

**Appendix B –Final Report Environmental Background Study – Little Tracadie River
Bridge No. 2, Route 365, Tracadie, NB – Stantec (September 22, 2017)**



**Environmental Background Study –
Little Tracadie River Bridge No. 2,
Route 365, Tracadie, NB**

SUBMITTED TO:

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September 22, 2017

Stantec Project No. 1054964.006/ 121812745

About this document:

In the fall of 2009, Stantec Consulting Limited (Stantec) was retained by the New Brunswick Department of Transportation (NBDOT; now the Department of Transportation and Infrastructure [NB DTI]) to conduct an Environmental Background Study (EBS) of the Little Tracadie River Bridge No. 2. The EBS included information gathered from a desktop review as well as from field surveys, and was intended to provide information in support of eventual decommissioning and replacement of the Little Tracadie River Bridge No. 2 (the Project) in terms of planning and design, and to support a future environmental impact assessment (EIA) process.

In January 2010, Stantec provided the draft EBS report to NBDOT for review and comment. This report was prepared on data collected in the field by Stantec during site visits conducted on September 1-3, 2009, and information available at the time from the Atlantic Canada Conservation Data Centre, New Brunswick Department of Natural Resources, Maritime Breeding Bird Atlas, Committee on the Status of Endangered Wildlife in Canada, Important Bird Areas in Canada, and the Species at Risk Act database, current at the time.

NBDOT at the time elected not to pursue the Project and the EBS report remained in draft status until the present. NB DTI has requested that this report be finalized as current to 2009 so that it can be used in support of an environmental impact assessment (EIA) registration for the Project. NB DTI provided revision comments to Stantec to finalize EBS report. The present document is the finalized EBS, with data herein current to 2009. No new information has been obtained or added to the EBS, with the exception of the addition of a brief description of an Important Bird Area to the east of the Project site.

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1.0 INTRODUCTION

1.1 BACKGROUND

The New Brunswick Department of Transportation and Infrastructure (NB DTI) plans to replace the existing Little Tracadie River Bridge No. 2 (the Project) crossing Little Tracadie River on Route 365, located in Little Tracadie, near Tracadie, Gloucester County, New Brunswick (Figure 1.1). The existing structure, which was built in 1949, is in poor structural condition and does not meet current Transportation Association of Canada (TAC) standards.

This report provides baseline information to assist in the project planning and design phases, and also to assist in responding to anticipated questions from the Canadian Environmental Assessment Agency, the Department of Fisheries and Oceans (DFO), Transport Canada, Environment Canada (EC), and/or the New Brunswick Department of Environment and Local Government (NBELG), should the Project reach the environmental impact assessment phase.

1.2 PROJECT DESCRIPTION

The existing bridge, Little Tracadie Bridge No. 2, crosses Little Tracadie River on Route 365, in Little Tracadie, New Brunswick, will be decommissioned and removed and a new structure will be constructed (the “Project”).

1.3 OBJECTIVES

The purpose of this Environmental Background Study is to provide baseline information for an environmental impact assessment review under Schedule A of the New Brunswick *Environmental Impact Assessment Regulation 87-83* of the *Clean Environment Act* (item (i)).

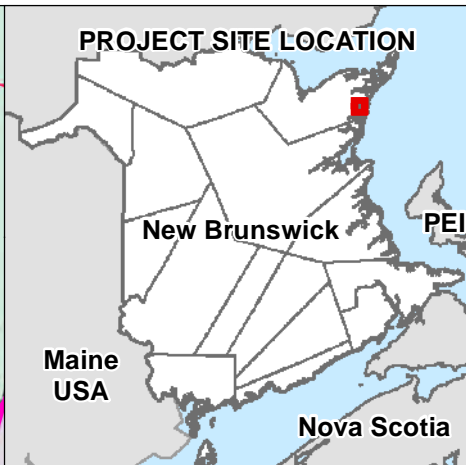
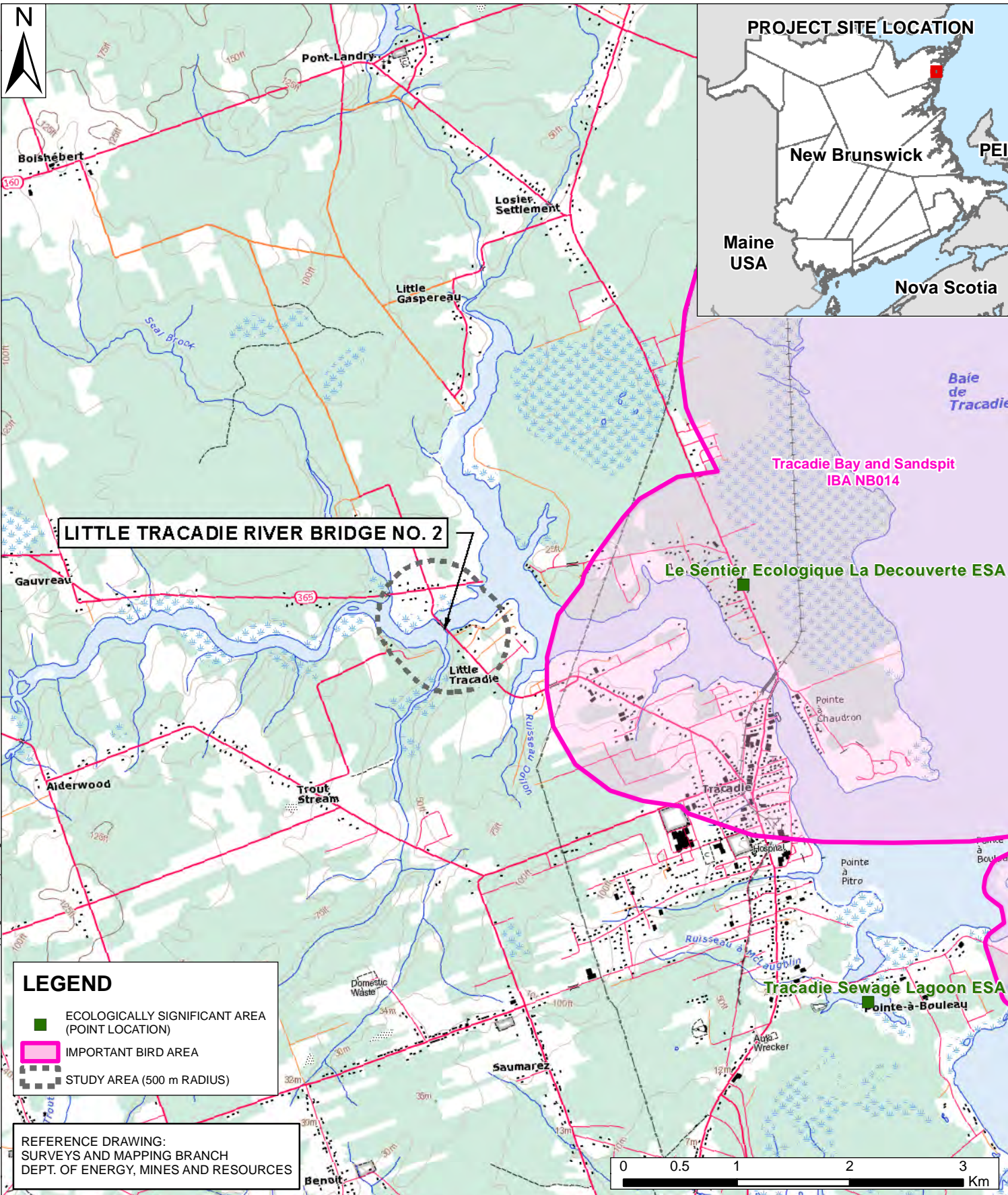
Specific components of the study, as requested by NB DTI, are listed below.

- Details of vegetation and wildlife habitat in the Study Area. The type and amount of any habitat that may be lost due to project activities will be identified (subject to limitations imposed by the lack of proposed design details).
- Details on water bodies and fish habitat in the Study Area. The type and amount of any habitat that may be lost due to project activities will be identified (subject to limitations imposed by the lack of proposed design details).
- Details on fish and wildlife species that use the Study Area throughout the year (subject to limitations caused by timing that is not optimal for the identification of breeding birds).

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- Details on any vulnerable, threatened, or endangered species of vascular plants or animals that utilize the Study Area.
- Location of NBENV-identified Environmentally Significant Areas located within a 5 km radius of the proposed culvert locations.
- Search results from the following database resources: Atlantic Canada Conservation Centre (ACCDC); Important Bird Areas of Canada (IBA); Maritime Breeding Birds Atlas (MBBA); *Species at Risk Act (SARA)*; Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Department of Natural Resources (DNR) General Status of Wildlife; DNR Vascular Plant 2008 Report; DNR Endangered Species.
- Details on any water extraction (e.g., wells) within 500 m radius of the proposed structure location, including search results from the NBENV Water Well database.
- Locations of any residences or businesses in the Study Area.
- Details on any individuals or groups, including First Nations people, who use the Study Area throughout the year.
- Details on any concerns expressed by the public, First Nations, community groups or individuals, including documentation of the methods used to collect such information (e.g., copies of correspondence, and telephone logs).
- Details on anything of physical or cultural importance in the Study Area.
- Details on any structures, sites or things within the Study Area that may be of historical, archaeological, paleontological or architectural significance.
- Details of any recommended site-specific mitigation measures supplementary to those identified in NBDTI's Environmental Management Manual.
- Details of any recommended environmental effects monitoring or environmental compliance monitoring.
- Identification of any wetlands or provincially significant wetlands in or near the Study Area based upon desktop review of relevant mapping (e.g., the DNR Forest Inventory Maps, DNR Wetland Layer, and Depth to Water Table), and ground truthing.
- Delineation of wetland boundaries within 50 m of the proposed project footprint, in accordance with NBENV Wetland Delineation Minimum Requirements Report, Submissions and Field Requirements for Standard Wetland Delineations (Version 1.9, May 2009) (NBENV 2009a).

