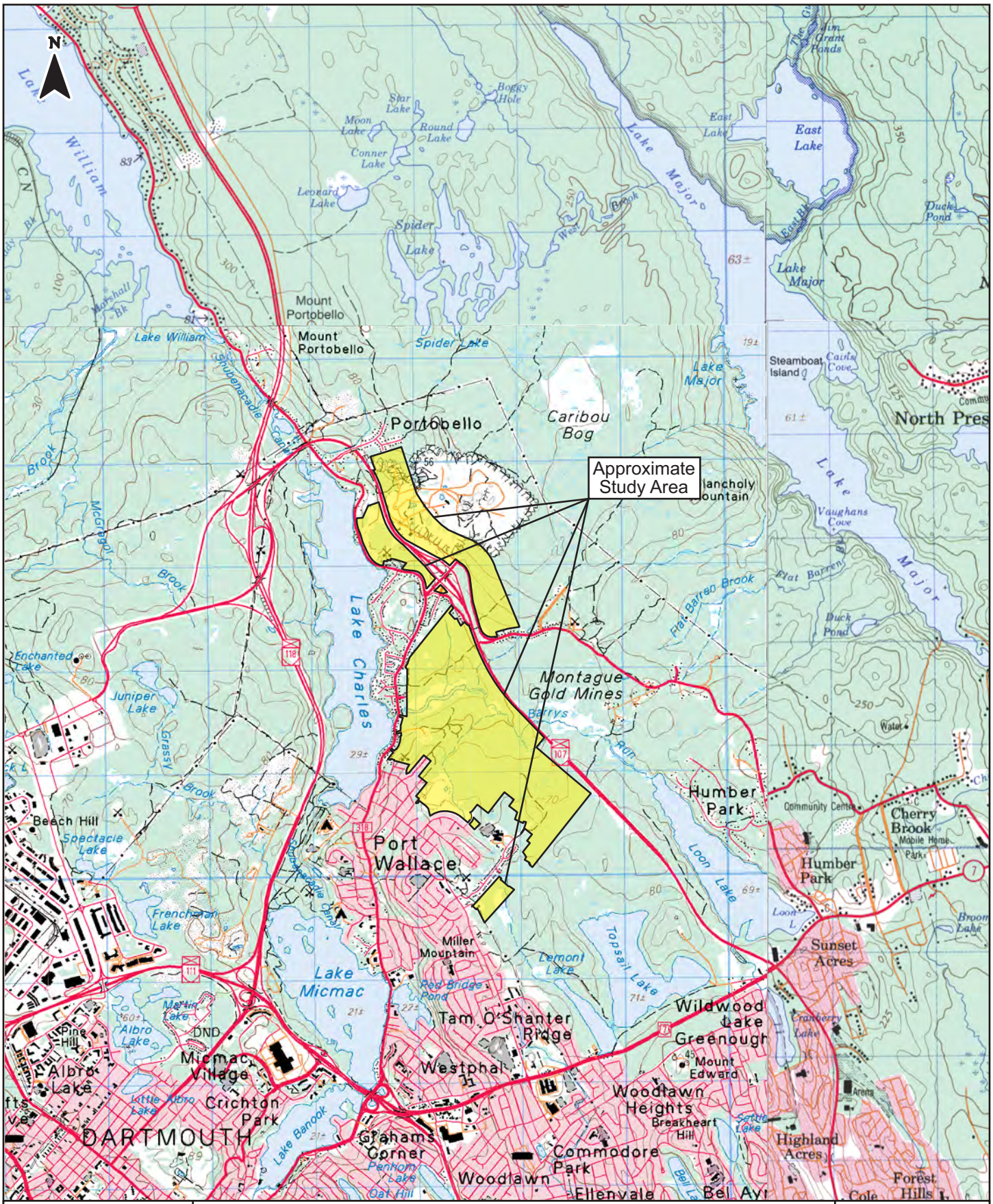
In the spring of 2014, WSP Canada Inc. was commissioned to undertake a land suitability and capacity analysis (Port Wallace Land Suitability and Capacity Analysis – LS&CA) to identify areas of cultural and environmental importance within the area of the Port Wallace Secondary Plan Study Area (PWSPSA) before alternative concept plans are prepared for future development (***Figures 1 & 2***). The PWSPSA represents a concentration of privately-owned properties located east of Lake Charles in the community of Port Wallace.

To address the cultural assets/resources components of the LS&CA, WSP Canada Inc. retained the services of Cultural Resource Management (CRM) Group Limited. CRM Group was tasked to identify, map and evaluate cultural assets/resources within the PWSPSA to determine their defining features, community value and how they should be recognized, preserved and, perhaps, enhanced through the refinement of a new development plan. As part of this overall Cultural Assets/Resources Screening, CRM Group was also tasked with undertaking archaeological screening and field investigation of the PWSPSA in order to identify areas of archaeological importance that could impact the suitability and capacity of the land for future development.

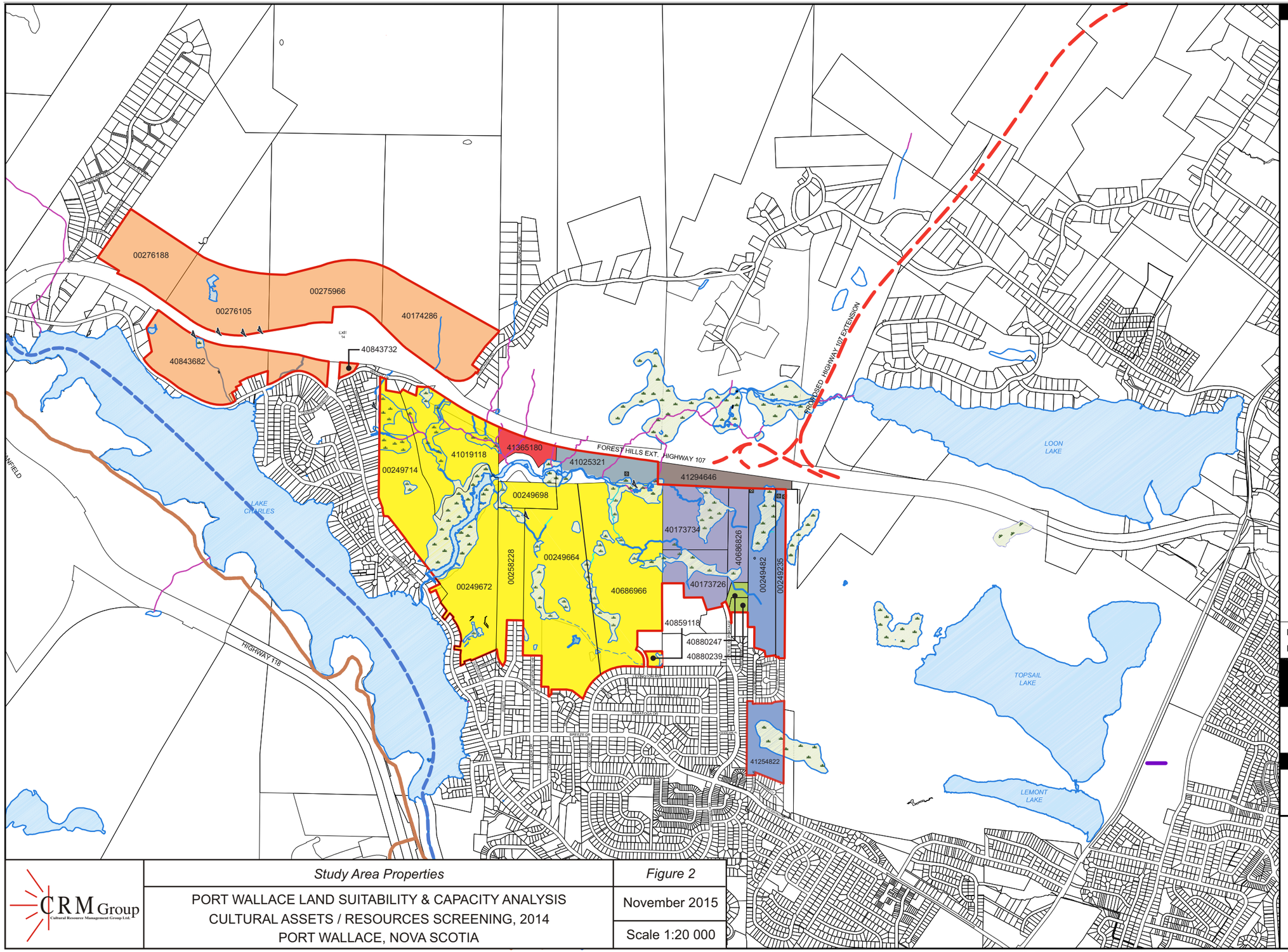
CRM Group's involvement with the project was initiated with a public workshop on June 11, 2014. Over the following three months, CRM Group Senior Archaeologist, Mike Sanders, conducted archival research and undertook public consultation/engagement, including inquiries with heritage professionals. Field investigations were conducted specifically from July 22 to September 15, 2014 in accordance with the terms of Heritage Research Permit A2014NS051 issued to Sanders through the Special Places Program of the Nova Scotia Department of Communities, Culture and Heritage.

This report addresses the cultural assets/resources components of the LS&CA, summarizes the results of research, public consultation/engagement and field investigations, and identifies potential constraints to future planning and development.

Upon submission of the first draft of this report, CRM Group was retained by Port Wallace Holdings Limited to undertake archaeological assessment of two areas within the PWSPSA that were ascribed high archaeological potential (Areas 3 & 13). The field component of the assessment was conducted in November, 2014, in accordance with the terms of Heritage Research Permit A2014NS107 issued to Kiersten Green. Since the results of the archaeological assessment have a bearing on the outcome of the LS&CA, they are included in the current version of this report.



CRM Group Cultural Resource Management Group Ltd.	*Approximate Study Area*	*Figure 1*
	PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS CULTURAL ASSETS / RESOURCES SCREENING, 2014 PORT WALLACE, NOVA SCOTIA	November 2015 Scale 1:50 000



LEGEND:

- CONRAD BROTHERS LTD.
- WHEBBY LTD.
- MUKUND & SUMITRIA UNIA
- ARMCO CAPITAL INC.
- CLAYTON DEVELOPMENTS.
- JOYCE E. COOPER
- PINNACLE PROPERTIES
- NS NATURAL RESOURCES
- STUDY AREA

NOTE:

Property lines approximate only.
Sites subject to survey

Designer: lain.grant
Planner:

VERSION 123

PORT WALLIS
MASTER PLAN AREA

May 20, 2014 B07057123

300 200 100 0 500 m

1 : 20,000

WSP
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM

FILE: K:\DARTMOUTH\20070\B07057_KLD PORT WALLIS\DWG\CONCEPT\B07057123.DWG

CRM Group
Cultural Resource Management Group Ltd.

Study Area Properties

PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS
CULTURAL ASSETS / RESOURCES SCREENING, 2014
PORT WALLACE, NOVA SCOTIA

Figure 2

November 2015

Scale 1:20 000

2.0 STUDY AREA

The PWSPSA consists of a concentration of properties located on either side of Forest Hills Extension / Highway 107 east of Lake Charles and Waverly Road in the community of Port Wallace (***Figures 1 & 2***). Collectively covering approximately 317 hectares, these properties extend over an area that measures approximately 4.7 kilometres long (northwest/southeast) by 1.6 kilometres wide (northeast/southwest). The PWSPSA is bounded on the north, west and south by residential neighbourhoods in the vicinity of Spider Lake Road, Waverley Drive/Route 318, Caledonia Road/Breeze Drive and Montague Road. The southern edge of the PWSPSA is also bounded by undeveloped land around Lemont Lake and Topsail Lake. On the east, the PWSPSA is bounded by a Conrad Brothers Limited quarry and the alignment of the Forest Hills Extension of Highway 107.

The individual properties within the PWSPSA are variously owned by Conrad Brothers Limited, Armco Capital Inc., W. Eric Whebby Ltd. / Frank Whebby Ltd., Blue Chip Development Limited, Mukund (Mark) and Sumitra Unia, Joyce Elizabeth Cooper, Pinnacle Properties Limited and the Crown (***Figure 2***). While most of the PWSPSA is wooded, the northern end includes offices, yards and facilities associated with the Conrad Brothers Limited quarry based at 31 Cono Drive (***Plate 1***). The southern end includes the Whebby Racing Stable – a private horse stable and harness racing track located at 56 Lethbridge Avenue (***Plate 2***). A small part of the wooded eastern edge of the PWSPSA lies within the historic limits of the Montague Gold District.

The northern end of the PWSPSA is located only about 12 metres east of Lake Charles – a 3.4 kilometre long lake that flows northward to the Minas Basin at Maitland via the Shubenacadie River and a chain of other lakes, including Lake William, Lake Thomas, Fletchers Lake and Shubenacadie Grand Lake. Lake Charles is situated only about 1.2 kilometres north of Lake Micmac – a lake that is part of a separate watercourse that flows southward to Halifax Harbour at Dartmouth via Lake Banook and Sullivans Pond. These two natural watercourses, united by the canals and locks of the Shubenacadie Canal System, are together known as the Shubenacadie River System. Draining both northward and southward, Lake Charles is the high-point in this unified natural waterway.

The central portion of the PWSPSA straddles Barrys Run. This stream flows westward from Loon Lake to Lake Charles and serves as a boundary between HRM Polling Districts 1 and 6 (***Plates 3 & 4***).

PLATE 1: **Conrad Brothers Limited quarry at 31 Cono Drive. Facing northwest. Photo from Conrad Brothers Limited website (http://www.conrads.ns.ca/Quarry.cfm).**

PLATE 2: **Whebby harness racing track (foreground) and stables (background) on W. Eric Whebby Ltd./Frank Whebby Ltd. PID 00249664. Facing southwest. August 5, 2014.**

PLATE 3: **Barrys Run Stillwater (foreground), looking southwest from a rise at the Conrad Brothers Limited quarry. August 6, 2014.**

PLATE 4: **Barrys Run Stillwater, looking upstream. Facing east. August 20, 2014.**

3.0 METHODOLOGY

The goal of the Cultural Assets/Resources Screening was to identify any areas of cultural assets/resources importance within the PWSPSA that might impact its suitability and capacity for future development. To achieve this objective, the study involved background research and public consultation/engagement including inquiries with heritage professionals, as well as field investigation. These results of these activities were then analyzed to delineate specific areas of cultural assets/resources concern.