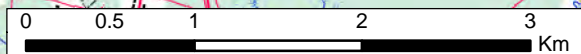


LITTLE TRACADIE RIVER BRIDGE NO. 2

LEGEND

- ECOLOGICALLY SIGNIFICANT AREA (POINT LOCATION)
- IMPORTANT BIRD AREA
- STUDY AREA (500 m RADIUS)

REFERENCE DRAWING:
SURVEYS AND MAPPING BRANCH
DEPT. OF ENERGY, MINES AND RESOURCES



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

<p>SITE LOCATION PLAN ENVIRONMENTAL BACKGROUND STUDY LITTLE TRACADIE RIVER BRIDGE NO. 2 GLOUCESTER COUNTY, NEW BRUNSWICK</p>	Scale: NTS		Job No.: 1054964		Fig. No.: 1.1		
	Date: Jan. 18 2010		Dwn. By: RJS		Appd. By: MS		
	Client: NEW BRUNSWICK DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE						

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This report is presented in 6 major sections as follows:

- Section 1.0 provides a general introduction and background information about the proposed Project and the purpose of this report;
- Section 2.0 describes the methods used for each of the study components;
- Section 3.0 presents the results of the study;
- Section 4.0 describes the potential environmental effects of the proposed Project and recommended mitigation and monitoring measures; and
- Sections 5.0 and 6.0, are the closing and references, respectively.

The appendices included in this report include are intended to provide supplementary data and fulfill licensing requirements incurred during this study.

2.0 METHODS

For Environmental Background Studies associated with a proposed development, and particularly with structures at river crossings, it is common to consider a Study Area boundary that has a radius of up to 500 m around the Project site (Figure 2.1). For such studies, the Study Area is usually represented as a circular boundary (where the structure is small and is effectively a map point) but may be expanded to meet site-specific requirements if the bridge is long, or the river is wide, and a causeway is present. The Study Area boundaries represent the outer limits of the area where Project environmental effects might reasonably be expected to occur. However, it is also appropriate to define Assessment Area boundaries within the overall Study Area.

Assessment Area boundaries are more localized and relevant in the context of the specific project footprint and associated activities, and in addition are tailored to the characteristics and sensitivities of the Valued Environmental Components (VECs) under consideration (Figure 2.1). For example, the Assessment Area for archaeological resources may be limited to areas of ground disturbance plus an appropriate buffer zone within the Study Area; and, the Assessment Area for groundwater resources may vary according to such factors as the proximity of wells, the nature of anticipated project activities and levels of ground vibration, or alterations in the anticipated use of road salt.

In the case of the Little Tracadie River Bridge No. 2, the Study Area is represented by semi-circular areas with a radius of 500 m at either end of the existing structure. The Assessment Area for this Project is defined separately for each Valued Environmental Component in the sub-sections below.

2.1 ELECTRONIC DATABASE SEARCHES

2.1.1 ACCDC Database Search

Prior to field surveys, the Atlantic Canada Conservation Data Centre (ACCDC) was consulted and a search of their database was requested in order to identify any known occurrences of rare species or unusual environmental features within a radius of 5 km from the proposed Project site (ACCDC 2009).

2.1.2 Maritime Breeding Birds Atlas (MBBA)

Prior to field surveys, as part of the ACCDC review, the Maritime Breeding Birds Atlas (MBBA) was consulted to identify avian species that are known to breed within the MBBA grid square around the proposed Project site.

LEGEND

- PROJECT SITE
- ASSESSMENT AREA
- 200 m ASSESSMENT AREA
- STUDY AREA
- PID BOUNDARIES
- WATERBODY (NBDNR)
- ➔ WATER FLOW DIRECTION



DATA SOURCE: NBDNR, SNB
AERIAL PHOTO 2002

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<p>STUDY AREA ENVIRONMENTAL BACKGROUND STUDY LITTLE TRACADIE RIVER BRIDGE NO. 2 GLOUCESTER COUNTY, NEW BRUNSWICK</p>				Scale: NTS	Job No. 1054964	Fig. No. 2.1	
Client: NEW BRUNSWICK DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE				Date: Mar. 30, 2010	Dwn. By: RJS	Appd. By: MS	



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2.1.3 Species at Risk Act (SARA)

The ACCDC review included records for Species at Risk (SAR) that are listed under the *Species at Risk Act (SARA)* that are known to occur in the area within a 5 km radius of the proposed Project site.

2.1.4 Committee on the Status of Endangered Wildlife in Canada (COSEWIC)

Prior to field surveys, as part of the ACCDC review, COSEWIC was consulted to verify any known occurrences of rare species or uncommon species in the area within a 5 km radius of the proposed Project site.

2.1.5 Important Bird Areas of Canada (IBA)

A review of the Important Bird Areas of Canada (IBA) database (ACCDC 2009) was conducted prior to the field survey to identify any known area(s) near the proposed Project that have been identified as containing highly valuable bird habitat.

2.1.6 New Brunswick Department of Natural Resources (NBDNR) General Status of Wildlife

NBDNR General Status Ranks for wildlife (NBDNR 2009) were reviewed after the completion of wildlife surveys and information regarding the general status in New Brunswick is included in the report to indicate the status of each wildlife species observed.

2.1.7 NBDNR Vascular Plant 2008 Report; NBDNR Endangered Species.

During field surveys, the ACCDC data and up to date NBDNR General Status Ranks for plants database (NBDNR 2008) for New Brunswick was downloaded onto a GPS-enabled “NOMAD” unit, in order that they could be consulted in real time by field staff. Any plant(s) found that had an S-rank higher than S3 (Uncommon) was investigated further and documented with a Stantec Rare Plant Form. Specific information about the location, habitat, abundance, and community in which that plant was found was recorded.

2.1.8 Environmentally Sensitive Areas Database Search

Prior to field surveys, NBENV was consulted and a search of the Nature Trust of New Brunswick’s Environmentally Sensitive Areas (ESA) database was requested, in order to identify any known ESAs within a 5 km radius of the proposed Project site (NBENV 2009b). This information was also reported by the ACCDC.

2.2 TERRESTRIAL SURVEYS

2.2.1 Terrestrial Habitat Description

Habitat descriptions and mapping were conducted within an Assessment Area extending 50 m on either side of the road approaching the Project site, and 200 m up and down the road from the Project site (Figure 2.1). Habitat descriptions were generated based on air photo interpretation and forest inventory map data and were confirmed by ground truthing, which was conducted by Mr. Gart Bishop, B.Sc., and Mr. Virgil Grecian, M.Sc., in the field on September 2 and 3, 2009. During the site visit, typical examples of each habitat type in the Assessment Area were described based on the dominant species of tree, shrub and ground vegetation species. Trees were defined as woody plants having a diameter at breast height (DBH) greater than 5 cm. Shrubs were defined as woody plants having a DBH less than 5 cm. Ground vegetation was defined as all non-woody plants.

2.2.2 Wetlands

The Assessment Area extending 50 m on either side of the road approaching the Project site, and 200 m up and down the road from the Project site (Figure 2.1) was evaluated on September 2 and 3, 2009, by Mr. Gart Bishop, B.Sc. (Provincially Recognized Wetland Delineator) and Mr. Virgil Grecian M.Sc., who compiled an inventory list of plants and wildlife that were encountered. Specific attention was given to habitats with the potential to harbour rare species, such as wetlands and mature forest. Wetlands were delineated within the Assessment Area using the NBENV Wetland Delineation Minimum Requirements Report, Submissions and Field Requirements for Standard Wetland Delineations (NBENV 2009a) document. As such, boundaries for wetlands within the Assessment Area were established on the basis of having hydrological, soil, and botanical indicators. Upland and wetland paired data points were recorded for each wetland type occurring in the Assessment Area. Wetland boundaries and test pit locations were not flagged on private property. The boundaries of wetlands were recorded with high precision GPS (Trimble Nomad data recorder with SX-Blue differential GPS receiver with an accuracy of ± 2 m).

2.2.3 Vegetation Surveys

Vegetation surveys were conducted on September 2 and 3, 2009, by Mr. Gart Bishop, B.Sc., focusing on an Assessment Area extending 50 m on either side of the road, and 200 m up and down the road from the Project site (Figure 2.1). A vascular plant inventory was compiled for the Assessment Area (Appendix C). All vascular plants observed in the Assessment Area were identified and their population status in New Brunswick was determined through a review of Hinds (2000), the New Brunswick *Endangered Species Act* (NB ESA), the General Status of Wildlife in New Brunswick (NBDNR 2009), and the ACCDC database (ACCDC 2009). Lists of

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nationally rare species found in New Brunswick are derived from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2009) and the federal *Species at Risk Act (SARA)*.

2.2.4 Wildlife Surveys

Wildlife surveys were conducted within an Assessment Area extending 50 m on either side of the road and 200 m up and down the road from the Project site (Figure 2.1) on September 2 and 3, 2009, by Mr. Virgil Grecian, M.Sc. All animal species noted in the Assessment Area were recorded (Appendix D). Mammals were identified on the basis of visual sightings, vocalizations, tracks, feces, distinctive dens or feeding activities, and skeletal remains. Because of their secretive nature, it is difficult to collect data on relative abundance for mammals.

All species of reptile and amphibian (herpetofauna) observed in the Assessment Area were also recorded. Habitats which provide food and cover for herpetofauna were searched. The habitats in which each species was found were recorded.

All species of birds observed or heard within the Assessment Area were recorded and evidence of breeding activity was gathered using the same techniques used in the Maritime Breeding Bird Atlas (MBBA) of the Maritimes Provinces program (Erskine 1992). The field survey was conducted outside of the accepted migratory breeding bird season, and is representative only of the birds which were present in the area during the time of survey.

A list of the birds reported to breed within the 10 km Atlas square (Erskine 1992) containing the Little Tracadie River Bridge No. 2 Study Area is provided in Appendix A (ACCDC 2009).

Listings of provincially rare wildlife species were derived from the New Brunswick *Endangered Species Act (NB ESA)*, the General Status of Wildlife in New Brunswick (NBDNR 2009), the ACCDC database (ACCDC 2009) and any species observed during wildlife surveys. Nationally rare species were derived from (COSEWIC 2009) and *SARA*.

2.3 AQUATIC SURVEYS

On September 1, 2009, a fish habitat assessment and presence/absence fish survey was conducted by Ms. Julianne Sullivan, M.Sc., and Mr. Matt Steeves, B.Sc., on Little Tracadie River in the area of the proposed Project. Detailed habitat surveys were completed for the reach extending 200 m upstream and downstream (the aquatic Assessment Area) of the existing watercourse crossing. A walk-over of the watercourse reach between the Assessment Area boundary (200 m upstream and downstream) and the Study Area boundary extending to 500 m upstream and downstream of the Little Tracadie River Bridge No. 2 was also conducted to confirm general habitat type and lack of barriers to fish passage within the Study Area.

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The detailed fish habitat assessment was conducted using a modified NBDNR/DFO River Survey Assessment Form (Hooper *et al.* 1995). Surface water chemistry parameters were also recorded (dissolved oxygen, pH, specific conductivity, and temperature) using a YSI Model 556 multimeter.

All fish captured during the survey were identified to species and released unharmed. Fishing was conducted under DFO Scientific License (Gulf Region SG-NBT-09-173A, see Appendix F).

2.4 WATER EXTRACTION, BUSINESSES AND RESIDENCES

Data requests were made to the NBENV Water Well Database for any available information regarding the well construction details and corresponding chemistry data for wells located within the Study Area.

Businesses and residences within the Study Area (500 m radius of the Little Tracadie River Bridge No. 2) were identified during the site visit. Selected residents (*i.e.*, those who were home at the time of the field visit) are asked to complete a Well Water Questionnaire and some residences are asked to volunteer a water sample. Any general comments that these residents made in relation to the proposed structure replacement work were recorded on the Well Water Questionnaire (Appendix H). In many cases, however, residents were not at home at the time of the site visit, and it is not always possible to obtain a complete Well Water Questionnaire.

2.5 PUBLIC AND ABORIGINAL INTERESTS

Interviews with local residents were conducted at the time of the well water survey (September 1, 2009) in order to identify groups or individuals using the Study Area, and the nature of any such uses that are reported.

Letters were sent via registered mail to nearby First Nations Band offices, on September 11, 2009. Follow up phone calls were made on September 29 and 30, 2009, to solicit information on any current use of the Study Area for traditional purposes by Aboriginal people (Appendix I).

2.6 PHYSICAL AND CULTURAL RESOURCES

2.6.1 Archaeological and Heritage Resources

A search of the provincial archives was conducted to gather background information for the proposed Project location and the surrounding region. Historical and current aerial photographs, historical documentation and mapping, and consultation with the Archaeology Services of the New Brunswick Department of Culture and Sport all informed this process.

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A site visit and pedestrian survey were completed within the Assessment Area extending 50 m on either side of the road, and 200 m up and down the road from the Project site (Figure 2.1) on September 9, 2009. This site reconnaissance was carried out by Stantec Archaeologists, Ms. Courtney Cameron, M.A., and Mr. Greg Buchanan, M.Sc., to verify the results of the desktop survey for the proposed Project site, and to assess the current condition and archaeological potential of the Assessment Area where ground disturbing activities associated with the replacement of the Little Tracadie River Bridge No. 2 are anticipated to occur (Appendix G).

2.6.2 Paleontological Resources

A review of provincial bedrock geology maps (NBDNR 2009) was conducted. Where bedrock is of an igneous, volcanic or metamorphic nature, it is assumed that paleontological resources will not be present. Where bedrock is sedimentary in nature Dr. Randall Miller of the New Brunswick Museum is consulted to determine the Paleontological significance of the proposed Project area.

3.0 RESULTS

3.1 ACCDC DATABASE SEARCH

The search of the ACCDC database identified thirty-four rare or uncommon vertebrate faunal species (33 birds and 1 mammal) and five rare or uncommon vascular plant species as occurring within 5 km of the proposed Project site (Table 3.1, Appendix A).

The ACCDC database search identified two environmentally sensitive areas: Le Sentier Ecologique la Decouverte ESA, and the Tracadie Sewage Lagoon ESA, within 5 km of the Study Area. No managed areas of special consideration were noted within the 5 km radius. These areas are discussed further in Section 3.2, below.

Table 3.1 Rare and Uncommon Fauna and Flora Within 5 km of the Proposed Project Site

Major Taxa Group*	Scientific Name	Common Name	COSEWIC/SARA**	Provincial	SRank***
B	<i>Charadrius melodus melodus</i>	Piping Plover	E	Endangered	S2B
B	<i>Haliaeetus leucocephalus</i>	Bald Eagle	NAR	Regionally Endangered	S3B
B	<i>Chaetura pelagica</i>	Chimney Swift	T	At Risk	S2S3B
B	<i>Wilsonia canadensis</i>	Canada Warbler	T	At Risk	S4B
B	<i>Chordeiles minor</i>	Common Nighthawk	T	At Risk	S4B
B	<i>Contopus cooperi</i>	Olive-sided Flycatcher	T	At Risk	S5B
B	<i>Aythya marila</i>	Greater Scaup		May Be At Risk, Sensitive	S1B, S2N
B	<i>Phalaropus tricolor</i>	Wilson's Phalarope		Sensitive	S1S2B
B	<i>Pooecetes gramineus</i>	Vesper Sparrow		May Be At Risk	S2B
B	<i>Sterna paradisaea</i>	Arctic Tern		Sensitive	S2B
B	<i>Anas strepera</i>	Gadwall		Secure	S2B
B	<i>Anas clypeata</i>	Northern Shoveler		Secure	S2B
B	<i>Nycticorax nycticorax</i>	Black-crowned Night-heron		Sensitive	S2B
B	<i>Butorides virescens</i>	Green Heron		Sensitive	S2B
B	<i>Larus ridibundus</i>	Black-headed Gull		Sensitive, Sensitive	S2M, S1N
B	<i>Tringa solitaria</i>	Solitary Sandpiper		Secure, Secure	S2B, S5M
B	<i>Tringa semipalmata</i>	Willet		Sensitive	S2S3B
B	<i>Sialia sialis</i>	Eastern Bluebird	NAR	Sensitive	S3B
B	<i>Sterna hirundo</i>	Common Tern	NAR	Sensitive	S3B
B	<i>Ammodramus nelsoni</i>	Nelson's Sharp-tailed Sparrow	NAR	Secure	S3B

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Table 3.1 Rare and Uncommon Fauna and Flora Within 5 km of the Proposed Project Site

Major Taxa Group*	Scientific Name	Common Name	COSEWIC/SARA**	Provincial	SRank***
B	<i>Pinicola enucleator</i>	Pine Grosbeak		Sensitive	S3B
B	<i>Mimus polyglottos</i>	Northern Mockingbird		Sensitive	S3B
B	<i>Hirundo rustica</i>	Barn Swallow		Sensitive	S3B
B	<i>Riparia riparia</i>	Bank Swallow		Sensitive	S3B
B	<i>Eremophila alpestris</i>	Horned Lark		May Be At Risk	S3B
B	<i>Rallus limicola</i>	Virginia Rail		Sensitive	S3B
B	<i>Anas americana</i>	American Wigeon		Secure	S3B
B	<i>Anas acuta</i>	Northern Pintail		Sensitive	S3B
B	<i>Phalaropus lobatus</i>	Red-necked Phalarope		Sensitive	S3M
B	<i>Melanitta nigra</i>	Black Scoter		Sensitive, Sensitive	S3M, S2S3N
B	<i>Bucephala albeola</i>	Bufflehead		Sensitive	S3N
B	<i>Dolichonyx oryzivorus</i>	Bobolink		Sensitive	S3S4B
B	<i>Mergus serrator</i>	Red-breasted Merganser		Secure, Secure, Secure	S3S4B, S4S5M, S4
M	<i>Odobenus rosmarus rosmarus</i>	Atlantic Walrus -NW Atlantic pop.	SC		SX
P	<i>Symphyotrichum laurentianum</i>	Gulf of St. Lawrence Aster	T	At Risk, ESA - Endangered	S1
P	<i>Salix pedicellaris</i>	Bog Willow		Secure	S3
P	<i>Salix myricoides</i>	Blue-Leaved Willow		Secure	S3
P	<i>Rubus chamaemorus</i>	Cloudberry		Secure	S3
P	<i>Polygonum raii</i>	Pondshore Knotweed		Undetermined	SX

Notes:

* B = Birds; F = Fish; IN = Invertebrates; M = Mammals; P = Plants

** COSEWIC Status: EX = Extinct; XT = Extirpated; E = Endangered; T = Threatened; SC = Special Concern; NAR = Not at Risk; DD = Data Deficient.

*** Source: ACCDC 2009, See Appendix C for details on SRank classification.

The species listed in Table 3.1 may or may not be present in any part of the Study Area. Therefore, the following sections describe the potential for species listed in Table 3.1 to be present in the Study Area: Section 3.3.2 – Vegetation Survey; Section 3.3.4 – Wildlife Survey; and Section 3.4.2 – Aquatic Survey.

Approximately 1 km east of Little Tracadie River Bridge No. 2 is the Tracadie Bay and Sandspit Important Bird Area (IBA NB014; IBA Canada 2017). This IBA consists of 8 km of barrier beach, wash-over and sand dunes that encloses Tracadie Bay and is fed by the mouth of the Little Tracadie River. Tracadie Bay and Sandspit IBA is known to support 2.8% of the Atlantic Canada Piping Plover (*Charadrius melodus melodus*) population (listed under SARA and NB ESA as special concern), as well acting as a staging area for waterfowl and shorebirds such as

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Canada Goose and Barrow's Goldeneye, and Semipalmated Sandpipers, Semipalmated Plovers, Ruddy Turnstones and White-Rumped Sandpipers. Atlantic Brant have also historically used the Tracadie Bay Sandspit IBA in small numbers during their spring and fall migration (IBA Canada 2017).

The Bald Eagle (*Haliaeetus leucocephalus*), is listed as endangered or regionally endangered under SARA and/or the New Brunswick ESA. Piping Plover nest on sand/pebble beaches in the upper reaches where beach transitions to marram and other beach grasses. This species nests in New Brunswick along the sandy coastline of the Northumberland Strait on isolated beaches or barrier islands. There was no suitable habitat within the Study Area, and no Piping Plover were observed during terrestrial surveys. Tracadie Beach and the associated barrier islands are a known location of Piping Plover breeding, located approximately 3.5 km to the east of the proposed Project Site.