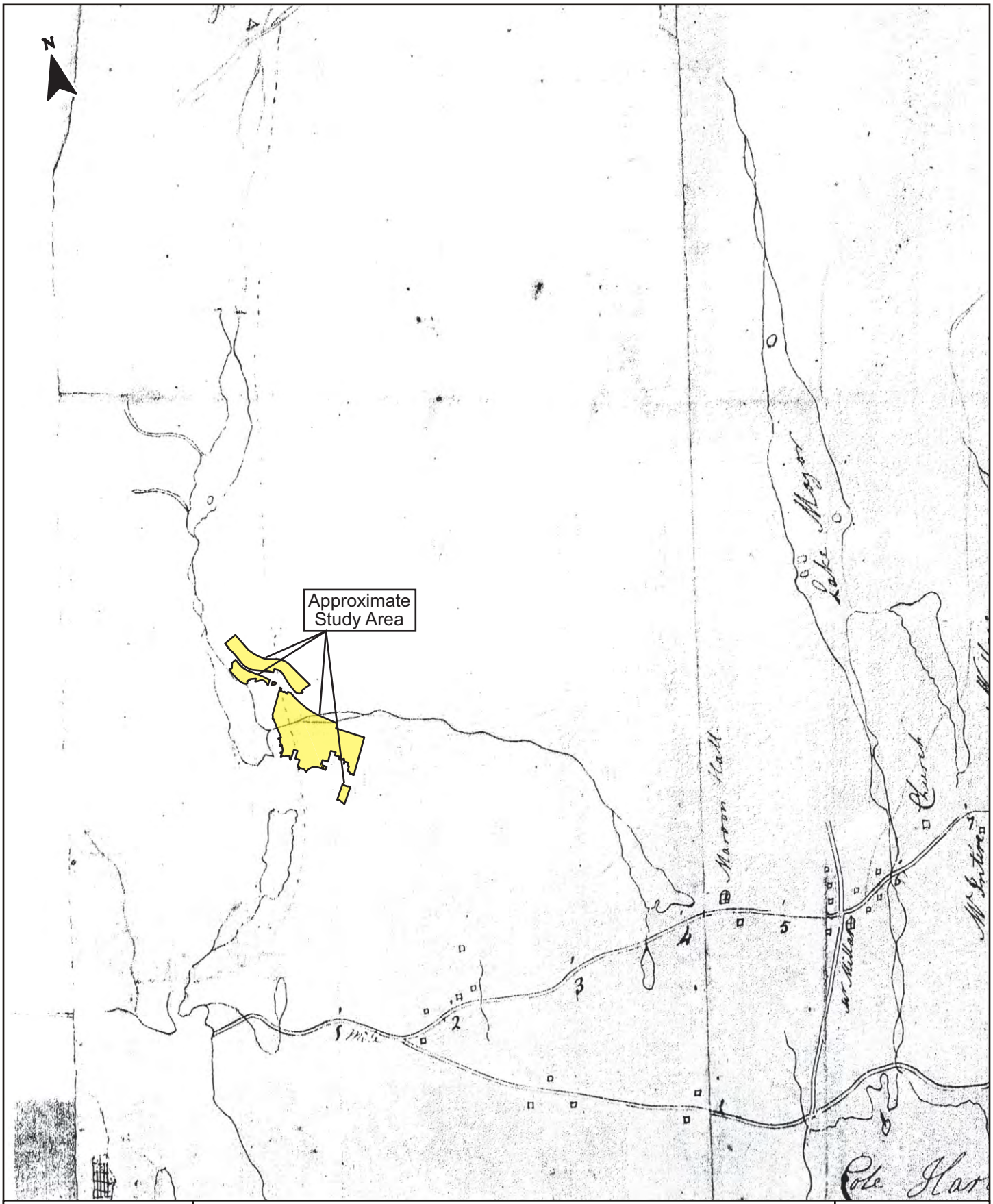
Background Research
The background research component of the study consisted of a review of relevant archaeological and historic documentation available through the Nova Scotia Archives, the Nova Scotia Museum, the Department of Natural Resources Library, the Crown Land Information Management Centre, the Dartmouth Heritage Museum, the Fairbanks Centre and the Waverly Heritage Museum. The research involved an examination of Maritime Archaeological Resource Inventory records, land grant documents, legal survey plans, historic maps, local and regional histories and relevant materials in CRM Group's own library. Topographic maps and aerial photographs, both current and historic (***Figures 3 - 10***), were used to identify physiographic features that may have influenced cultural activity. Ultimately, the historical and cultural information was integrated with the environmental and physiographic data to evaluate the potential distribution of cultural assets/resources within the PWSPSA. This research identified primary focal points for the field investigation program and generated a base of knowledge for the interpretation of potential archaeological resources encountered during the fieldwork.

Public Consultation/Engagement
In order to expand upon the information acquired through background research, CRM Group made inquiries with local residents, fellow researchers and other individuals familiar with the cultural history of the PWSPSA. The inquiries involved communication with personnel from Natural Resources Canada, the Nova Scotia Museum, the Nova Scotia Department of Natural Resources, the Dartmouth Historical Association, Shubenacadie Canal Commission and the Waverley Heritage Society.

Field Investigation
Once the results of the background research were compiled and evaluated, CRM Group undertook field investigation within PWSPSA, focussing primarily on areas of concern identified on the basis of the background research and public consultation/engagement. This field observation further delineated areas of potential cultural assets/resources and, where possible, identified areas where archaeological potential was eliminated by modern ground disturbance (*e.g.* areas of modern road construction and quarry development) (***Plates 1 & 2***). Areas of potential cultural assets/resources were inspected for physical evidence of those assets/resources, bearing in mind the results of the prior research. In particular, soil exposures (*e.g.* around uprooted trees and other recent soil disturbances) were searched for exposed artifacts and traces of archaeological features. Where prominent stone faces were encountered, whether on bedrock outcrops or exposed boulders, they were searched for petroglyphs (***Plate 5***). The investigation did not involve subsurface testing.

All cultural assets/resources observations were documented in the form of field-notes, photographs and GPS way-points (***Plate 6***). Had artifacts been encountered during the field investigation, the *in situ* positions would have been recorded and representative samples would have been recovered and trans-

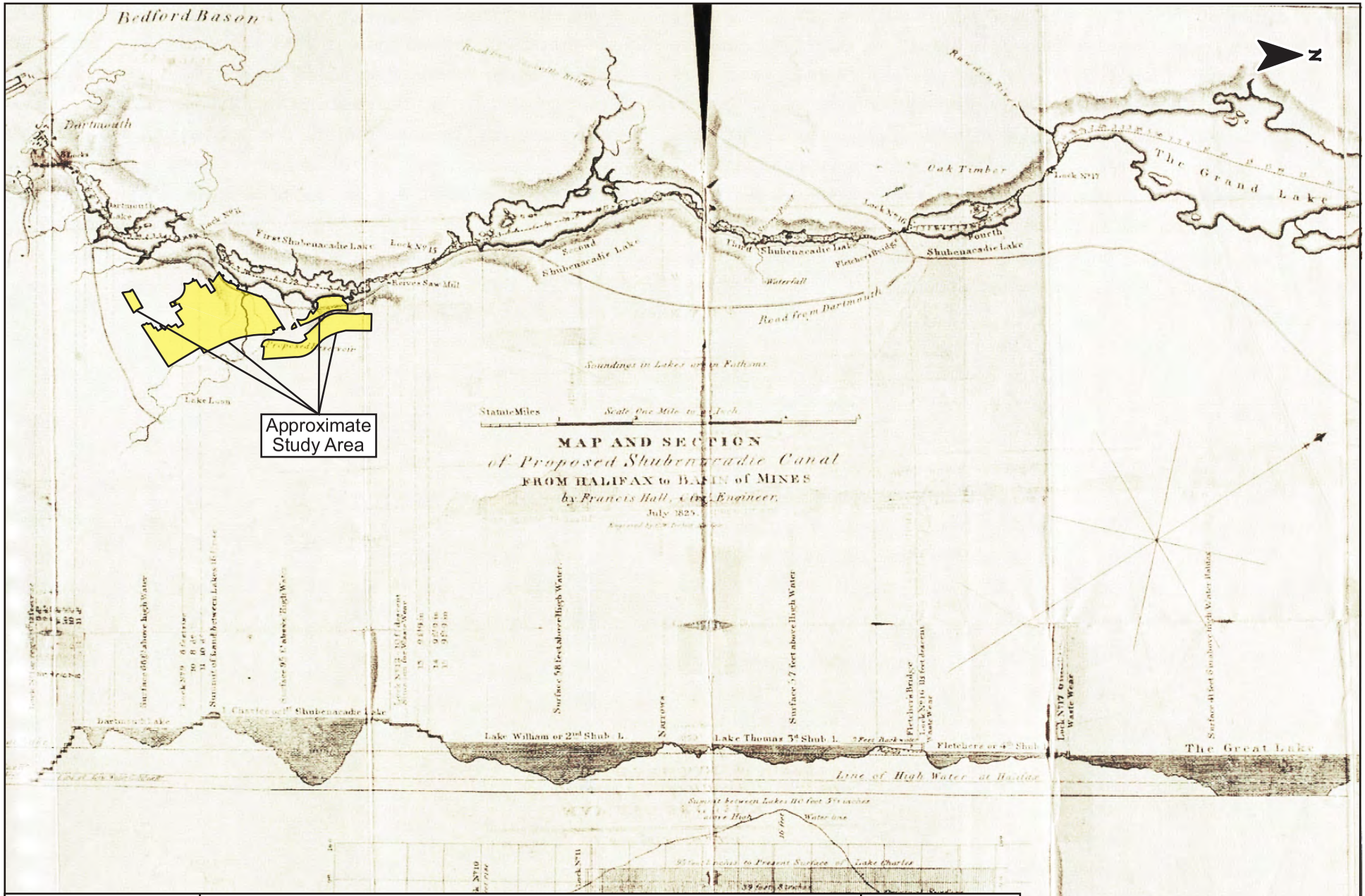
CRM Group Cultural Resource Management Group Ltd.	*Hildrith & Chamberlain, 1797*	*Figure 3*
	PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS CULTURAL ASSETS / RESOURCES SCREENING, 2014 PORT WALLACE, NOVA SCOTIA	November 2015



CRM Group Cultural Resource Management Group Ltd.	*Anonymous, ca. 1800*	*Figure 4*
	PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS CULTURAL ASSETS / RESOURCES SCREENING, 2014 PORT WALLACE, NOVA SCOTIA	November 2015

CRM Group Cultural Resource Management Group Ltd.	*Chamberlain, 1813*	*Figure 5*
	PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS CULTURAL ASSETS / RESOURCES SCREENING, 2014 PORT WALLACE, NOVA SCOTIA	November 2015

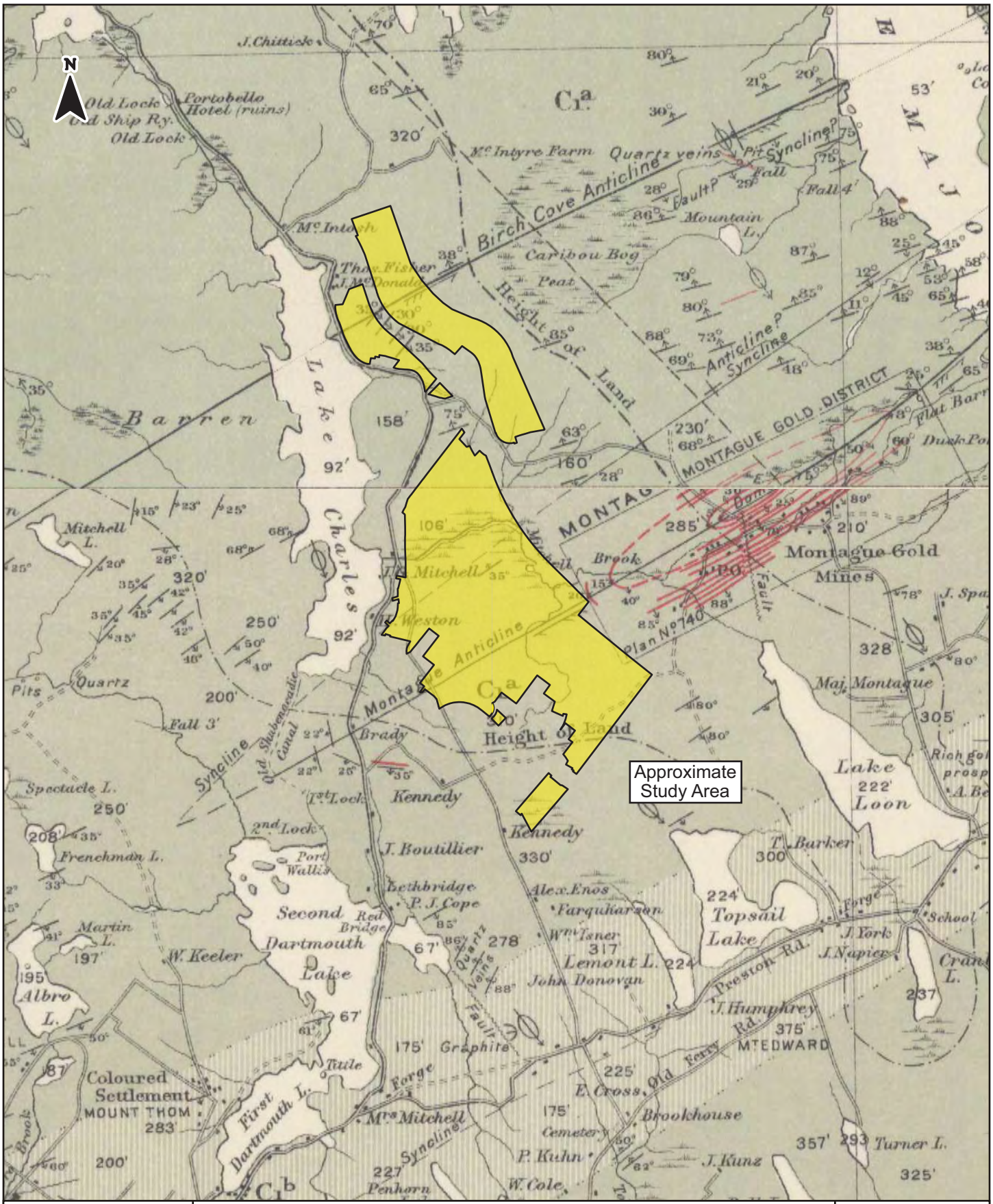
CRM Group Cultural Resource Management Group Ltd.	*Gill, 1815*	*Figure 6*
	PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS CULTURAL ASSETS / RESOURCES SCREENING, 2014 PORT WALLACE, NOVA SCOTIA	November 2015



CRM Group Cultural Resource Management Group Ltd.	*Hall, 1825*	*Figure 7*
	PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS CULTURAL ASSETS / RESOURCES SCREENING, 2014 PORT WALLACE, NOVA SCOTIA	November 2015

CRM Group Cultural Resource Management Group Ltd.	*Hall, 1825/1832*	*Figure 8*
	PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS CULTURAL ASSETS / RESOURCES SCREENING, 2014 PORT WALLACE, NOVA SCOTIA	November 2015

CRM Group Cultural Resource Management Group Ltd.	*Church, 1865*	*Figure 9*
	PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS CULTURAL ASSETS / RESOURCES SCREENING, 2014 PORT WALLACE, NOVA SCOTIA	November 2015



CRM Group Cultural Resource Management Group Ltd.	*Faribault, 1908 & 1909*	*Figure 10*
	PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS CULTURAL ASSETS / RESOURCES SCREENING, 2014 PORT WALLACE, NOVA SCOTIA	November 2015

PLATE 5: **Examination for petroglyphs at a prominent boulder beside Barrys Run (right) on a lot owned by Pinnacle Properties Limited (PID 41025321). August 7, 2014.**

PLATE 6: **Documentation of an exploratory gold mine shaft on a lot owned by Pinnacle Properties Limited (PID 41025321), near the Forest Hills Extension of Highway 107. Facing north. September 15, 2014.**

ported to the CRM Group office in Halifax for cleaning, cataloguing and packaging according to standards set by Special Places.

Evaluation
Identification of specific areas of cultural assets/resources concern was undertaken through analysis of the historic, consultative and physical evidence gathered on the basis of background research, public consultation/engagement and field investigation. The areas of cultural assets/resources concern are described in detail in the text of this report.

The investigation noted the locations of cemeteries/burial plots, registered/designated heritage features (municipal, provincial or federal), known archaeological sites (whether known previously or identified during the study) and areas ascribed archaeological potential. Areas of archaeological potential were designated on the basis of observed ground conditions and proximity to the following:

- registered archaeological sites
- cemeteries or individual burial plots
- registered or designated heritage features (municipal, provincial or federal)
- suspected heritage feature locations as indicated by research (historic documents, oral history) or fieldwork (personal observation)
- margins of significant water bodies or watercourses
- known or suspected early travel-ways (waterways, portage routes, trails, roads, railways)
- strategic vantage points or curious landforms
- key sources of valuable natural resources

Following the Standards and Guidelines for the Conservation of Historic Places in Canada (2010) in accordance with Policy CH-14 of HRM's Regional Plan, the cultural landscape component of the investigation noted the location of evidence of the following:

1. **Land Use** (*e.g.* fields, tree lines, hedgerows, managed wood lots)

2. **Traditional Practices** (*e.g.* beliefs, wisdom, activities, traditions and skills derived from extended observation of the land, creatures, cycles & spiritual associations; includes cemeteries)

3. **Land Patterns** (*e.g.* patterning of the arrangement of the landscape as revealed especially by aerial photographs & maps)

4. **Spacial Organization** (the arrangement of spaces in a cultural landscape)

5. **Visual Relationships** (between the observer and a landscape feature; scale can be an important factor)

6. **Circulation** (*e.g.* paths, roads, railways, canals, portages; accessibility – grade and water level may be an important consideration)

7. **Ecological Features** (*e.g.* natural elements such as a marshes, ponds or stands of trees)

8. **Vegetation** (*e.g.* sentinel trees, designed groupings, wind/sun control, planted crops)

9. **Landforms** (*e.g.* hills, valleys, berms & ditches)

10. **Water Features** (*e.g.* canals, ponds, lakes, rivers, streams)

11. **Built Features** (*e.g.* buildings, dams, bridges, fences, boundary markers, grave markers)

It was recognized that, regardless of age and depending on their level of recognition and significance (locally and regionally), these character-defining elements might warrant documentation, recognition, preservation, enhancement or mitigation if they exist within an area being considered for development.