Bald Eagles nest in conspicuous stick nests, usually at or near the tops of large trees, such as white pines. No such nests were observed during the field visit, including a few large trees in the southeastern portion of the Study Area. There was an immature Bald Eagle observed during the terrestrial survey, however breeding season had concluded and this immature could have been passing through. It was unclear from the observation whether the individual observed was a multi-year juvenile (pre-adult) or young of the year. Bald Eagles generally disperse away from the nest site after the young fledge and will keep large home ranges until migrating in the fall. Therefore, there is no reason to be concerned about the potential presence of nesting Bald Eagles in the Study Area.

3.2 ENVIRONMENTALLY SENSITIVE AREAS DATABASE SEARCH

The search of the ESA database yielded two ESAs within 5 km of the proposed Project site: Le Sentier Ecologique la Decouverte ESA (ESA191), and the Tracadie Sewage Lagoon ESA (ESA203) (ACCDC 2009, Appendix A).

The Le Sentier Ecologique la Decouverte ESA (ESA191) is located on the east side of Highway 11, just north of the Tracadie Town Limits, at the "Centre Developpement de L'enfant." This is a narrow strip of land extending to the Bay approximately 2.9 km east of the proposed Project site on the southern tip of Pointe-à-Chaudron (Figure 1.1).

The mixed coastal forest and partially treed coastal bog is very characteristic of this coastal region. No rare plants or animals have been observed at this site. However increasing development in the area may make this site more valuable as a natural green space (ACCDC 2009).

The Tracadie Sewage Lagoon ESA (ESA203) is located near Pointe-à-Bouleau, approximately 4.9 km southeast of the proposed Project site. The site is privately owned and has been

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developed for environmental education as it spans several different habitats such as a mixed forest, coastal bog, open fields and a coastal saltmarsh (Figure 1.1).

The Tracadie Sewage Lagoon ESA is surrounded by mixed forest, which serves as a breeding and roosting location for birds, many of which are rare on the Acadian Peninsula. Over 120 different species have been recorded from this site, making it one of the best birding spots on the peninsula. Almost every species of waterfowl that has been recorded on the Acadian Peninsula has been seen at this site (ACCDC 2009).

3.3 TERRESTRIAL SURVEYS

3.3.1 Terrestrial Habitat Description

Route 365 connects the north and south shores of the Little Tracadie River by a combination of causeway and bridge. Photos 1, 2, 4 and 7 (Appendix B) show the causeway, bridge and Right-of-Way (RoW). The terrestrial habitats surrounding the Little Tracadie River Bridge (Figure 3.1) include developed rural landscape, cultivated upland, and saltmarsh wetland. Most of the land within the Study Area is disturbed due to cultivation, use for pasture/hayfield, or due to residential landscaping. Little upland forest remains in the Study Area due to the predominance of rural and residential development. A notable exception is a large stand of trees adjacent to the south shore of Little Tracadie River, along Route 365, and forest that extends along the western shore of Trout Stream which drains to Little Tracadie River (Figures 3.1 and 3.2). Within the Assessment Area, a thin strip (less than 30 m wide) of saltmarsh wetland extends southwestward from the southern end of the causeway between the river and a stand of trees, and continues along the right bank of Trout Stream as a more substantial saltmarsh. Another more extensive saltmarsh wetland exists in the northeastern portion of the Assessment Area, extending northeast from the causeway along the downstream left bank of the river. A third strip of saltmarsh wetland begins on the northwest side of the causeway and extends upstream along the left bank of the river (Figure 3.2). However, wetland is not as extensive as indicated by the NBDNR wetland boundary in Figure 3.2. Due to infilling from the adjacent upland area, the only remaining wetland at this location is a thin strip along the shoreline (less than 2 m wide)

With the exception of a forested patch in the extreme northeastern portion of the Assessment Area (Figure 3.1), the north side of Little Tracadie River is dominated by rural landscaping and cultivated pasture/hayfields. Several residential properties are located along Route 365 with associated disturbed areas, including lawns and landscaping. South of the bridge along Route 365 are more residential properties with associated disturbed areas and fields associated with farms in close proximity to the road. The forest patches spread throughout the Study Area are composed of mature white and red spruce, and occasional white pine, white birch and balsam fir.

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The causeway itself is cloaked with mostly introduced weedy species such as awnless brome (*Bromus inermis*), twitch grass (*Elytrigia repens*), field sow thistle (*Sonchus arvensis*), wild radish (*Raphanus raphanistrum*) and a native species, the seaside goldenrod (*Solidago sempervirens*). Along the northern margin of the causeway is a dense population of *Stuckenia pectinata* which is thickly coated with algae. Several species of waterfowl were observed foraging amongst the algae.

Estimated areas of each habitat type within the Study Area are as follows (Table 3.2).

Table 3.2 Estimated Areas of Key Habitat Types within the Little Tracadie River Assessment Area

Habitat Type	Estimated Area (ha)
Forested Areas	14.92
Waterbodies	25.62
Wetlands	8.34
Cultivated land used for the production of crops including grains	3.14
Cultivated land used for blueberry production	17.15
Fallow pasture land	9.76
Provincial highways (DOT roads)	4.79
Urban settlements or occupied lands which are outside 1 km of DNR's mapped Municipal Areas	16.64

3.3.1.1 Terrestrial Habitat Loss

The Project description is insufficiently developed at present to estimate areas of habitat likely to be lost due to Project activities. Figures 3.1 and 3.2 show details of habitat and wetland delineation within the Assessment Area.

3.3.2 Vegetation Surveys

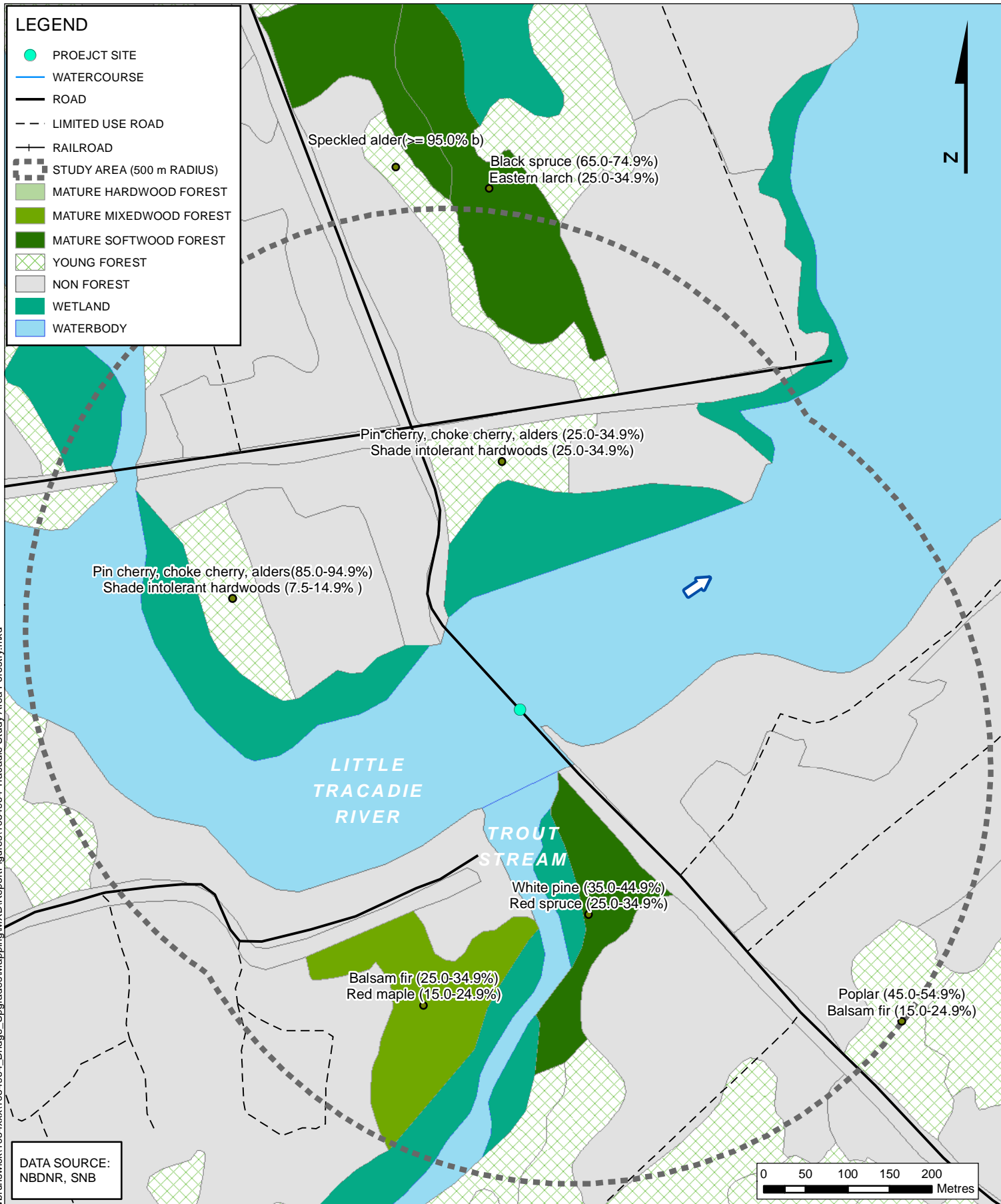
Vegetation surveys were conducted on September 2 and 3, 2009 focusing on areas where construction associated with bridge construction may occur. A list of the 99 plant species encountered in the vicinity of the bridge is presented in Appendix C. The vegetation surveys focused on three key habitat areas, including:

- Compacted dry roadside soils (disturbed areas);
- Little Tracadie River margin; and
- Saltmarsh.

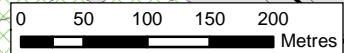
Access to private property was not secured prior to the field visit, and therefore surveys of private land (e.g., residential properties) within the Assessment Area were not conducted. Most private lands within the Assessment Area had been developed and/or landscaped. Thus the likelihood of occurrence of rare plants within these areas is considered low.