To contribute to the overall LS&CA, the results of the Cultural Assets/Resources Screening were illustrated in the form of a figure (***Figure 12***) and tabulated in the form of a Cultural Assets/Resources Matrix (***Appendix A***). As indicated in the Matrix, a score of “0” and a determination of “Not Constrained” were applied to areas that exhibited either no or low potential for Cultural Assets/Resources. A score of “3” and a determination of “Moderately Constrained” were applied to areas that exhibited high potential for Cultural Assets/Resources. A score of "4" and a determination of “Totally Constrained” were reserved for areas confirmed as having Cultural Assets/Resources.

4.0 RESULTS

The following results represent an amalgamation of information gathered through background research, public consultation/engagement and field inspection.

4.1 General History of the PWSPSA and its Environs

Place-Names . . .

Port Wallace

The PWSPSA is located in the community of Port Wallace. This community takes its name from a cove that lies at the northern end of Lake Micmac, where work began on the construction of the Shubenacadie Canal in 1826. Situated at the southern entrance to the channel of the "Deep Cut" that was dug to join Lake Micmac to Lake Charles, Port Wallace was named in honour of Michael Wallace, who was President of the Shubenacadie Canal Company at the time of the 1826 sod-turning ceremony (Martin 1957: 39; PANS 1967: 159). While the spelling of the community name "Port Wallace" was altered to "Port Wallis" in about 1930 to honour Admiral Provo Wallis, the original spelling (Port Wallace) was officially restored in 1962 as a result of a public campaign (PANS 1967: 159).

Lake Charles

When construction of the canal system was being planned and commenced, Lake Charles was often identified as 1st Shubenacadie Lake (Hildreth & Chamberlain 1797; Hall 1825; ***Figures 3, 7 & 8***). The name "Lake Charles" is believed to have been applied in honour of Judge Charles R. Fairbanks, who was a Secretary, financier and promoter of the Shubenacadie Canal Company (Martin 1957: 253-254). This Charles Fairbanks was also the father of Charles W. Fairbanks – the individual who produced the design ultimately used for the successful operation of the canal. Use of the name "Lake Charles" appears on maps as early as 1815 (Gill 1815; ***Figure 6***). Once establishment of the canal facilitated travel from Dartmouth by canoe or boat, Lake Charles was often called Third Lake (*e.g.* Creighton 1918).

Barrys Run

In 1815, Barrys Run was known variously as Loon Creek (Gill 1815; ***Figure 6***) and Beaver Dam Run (Martin 1957: 124). The more recent names "Barrys Run" and "Mitchells Brook" reflect the surnames of individuals who owned a residence that stood outside of the PWSPSA on the western side of Waverley Road, immediately north of the base of the brook (Martin 1957: 256; Faribault 1908; ***Figure 10***).

Historical/Cultural Features and Events . . .

Mi'kmaq Habitation (Precontact, Contact and Historic Periods)

During the Precontact period, the Shubenacadie River System, located just outside of the PWSPSA, would have served as a natural travel-way linking Mi'kmaw communities at Kjipuktuk (the port of Chebucto or Halifax Harbour) with communities on the Minas Basin, especially those at We'kopektik (Cobequid Bay). In recent years, chance finds and localized archaeological investigation has revealed the existence of Precontact habitation sites along the full length of the river system. Based on the dating of recovered artifacts, these sites demonstrate a history of human activity on the watercourse that spans the Archaic and Ceramic Periods (*ca*. 9000-400 BP) (Preston 1974; Maritime Archaeological Resource Inventory records).

Mi'kmaw use of the Shubenacadie River System continued through the Contact and historic periods and it persists today. During the historic period, it was chronicled in the form of historic maps, paintings, written accounts, early photographs and oral tradition.

At the far end of Shubie Park, approximately 1.8 kilometres south of the PWSPSA, a Mi'kmaq encampment consisting of several wigwams is depicted at the northeastern corner of Lake Micmac on Hall's *ca*. 1825 "Shubenacadie Canal Map of No. 2 Division" (Barnett 2002: 23) and also on a plan for the canal's 1826 opening ceremony (Barnett 2002: 31). Flooded when the locks were established at the base of Lake Banook, this site occupied a point on the former lakeshore located south of Garshan Road.

Prior to 1844 and up until the early 1900s, a Mi'kmaw community also existed at Second Red Bridge – on the northern side of the Waverley Road causeway across the outlet of Red Bridge Pond (Gill 1815; Anonymous 1913; Martin 1957: 276, 287 & 442; Whitehead 1991: 316). Other historic Mi'kmaw encampments existed at the narrows between Lake Micmac and Lake Banook (Day *ca*. 1870; ***Plate 7;*** Martin 1957: 276, 286, 287, 324, 426 & 493), on the eastern side of Lake Banook (Martin 1957: 276, 287) and in various locations along the Shubenacadie River system to the north of the PWSPSA (Preston 1974).

PLATE 7: ***Ca*. 1870 painting of Mi'kmaw encampments that are believed to have been located at the narrows between Lake Banook (foreground) and Lake Micmac (background) (Day *ca*. 1870). Image provided by the Nova Scotia Museum.**

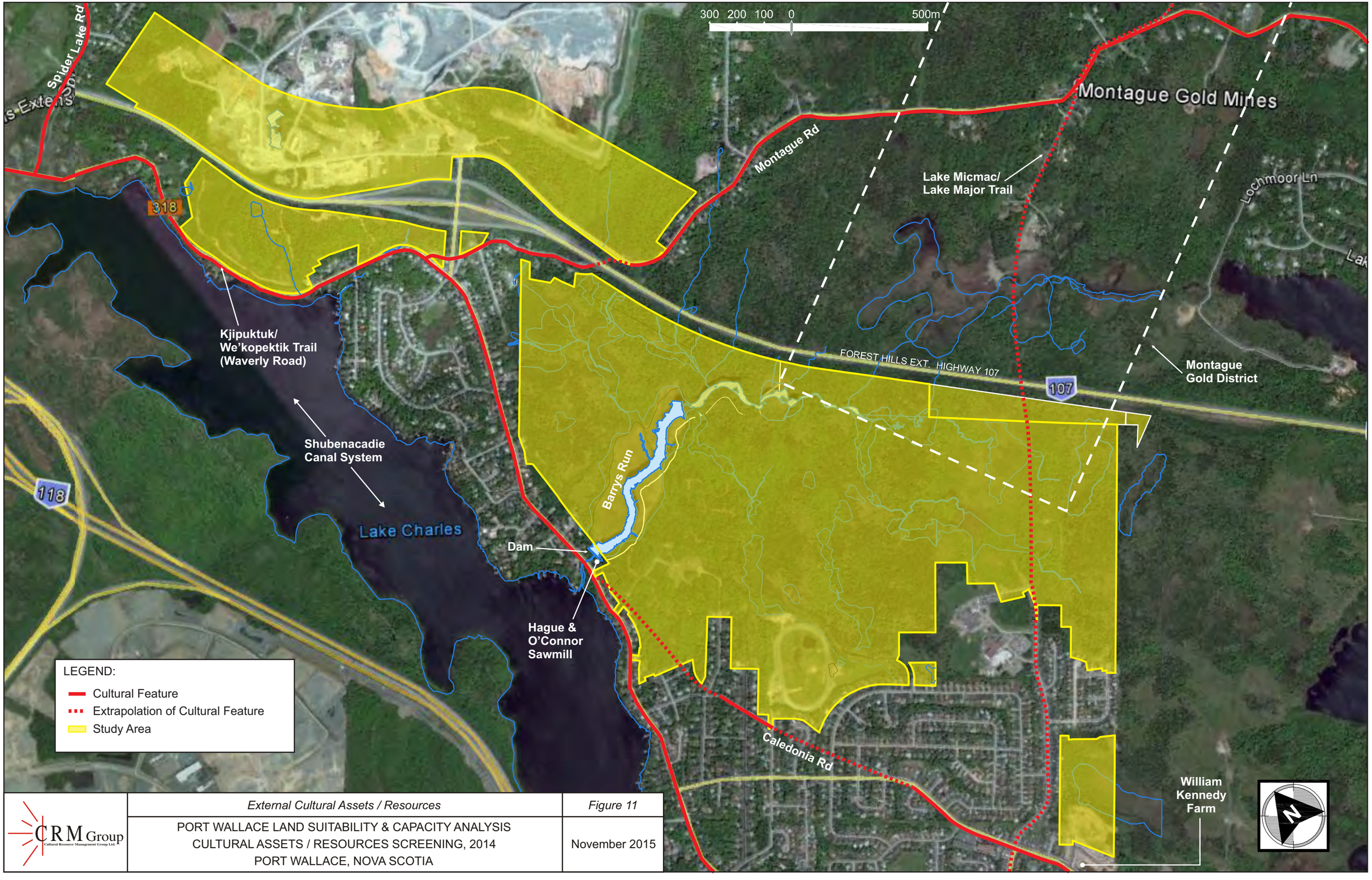
Research has not revealed any account of Precontact or historic Mi'kmaw activity specifically within the PWSPSA (Lewis 2014). However, despite this absence of documentation, it is likely that the area was frequented by Mi'kmaq visitors throughout the Precontact, Contact and early historic periods. Just as the Shubenacadie River System served as an early travel-way between Halifax Harbour and Cobequid Bay, Barrys Run likely served as an early travel-way between Lake Charles and Lake Loon. Its pools and courses may have been valuable fishing locations in the distant past, even more-so than they are today. The bogs and woodlands that once spread all across the entire remainder of the PWSPSA may have been visited often by the Mi'kmaq for the purpose of hunting and/or gathering. While early Mi'kmaw encampments within the PWSPSA are not currently in evidence, they likely existed.

Kjipuktuk/We'kopektik Trail (Precontact Period; Now Waverley Road)
Pedestrian travel back and forth along the Shubenacadie River System during the Precontact period would have been facilitated by the establishment of trails that followed along either side of the waterway. The one on the eastern side of the waterway would have been the precursor to today's Waverley Road (***Figure 11***). As a Precontact footpath, this ancient Kjipuktuk/We'kopektik trail would have allowed cross-province travel to continue even during those times of the year when lake-surface travel (either in canoe or on-foot) was prevented by the presence of thin ice. In its route along on the eastern side of the chain of lakes, the old trail would have crossed Barrys Run within the narrow corridor between Lake Charles and Barrys Run Stillwater – roughly in the same alignment as the present-day Waverly Road crossing (anonymous early 1800s; ***Figure 4***).

As early as the 1680s, the ancient Kjipuktuk/We'kopektik trail (the precursor of Waverley Road) could have served as a means of communication between populations of European settlers, linking Chibouctou – a French fishing station situated at Halifax Harbour (Murdoch 1865: 243; Webster 1934: 134) with Cobequit – a pastoral Acadian community located at the site of present-day Truro (Miller 1873: 7, 14, 282). French communication along this route was noted by the British and was documented in the writings of Paul Mascarene, Chief Engineer for the British at Port Royal, in the early 1720s (Martin 1957: 75).

The British were very aware of this trail when Halifax was founded in 1749. Erection of a guardhouse at its southern end, where the flow from Lake Banook meets Halifax Harbour, preceded the founding of Dartmouth in 1750. Fears of attack were soon realized, for it was via the Shubenacadie River System and this old trail that Mi'kmaw attacks were launched on Dartmouth settlers in 1749 and 1751 (Martin 1957: 38, 59, 83 & 354). These attacks, which were urged by a French missionary, helped to create the British fervor that resulted in the deportation of Acadians from Nova Scotia in 1755.

As the British gained control of the mainland of Nova Scotia, the Shubenacadie River System was recognized, yet again, as an important cross-province transportation and supply route. Consequently, the creation of strategic canals to enable barge navigation was soon being contemplated. When the first survey for a potential Shubenacadie canal project was undertaken by Captain William Owen and company in 1767, the old Kjipuktuk/We'kopektik trail was widened in order to allow portages with a gig and a whaleboat (Russell 1985:3). When Hildreth and Chamberlain conducted a similar survey of the prospective canal route in 1797, three decades later, the trail was probably still quite rugged. It's existence in the vicinity of the PWSPSA was not noted on the plan that they generated for the local area (***Figure 3***). Valentine Gill also neglected to depict the trail in the vicinity of the PWSPSA when he completed the next survey for the canal in 1815 (***Figure 6***).



CRM Group Cultural Resource Management Group Ltd.	*External Cultural Assets / Resources*	*Figure 11*
	PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS CULTURAL ASSETS / RESOURCES SCREENING, 2014 PORT WALLACE, NOVA SCOTIA	November 2015

Waverley Road emerged as a formal road between 1826 and 1828 as upgrades were applied to the original to ready this ancient thoroughfare for use during the first phase of canal construction. Although Hall reported the completion of Waverley Road in 1827, stating that "*By this road, the Lock Stone will be conveyed*." (Martin 1957:149, 442), newspapers issued in October of the following year reported that "*the new road on the line of the Canal is nearly completed and already affords great convenience for travelers. It is perfectly level and shortens the distance between Fletcher's Bridge* [at the present community of Waverley] *and Halifax via the Team Boat by nearly eight miles*" (Martin 1957: 156). Waverley Road, including a dam/bridge at Barry's Run, is depicted on several maps by Hall (Hall 1825; 1825/1829; 1829; 1825/1832; ***Figures 7 & 8***).

Lake Micmac/Lake Major Trail (Suspected Precontact Period)
Another early travel-way that may have crossed the PWSPSA in Precontact times is a suspected footpath between Lake Micmac and Lake Major (***Figure 11***). Examination of modern maps reveals that a singular northeast/southwest alignment is shared by segments of several early roads that lie between these two lakes, including portions of Locks Road, Montebello Drive, Montague Mines Road and, perhaps significantly, Avenue du Portage. The course of this shared alignment suggests that these road segments may have originated as part of a continuous portage trail that linked the two lakes. Specifically, the route would have connected the northeastern cove of Lake Micmac (Port Wallis) with the historic base of Lake Major, east of Duck Pond. Although no historic map has been found illustrating the route as a continuous trail, the connectivity of the route elements becomes evident in comparisons made between detailed historic maps (*e.g.* Church 1865; Faribault 1908; ***Figures 9 & 10***).

Preston Roads (*ca*. 1780s; now Main Street and the Eastbound Segment of Highway 107)
In the 1780s, the community of Preston was established by Loyalists of African-American descent approximately six kilometres east of the PWSPSA. The original Preston Road branched off the Lawrencetown Road (today's Portland Street) and followed the present routes of Woodlawn Road, Mount Edward Road and the eastbound alignment of Highway 107, passing approximately 2.0 kilometres southeast of the PWSPSA. Main Street, which is situated slightly closer to the PWSPSA (about 1.5 kilometres to the southeast), was probably established in the 1790s as an alternate route to Preston. In 1796, Jamaican refugees known as Maroons, were settled near the intersection of these two roads, in the Cherry Brook area (about 2.5 kilometres east of the PWSPSA) (Anonymous *ca*. 1800; Chamberlain 1813; Grant 2002: 41-46; ***Figures 4 & 5***). As many of the Preston Loyalists had done in 1792, these settlers of African-Jamaican descent departed for Sierra Leone in 1800.

Montague Road (pre-1813)
Examination of historic maps suggests that Montague Road was established sometime between 1801 and 1813 to serve as a connector between the united Preston roads southeast of Lake Loon and the Halifax/Cobequid Road at Waverley, where Fletcher's Inn was located at the northern end of Lake William (Hildrith & Chamberlain 1797; Chamberlain 1801; Chamberlain 1813; Hall 1825/1829; ***Figures 4 & 5***). In its approach to Lake Charles, the original alignment of Montague Road included Wilcot Lane (Faribault 1909; ***Figure 10***). The old alignment borders the PWSPSA where it was breached by the creation of the Forest Hills Extension of Highway 107 (***Figure 11***).

Caledonia Road (1815)

Historic maps (*e.g.* Faribault 1908; ***Figure 10***) and the following excerpts from John Martin's history of Dartmouth indicate that Caledonia Road was established in 1815 and that it originally merged with Waverley Road immediately south of Barrys Run. The timing of its establishment coincided with a renewed provision of funding to complete surveys and plans for the Shubenacadie Canal.