LEGEND

- PROEJCT SITE
- WATERCOURSE
- ROAD
- - - LIMITED USE ROAD
- + + + RAILROAD
- STUDY AREA (500 m RADIUS)
- MATURE HARDWOOD FOREST
- MATURE MIXEDWOOD FOREST
- MATURE SOFTWOOD FOREST
- YOUNG FOREST
- NON FOREST
- WETLAND
- WATERBODY



DATA SOURCE:
NBDNR, SNB



File Path: X:\Projects\ewbrunswick\1054964\Reporting\WxD\Report\Figures\1054964 Tracadie Study Area Forestry.mxd

<p>FOREST INVENTORY ENVIRONMENTAL BACKGROUND STUDY LITTLE TRACADIE RIVER BRIDGE NO. 2 GLOUCESTER COUNTY, NEW BRUNSWICK</p>				Scale: NTS		Job No.: 1054964.		Fig. No.: 3.1		
Client: NEW BRUNSWICK DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE		Date: 14/01/2010		Dwn. By: JB		Appd. By: MS				
Stantec Consulting Ltd. Map: Double Stereographic										



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
TRACADIE, NB**

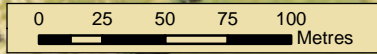
September 22, 2017

LEGEND

- PROJECT SITE
- RARE PLANT
- RARE PLANT AREA
- WETLAND; FIELD DELINEATED
- WETLAND; EXTRAPOLATED
- TERRESTRIAL AND WETLAND ASSESSMENT AREA
- 200 m ASSESSMENT AREA
- WETLAND (NBDNR)
- WATERCOURSE (NBDNR)
- ➔ WATER FLOW DIRECTION
- UPLAND DATA POINT
- + WETLAND DATA POINT
- DEPTH TO WATER TABLE <25 cm



DATA SOURCE: NBDNR, SNB
 AERIAL PHOTO 2002
 WETLAND BOUNDARIES DELINEATED BY RECOGNIZED
 WETLAND DELINEATOR G. BISHOP, SEPTEMBER 2, 2009
 BASED ON EXISTING SITE CONDITIONS AT TIME OF SURVEY.



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

TERRESTRIAL HABITAT AND WETLANDS ENVIRONMENTAL BACKGROUND STUDY LITTLE TRACADIE RIVER BRIDGE NO. 2 GLOUCESTER COUNTY, NEW BRUNSWICK	Scale:	Job No.	Fig. No.	
	NTS	1054964	3.2	
	Date:	Dwn. By:	Appd. By:	
Client: NEW BRUNSWICK DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE	Apr. 22, 2010	RJS	MS G. BISHOP	

File Path: V:\12\active\Projects\New Brunswick\1054964\Mapping\MXD\Report\Figures\TERRESTRIAL HABITAT AND WETLANDS TEMPLATE (JAN 20).mxd



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
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The ACCDC report (summarized in Table 3.1) included five species of rare and uncommon vascular plant species that have been observed within a 5 km radius of the project site. Four of the five species of vascular plants species is considered to be fairly common (ranked S2 or lower). One species (*Salix myricoides*) appears to have been previously collected at or near the bridge site, although as an S3 species, it is considered secure in New Brunswick. This species was not found in the Assessment Area at the time of the survey. Only one of these five vascular plant species is potentially of high concern:

- Gulf of St. Lawrence Aster (*Symphotrichum laurentianum* – S1).

The Gulf of St. Lawrence aster species prefers cobble river strands and cobble/rocky banks of larger rivers. This habitat was not present near the causeway. This species would rate a high level of concern if found, however habitat for this aster was not present at the proposed Project site and it was not observed within the Assessment Area at the time of the survey.

One rare or uncommon plant species was observed within the Assessment Area, pectinate pondweed (*Stuckenia pectinata* – S2). This species is most commonly found (often in great abundance) in brackish water such as the habitat found at the Little Tracadie River where it was in 1 to 2 m deep water along the east side of the causeway by the structure on Route 365. The population of plants (likely over 1,000) cover a linear strip (40 m x 10 m) running parallel to the road, some 3 to 10 m out from shore (Figure 3.2).

One noteworthy vascular plant species, basswood (*Tilia americana* – S3S4), was found in the northwestern section of the Assessment Area (Figure 3.2). Although not rare in New Brunswick, basswood is a more southern species and is not recorded previously for Gloucester County. Three stems, measuring not more than 2 m tall and 5 cm dbh were found growing at the edge of a grass field in a grove of other small tree species. At Little Tracadie River, there were no apparent mature basswood trees to supply seed for these saplings in the immediate area. No significant environmental effects to Basswood are anticipated due to the location of the these trees approximately 150 m from the north end of the causeway.

3.3.3 Wetland Habitat Description

The three sections of saltmarsh within the Assessment Areas are bounded by the river and upland composed of fill materials (northeastern and northwestern), or forest (southwestern). The wetland in the northeastern section of the Assessment Area is bounded by fill material from the causeway construction however there do not appear to be any other intrusions into wetland. The northeastern saltmarsh is approximately 2.7 ha in size with 1.6 ha inside the Assessment Area. The northwestern wetland confined to a thin strip along the shoreline and is approximately 2.42 ha in size with only 0.004 ha inside the Assessment Area. This wetland has been impacted by the addition of fill materials, and is no longer as extensive as the NBDNR aerial photo interpretation would suggest. A more accurate “extrapolated” boundary line is

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shown in Figure 3.2. The southwestern saltmarsh is approximately 1.2 ha in size with 0.5 ha inside the Assessment Area. The pieces of saltmarsh are similar in all aspects (hydrology, vegetation, and soils). One set of paired points for wetland delineation was conducted on the saltmarsh in the northeastern corner of the Assessment Area (Figure 3.2). The point locations are as follows Upland: 47.53268, 64.94867; Wetland: 47.53265, 64.94853. Wetland delineation forms for the paired data points are provided in Appendix E.

3.3.3.1 Hydrology

The main hydrological feature of these saltmarsh wetlands is the Little Tracadie River which is a tidal estuary. Water in these wetlands is derived from tidal inundation, overland surface water flow, and from ditch drainage along Route 365. In addition, the southwestern wetland hydrology is also influenced by Trout Stream. The hydrological indicators Surface Water, High Water Table and Saturation were present at the wetland point location. Secondary hydrological indicators at this wetland point location included “Drainage Patterns” and “FAC-Neutral Test”.

3.3.3.2 Vegetation

The vegetation present in each of the saltmarsh areas was typical for estuarine conditions at this level of the estuary and dominated by a dense cover of inflated sedge (*Carex vesicaria*) and Baltic rush (*Juncus arcticus*). Other vegetation in the wetland included broad-leaved cattail (*Typha latifolia*), white turtlehead (*Chelone glabra*), New Belgium American-aster (*Aster novibelgii*), spreading bentgrass (*Agrostis stolonifera*), marsh bedstraw (*Galium palustre*), water horsetail (*Equisetum fluviatile*), spotted jewel-weed (*Impatiens capensis*), and small-fruit bulrush (*Scirpus microcarpus*). Ditch-grass (*Ruppia maritima*) was found in small pools near the river’s edge of the saltmarsh northeast of the causeway. No trees or shrubs were present in the wetlands.

3.3.3.3 Soils

The soil was saturated at the time of the field investigation and hydric soils were indicated by the presence of histic epipedon.

3.3.4 Wildlife Surveys

Wildlife surveys were conducted on September 2 and 3, 2009 within the Assessment Area. Wildlife species noted in the Assessment Area only included birds; no mammals or herpetofauna were observed.

All species of birds observed or heard within the Assessment Area during the survey were recorded, and evidence of breeding, if any, was gathered (Appendix D). This survey was conducted outside of the accepted migratory breeding bird season, and is representative only of the birds which were present in the area during the time of survey.

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One rare or uncommon bird species was observed during the surveys. A single immature Bald Eagle (*Haliaeetus leucocephalus*), designated as Regionally Endangered by the NB *ESA* and as At Risk by NBDNR General Status Ranks, was observed flying over the Study Area. The ACCDC database search reported two observations of Bald Eagle within 5 km of the proposed Project Site, but these records do not indicate evidence of breeding activity. No breeding status was assigned for this species due the observation being an immature bird out of breeding season. However, there is mature mixed-wood habitat with trees large enough to support nesting in the southwestern region of the Study Area, although it is unlikely that Bald Eagle would nest there due to the proximity to human disturbance (*i.e.*, roads and residences) immediately adjacent to the stand of mature trees. Therefore it is unlikely that Bald Eagle will nest within 400 m of the bridge, and there is low concern regarding the occasional presence of this species within the Study Area.

Other than Bald Eagle, no other rare or uncommon avian species were observed within the Assessment Area. The ACCDC report (summarized in Table 3.1) included thirty-three species of rare and uncommon avian species (including Bald Eagle) that have been observed within a 5 km radius of the project site. Twenty-nine of these species are actually fairly common (ranked S2 or lower). Only three of these avian species are potentially of high concern:

- Piping Plover (*Charadrius melodus melodus* – S2B);
- Greater Scaup (*Aythya marila* – S1B,S2N); and
- Wilson's Phalarope (*Phalaropus tricolor* – S1S2B).

Piping Plover, listed as Endangered under *SARA*, nest in the upper reaches of sand/pebble beaches where beach transitions from sand to marram and other beach grasses. This species nests in New Brunswick along the sandy coastline of the Northumberland Strait on isolated beaches or barrier islands. No Piping Plover were observed during terrestrial surveys and there was no suitable habitat within the Study Area. The ACCDC data indicate that Piping Plover were nesting approximately 2.5 km away, likely on Tracadie Beach and the associated barrier islands of Tracadie Bay. Greater Scaup nest on lakes and ponds throughout the near-Arctic and winter along the east and west coasts of North America. The ACCDC data indicate that the observation for this species was at the Tracadie Sewage Lagoon, approximately 4.9 km from the proposed Project site. Sewage lagoons are attractive to wintering birds needing open water. Wilson's phalarope also nest across the north and there are no breeding records for this species near the proposed Project site (Erskine 1992, Lepage 2009).

Little or no habitat is present for any of these three bird species right at the proposed Project location, but sufficient habitat potentially exists further down into the Tracadie Bay area and estuary. These species are rare breeders (S1B, S1S2B, or S2B) in New Brunswick and in the case of Greater Scaup and Wilson's Phalarope, observations are usually only recorded during

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migration when birds are passing through, or wintering birds. Piping Plover nest on well-known beaches, none of which are near to the proposed Project site. No specific mitigation is necessary for these species, however, clearing of vegetation should occur outside of the migratory bird breeding season (May 1 to August 31) in order to mitigate potential effects on any nesting birds. No other rare or uncommon bird species were observed in the Study Area during the survey.