> *"Listed among the highway grants of 1815 was an amount of £70 "to assist the inhabitants of Dartmouth township to open a road from Mrs. Floyer's* [Brook House at the intersection between Woodlawn Road and Mount Edward Road] *to Shubenacadie River". This appears to be the first mention of communication being opened from Dartmouth to meet the road from Truro leading to Halifax. The latter, known as "Cobequid Road", turned westerly to cross Fletcher's bridge where now stands Fletcher's Locks"* (Martin 1957: 123)

> "*The promoters of the new highway no doubt included those who owned land along the chain of lakes. For instance, Bartholomew O'Connor was on the present farm of Fred Hoskin. Charles Reeves had a sawmill at Porto Bello. John Kennedy, whose old farm-house still* [1957] *stands on the hilltop, got 300 acres of the Richard Prowse grant in 1810. And the Farquharsons had been in possession of land on Caledonia Road years before.*" (Martin 1957: 124)

> "*Of course, there was* [in 1815] *no village of Waverly as yet, nor any causeway at "Second Red Bridge"* [Red Bridge Pond]. *Hence the "road from Mrs. Floyer's" of 1815 was cut from Woodlawn Church through Caledonia Road past Kennedy's to cross Lake Loon outlet at Barry's Run, or Beaver Dam Run" as it was then known. At Lake William the road went up the hill through the old Findlay (Skerry) farm so that it paralleled Lake Thomas about a mile to the eastward, until it met Cobequid Road beyond Fletcher's. This old trail is still* [1957] *used by trout-fishermen, and huntsmen.*" (Martin 1957: 124)

The origin of the name "Caledonia Road" is uncertain. Waverley, located at its original northern end, was originally called "Germantown" (Withrow 1999: 119) before assuming the name of a cottage built there by Charles P. Allen in 1847 (PANS 1967: 713). If John Kennedy was Scottish, the name "Caledonia" may have been applied specifically to the area of his farm, since "Caledonia" was the Latin name given by Romans to the territory that became Scotland. As one author wrote, "There are many places in the Province with this name [Caledonia] or variations of it, all named by settlers in honor of their Scottish home." (Brown 1922: 26).

Although Caledonia Road originally connected with Waverley Road, its northern end was not maintained as a public road. Use of the northern end of the road probably diminished with the *ca.* 1826 establishment of a causeway that allowed Waverley Road to cross the mouth of Red Bridge Pond. While Caledonia Road is shown still fully connected to Waverley Road on a 1908 map (Faribault 1908; ***Figure 10***), it is shown terminating at the original Kennedy residence on an 1865 map (Church 1865; ***Figure 9***). Use of the northern end of Caledonia Road as a gated woods road that crossed a corner of the PWSPSA at the western end of Webby Ltd. Property PID 00249672 is still recalled by elder Port Wallace residents (Traer 2014).

Residences
Beginning in the early 1800s, residences were established along trails and roads in the Port Wallace area. While several early homes were located in close proximity to the PWSPSA, especially along Waverley Road, the only historic residence that is known to have had elements within the limits of the PWSPSA was a Caledonia Road farm was established by William Kennedy *ca*. 1842 (see Section 4.2.5, Area 2). No historic background was found for a probable cabin foundation encountered during field investigation near Stillwater Drive at the southern edge of Barrys Run Stillwater (see Section 4.2.5, Area 5).

Shubenacadie Canal (1826-1870)
Although engineering of a canal system that would make the Shubenacadie River System fully navigable between Dartmouth and Maitland had been contemplated as early as 1767, the actual construction of the Shubenacadie Canal did not begin until 1826. The monumental building program for the extensive works occurred in two stages. The first stage began in 1826 and ended in 1831 due to insufficient funding. The second stage lasted from 1854 to 1861, with successful passages through locks occurring as early as 1857 and the first successful round trip of the entire canal/inclined plane system occurring in 1861. Ultimately, operation of the system ceased in 1870 due to the presence and relative efficiency of the railway (Russell 1985; Chapman 1994; Barnett 2002; Younger & Billard 2011).

Historic maps indicate that the Shubenacadie Canal System included two reservoirs on the waterway between Lake Loon and Lake Charles (Hall 1825; 1825/1829; *ca.* 1829; *ca*. 1832; Church 1865). Established *ca*. 1826 by the construction of dams in strategic locations, these reservoirs were designed to help regulate the elevation of the water level within Lake Charles, at the summit of the Shubenacadie Canal System. The upper reservoir was located at Lake Loon, about 600 metres east of the PWSPSA. The lower reservoir, known as "Summit Reservoir", was located at Barrys Run Stillwater, almost entirely within the PWSPSA. The Summit Reservoir Dam was a stone-faced earthen structure built at the western end of the Stillwater (Martin 1957: 216, 256). The main part of this structure is still visible just outside of the PWSPSA in the HRM property known as Mitchell's Brook Park and in the back yards of adjacent residences located at 420 and 428 Waverley Road (***Figure 11; Plate 8***). A low extension of this dam is also visible within Area 3 of the PWSPSA, as indicated in Section 4.2.5, Figure 12 and Appendix A of this report.

PLATE 8: **Summit Reservoir Dam, located outside of the PWSPSA in the back yard of 420 Waverley Road. Facing east, toward Barrys Run Stillwater - the former location of the reservoir. August 26, 2014.**

Hague & O'Connor Sawmill (1841)
In 1841, a decade after initial work on the canal system ended, William Hague and John O'Connor took advantage of the existence of Summit Reservoir and established a water-powered sawmill on the grounds of 420 Waverley Road, just outside of the PWSPSA (Church 1865; Martin 1957: 256, 279, 313; ***Figures 9 & 11***). The following excerpt from John Martin's history of Dartmouth confirms that this use of the reservoir outflow to power the mill involved negotiation with the Shubenacadie Canal Company:

"In that year [1841] *William Hague and John O'Connor* erected a sawmill at Lake Loon Run, and obtained a lease of water rights for a term of eight years at the rate of £4 annually. The contract was arranged with Thomas Boggs and Martin G. Black, Directors of the Shubenacadie Canal Company. (This mill stood on the eastern side of Barry's Run Bridge just below the still-waters of Lake Loon. The Canal company had erected a dam there in 1826.)"* (Martin 1957: 256)

Operation of the mill by the O'Connors likely continued at least until the 1860s. The reservoir/mill pond at Barrys Run Stillwater is shown at or near full capacity on an 1865 map of Halifax County (Church 1865; ***Figure 9***). The same map depicts "O'Connor Mill" on the southern bank of Barrys Run, immediately east of Waverly Road. If, indeed, the mill was reliant on the maintenance of Summit Reservoir Dam, built and owned by the Shubenacadie Canal Company, it may have ceased operating *ca*. 1870, when the Shubenacadie Canal Company was forced to abandon the operation of the entire canal system.

Fishing
The following references pertain to gaspereau stocks and fishing on sections of the Shubenacadie River System near the PWSPSA. They are included here to illustrate past value of the gaspereau fishery and its potential to have existed on Barrys Run within the PWSPSA during the Precontact, Contact or early historic periods.

> "*About 10 days ago* [in 1844] *a wolf, attracted by the smell of barrels of salt herring, broke into the small enclosure on which stands the dwelling house of Mr. Reeves on the Canal Road, about seven miles from Dartmouth* [at the northern end of the river segment at Portobello, between Lake Charles and Lake William]." (Martin 1957: 282)

> "*Lake Thomas and Charles are about the centre of the chain, and from them the water runs in both a northerly and southerly direction; that to the north emptying into Grand Lake, which becomes the Shubenacadie River from its outlet, and the southern issue discharging into a small creek at Dartmouth. This year* [1882], *I may mention, the gaspereaux struck up this place, but were stopped by a heavy fall below the "Skate Factory". Were this opened up by a* [fish] *ladder, the residents of Dartmouth, and those about the lakes I have described, could have gaspereaux not only entering these waters from the Bay of Fundy side, but from the Atlantic side as well, and a valuable fishery could be fostered, worth probably, thousands of dollars to the district.*" (Veith 1884: 60)

Forestry
The following quote from historian Mike Parker provides insight into the local importance of logging and milling during the nineteenth century (***Plate 9***).

"*Logging was an integral part of the* [Dartmouth] *economy, and the chain of Dartmouth Lakes provided an excellent route for transporting logs in winter. At one point, logging operations along Highway 18 (Waverley Road) so snarled traffic with brows of logs piled on both sides of the roadway, that stagecoach drivers complained there was no room to pass. The result was an Act passed in 1840, making it illegal for "the piling of all logs, planks, wood, stone, etc. in the ditches or tracks between Scallons in Dartmouth and Fletchers Bridge*." (Parker 1998: 88)

PLATE 9: Transportation of logs on the frozen surface of a Dartmouth lake in the early twentieth century (Parker 1998: 89).

Gold Mining

The community of Montague is believed to be named after Colonel George Montagu, who purchased the former residence of Charles Morris on the shore of Lake Loon in 1847 (PANS 1967: 449). Ben Clarke is credited with discovering gold at Montague in 1860 or 1861 (PANS 1967: 449). If this is accurate, it was one of the earliest discoveries of gold in the province (Bates 1987: 9 & 10). However, others indicate that the date of discovery was 1862 (Parsons *et al*. 2012: 82). The discovery was not reported to the Gold Commissioners Office until April 21, 1863 (Lawson 1893: 240). Mining did not begin in earnest until a stamp mill was erected at the site in 1865 (Parsons *et al*. 2012; 82). Development of the mines occurred during Nova Scotia's first gold rush (early 1860s to early 1870s) and continued until 1940 (Bates 1987: 15) (***Plates 10 & 11***). Ultimately, the Montague Gold District (***Figure 11***) yielded 65,196 troy ounces of gold, making it one of the most productive mining districts in the province, exceeded only by Goldenville, Caribou, Oldham and Waverley (Bates 1987: 33).

PLATE 10: Gold mining at Montague in the early twentieth century (Parker 1998: 89).

PLATE 11: Mining facilities at Montage Gold District in the early twentieth century (Bates 1987: 13).

Comparison between current maps of the PWSPSA and historic maps of the same area (*e.g.* Church 1865; Faribault 1902, 1908; ***Figures 9 & 10***) suggests that the PWSPSA includes only the extreme southwestern end of the Montague Gold District (***Figure 11*****).** This is confirmed by recent overlays of the historic mining area on aerial photographs (*e.g.* Smith & Goodwin 2009).

Forest Fires (1844 & 1860)
As evidenced by the following excerpts from written histories, land within the PWSPSA was impacted by a forest fire in 1844 and, possibly, in 1860.

> *"Another disastrous forest fire broke out near Dartmouth in August [1844]. Along the road for a mile or two beyond Red Bridge, the flames raged with undiminished fury for nearly two days. Near O'Connor's sawmill, it was at its worst. Everything was as dry as tinder, and burst out as the live sparks landed. Swamps were parched, so that wherever an ember fell, up started a sudden blaze. On the second night, the wind went down and a timely shower effectively extinguished the flames."* (Martin 1957: 278-279)

> *"On May 11, 1860, Henry Findlay recorded the effects of a very large forest fire raging in the Dartmouth area. On that day it burned the entire west side of Port Wallace. The next day he sent a man up to Porto Bello to ensure the protection of the works there from the fire. Upon arriving there himself that afternoon, Findlay found the fire burning fearfully close to the inclined plane. For three days the fire consumed his efforts but no damage appears to have befallen the canal works."* (Barnett 2002: 86)

Spider Lake Road (pre-1909)
Historic maps suggest that Spider Lake Road (***Figure 11***) was established sometime between 1865 and 1909 (Church 1865; Faribault 1909; ***Figures 9 & 10***).

4.2 Cultural Assets/Resources within the PWSPSA

The following sections of this report (Sections 4.2.1 to 4.2.6) describe the specific areas of cultural assets/resources concern within the PWSPSA. Discussed according to their nature, these areas of concern are numbered sequentially for ease of reference (Areas 1-13). Also included area are any former designations assigned in earlier drafts of this report (*e.g.* HH3, CH2, etc.).

4.2.1 Cemeteries or Individual Burial Plots
The combined results of background research, public consultation/engagement and field investigation yielded no evidence of human burials within the PWSPSA. The nearest known cemetery is Dartmouth Memorial Gardens, located at 767 Main Street, 2.4 kilometres southeast of the PWSPSA.

4.2.2 Registered/Designated Heritage Features

Area 1: Summit Reservoir (formerly HH10 & CH1)
The Shubenacadie Canal System was declared a National Historic Engineering Site (NHES) in 1984 (http://www.shubenacadiecanal.ca/). As described in Section 4.1 of this report, this canal system included

Summit Reservoir, established *ca*. 1826 at Barrys Run Stillwater, almost entirely within the PWSPSA (***Figure 12***). Although the geography of the canal system was not rigidly defined in the NHES declaration (Hart 2014), it should be considered that the NHES designation extends to Summit Reservoir Dam and the former footprint of Summit Reservoir. The delineation of Summit Reservoir varies on historic maps (*e.g.* Hall 1825; 1825/1829; *ca.* 1829; 1825/1832; Church 1865; ***Figures 7-9***). However, it appears that, when at full capacity, the reservoir would have extended outward to the outer limit of the fringe bog that surrounds Barrys Run Stillwater.

A portion of the Shubenacadie Canal has been designated as a Protected Site under the terms of the Special Places Protection Act. This segment consists of Fletchers Lock, located approximately 11 kilometres northwest of the PWSPSA (http://cch.novascotia.ca/exploring-our-past/special-places/getting-site-designated-protected-site).

Fletchers Lock and at least four other areas along the Shubenacadie Canal constitute Shubenacadie Canal Provincial Park, which is administered by the Shubenacadie Canal Commission. The Provincial Park segment that is nearest to the PWSPSA lies within Shubie Park and extends 50 metres outward from the centreline of the Canal (Hart 2014). This segment is located about a kilometre southwest of the PWSPSA.

There are no registered heritage properties within the PWSPSA. The nearest registered heritage property is a Municipally Registered Property known as Oakwood House, located at 88A Crichton Avenue, 3.4 kilometres southwest of the PWSPSA on the western side of Lake Banook. Inventories consulted include the Directory of Federal Heritage Designations (http://www.pc.gc.ca/apps/dfhd/default_eng.aspx), the Canadian Register of Historic Places (http://www.historicplaces.ca/en/home-accueil.aspx), the Canadian Heritage Rivers registry (http://www.chrs.ca/en/main.php), the Nova Scotia Provincial Registry of Heritage Property (http://cch.novascotia.ca/exploring-our-past/heritage-property) and the Halifax Regional Municipality Heritage Registry (http://www.halifax.ca/Heritage-Properties/index.php).

4.2.3 Undesignated Heritage Features

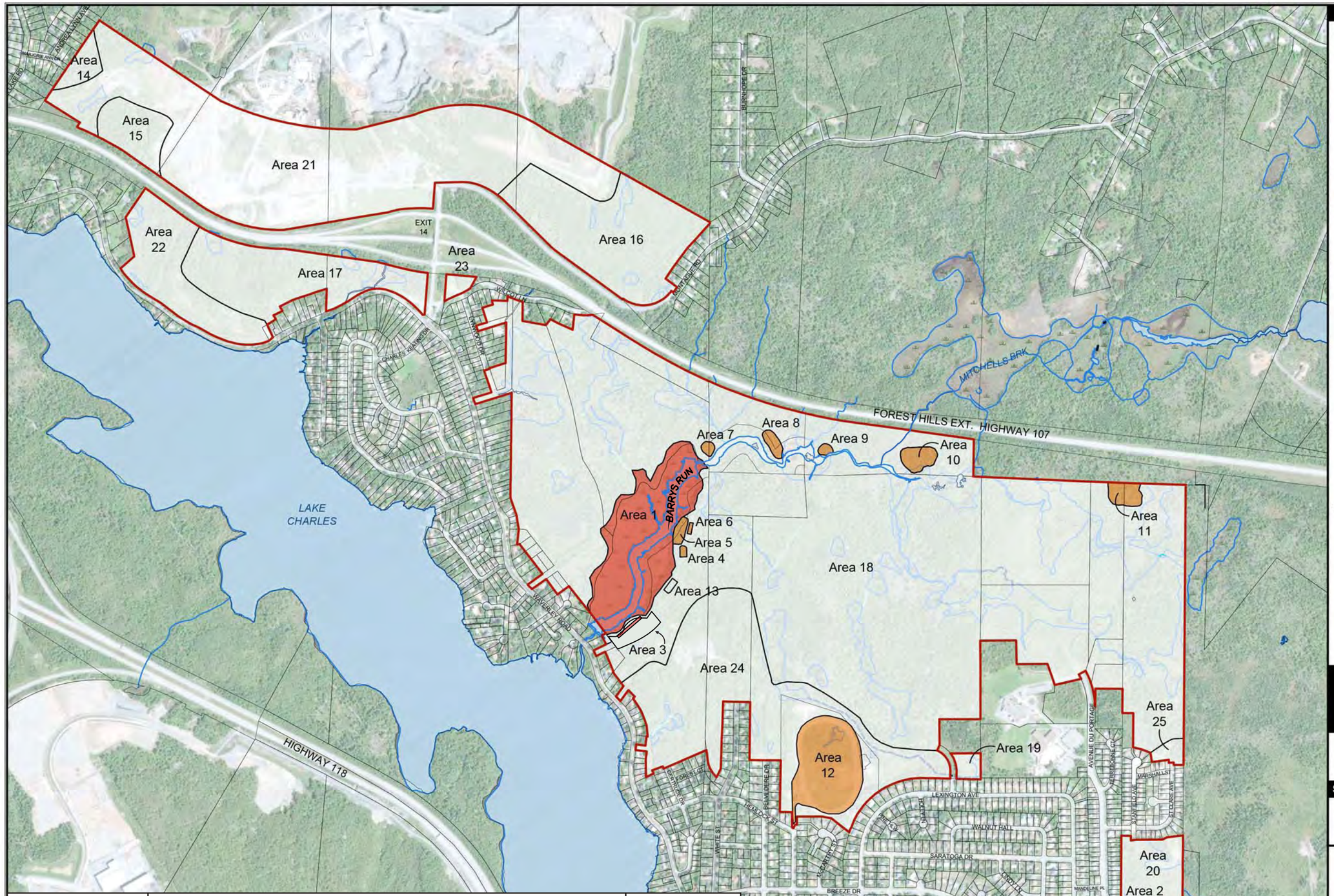
The combined results of background research, public engagement and reconnaissance yielded no evidence of undesignated extant heritage features, such as standing heritage buildings, bridges, wharves, etc.