The ACCDC data request identified Atlantic Walrus (*Odobenus rosmarus rosmarus*), listed as Endangered under SARA, as being found within a 5 km radius of the proposed Project site. Atlantic Walrus is commonly found in shallow water and coastal habitats, usually associated with pack ice and regularly haul out on sandy beaches, rocky shores, and ice floes. This habitat could be found along the coast of Tracadie Bay, approximately 5 km east of the proposed Project location. No specific habitat for Atlantic Walrus was found at the proposed Project location, nor would Atlantic Walrus be expected to be present due to the inland nature of the proposed Project.

There were no rare or uncommon mammal species or animal signs observed during the survey; however the area is likely to support typical assemblage of small mammals including snowshoe hare, raccoon, red fox, and skunk.

No other mammal or herpetile species of concern are anticipated to be found within the Assessment Area during the projected construction season.

3.4 AQUATIC SURVEYS

A fish habitat survey was conducted on September 1, 2009 at the Little Tracadie River where it is crossed by Route 365.

3.4.1 Fish Habitat Assessment

Fish habitat was assessed using the modified NBDNR/DFO Stream Survey Forms. Fish habitat was assessed 200 m upstream and 200 m downstream of the Little Tracadie River Bridge No. 2. Additional 300 m reaches were surveyed upstream and downstream (500 m total) to assess potential for the presence or absence of barriers to fish passage.

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The fish habitat assessed was divided into two reaches:

- Reach 1 – 200 m downstream (extending from the Project site), and
- Reach 2 – 200 m upstream (extending from the Project site).

A summary of the NBDNR/DFO Stream Survey habitat assessment is presented in Appendix F.

The Assessment Area was tidally influenced.

Reach 1 is a wide, open water river feeding the Tracadie Bay. It was estimated to be approximately 200 m wide and greater than 1 m in depth at the time of the survey. In the shallow areas close to shore, the substrate was dominated by sand, with some gravel. A few boulders and light fines deposition were also observed. No undercutting or overhanging vegetation was apparent from the shoreline. Bank vegetation was predominantly grasses with small areas of bare ground. Both banks were stable, with the right bank also having bare ground sections. Embeddedness of the substrate in the shallow areas close to shore was less than 20%.

Reach 2 was very similar to Reach 1. It can be characterized as a wide river environment, with a convergence approximately 50 m upstream. The upstream reach was approximately 170 m wide at the time of the survey, deeper than 1 m, with sandy substrate in the shallow areas. Substrate also included fines, gravel and a few boulders. No undercutting was observed on either bank, the left bank supported very limited overhanging vegetation, and both banks were predominantly stable. The right bank had a few areas of bare stable ground. Bank vegetation was dominated by grasses, as seen downstream, although there was more bare ground and some trees as well. In the shallow areas that could be assessed, substrate was embedded less than 20%. A large tributary to the Little Tracadie River, Trout Stream, enters the assessment area from the south and joins the Little Tracadie River approximately 13 m west (upstream) of the RoW. Substrate, vegetation and bank stability of Trout Stream is comparable to that found in Reach 2 of the Little Tracadie River, although Trout Stream is much smaller, having a width of 25 m to 30 m in the Assessment Area.

Surface water quality was measured in Reach 1, adjacent to the existing approach span approximately 10 m from the eastern abutment of the bridge. Water quality was sampled late afternoon (15:30), close to high tide. Water temperature was found to be 18.5°C, dissolved oxygen was 11.4 mg/L (127% saturation), specific conductivity was 13,110 µS/cm, salinity was 7.7 ppt, and pH was 8.5. Velocity was not measured given that the site was tidally influenced.

3.4.2 Fish Survey

A fish survey was carried out on September 1, 2009, using a beach seine net. Multiple minnow traps were also set overnight and collected on September 2, 2009. Using both of these

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methods, three species of fish were caught and released unharmed into the tributary to Little Tracadie River:

- mummichog (*Fundulus heteroclitus*);
- threespine stickleback (*Gasterosteus aculeatus*); and
- ninespine stickleback (*Pungitius pungitius*).

The size range and number of fish sampled in the fish survey are presented in Appendix F.

Based on the results of the fish survey, it can be confirmed that the Little Tracadie River supports small-bodied, salt-water tolerant fish and fish habitat. It should be noted that the wetland assessment field team observed large schools (>1,000 fish) of small-medium sized fish underneath the Route 365 bridge on September 3, 2009 during their site visit. It is anticipated that these fish were mummichogs, but their identification was not confirmed at the time of the sighting. Large schools of fish were not observed by the aquatic field crew during their site visit.

Although not captured at the time of the fish survey, it is likely that the Study Area serves as a migratory pathway and/or is used seasonally by a wide variety of fish species. Diadromous species such as Atlantic salmon (*Salmo salar*), American eel (*Anguilla rostrata*), gaspereau (*Alosa pseudoharengus*), smelt (*Osmerus mordax*), and sea lamprey (*Petromyzon marinus*) likely migrate through the reach. Seasonal use by freshwater species such as white sucker (*Catostomus commersonii*), and by saltwater species such as tomcod (*Microgadus tomcod*), flat fish (*Heterosomata* sp.) and striped bass (*Morone saxatilis*) is also probable.

3.4.3 Surface Drainage

Route 365 crosses Little Tracadie River in Tracadie, New Brunswick in Gloucester County. A review of the 1:50,000 topographical map indicates that the Little Tracadie River watershed is approximately 13,827 ha in area and is part of the Eastern Lowlands Ecoregion. The Caraquet Ecodistrict is approximately 10 km wide along the Acadian Peninsula coastline. It begins at the mouth of the Nepisiguit River and ends at the mouth of the Miramichi River (NBDNR 2007).

The coastline in this Ecodistrict is linked by chain of sand dunes, sand spits, protected bays, and saltmarshes, severed by estuaries of the Pokemouche, Tracadie, Tabusintac, and other rivers merging into the Gulf of St. Lawrence (NBDNR 2007).

Quaternary geology maps indicate that the predominant soil type in the Tracadie (Little Tracadie) region of northeast New Brunswick consists of blankets and plains of marine sediments. Thickness of the blanket is expected to vary between 0.5 m and 3 m depending on bedrock relief at that particular location. Marine sediments consist of sand, silt, gravel and clays deposited in shallow marine water on coastal areas.

3.4.4 Aquatic Habitat Loss

Installation of the new structure may result in the temporary disturbance or loss of fish habitat, as the Project will involve the removal of the existing structure and the construction of a new watercourse crossing. However, Project design details are not presently available, so habitat loss/gain can not yet be determined. Any HADD related issues will be mitigated by NBDOT in consultation with DFO, (see Section 4.2).

3.5 WATER EXTRACTION, BUSINESSES AND RESIDENCES

Approximately 94 properties were identified by PID number within the Study Area (Figure 2.1). These properties are generally assumed to have onsite private water wells which are used for potable purposes. During the field visit conducted on September 1, 2009 an inventory of houses and businesses in the area was completed. Approximately 60 residences and 5 agricultural properties (blueberries) were located within a 500 m radius of the Project site.

A detailed inventory of land use was completed within the Assessment Area (e.g., 200 m radius of the proposed Project site) and is summarized by a PID number in Table 3.3 (see Appendix H for further information). Approximately 26 properties, consisting of 19 residences and one agricultural property (blueberries) were located within the 200 m radius.

Table 3.3 Land Use by PID in the Little Tracadie River Bridge No. 2 Assessment Area

Property PID	Farm	Residence	Vacant
20156964			x
20156402		x	
20155651		x	
20413050		x	
20153615		x	
20153607		x	
20153383		x	
20805867		x	
20806808		x	
20157012	Agricultural (Blueberries)		
20635280		x	
20157814		x	
20413175			x
20152914		x	
20155867			x
00000002			x
20133971			x
20157954		x	
20148334		x	
20134177		x	
20782462		x	
20134805			x
20151809		x	

ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365, TRACADIE, NB

September 22, 2017

Table 3.3 Land Use by PID in the Little Tracadie River Bridge No. 2 Assessment Area

Property PID	Farm	Residence	Vacant
20429106			x
20151791		x	
20812970			x
20574117		x	
20148342		x	

The NBENV maintains a database of available Well Logs which is limited to wells drilled after 1994. A request for well logs within the Study Area yielded 14 results (Appendix H). Based on the available well logs, wells in the area are generally shallow (less than 18 m in depth). The well logs also indicate that the wells are generally offered some protection from surface contamination by the horizontal layering of the geologic units (e.g., sandstone, shale, sandstone). The reported estimated safe yields generally ranged from 2 to 15 imperial gallons per minute. Properties to the north and south of the bridge appear to be situated such that one or more wells may be within 50 m of construction activities. During the field visit, eight available residents were asked to complete a well questionnaire. Completed questionnaires are presented in Appendix H. Based on the completed questionnaires, there is a dug well located on PID number 20154613 that is approximately 4.6 m deep. Of the seven drilled wells, three depths were known and ranged from approximately 15 m to 46 m. There are reportedly several springs in the area.

The NBENV also maintains a database of water quality, available for wells where the owners of the property submitted samples to the NBENV for testing. A request to NBENV for water quality within the Study Area yielded 11 chemistry results and 12 bacteria results (Tables H.2 and H.3, Appendix H). Additionally, during the field visit, water samples were collected at two properties. The samples were analyzed for general chemistry parameters, trace metals, and bacteria (coliform/*E.coli*) and the results are summarized in Table H.4 (Appendix H). Laboratory certificates of analysis are presented in Appendix H. The following provides a summary of exceedances of the collected samples and NBENV data:

- Lead(1/13);
- Manganese (4/13);
- Turbidity (4/13);
- Zinc (1/13); and
- Bacteria (Total Coliform) (2/14).

Individual homeowners having wells where water quality did not meet CCME guidelines were contacted by phone and letter and were advised to contact NBENV and/or the New Brunswick Department of Health for further guidance and assistance.