4.2.4 Archaeological Sites

Prior to the CRM Group investigation for the Port Wallace LS&CA, no portion of the PWSPSA had subjected to archaeological research (Maritime Archaeological Resource Inventory records; Powell 2014). Currently, the registered archaeological sites nearest to the PWSPSA are as follows:

- *Greene Site (BeCv-3)* – the location where Late Archaic Period (*ca*. 6000-3000 BP) side-notched and stemmed projectile points made of flaked stone were found in 1922 in a ploughed field at the intersection of Waverley Road and Spider Lake Road, about 400 metres west of the northern end of the PWSPSA.

- *BeCv-8* – the location where a grooved stone axe possibly dating to the Terminal Archaic Period (*ca*. 3800-3400 BP) was reported to have been found in 1981 on the western bank of the Lake Charles outlet within Shubie Park, about 700 metres southwest of the PWSPSA.



LEGEND

- Study Area Boundary
- Property Boundaries
- Watercourse
- WetlandsWetlands Under 2 Hectares

Score Classification

- Not Constrained (Score 0)
- Minor Constraints (Score 1)
- Marginally Constrained (Score 2)
- Moderately Constrained (Score 3)
- Totally Constrained (Score 4)

NOTES:

- Property lines approximate only. Site subject to survey

SOURCES:

- Cultural Resource Management Group Ltd., Port Wallace Land Suitability and Capacity Analysis, Heritage Potential, September 2014.
- Service Nova Scotia and Municipal Relation Online Property Database
- Nova Scotia Digital Topographic Series
- WSP Wetland and Watercourse Delineation, Port Wallis, August 2014
- GENIVAR Wetland and Watercourse Delineation, Port Wallis, January 2013
- Strum Field Identified Wetlands and Watercourse, June 2008
- Clayton Developments Port Wallace Watercourse Determination Map, September 15, 2014
- NSE Compliance letter (email) received, via Clayton Developments, September 29, 2014.

HERITAGE AND CULTURAL LANDSCAPE

FIGURE 3.6-1
CULTURAL AND HERITAGE LANDSCAPE CONSTRAINTS MAP
DARTMOUTH, NOVA SCOTIA

PORT WALLACE SECONDARY PLANNING STUDY AREA

OCTOBER 26, 2015 B07057-127-R1

SCALE NORTH

200 100 0 100 200 300 m

1 : 12,500

WSP
1 SPECTACLE LAKE DRIVE
DARTMOUTH, NOVA SCOTIA CANADA, B3B 1X7
PHONE: 902 835-9955 - FAX: 902 835-1645 - WWW.WSPGROUP.COM

FILE: K:\DARTMOUTH\2007\B07057_KLD PORT WALLIS\DWG\CONCEPT\B07057-127-R1.DWG Sheet: HERT-CULT

CRM Group Cultural Resource Management Group Ltd.	*Cultural Assets / Resources Constraints*	*Figure 12*
	PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS CULTURAL ASSETS / RESOURCES SCREENING, 2014 PORT WALLACE, NOVA SCOTIA	November 2015

- *Canal Zone 3 Site (BeCv-12)* – a concentration of nineteenth century structural features representing elements of the Shubenacadie Canal extending between Lake Charles and Lake Micmac, about 0.7 to 1.5 kilometres southwest of the PWSPSA. Included among these canal features is *BeCv-24* – a nineteenth century stone foundation located about 1.3 kilometres southwest of the PWSPSA.

- *Morris/Montague Site (BeCv-21)* – the location of eighteenth or nineteenth century residential structures on a hill within the limits of the Montague Estates Subdivision on the eastern side of Lake Loon (between the lake and Montague Road), about 1.2 kilometres southeast of the PWSPSA.

It should be noted that two of the areas of high archaeological potential described below in Section 4.2.5 (Areas 2 & 3) will likely be designated Registered Archaeological Sites by Special Places upon submission of completed Maritime Archaeological Resource Inventory forms. Area 2, which is identified as the William Kennedy Farm Site and dates to *ca*. 1842, is located on Unia Property (PID 41254822) at the southern end of the PWSPSA. Area 3, which includes an extension of the 1826 Summit Reservoir Dam, is located on Whebby Ltd. Property (PID 00249672).

4.2.5 Archaeological potential

Based on the combined results of background research and field investigation, high archaeological potential was ascribed to eight localized zones within the PWSPSA (Areas 2 to 9). Most of these zones consisted of areas of relatively flat, dry ground situated in close proximity to Barrys Run or atop overlooking ridges or plateaus. The only exception was a surviving segment of a mid-nineteenth century farm (Area 2) located east of Poonam Court – an area destined to be registered as an archaeological site.

The areas of high archaeological potential are described individually in the following discussion.

Area 2: William Kennedy Farm Site; *ca*. 1842 (formerly HH9)

A rectangular building pad made of un-mortared fieldstones was identified beside a bog at the base of a hill within Unia Property PID 41254822. Located approximately 170 metres northeast of Poonam Court and 250 metres northeast of Caledonia Road (***Figures 12 & 13; Plate 12***), it measures approximately 6.8 metres long (northwest/southeast), 5.7 metres wide (northest/southwest) and up to 1.0 metres high. Based on its compact structure and dimensions, this pad would have formed a secure, level footing for a medium-sized (22 by 18 foot) outbuilding, such as a shed or small barn. The surface of the pad is largely concealed by vegetation, including trees estimated to be up to 50 years old. The surface of the adjacent hillside, though also wooded at present, appears artificially levelled and probably once functioned as open pasture. Descending this slope approximately 18 metres southeast of the pad is the faint track of a former driveway that appears to end beside the outbuilding.

Background research suggests that the field, the driveway and the outbuilding were all elements of a 140 acre (57 hectare) farm established by William Kennedy *ca*. 1842. The farm is depicted and labeled on detailed historic maps of the area (anonymous 1842; Church 1865; Faribault 1908; ***Figures 9 & 10***) and is visible in a 1931 aerial photograph (A3524-40). According to these documents, the farmhouse was located close to Caledonia Road, in the vicinity of the relatively modern residence that currently exists at civic address 203 Caledonia Road. The 1931 photograph shows associated fields extending northeastward to the

CRM Group Cultural Resource Management Group Ltd.	*Area 2 (William Kennedy Farm Site; Formerly HH9)*	*Figure 13*
	PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS CULTURAL ASSETS / RESOURCES SCREENING, 2014 PORT WALLACE, NOVA SCOTIA	November 2015

bog, across areas that are now being developed along Stanfield Avenue and Poonam Court. In this photo, the field areas closest to the bog appear fallow and largely overgrown with trees. The driveway to the bog-side stone pad is clearly visible, but the photo suggests that the pad was vacant by 1931.

PLATE 12: Stone building pad at Area 2 (William Kennedy Farm Site). Facing northwest. August 7, 2014.

This was not the original Kennedy farm in the Port Wallis area. The original, known as Mount Pleasant, was established by John Kennedy (William's father) in about 1810 (Martin 1957: 124; PANS 1967: 159). It was located about 400 metres west of the William Kennedy farm, outside of the PWSPSA in the residential area that now exists between Casavechia Court and Ancona Place (Gill 1815, Church 1865, Faribault 1908; ***Figures 9 & 10***). Pre-dating the 1814 establishment Caledonia Road, it is believed to have been located, instead, on the Lake Micmac/Lake Major portage trail.

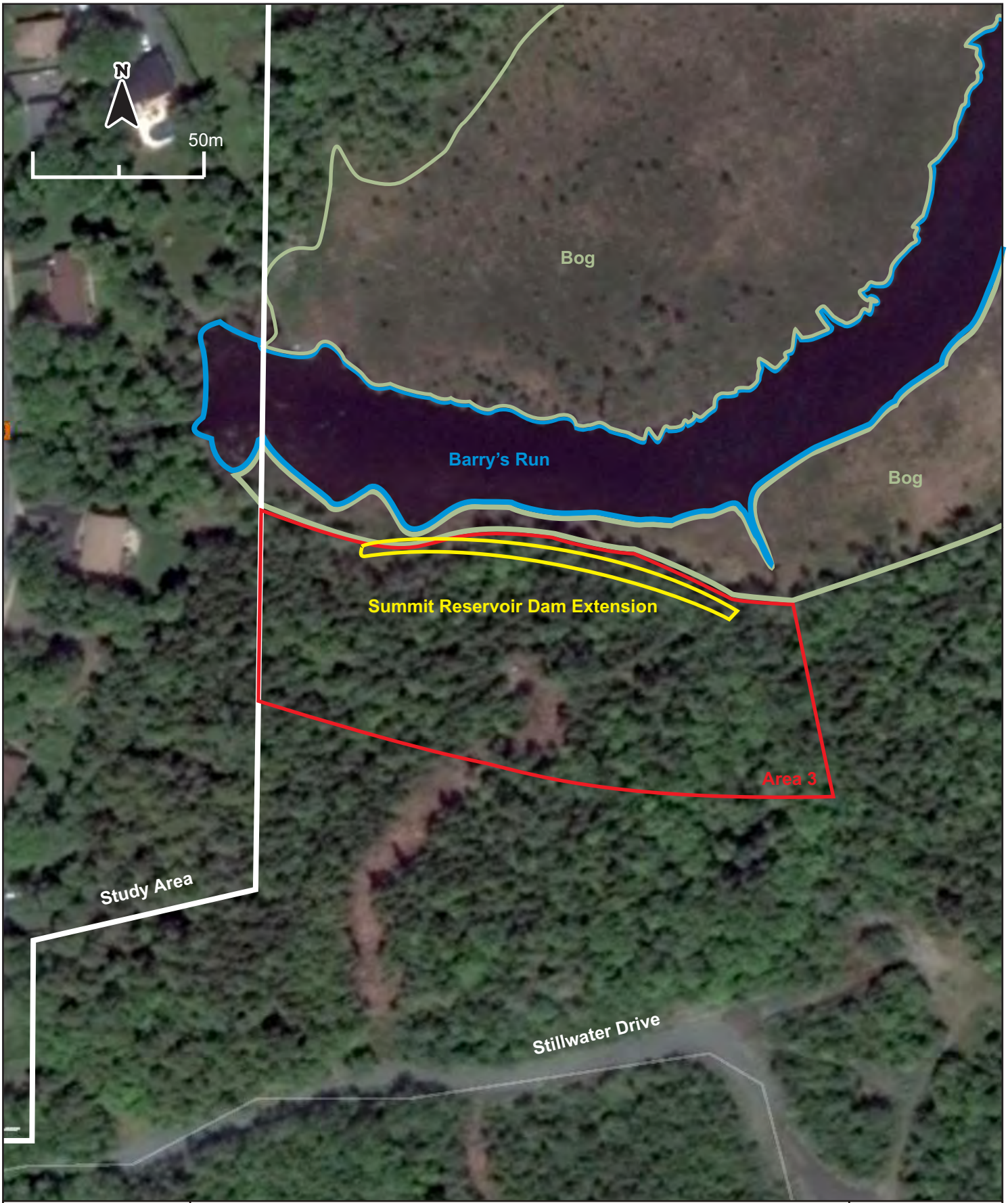
Examination of aerial photographs and field investigation of the neighbourhood suggests that most of the W. Kennedy farm has been fully impacted by recent residential development along Caledonia Road, Stanfield Avenue and Poonam Court. The only surviving portion of the farm is the wooded hillside segment that exists northeast of recent residential ground impacts along Poonam Court, southwest of the bog. This segment, which includes the pasture, building pad and driveway described in this report, lies entirely within the PWSPSA.

Area 3 (formerly HH1)

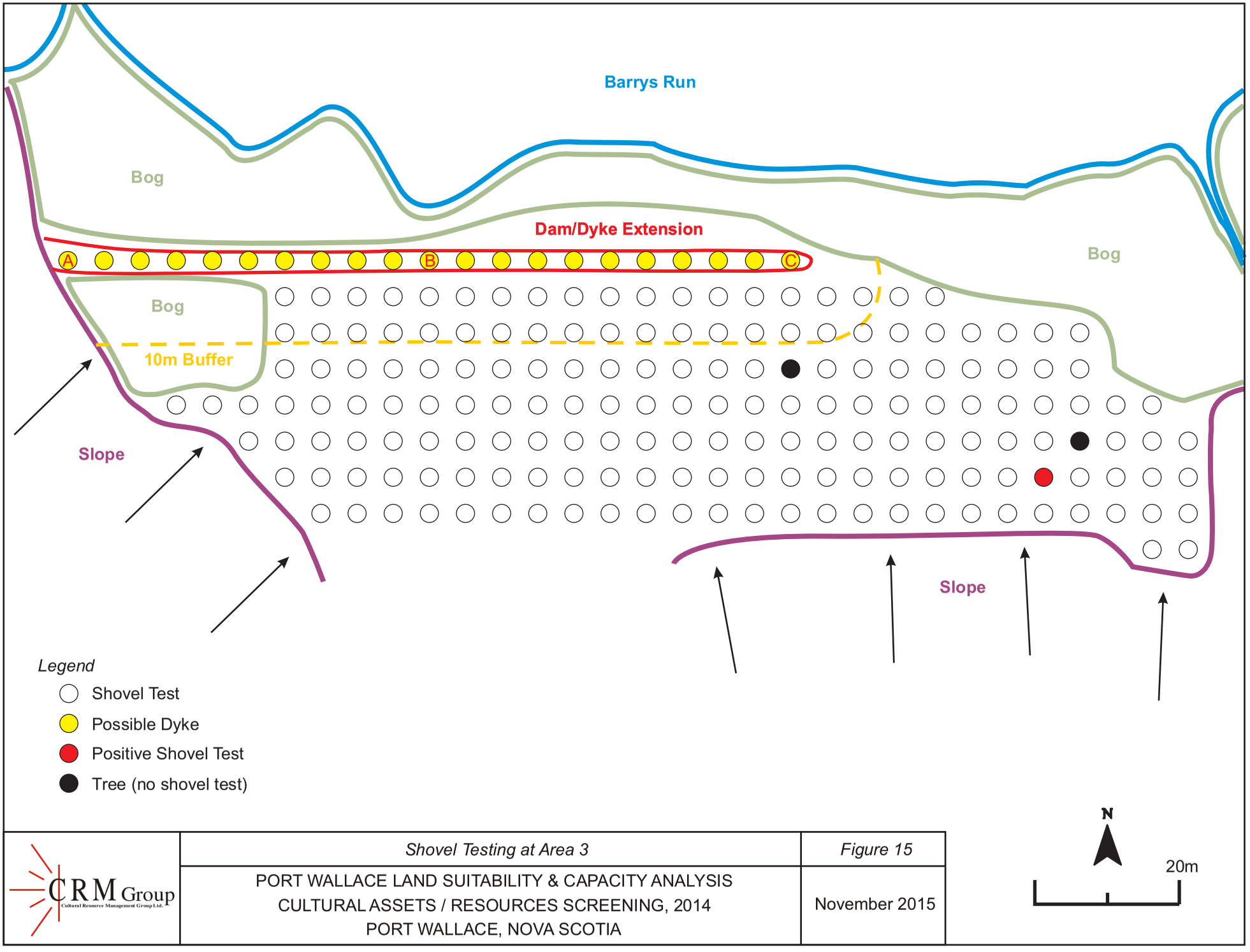
Area 3 is a zone of relatively flat, dry ground located on the southern side of Barrys Run Stillwater at the western edge of the PWSPSA (within Blue Chip Development Property PID 00249672). It is situated just upstream from where Barrys Run narrows in its final descent beneath Waverley Road to Lake Charles (***Figures 12 & 14***). It is also situated just upstream from the former intersection between Caledonia Road and Waverley Road. Partially isolated from the Stillwater by marshy ground, Area 3 extends approximately 70 to 155 metres eastward along the edge of the waterway/wetland and 50 metres southward into wooded terrain. Due to its proximity to Barrys Run, the former Kjipuktuk/We'kopektik Trail (now Waverley Road), Caledonia Road and the Hague/O'Connor Sawmill, the Area 3 was ascribed have high potential to contain Precontact, Contact and/or historic period archaeological resources.