3.6 PUBLIC AND ABORIGINAL INTERESTS

Residents in the local area were contacted in person and interviewed (when willing) during the September 1, 2009 site visit. Several residents were supportive of the proposed bridge construction activities as they feel the approaches to the bridge are dangerous. One resident also expressed that they hoped the new bridge design is more open than the current bridge, as they believed the water movement is currently restricted and that this contributes to an unpleasant odour in the area.

The Little Tracadie River supports a variety of fisheries (including but not limited to smelts, eels, and salmon) which may be practiced in the vicinity of the Study Area.

No written responses have been received to date in relation to letters that were sent to nearby First Nations on September 11, 2009. Follow up phone calls were made on September 29-30, 2009 to four First Nations communities identified to be within approximately 100 km of the Study Area. The four First Nations identified within 100 km of the Study Area included the Mi'kmaq First Nations at Burnt Church, Eel Ground, Metepenagiag, and Pabineau.

Attempts to contact the Chiefs of the First Nations within the vicinity of the Project site resulted in messages being left with at the Band Office's in Burnt Church, Eel Ground and Pabineau First Nations. Contact was made with the Metepenagiag First Nation. Band Manager, Kenny Levi identified no known current use of land or resources for traditional purposes within the Little Tracadie River Study Area, nor would any use of the land or resources in the immediate area be impaired by the proposed Project (K. Levi, pers. comm. September 30, 2009).

3.7 PHYSICAL AND CULTURAL RESOURCES

The archaeological survey report is presented in Appendix G. Key findings are summarized below.

3.7.1 Archaeological and Heritage Resources

On September 9, 2009 a visual survey was conducted by the Stantec Archaeological Team of a 100 m by 400 m Assessment Area around the Project site on Route 365 over Little Tracadie River (Figure 3.3). The existing structure is comprised of a causeway and bridge that runs in a north-south orientation over the Little Tracadie River (Photo 7, Appendix B). The river is approximately 200 m wide with a large wetland area along the northeast shore (Photo 8), and marginal wetlands also present along the northwest shore and along the southwest shore

extending into Trout Stream. The Assessment Area is divided into four quadrants: southeast (SE), southwest (SW), northwest (NW) and northeast (NE).

Documentary Research

In general, preliminary background research of the area indicated elevated potential for pre-contact archaeological and heritage resources due to its proximity to significant hydrological features including Tracadie Bay and the Gulf of St. Lawrence. While no previously recorded archaeological sites appear in the immediate vicinity of the proposed Project location, it should be noted that there are over a dozen sites located at the mouth of the Little Tracadie River approximately 5 km downstream of the Assessment Area.

Southeast Quadrant

The southeast quadrant extends along the south side of Little Tracadie River and on the east side of Route 365 (Figure 3.3). The southeastern quadrant of the Assessment Area has been extensively disturbed by residential property development, from the banks of the Little Tracadie River to 170 m from the River along Route 365 (Photo 9). The area between 170 m to 200 m south of the watercourse is characterized by flat hay and blueberry fields. This quadrant has low potential for the presence of intact heritage sites due to the extensive ground disturbance from residential construction and agricultural activities. No further testing is recommended.

Southwest Quadrant

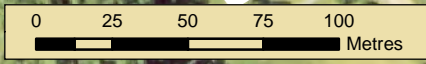
The southwest quadrant extends along on the south side of Little Tracadie River and on the west side of Route 365 (Figure 3.3). The southwestern quadrant of the Assessment Area is defined by a tall (approximately 2.5 m high) flat terrace. The vegetation is dominated by an open pine forest with immature fir trees (Photo 10). The terrace extends approximately 30 m before it is truncated by an abandoned quarry. Beyond the quarry is a residential property. The terrace area along the shoreline holds moderate archaeological potential; however the areas beyond the terrace, have been extensively disturbed by quarrying operations. One shovel test was dug on the terrace. The shovel test revealed approximately 20 cm of sand with some pebbles overlying a dense pebbly layer in a sandy matrix. Further testing is recommended should ground-disturbing activities be planned in the vicinity of the terrace area (Figure 3.3).

LEGEND

- NE ARCHAEOLOGICAL ZONE
- PROJECT SITE
- SHOVEL TEST PIT
- APPROXIMATE AREA WITH ARCHAEOLOGICAL POTENTIAL
- ARCHAEOLOGICAL ASSESSMENT AREA
- WATERBODY (NBDNR)
- ➔ WATER FLOW DIRECTION



DATA SOURCE: NBDNR, SNB
AERIAL PHOTO 2002



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

HERITAGE AND ARCHAEOLOGICAL RESOURCES

ENVIRONMENTAL BACKGROUND STUDY

LITTLE TRACADIE RIVER BRIDGE NO. 2
GLOUCESTER COUNTY, NEW BRUNSWICK

Scale: NTS	Job No. 1054964	Fig. No. 3.3	
Date: May 9, 2010	Dwn. By: RJS	Appd. By: MS	

Client: NEW BRUNSWICK DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE

File Path: V:\1218\active\Projects\New Brunswick\1054xxx\1054964\Mapping\MXD\Report\Figures\HERITAGE AND ARCHAEOLOGICAL RESOURCES.mxd



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
TRACADIE, NB**

September 22, 2017

Northwest Quadrant

The northwest quadrant extends along the north side of Little Tracadie River and on the west side of Route 365 (Figure 3.3). The northwestern quadrant of the Assessment Area has been extensively disturbed by residential property development along the existing road (Photos 11-13). A hayfield with a poorly defined terrace exists along the western edge of the Assessment Area. Potential for the presence of heritage resources exists within the hayfield. Shovel testing was not conducted as permission to access the area had not been secured. Further testing is recommended should ground-disturbing activities be planned for this area (Figure 3.3).

Northeast Quadrant

The northeast quadrant extends along the north side of Little Tracadie River and on the east side of Route 365 (Figure 3.3). The topography of the northeastern portion of the Assessment Area is dominated by a large wetland along the Little Tracadie River (Photo 8). An abandoned field is located approximately 100 m beyond the wetland area. The field is approximately 1 m above the current water level and is dominated by young poplar and firs. Potential for the presence of heritage resources exists within the abandoned field. Shovel testing was not conducted as permission to access the area had not been secured. Further testing is recommended should ground-disturbing activities be planned in this area (Figure 3.3).

3.7.2 Paleontological Resources

The bedrock within the Tracadie area is part of the Pictou Group of the Late Carboniferous Age and consists of primarily sedimentary rocks; red to grey arkosic sandstone, conglomerate and shale. These types of rock are formed in a terrestrial setting and, like all sedimentary rocks, have the potential to bear fossils.

(Arkosic) sandstone is a sedimentary rock whose particles are derived from weathered silicate particles originating from older rocks or pyroclastic volcanism. Arkosic sandstones are those containing >25% feldspar. Particle size typically ranges between silt sized particles (75 µm) and coarse particles (2 mm). Primary mineral types include quartz, feldspar and clay minerals/fine mica.

Conglomerate is a sedimentary rock whose particles are derived from weathered silicate particles originating from older rocks or pyroclastic volcanism. Conglomerates contain >30% gravel sized particles (>2 mm). Particles can be igneous, metamorphic or sedimentary of origin and the rock can be described as either clast supported or matrix supported. Clast supported conglomerates occur when gravel sized particles are sufficiently dense they form the supporting framework. Matrix supported conglomerates occur when a fine grained matrix of silt, clay, and sand bind less frequent gravel sized particles together.

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Shale is a siliciclastic sedimentary rocks containing >50% particles with grain sizes <0.062 mm. Silt and clay size particles (0.062 mm to 0.004 mm) are the dominant particle size in these rocks. Primary minerals include clay minerals, and fine quartz and feldspar. Shale is easily identified by its lamination or fissility, meaning these rocks can be readily split into very fine layers.

Dr. Randall Miller, Manager, Natural Resources, NB Museum was contacted for paleontological significance in the area in September 2009, however, no response has been received to date. It is therefore assumed that some potential for paleontological resources could be present in the Study Area and further information should be sought from the NB Museum during detailed design for the Project.

4.0 POTENTIAL ENVIRONMENTAL EFFECTS, MITIGATION AND MONITORING

Due to the lack of Project design details at the time of preparation of this Report, it is not possible to identify or determine the significance of potential environmental effects on terrestrial wildlife, vegetation, or habitat or to quantify possible habitat loss.

4.1 ENVIRONMENTAL SENSITIVE AREAS AND SPECIES

Two environmentally sensitive areas were identified during the data search or during the field visit within the Assessment Area, Le Sentier Ecologique la Decouverte located east of the proposed Project site, and the Tracadie Sewage Lagoon located southeast of the proposed Project site. Both of these ESAs are located on peninsulas downstream of the proposed Project site, and far enough from any disturbance caused by the Project that no significant environmental effects would be expected to occur to either ESA as a result of Project activities.

One Important Bird Area was identified during the IBA Database Search as being proximal to the Study Area (IBA Canada 2017). IBA NB014 Tracadie Bay and Sandspit is located approximately 1 km east of the Project site and encompasses the mouth of the Little Tracadie River and the barrier islands that separate Tracadie Bay from the Northumberland Strait. This IBA is far enough away from the Project that no significant environmental effects would be anticipated as a result of Project activities.

No occurrences of rare mammals were identified during the field visit. Two rare or uncommon bird species were identified as being within 5 km of the Study Area in the ACCDC database search: the Piping Plover (*Charadrius melodus melodus*) and the Bald Eagle (*Haliaeetus leucocephalus*). No Piping Plover were observed during terrestrial surveys and there was no suitable habitat within the Study Area. Tracadie Beach and the associated barrier islands are a known location of Piping Plover breeding, located approximately 3.5 km to the east of the proposed Project site. One immature Bald Eagle was observed in during the field visit. Bald Eagles nest in conspicuous stick nests, usually at or near the tops of large trees, such as white pines. No nests were observed during the field visit, in the southeastern portion of the Study Area where a small stand of mature forest was identified. No other suitable nesting or breeding habitat was found for Bald Eagle within the Study Area. Due to the lack of suitable nesting or breeding habitat within the Assessment Area, no significant environmental effects on either species are anticipated. However, clearing of land should be done outside of the peak breeding bird season (typically May 1 to August 31), in order to minimize the potential for damage or loss of nests of breeding or migratory birds.