Examination of the ground surface within Area 3 resulted in the documentation of a linear mound of earth and stone located at the southern or "inland" edge of boggy ground south of Barrys Run Stillwater (***Figures 14 & 15***). Its alignment is believed to mark the outer margin of Summit Reservoir - a reservoir that was established *ca*. 1826 as part of the Shubenacadie Canal System and also served as the millpond for the Hague/O'Connor Sawmill. The mound measures approximately 70 metres long, 2.0 metres wide and 0.5 metres high (***Plate 13***) and bounds an area of relatively low wooded terrain situated between 100 and 170 metres east of Waverley Road. Although difficult to discern amid the grassy vegetation at the edge of the bog, this mound is a physical extension of the stone-clad Summit Reservoir Dam that lies just outside of the PWSPSA at the foot of Barrys Run Stillwater (***Plate 8***). As a structural remnant of the Shubenacadie Canal System, it is an element of a National Historic Civil Engineering Site and is destined to become a Registered Archaeological Site.

PLATE 13: Dam extension (centre; foreground to background) within Area 3. Facing west-northwest. August 20, 2014.



CRM Group Cultural Resource Management Group Ltd.	*Area 3 (Formerly HH1)*	*Figure 14*
	PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS CULTURAL ASSETS / RESOURCES SCREENING, 2014 PORT WALLACE, NOVA SCOTIA	November 2015



CRM Group Cultural Resource Management Group Ltd.	*Shovel Testing at Area 3*	*Figure 15*
	PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS CULTURAL ASSETS / RESOURCES SCREENING, 2014 PORT WALLACE, NOVA SCOTIA	November 2015

Due to its perceived level of archaeological potential, and in accordance with recommendations made in an earlier draft of this report, Area 3 was subjected to a program of archaeological assessment in November of 2014. Commissioned by Port Wallace Holdings Limited and undertaken by CRM Group, this study involved additional archival research and a program of systematic shovel testing. Of the 183 shovel tests dug within Area 3, only one yielded cultural material (Green 2015: 23-26; ***Figure 15***). The finds consisted of two sherds of cobalt blue glass - a material still used in the production of bottles and jars. Consequently, while it was recommended that no ground disturbance occur within a 10 metre buffer of the Summit Reservoir Dam extension (***Figure 15***), it was recommended that the remainder of Area 3 be cleared of any requirement for further archaeological investigation (Green 2015: 28).

The Shubenacadie Canal Commission has expressed concern for the preservation of the Summit Reservoir Dam (Hart 2014) and has already alerted the Special Places Program to the need for the protection of a similar dam that exists outside of the PWSPSA at the base of Lake Loon. Concern for the protection of such Canal features has already been instrumental in the routing of the extension of Highway 107.

Area 4 & Area 6 (formerly HH3 & HH5)
Areas 4 and 6 are promontories of relatively high, flat ground located on the upper part of the southern edge of Barrys Run Valley (***Figure 12***). Although they are currently wooded, both, at times of deforestation (*e.g.* after being denuded by a forest fire or a hurricane), would have offered a commanding view upstream and downstream along the length of the stillwater. Areas 4 and 6 are the narrow summits of esker-like ridges (***Plate 14***). Both of these areas of high archaeological potential are 30 metres long and less than 10 metres wide. Both are considered to have high potential to contain Precontact, Contact or historic period archaeological resources.

PLATE 14: Western end of Area 6. Facing northeast. August 24, 2014.

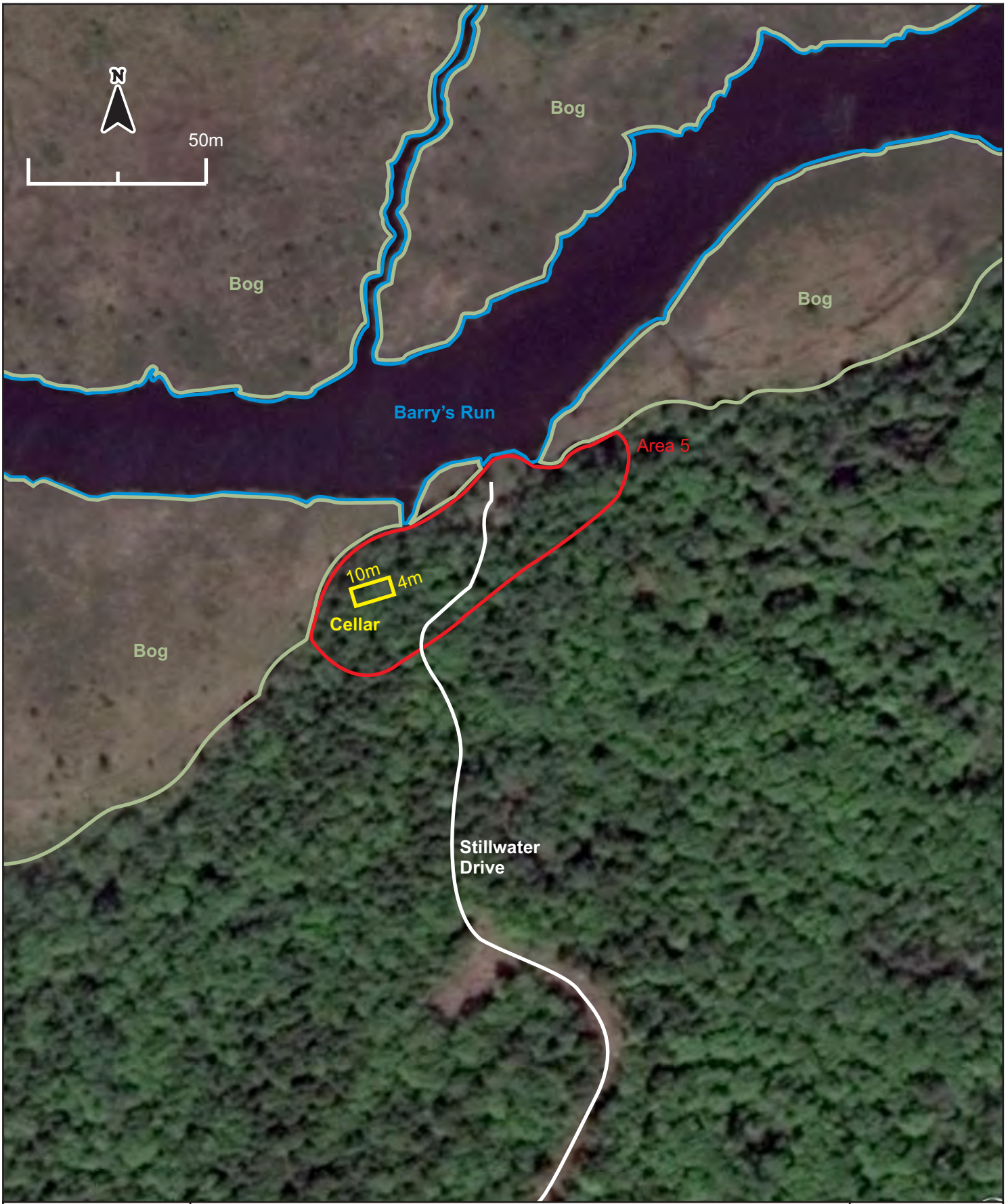
Area 5 (formerly HH4)

Archaeological field investigation on August 24, 2014 encountered a relatively broad area of fairly flat, dry ground located on the southern side of Barrys Run Stillwater at the northeastern end of Stillwater Drive (***Figures 12 & 16***). Partially cleared to serve as a modern campsite (***Plate 15***), this area is situated on the outside of a bend in Barrys Run Stillwater, where gaps in the fringe bog allow canoes to be launched directly from dry ground. Overall, the area measures approximately 100 metres long (east/west) and 30 metres wide (north/south). Due to its position, Area 5 offers extensive views up and down the full length of the Stillwater.

At the southwestern end of Area 5, a small earthen foundation was identified approximately 27 metres west of the northern end of Stillwater Drive (***Figure 16; Plate 16***). Probably representing the former location of a cabin, this feature consists of a relatively low earthen mound that rises approximately 40 centimetres above the surrounding ground surface. Its rectangular outline measures approximately 10 metres east/west by 4 metres north/south. At its southern end, the foundation encloses a relatively small depression (6 metres east/west by 3 metres north/south) that is believed to represent a cold cellar. Both the cellar and the encompassing foundation are obscured by vegetation, including overlying trees estimated to be up to 50 years old. Archival research and consultation with fellow researchers and local residents has yielded no information regarding the age, nature or significance of the represented building.

Area 5 is ascribed high potential to contain Precontact, Contact and/or historic archaeological resources, based on its proximity to the Stillwater and the presence of an undated building foundation.

PLATE 15: Modern campsite at the centre of Area 5. Facing north. August 24, 2014.



CRM Group Cultural Resource Management Group Ltd.	*Area 5 (Formerly HH4)*	*Figure 16*
	PORT WALLACE LAND SUITABILITY & CAPACITY ANALYSIS CULTURAL ASSETS / RESOURCES SCREENING, 2014 PORT WALLACE, NOVA SCOTIA	November 2015

PLATE 16: Possible cabin foundation at the western end of Area 5. Facing west. August 24, 2014.

Areas 7, 8 and 9 (formerly HH6, HH7 & HH8)

Three zones of high archaeological potential were identified along Barrys Run upstream from the Stillwater (***Figure 12***). Named Areas 7, 8 and 9, these zones were areas of relatively flat and dry ground located at the edge of the brook. Each was situated at a place where a set of rapids entered a long pool – at a prime position for intercepting runs of fish such as eels or gaspereau. Consequently, each was considered a likely location for Precontact, Contact or historic period encampments.

Area 7 is located on the northern or right bank of the brook (on the right bank when looking downstream) at the base of Long Pond – the narrow pool that lies just upstream from the Stillwater. Roughly round in plan view, Area 7 measures approximately 40 metres in diameter.

Area 8 is located on the right bank of the brook on the set of rapids that separates Long Pond from Round Pond – the next pool or stillwater up the system. Area 8 measures approximately 100 metres long (north/south) and 40 metres wide (east/west) (***Plates 17 & 18***).

Area 9 straddles the set of rapids where Barrys Run enters the upper end of Round Pond. Bisected by Barrys Run, Area 9 measures approximately 60 metres long (north/south) and 30 metres wide (east/west).

PLATE 17: **Area 8 (background, left) where Barrys Run enters Long Pond. Facing southeast. August 7, 2014.**

PLATE 18: **Ground surface within Area 8. Long Pond is just beyond the trees in the background. Facing west. August 7, 2014.**

Area 13 (formerly HH2)
Area 13 is a promontory of relatively high, flat ground located at on the upper part of the southern edge of Barrys Run Valley (***Figure 12***). The area consists of the outer edge of a broad plateau and measures approximately 50 metres long and 10 metres wide. Although currently wooded, Area 13, at times of deforestation (*e.g.* after being denuded by a forest fire or a hurricane), would have offered a commanding view upstream and downstream along the length of the stillwater. Consequently, the area was ascribed high potential to contain Precontact, Contact or historic period archaeological resources.

Due to its perceived level of archaeological potential, and in accordance with recommendations made in an earlier draft of this report, Area 13 was subjected to a program of subsurface archaeological testing in November of 2014. Commissioned by Port Wallace Holdings Limited, this testing was undertaken by CRM Group. The testing yielded no evidence of cultural resources (Green 2015: 28). As a result, the Special Places Program cleared Area 13 of any requirement for further archaeological investigation. Consequently, Area 13 is no longer considered an area of high archaeological potential.

4.2.6 Cultural Landscape Concerns
HRM's Regional Municipal Planning Strategy indicates that a cultural landscapes are "geographic areas which have been modified, influenced or given special cultural meaning" (HRM 2014: 85). Following the format suggested in the Standards and Guidelines for the Conservation of Historic Places in Canada (Canada's Historic Places 2010: 49-93), information pertaining to specific cultural landscape categories are presented separately in the following paragraphs.

Land Use
The combined results of background research, public consultation/engagement and field investigation yielded no evidence of cultural landscape features of the Land Use category (*e.g.* fields, tree lines, hedgerows, managed wood lots) within the PWSPSA that should be recognized for their heritage value.

Traditional Practices
The combined results of background research, public consultation/engagement and field investigation yielded no evidence of cultural landscape features of the Traditional Practices category (*e.g.* beliefs, wisdom, activities, traditions and skills derived from extended observation of the land, creatures, cycles and spiritual associations, including cemeteries) within the PWSPSA that should be recognized for their heritage value.

Land Patterns
The combined results of background research, public consultation/engagement and field investigation yielded no evidence of cultural landscape features of the Land Patterns category (*e.g.* patterning of the arrangement of the landscape as revealed especially by aerial photographs and maps) within the PWSPSA that should be recognized for their heritage value.

Spatial Organization
The combined results of background research, public consultation/engagement and field investigation yielded no evidence of cultural landscape features of the Spatial Organization category (*e.g.* perimeter stone piles or walls, boundary plantings or engineered street grids) within the PWSPSA that should be recognized for their heritage value.

Visual Relationships
As described in Section 4.2.5, Areas 4 to 9 (***Figure 12***) are considered areas of high archaeological potential based, in part, on the fact that they offer broad views of sections of Barrys Run. If any of these areas is subjected to future archaeological assessment and is found to have significant cultural resources, it might warrant recognition as a cultural landscape feature of the Visual Relationships category, as well as consideration for registration as an archaeological site. The combined results of background research, public consultation/engagement and field investigation yielded no evidence of other cultural landscape features of the Visual Relationships category (*e.g.* particular viewscapes or valued scale relationships between the observer and a landscape feature) within the PWSPSA that should be recognized for their heritage value.

Circulation
The combined results of background research, public consultation/engagement and field investigation yielded no evidence of cultural landscape features of the Circulation category (*e.g.* paths, roads, railways, canals, portages or the maintenance of grades or water levels) within the PWSPSA that should be recognized for their heritage value. Although research suggests that the PWSPSA once included segments of a Lake Micmac/Lake Major trail and Caledonia Road, reconnaissance has revealed that those segments have been lost to forest growth and residential development, respectively.

Ecological Factors
The combined results of background research, public consultation/engagement and field investigation yielded no evidence of cultural landscape features of the Ecological Factors category (*e.g.* natural elements such as marshes, ponds or stands of trees) within the PWSPSA that should be recognized for their heritage value.

Vegetation
The combined results of background research, public consultation/engagement and field investigation yielded no evidence of cultural landscape features of the Vegetation category (*e.g.* sentinel trees, designed groupings, planted crops or plantings for wind/sun control) within the PWSPSA that should be recognized for their heritage value.

Landforms
As described in Section 4.2.5, Area 2 includes vestiges of a historic field, driveway and outbuilding. Recognized as surviving elements of a *ca*. 1842 farm, these cultural resources are the basis for the anticipated registration of Area 2 as an archaeological site known as the William Kennedy Farm Site. Public consultation/engagement is warranted to determine whether they are also character defining elements of a cultural landscape of the Landform Feature category.

Through consultation with Natural Resources Canada personnel (Parsons 2014) and a review of the Nova Scotia Department of Natural Resources Abandoned Mine Openings Database (http://novascotia.ca/NATR/meb/download/dp010.asp), CRM Group archaeologists were able to find and document two separate clusters of exploratory gold mining pits or shafts (Area 10 and Area 11) located within the limits of the former Montague Gold District near the northeastern edge of the PWSPSA (***Figure 12; Plate 6***). These shafts, which tended to be oval in plan-view, ranged from 3 to 7 metres in length, from 1 to 3 metres in width and from 1 to 3 metres in perceptible depth. Several appeared to have been partially

infilled with stone and soil. Some were also flooded with groundwater. Public consultation/engagement is warranted to determine whether either or both clusters are cultural landscape features of the Landform Feature category.

The northwestern cluster (Area 10; formerly CH-2), identified in the Abandoned Mine Openings Database as "g740sh", was located on Pinnacle Properties Limited Property PID 41025321, approximately 130 metres southwest of the centreline of Highway 107 (***Figure 12; Plate 19***). The southeastern cluster (Area 11; formerly CH-3), identified in Natural Resources Canada correspondence as "MON-1-228", was located at the intersection of Nova Scotia Department of Natural Resources Property PID 41294646, Clayton Developments Property PID 40686826 and Unia Property PID 00249482, about 110 metres southwest of the centreline of Highway 107 (***Figure 12; Plate 20***).

The combined results of background research, public consultation/engagement and field investigation yielded no evidence of other cultural landscape features of the Landforms category (*e.g.* hills, valleys, berms & ditches) within the PWSPSA that should be recognized for their heritage value.

PLATE 19: Examination of an exploratory gold mine shaft at Area 10. Facing northeast. September 15, 2014.

PLATE 20: Wooden bracing within an exploratory gold mine shaft at Area 11. Facing southeast. September 15, 2014.

Water Features

The combined results of background research, public engagement and field investigation yielded evidence of a single water feature already formally recognized for its heritage value. The Shubenacadie Canal System was declared a National Historic Engineering Site (NHES) in 1984 (http://www.shubenacadiecanal.ca/). As described in Section 4.1 and Section 4.2.4 of this report, this canal system included Summit Reservoir, established *ca*. 1826 at Barrys Run Stillwater, almost entirely within the PWSPSA. Although the geography of the canal system was not rigidly defined in the NHES declaration (Hart 2014), it is considered that the NHES designation extends to Summit Reservoir Dam and the former footprint of the reservoir that it created. Consequently, CRM Goup has identified the former reservoir (Area 1; formerly CH1) as a cultural landscape feature of the Water Features category (***Figure 12***).

Built Features

As indicated in Section 2.0 of this report, the southern end of the PWSPSA includes the Whebby Racing Stable – a private horse stable and harness racing track located at 56 Lethbridge Avenue (***Plate 2***). This facility was established in 1957 by Eric Whebby. During its peak of operation (between 1965 and the 1980s), the facility managed as many as 32 horses and was one of the most highly regarded stables in Atlantic Canada. Whebby horses included top earners like Andy's Son and Waveore that were the first in the region to pace a mile-long track in less than 2:00 minutes and, subsequently, in less than 1:55 minutes.

In 1999, two years after his death, Eric Whebby was inducted into the Canadian Horse Racing Hall of Fame in recognition of his contributions to the development of the sport. The stable is still active and is currently owned and managed by Eric's son, Wayne Whebby. Since 2009, it has quartered no more than three horses at a time. While this facility has had an illustrious history, the family does not recognize it as a cultural heritage feature (Whebby 2015). However, in accordance with views expressed by HRM cultural planners and members of the local community at the Port Wallace Community Planning Workshop held on June 12, 2014, CRM Group has identified the combined stable/racetrack facility as a built feature that is a potential cultural landscape concern (Area 12; formerly CH4) (***Figure 12***).

The combined results of background research, public engagement and field investigation yielded no other evidence of built features within the PWSPSA that should be formally recognized for their heritage value (*e.g.* buildings, dams, bridges, fences, boundary markers, grave markers).

5.0 SUMMARY AND RECOMMENDATIONS

As a result of the combined background research, public consultation/engagement and field investigation undertaken by CRM Group, it is concluded that the PWSPSA, due to its proximity to the Shubenacadie River System and to suspected Precontact trails and historic roads (***Figure 11***), lies within a broader area that is rich in cultural history and resources. Despite its position in this context, the PWSPSA, itself, sustained very little cultural modification prior to the late twentieth century. The recent modifications consist primarily of quarries established by the Conrad and Whebby families during and since the 1960s. These areas of extensive soil and stone removal (Areas 21 to 26) are devoid of cultural assets/resources and pose no constraint to development from a cultural perspective (***Figure 12; Appendix A***). Most other sections of the PWSPSA are relatively undisturbed by modern development, but exhibit no evidence of cultural assets/resources (Areas 14 to 20). Like the former and active quarries, these areas of low cultural asset/resource potential pose no constraint to development from a cultural perspective (***Figure 12; Appendix A***). Included among these areas is Area 13 – an area initially ascribed high archaeological potential because it is relatively flat and dry and overlooks Barrys Run. However, when subsequent subsurface testing of Area 13 was undertaken in November of 2014, no evidence of archaeological resources was identified. Consequently, Area 13 is no longer considered to represent an area of high archaeological potential or a constraint to development (Green 2015: 28).

A total of 12 areas within the PWSPSA (Areas 1 to 12) contain documented cultural assets/resources or have been ascribed high potential to contain cultural assets/resources.

Area 1 was the former location of Summit Reservoir. Established *ca*. 1826 as an expansion of Barrys Run Stillwater, this reservoir was part of the Shubenacadie Canal System – a system that was declared a National Historic Engineering Site in 1984 (http://www.shubenacadiecanal.ca/). In addition to being part of a National Historic Engineering Site, this former reservoir is a potential cultural landscape feature of the "Water Features" category (***Figure 12; Appendix A***).

Areas 2 to 9 consist of eight areas of high archaeological potential (***Figure 12; Appendix A***). Two of these areas (Areas 2 & 3) have visible archaeological resources and are already destined to become registered archaeological sites.

Area 2 or the William Kennedy Farm Site (***Figures 12 & 13***), represents the surviving remains of a *ca*. 1842 farm. While it is certainly an archaeological resource, this site is also considered a potential cultural landscape feature of the "Landforms" and "Built Features" categories.

The Summit Reservoir Dam, partially included in Area 3 (***Figures 12, 14 & 15***), represents surviving remains of a Shubenacadie Canal System dam established *ca*. 1826 for the creation of Summit Reservoir. While it is certainly an archaeological resource, this structural feature is also considered a potential cultural landscape feature of the "Built Features" category.

Areas 4 to 9 (***Figures 12 & 16***), which lie close to Barrys Run, each exhibit a suite of physical attributes known to have been favourable for Precontact, Contact or historic settlement. While these areas are considered areas of high archaeological potential, they are also considered potential cultural landscape features of the "Visual Relationships" category.

Areas 10 and 11 are two clusters of exploratory gold mine shafts established within the limits of the Montague Gold District sometime between 1860 and 1940 (***Figure 12; Appendix A***). These resources are considered potential cultural landscape features of the "Landforms" category.

Area 12 is the Whebby Racing Stable and its associated harness racing track located at 56 Lethbridge Avenue (***Figure 12; Appendix A***). This facility is considered a potential cultural landscape feature of the "Built Features" category.

Areas 1 to 12 each require further investigation to assess significance and/or determine requirements for mitigation or conservation – information that will be essential in the secondary planning process. It should be noted that the present delineation and scoring of any of these areas could possibly change based on the results of future investigation, and may, ultimately, have little bearing upon the suitability of land for future development. For example, an area of high archaeological potential, once subjected to a program of archaeological assessment consisting of shovel testing, may be cleared of constraints for development if no archaeological resources are found. Conversely, an assessment could reveal archaeological resources of a highly significant nature that might be impossible or impractical to mitigate through further excavation, thus rendering it the equivalent of a score of "4" and "totally constrained". The same might be true of cultural landscape features. Their ranking as obstacles to future land use will depend on their perceived significance in the eye of regulators and the public, as well as their suitability for mitigation.

Based on these conclusions, CRM Group offers the following resource management recommendations.

1. It is recommended that each of the identified areas of high archaeological potential (Area 2 and Areas 4 to 9) (***Figure 12; Appendix A***) undergo archaeological assessment involving a combination of background research and systematic shovel testing to determine their heritage significance and any requirements for protection or mitigation in conjunction with future development. It should be noted that, in previous drafts of this report, this recommendation was also applied to Areas 3 and 13. Those areas were subsequently addressed by archaeological assessment conducted by CRM Group on behalf of Port Wallace Holdings Limited in 2014. The results of that work are cited herein.

2. It is recommended that the two clusters of exploratory gold mine shafts (Area 10 and 11) (***Figure 12; Appendix A***) be researched to determine their age and significance as cultural landscape elements to determine any requirements for protection or mitigation in conjunction with future development. This will require public consultation/engagement during the secondary planning process.

3. It is recommended that further public consultation/engagement be undertaken to determine any requirements for protection or mitigation of the former area of Summit Reservoir (Area 1) - the Shubenacadie Canal reservoir that formerly existed at Barrys Run Stillwater (***Figure 12; Appendix A***). This investigation would include attention to the portion of Summit Reservoir Dam that lies within Area 3 (***Figures 12, 14 & 15; Appendix A***), and would necessarily involve inquiry with the Shubenacadie Canal Commission, the Heritage Property Program of the Nova Scotia Department of Communities, Culture and Heritage and the National Historic Sites and Monuments Board. The former reservoir is believed to have extended outward to the outer

margins of the fringe bog that surrounds Barrys Run Stillwater (***Figure 12***).

4. It is recommended that additional public consultation/engagement be undertaken to further assess the significance of the Whebby Racing Stable (Area 12) as a potential cultural landscape feature, and determine any requirements for protection or mitigation in conjunction with future development.

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APPENDIX A:

Cultural Assets Resources Matrix

Cultural Resource	Research and Engagement ["Data Source" and "Indicator" as referenced in current CRM table]	Outstanding Research	Findings and Resource Profile	Character Defining Elements	Level of Constraint 0 = Not Constrained 1 = Minor Constraints 2 = Marginally Constrained 3 = Moderately Constrained 4 = Totally Constrained	Next Steps	Potential Measures for Mitigation and Inclusion in Design Phase
Area 1: Barrys Run Stillwater/Summit Reservoir (Formerly HH10 & CH1) Registered Historic Site (part of Shubenacadie Canal System National Historic Civil Engineering Site) Water Feature *(Figure 12); CRM Group Report Sections 4.2.2 & 5.0)*	**Data Source:** National Historic Site Registry; Various archival documents; Reconnaissance **Indicator:** Historic Record/Physical Evidence	Consultation is recommended to be undertaken with the Shubenacadie Canal Commission, the Heritage Property Program of the Nova Scotia Department of Communities Culture and Heritage, the Historic Sites and Monuments Board of Canada and representatives of the local community to determine any requirements for mitigation or protection.	Former reservoir within PWSPSA, where natural stillwater was enlarged and deepened by 1826 construction of dam near Waverly Road. Was part of Shubenacadie Canal System (regulated elevation of water level within Lake Charles, at summit of system). Also served as millpond for Hague & O'Connor sawmill from ca. 1841 to 1870s or 1880s. Considered well-preserved, although water level subsided and naturalized long ago, when maintenance of dam ceased. (*CRM Group Report Sections 4.2.2 & 5.0)*	**Standards & Guidelines Category:** Water Features • part of a waterway that includes Barrys Run Stillwater and its surrounding fringe bog • part of the Shubenacadie Canal System National Historic Civil Engineering Site	4 Totally Constrained due to being a component of a National Historic Civil Engineering Site	Consultation is recommended to be undertaken with the Shubenacadie Canal Commission, the Heritage Property Program of the Nova Scotia Department of Communities Culture and Heritage, the Historic Sites and Monuments Board of Canada and representatives of the local community to determine any requirements for mitigation or protection. This investigation should begin before the engagement and design phases of the secondary planning process.	Totally constrained. Recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.
Area 2: William Kennedy Farm Site (Formerly HH9) Area of High Archaeological Potential; Likely to become a registered archaeological site *(Figures 12 & 13; CRM Group Report Sections 4.2.5 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance and any requirements for mitigation or protection. Such requirements are to be decided in consultation with the Special Places Program of the Nova Scotia Department of Communities Culture and Heritage and representatives of the local community.	Includes remains of a historic field, driveway and outbuilding within the PWSPSA associated with a farm established *ca*. 1842 on Caledonia Road. Not associated with the Shubenacadie Canal System. Condition of the surviving remains has yet to be investigated by sub-surface archaeological testing. *CRM Group Report Sections 4.2.5 & 5.0)*	**Standards & Guidelines Categories:** Built Features and Landforms • Presence of built features (building pad & former driveway) • Evidence of land use (levelled ground) • Archival documentation • Possibly within 100 metres of a historic transportation route (Lake Micmac/Lake Major trail)	4 Totally Constrained due to presence of archaeological resources	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance and any requirements for mitigation or protection. The archaeological fieldwork should occur before the engagement and design phases of the secondary planning process.	Totally constrained. Recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.
Area 3 (Formerly HH1) Area of High Archaeological Potential Includes a dyke or dam extension that was part of the Shubenacadie Canal System National Historic Civil	**Data Source:** Various archival documents; Informed interviews; Reconnaissance; Archaeological shovel testing **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	Requirements for mitigation or protection are to be decided in consultation with the Special Places Program of the Nova Scotia Department of Communities Culture and Heritage and representatives of the local community.	Includes a linear mound of earth and stone within the PWSPSA that was an extension of Summit Reservoir Dam - a dam established *ca*. 1826 to make Barrys Run Stillwater a reservoir for the	**Standards & Guidelines Category:** Built Features • Within 100 metres of a waterway (Barrys Run Stillwater/Summit Reservoir)	4 Totally Constrained within a 10 metre buffer of the Summit Reservoir Dam due to the presence of archaeological/ built heritage resources associated with a National Historic Civil	Consultation is recommended to be undertaken with the Shubenacadie Canal Commission, the Heritage Property and Special Places Programs of the Nova Scotia Department of Communities Culture and Heritage, the	Totally Constrained within a 10 metre buffer of the Summit Reservoir Dam in accordance with recommendations in an archaeological report on file with the Special Places Program (Green 2015: 28).

Cultural Resource	Research and Engagement ["Data Source" and "Indicator" as referenced in current CRM table]	Outstanding Research	Findings and Resource Profile	Character Defining Elements	Level of Constraint 0 = Not Constrained 1 = Minor Constraints 2 = Marginally Constrained 3 = Moderately Constrained 4 = Totally Constrained	Next Steps	Potential Measures for Mitigation and Inclusion in Design Phase
Engineering Site; Likely to become a registered archaeological site *(Figures 12, 14 & 15; CRM Group Report Sections 4.2.5 & 5.0)*			Shubenacadie Canal System. The reservoir also served as the millpond for Hague & O'Connor sawmill from *ca*. 1841 to 1870s or 1880s. The dam was rebuilt in 1856, during the second phase of canal construction. (*CRM Group Report Sections 4.2.5 & 5.0)*	• Within 100 metres of historic transportation routes (Waverley road & Caledonia Road) • Within 100 metres of an archaeological site (the Hague/O'Connor Sawmill • Relatively flat • Relatively dry • Presence of built feature (a dam extension that was associated with the Shubenacadie Canal) • Strategic view	Engineering Site.	Historic Sites and Monuments Board of Canada and representatives of the local community to determine any requirements for mitigation or protection. This investigation should begin before the engagement and design phases of the secondary planning process.	Recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.
Area 4 (Formerly HH3) Area of High Archaeological Potential *(Figure 12; CRM Group Report Sections 4.2.5 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance. If cultural resources are found, any requirements for mitigation or protection are to be decided in consultation with the Special Places Program of the Nova Scotia Department of Communities Culture and Heritage and representatives of the local community.	Located within the PWSPSA and within 100 metres of the Summit Reservoir of the Shubenacadie Canal System. (*CRM Group Report Sections 4.2.5 & 5.0)*	**Standards & Guidelines Category:** Visual Relationships (potentially) • Within 100 metres of a waterway (Barrys Run Stillwater/Summit Reservoir) • Elevated topography • Relatively flat • Relatively dry • Strategic view	3 Moderately Constrained due to high potential to contain archaeological resources.	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance and any requirements for mitigation or protection. The archaeological fieldwork should occur before the engagement and design phases of the secondary planning process.	Moderately constrained. If cultural resources are found during archaeological assessment, those resources may require additional site-specific research/archaeological testing to determine whether recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.
Area 5 (Formerly HH4) Area of High Archaeological Potential *(Figures 12 & 16; CRM Group Report Sections 4.2.5 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance. If significant cultural resources are found, any requirements for mitigation or protection are to be decided in consultation	Located within the PWSPSA and within 100 metres of the Summit Reservoir of the Shubenacadie Canal System. (*CRM Group Report Sections 4.2.5 & 5.0)*	**Standards & Guidelines Category:** Visual Relationships (potentially) • Within 100 metres of a waterway (Barrys Run Stillwater/Summit Reservoir) • Relatively flat • Relatively dry • Presence of built	3 Moderately Constrained due to high potential to contain archaeological resources.	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance and any requirements for mitigation or protection. The archaeological fieldwork should occur before the engagement and design	Moderately constrained. If significant cultural resources are found during archaeological assessment, those resources may require additional site-specific research/archaeological testing to determine whether recognition, inclusion, mitigation and/or conservation should occur

Cultural Resource	Research and Engagement ["Data Source" and "Indicator" as referenced in current CRM table]	Outstanding Research	Findings and Resource Profile	Character Defining Elements	Level of Constraint 0 = Not Constrained 1 = Minor Constraints 2 = Marginally Constrained 3 = Moderately Constrained 4 = Totally Constrained	Next Steps	Potential Measures for Mitigation and Inclusion in Design Phase
		with the Special Places Program of the Nova Scotia Department of Communities Culture and Heritage and representatives of the local community.		feature (building foundation of undetermined age) • Strategic view		phases of the secondary planning process.	during the engagement and design phases of the secondary planning process.
Area 6 (Formerly HH5) Area of High Archaeological Potential *(Figure 12; CRM Group Report Sections 4.2.5 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance. If cultural resources are found, any requirements for mitigation or protection are to be decided in consultation with the Special Places Program of the Nova Scotia Department of Communities Culture and Heritage and representatives of the local community.	Located within the PWSPSA and within 100 metres of the Summit Reservoir of the Shubenacadie Canal System. (*CRM Group Report Sections 4.2.5 & 5.0)*	**Standards & Guidelines Categories:** Built Features and Visual Relationships (potentially) • Within 100 metres of a waterway (Barrys Run Stillwater/Summit Reservoir) • Elevated topography • Relatively flat • Relatively dry • Strategic view	3 Moderately Constrained due to high potential to contain archaeological resources.	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance and any requirements for mitigation or protection. The archaeological fieldwork should occur before the engagement and design phases of the secondary planning process.	Moderately constrained. If cultural resources are found during archaeological assessment, those resources may require additional site-specific research/archaeological testing to determine whether recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.
Area 7 (Formerly HH6) Area of High Archaeological Potential *(Figure 12; CRM Group Report Sections 4.2.5 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance. If cultural resources are found, any requirements for mitigation or protection are to be decided in consultation with the Special Places Program of the Nova Scotia Department of Communities Culture and Heritage and representatives of the local community.	Located within the PWSPSA and within 100 metres of the Summit Reservoir of the Shubenacadie Canal System (*CRM Group Report Sections 4.2.5 & 5.0)*	**Standards & Guidelines Category:** Visual Relationships (potentially) • Within 100 metres of a waterway (Barrys Run Stillwater/Summit Reservoir) • Relatively flat • Relatively dry • Strategic view	3 Moderately Constrained due to high potential to contain archaeological resources.	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance and any requirements for mitigation or protection. The archaeological fieldwork should occur before the engagement and design phases of the secondary planning process.	Moderately constrained. If cultural resources are found during archaeological assessment, those resources may require additional site-specific research/archaeological testing to determine whether recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.
Area 8 (Formerly HH7)	**Data Source:** Various archival documents; Informed	Archaeological assessment involving a combination of	Located within the PWSPSA and within 100 metres of	**Standards & Guidelines Category:** Visual Relationships	3 Moderately Constrained	Archaeological assessment involving a combination of	Moderately constrained. If cultural resources are found

Cultural Resource	Research and Engagement ["Data Source" and "Indicator" as referenced in current CRM table]	Outstanding Research	Findings and Resource Profile	Character Defining Elements	Level of Constraint 0 = Not Constrained 1 = Minor Constraints 2 = Marginally Constrained 3 = Moderately Constrained 4 = Totally Constrained	Next Steps	Potential Measures for Mitigation and Inclusion in Design Phase
Area of High Archaeological Potential *(Figure 12; CRM Group Report Sections 4.2.5 & 5.0)*	interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	background research and systematic shovel testing is recommended to determine this site's heritage significance. If cultural resources are found, any requirements for mitigation or protection are to be decided in consultation with the Special Places Program of the Nova Scotia Department of Communities Culture and Heritage and representatives of the local community.	the Summit Reservoir of the Shubenacadie Canal System. (*CRM Group Report Sections 4.2.5 & 5.0)*	(potentially) • Within 100 metres of a waterway (Barrys Run Stillwater/Summit Reservoir) • Relatively flat • Relatively dry • Strategic view	due to high potential to contain archaeological resources.	background research and systematic shovel testing is recommended to determine this site's heritage significance and any requirements for mitigation or protection. The archaeological fieldwork should occur before the engagement and design phases of the secondary planning process.	during archaeological assessment, those resources may require additional site-specific research/archaeological testing to determine whether recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.
Area 9 (Formerly HH8) Area of High Archaeological Potential *(Figure 12; CRM Group Report Sections 4.2.5 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance. If cultural resources are found, any requirements for mitigation or protection are to be decided in consultation with the Special Places Program of the Nova Scotia Department of Communities Culture and Heritage and representatives of the local community.	Located within the PWSPSA and within 100 metres of the Summit Reservoir of the Shubenacadie Canal System. (*CRM Group Report Sections 4.2.5 & 5.0)*	**Standards & Guidelines** **Category:** Visual Relationships (potentially) • Within 100 metres of a waterway (Barrys Run Stillwater/Summit Reservoir) • Relatively flat • Relatively dry • Strategic view	3 Moderately Constrained due to high potential to contain archaeological resources.	Archaeological assessment involving a combination of background research and systematic shovel testing is recommended to determine this site's heritage significance and any requirements for mitigation or protection. The archaeological fieldwork should occur before the engagement and design phases of the secondary planning process.	Moderately constrained. If cultural resources are found during archaeological assessment, those resources may require additional site-specific research/archaeological testing to determine whether recognition, inclusion, mitigation and/or conservation should occur during the engagement and design phases of the secondary planning process.
Area 10 (Formerly CH2) Exploratory Gold Mining Pit g740sh in Abandoned Mine Openings Database	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Physical	Requirements for mitigation or protection are to be decided on the basis of public communication/engagement.	Cluster of exploratory gold mine pits and/or shafts established sometime between 1860 and 1940 within Montague Gold	**Standards & Guidelines** **Category:** Landforms (potentially) • Presence of pits and mounds	3 Moderately Constrained due to potential desire for mitigation or protection.	Public engagement is recommended to determine any requirements for mitigation or protection. This action should occur	Public engagement will decide whether or not these mining features warrant provision of mitigation and/or conservation measures in the

Cultural Resource	Research and Engagement ["Data Source" and "Indicator" as referenced in current CRM table]	Outstanding Research	Findings and Resource Profile	Character Defining Elements	Level of Constraint 0 = Not Constrained 1 = Minor Constraints 2 = Marginally Constrained 3 = Moderately Constrained 4 = Totally Constrained	Next Steps	Potential Measures for Mitigation and Inclusion in Design Phase
Cultural Landscape Feature *(Figure 12; CRM Group Report Sections 4.2.6 & 5.0)*	Evidence/Community Input		District. Located within the PWSPSA. Not associated with the Shubenacadie Canal System. Partially infilled and flooded. (*CRM Group Report Sections 4.2.6 & 5.0)*			during the engagement phase of the secondary planning process and could influence the design phase of the secondary planning process.	design phase of the secondary planning process.
Area 11 (Formerly CH3) Exploratory Gold Mining Pit MON-1-228 in Abandoned Mine Openings Database Cultural Landscape Feature *(Figure 12; CRM Group Report Sections 4.2.6 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Physical Evidence/Community Input	Requirements for mitigation or protection are to be decided on the basis of public communication/engagement.	Cluster of exploratory gold mine pits and/or shafts established sometime between 1860 and 1940 within Montague Gold District. Located within the PWSPSA. Not associated with the Shubenacadie Canal System. Partially infilled and flooded. (*CRM Group Report Sections 4.2.6 & 5.0)*	**Standards & Guidelines Category:** Landforms (potentially) • Presence of pits and mounds	3 Moderately Constrained due to potential desire for mitigation or protection.	Public engagement is recommended to determine any requirements for mitigation or protection. This action should occur during the engagement phase of the secondary planning process and could influence the design phase of the secondary planning process.	Public engagement will decide whether or not these mining features warrant provision of mitigation and/or conservation measures in the design phase of the secondary planning process.
Area 12 (Formerly CH4) Whebby Racing Stable & associated harness racing track 56 Lethbridge Avenue Cultural Landscape Feature *(Figure 12; CRM Group Report Sections 4.2.6 & 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Physical Evidence/Community Input	Requirements for mitigation or protection are to be decided on the basis of public communication/engagement.	Private horse stable and harness racing track established in 1957. Situated in the PWSPSA, but not in association with the Shubenacadie Canal System. Still in operation. (*CRM Group Report Sections 4.2.6 & 5.0)*	**Standards & Guidelines Category:** Built Features (potentially) • Presence of buildings and a racing track	3 Moderately Constrained due to potential desire for mitigation or protection.	Public engagement is recommended to determine any requirements for mitigation or protection. This action should occur during the engagement phase of the secondary planning process and could influence the design phase of the secondary planning process.	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 13 (Formerly HH2) Initially identified as an area of High Archaeological Potential, but cleared of any requirement for further archeological investigation following archaeological assessment involving shovel testing in 2014 *(Figure 12; CRM Group Report*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance; Archaeological shovel testing **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	Located within the PWSPSA and within 100 metres of the Summit Reservoir of the Shubenacadie Canal System. (*CRM Group Report Sections 4.2.5 & 5.0)*	**Standards & Guidelines Category:** None • Within 100 metres of a waterway (Barrys Run Stillwater/Summit Reservoir) • Elevated topography • Relatively flat • Relatively dry • Strategic view	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.

Cultural Resource	Research and Engagement ["Data Source" and "Indicator" as referenced in current CRM table]	Outstanding Research	Findings and Resource Profile	Character Defining Elements	Level of Constraint 0 = Not Constrained 1 = Minor Constraints 2 = Marginally Constrained 3 = Moderately Constrained 4 = Totally Constrained	Next Steps	Potential Measures for Mitigation and Inclusion in Design Phase
Sections 4.2.5 & 5.0)							
Area 14 (Formerly HL1) Area intact, but lacking any indication of cultural resources *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Area intact, but lacking any indication of cultural resources	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 15 (Formerly HL2) Area intact, but lacking any indication of cultural resources *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Area intact, but lacking any indication of cultural resources	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 16 (Formerly HL3) Area intact, but lacking any indication of cultural resources *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Area intact, but lacking any indication of cultural resources	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 17 (Formerly HL4) Area intact, but lacking any indication of cultural resources *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Area intact, but lacking any indication of cultural resources	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 18 (Formerly HL5) Area intact, but lacking any indication of cultural resources *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; **Data Source:** Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Area intact, but lacking any indication of cultural resources	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 19 (Formerly HL6) Area intact, but lacking any indication of cultural resources *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Area intact, but lacking any indication of cultural resources	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.

Cultural Resource	Research and Engagement ["Data Source" and "Indicator" as referenced in current CRM table]	Outstanding Research	Findings and Resource Profile	Character Defining Elements	Level of Constraint 0 = Not Constrained 1 = Minor Constraints 2 = Marginally Constrained 3 = Moderately Constrained 4 = Totally Constrained	Next Steps	Potential Measures for Mitigation and Inclusion in Design Phase
Area 20 (Formerly HL7) Area intact, but lacking any indication of cultural resources *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Area intact, but lacking any indication of cultural resources	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 21 (Formerly HN1) Area of modern ground impact *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Ground impacted to subsoil by modern quarrying activity	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 22 (Formerly HN2) Area of modern ground impact *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Ground impacted to subsoil by modern quarrying activity	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 23 (Formerly HN3) Area of modern ground impact *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Ground impacted to subsoil by modern quarrying activity	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 24 (Formerly HN4) Area of modern ground impact *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Ground impacted to subsoil by modern quarrying activity	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 25 (Formerly HN5) Area of modern ground impact *(Figure 12; CRM Group Report Section 5.0)*	**Data Source:** Various archival documents; Informed interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None Ground impacted to subsoil by modern quarrying activity	0 Not Constrained due to absence of evidence of Cultural Resources	None	Not constrained. No requirement for recognition, inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.
Area 26 (Formerly HN6)	**Data Source:** Various archival documents; Informed	None	(*CRM Group Report Section 5.0)*	**Standards & Guidelines Category:** None	0 Not Constrained due to	None	Not constrained. No requirement for recognition,

Cultural Resource	Research and Engagement ["Data Source" and "Indicator" as referenced in current CRM table]	Outstanding Research	Findings and Resource Profile	Character Defining Elements	Level of Constraint 0 = Not Constrained 1 = Minor Constraints 2 = Marginally Constrained 3 = Moderately Constrained 4 = Totally Constrained	Next Steps	Potential Measures for Mitigation and Inclusion in Design Phase
Area of modern ground impact *(Figure 12; CRM Group Report Section 5.0)*	interviews; Reconnaissance **Indicator:** Historic Record/Environmental Conditions/Physical Evidence/Community Input			Ground impacted to subsoil by modern quarrying activity	absence of evidence of Cultural Resources		inclusion, mitigation and/or conservation in the engagement and design phases of the secondary planning process.

APPENDIX F

Land Suitability Matrix

LAND SUITABILITY MATRIX: METHODOLOGY

The LSA Scoring System definitions considered 'potential for mitigation' as an adjustment variable, which, in the context of the overall Secondary Planning process, permits further investigation (at a later date) that may reduce an assigned constraint score on a particular land feature. Potential for mitigation could involve planning and engineering design alternatives or additional environmental or cultural landscape remediation work.

The **Land Suitability Matrix** – conceptualized by HRM's Land Suitability Analysis Third-Party Reviewer, *AMEC Foster Wheeler Environment & Infrastructure* – was, therefore, developed as a tool to help prioritize which land uses are most suitable for development (or conservation) within the PWSPSA when evaluated against the constraint scores as depicted on **Figure 4.1-1** (or on any of the individual layered constraints maps). The Matrix cross-references 'land use' with 'land suitability': for example, when considering residential development on or near a Forest Area scored 'Totally Cconstrained', the land use (residential development) should not be permitted because it is defined 'Not Suitable'. However, when considering residential development on or near a Forest Area scored 'Moderately Constrained', mitigation efforts may be required in order to preserve ecological function while also supporting residential development.

LAND SUITABILITY	DEFINITION
Primary Function (Green)	means land where the primary function is intended to support development
Highly Suitable (Yellow)	means land suitable for development, where the purpose of the land is to be developed in response to natural and cultural landscape features
Somewhat Suitable (Orange)	means land somewhat suitable for development, where some environmental and cultural conservation or mitigation efforts may be required in order to preserve ecological function and cultural value; additional studies may be required to verify the presence of significant habitats prior to development
Not Suitable (Red)	means land where the primary function is intended to support environmental and cultural conservation efforts. Natural corridor, passive recreation, and some active recreation and infrastructure, such as bridges and roads, may be permitted where they do not undermine the ecological function of the land

LAND SUITABILITY MATRIX

SUITABILITY LEGEND		LAND USES							
	Primary Function	Environmental Protection	Natural Corridor	Passive Recreation	Active Recreation	Residential	Commercial	Institutional	Industrial
	Highly Suitable								
	Somewhat Suitable								
	Not Suitable								
PRIMARY LAND FEATURES / LAYERS	**Forest Areas**								
	Not Constrained								
	Minor Constraints								
	Marginally Constrained								
	Moderately Constrained								
	Totally Constrained								
	Wetlands								
	Not Constrained								
	Minor Constraints								
	Marginally Constrained								
	Moderately Constrained								
	Totally Constrained								
	Watercourses								
	Not Constrained								
	Minor Constraints								
	Marginally Constrained								
	Moderately Constrained								
	Totally Constrained								
	Slopes								
	Not Constrained								
	Minor Constraints								
	Marginally Constrained								
	Moderately Constrained								
	Totally Constrained								
	Contaminated Sites								
	Not Constrained								
	Minor Constraints								
	Marginally Constrained								
	Moderately Constrained								
	Totally Constrained								
	Culture/Heritage Assets								
	Not Constrained								
	Minor Constraints								
	Marginally Constrained								
	Moderately Constrained								
	Totally Constrained								