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Atlantic Walrus was identified in the ACCDC database results as being noted within a 5 km radius of the proposed Project site. However, it is unlikely that Atlantic Walrus would be found at the proposed Project location as no suitable habitat exists due to the inland location of the proposed Project. Therefore, no significant environmental effects are anticipated on Atlantic Walrus.

One rare or uncommon plant species was observed within the Assessment Area, pectinate pondweed (*Stuckenia pectinata* – S2). This vascular plant species was found along the east side of the causeway by the structure on Route 365. The population of plants (likely over 1,000) and covers a linear strip (40 m x 10) running parallel to the road, and extends 3-10 m from shore (Figure 4.1). Location of these rare species should be noted by the design team in order that they can be avoided. There is no specific mitigation for *Stuckenia pectinata*. Should avoidance of the species not be possible design should be planned to minimize the environmental effects on the population in the area.

If any federally or provincially protected species are found within the footprint of construction activities, activities should be suspended until after the species has been properly removed according to applicable legislation and policy from the Project area or mitigation has been implemented.

In the unlikely event of encountering protected wildlife species during construction:

- an NBDOT project manager should be notified;
- the location of the protected species should be recorded, if applicable;
- record the observation, including date, time, direction of travel, and approximate size of individual; and
- contact Don McAlpine, Curator of Zoology, New Brunswick Museum, (506) 643-2345, and provide the above information recorded.

4.2 WETLAND HABITAT

Saltmarsh habitat is present on the northeast, northwest and southwest sides of the bridge approaches (Figure 4.1). All coastal marshes are considered to be Provincially Significant by the province of New Brunswick under the *New Brunswick Wetlands Conservation Policy*. This policy states that the Government of New Brunswick will prevent the loss of Provincially Significant Wetland habitat. In addition, the policy states as follows:

“Government will not support proposed activities in a Provincially Significant Wetland, within 30 meters of the perimeter of a Provincially Significant Wetland, or any activity that poses substantial risk to a Provincially Significant Wetland except:

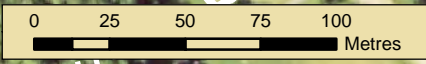


- LEGEND**
- NE ARCHAEOLOGICAL QUADRANT
 - PROJECT SITE
 - AREAS WITH ARCHAEOLOGICAL POTENTIAL
 - ARCHAEOLOGICAL/ TERRESTRIAL AND WETLANDS ASSESSMENT AREA
 - 200 m ASSESSMENT AREA
 - RARE PLANT AREA
 - RARE PLANT
 - UPLAND DATA POINT
 - WETLAND DATA POINT
 - WETLAND; FIELD DELINEATED
 - WETLAND; EXTRAPOLATED
 - WATERBODY (NBDNR)
 - DEPTH TO WATER TABLE <25 cm
 - WATER FLOW DIRECTION

File Path: V:\12\18\active\Projects\NewBrunswick\1054964\Mapping\MXD\ReportFigures\Tracadie\Fig 4.1 CONSTRAINT MAP (TRACADIE).mxd

DATA SOURCE: NBDNR, SNB
AERIAL PHOTO 2002

WETLAND BOUNDARIES DELINEATED BY RECOGNIZED
WETLAND DELINEATOR G. BISHOP, SEPTEMBER 2, 2009
BASED ON EXISTING SITE CONDITIONS AT TIME OF SURVEY.



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

ENVIRONMENTAL CONSTRAINTS ENVIRONMENTAL BACKGROUND STUDY LITTLE TRACADIE RIVER BRIDGE NO. 2 GLOUCESTER COUNTY, NEW BRUNSWICK	Scale:	Job No.	Fig. No.	
	NTS	1054964	4.1	
	Date:	Dwn. By:	Appd. By:	
Client: NEW BRUNSWICK DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE	Feb. 03, 2010	RJS	MS	



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1. *Activities that rehabilitate, restore, or enhance a Provincially Significant Wetland, or*
2. *Activities deemed to provide necessary public function, after completing an Environmental Impact Assessment with public review.”*

“Necessary Public Function” is defined in the Policy as including, public transportation projects, public infrastructure and projects necessary for public safety.

As such, loss of saltmarsh habitat should be avoided during design of the proposed Project. Should avoidance not be possible, the extent of loss should be minimized and compensation planned in consultation with NBENV during the Environmental Assessment process, and prior to ground-disturbing activities in the area.

The NBDTI’s Environmental Management Manual (NBDOT 2010) provides standard methods for construction practices that are protective of the environment. The Assessment Area does not appear to present any conditions that are beyond the scope of the Environmental Management Manual. Therefore, provided the procedures outlined in the Environmental Management Manual are followed (e.g., erosion and sediment control, hazardous material spills), there should be effective mitigation against most potential adverse environmental effects related to the Project.

A Watercourse and Wetland Alteration (WAWA) Permit must be obtained for any work in, or within 30 m of the watercourse in the vicinity of the proposed Project. All work must comply with the terms of the permit.

4.3 FISH AND FISH HABITAT

The potential environmental effects of Project activities on fish and fish habitat include direct disturbance/loss of habitat, interference with biological time periods (*i.e.*, migration or spawning of fish), the addition of suspended solids to the water column through erosion and sedimentation, and direct mortality of fish.

Erosion and sedimentation may increase the amount of suspended solids in the water column and may increase the amount of fine material that settles over the substrate. Such materials can smother fish eggs that occur on the river bottom, or can smother benthic invertebrates that are a primary food source for many fish species. High levels of suspended solids in the water column can occlude fish gills, causing suffocation.

Based on the results of the visual fish survey, it is confirmed that Little Tracadie River and Trout Stream are fish habitat and do support fish. Little Tracadie River within the Study Area is tidally influenced and is characterized as estuarine at the Project site. Therefore, timing restrictions may be required to mitigate potential adverse environmental effects of the Project on critical fish migration and spawning times. While the optimal period for in-stream work is usually identified

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as the low-flow months from June to September, an alternative window for in-stream work may be available between December and March at this estuarine site. During these months, there would be minimal interference with the biological requirements of most fish species, and in particular the sensitive periods for fish such as brook trout and Atlantic salmon could be avoided. Final recommendations regarding optimal periods for work in or near the water would require approval from DFO.

A Watercourse and Wetland Alteration (WAWA) Permit must be obtained for any work in-River or within 30 m of the Little Tracadie River and Trout Stream. All work must comply with the terms of the permit. In-River work, if required, should be conducted during low flows (June 1st to September 30th). In addition, timing restrictions to accommodate critical fish migration periods and spawning may be required. All HADD related issues will be mitigated by NBDOT in consultation with DFO.

Environmental Effects Monitoring during construction activities should include the collection of water samples from the Little Tracadie River, upstream and downstream of the Project site, in the event that a visible silt plume be present while soil surfaces are exposed by construction activities or during periods of in-River work. The same would apply for Trout Stream at its confluence with the Little Tracadie River. Water samples should be collected at mid-depth in the water column, 25 m upstream and 25 m downstream from the work areas, in the visible plume, in order to document the magnitude of any siltation events. Water samples should be analyzed for total suspended solids (TSS) to ensure that mitigation (*e.g.*, silt fencing, silt curtains, cofferdams) is performing adequately, and that there is no significant release of a deleterious substance (*i.e.*, silt) to fish habitat.

According to the Canadian Environmental Quality Guidelines, during clear flow conditions, suspended solids should not increase by a level exceeding 25 mg/L over background levels for any short-term exposure (*e.g.*, 24-hour period), and must not increase beyond a level exceeding 5 mg/L over background levels for any longer term exposure (*e.g.*, inputs lasting between 24-hours and 30 days) (CCME 1999, 2008 update). Work should be suspended and/or additional mitigation should be implemented in the event that it is found or suspected that TSS concentrations resulting from Project activities are exceeding CCME guidelines.

4.4 WATER EXTRACTION, BUSINESSES AND RESIDENTS

Approximately 19 residential properties were identified by PID number within the Assessment Area (Figure 4.1). These properties are generally assumed to have onsite private water wells which are used for potable purposes.

It is likely that construction activities will occur within approximately 50 m of the some wells located within the Assessment Area. It is recommended that wells within the 50 m area be sampled prior to construction. A water well sampling plan should be prepared once project

design details and construction plans are sufficiently advanced to identify a zone of potential effects based on anticipated intensity and duration of ground vibrations. However, in the absence of Project details, the potential environmental effects of construction activities can not be yet be evaluated.

4.5 PUBLIC AND ABORIGINAL INTERESTS

No substantive adverse environmental effects on public interests (e.g., boating, fishing, hunting) are expected due to Project activities. Although evidence public use of Little Tracadie River was observed (e.g., boat wharves at residential properties) during the site visit, it is anticipated that the interruption caused by construction of the Project would be short-term in nature and would not result in a substantive environmental effect.

The Little Tracadie River supports a variety of recreational and commercial fisheries. Further consultation to identify commercial fisheries, seasons, and locations should be undertaken.

Little Tracadie River at the Project site is likely considered to be navigable waters by Transport Canada. Therefore, Transport Canada should be contacted by NBDOT in order to seek a determination regarding navigability and permitting or approval requirements prior to construction activities, in sufficient time to inform any provincial or federal environmental assessment process.

There are no known concerns with respect to the Project regarding current use of land or resources for traditional purposes by First Nations persons. Efforts to consult with local First Nations communities have been undertaken (i.e., a registered letter was sent on September 11, 2009, with follow-up telephone calls completed the week of September 29-30, 2009). No written responses have been received to date in response to the letters sent to the four First Nations identified within 100 km of the Project site. Follow-up phone calls were made to Burnt Church, Eel Ground, Pabineau and Metepenagiag First Nations. The Band Manager at the Metepenagig First Nation indicated that there would be no anticipated significant environmental effects as a result of the Project on the current use of land or resources by Aboriginal Persons.

4.6 PHYSICAL AND CULTURAL RESOURCES

4.6.1 Archaeological and Heritage Resources

The visual survey of the Assessment Area identified three areas containing archaeological or heritage potential in the southwest, northwest and northeast quadrants (Figure 4.1). A shoreline terrace area in the southwest quadrant, and a terrace area within a hayfield in the northwest quadrant and a field within the northeast quadrant (Appendix F).

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One shovel test was completed in the southwest quadrant of the Assessment Area. No archaeological or heritage resources were recovered in the shovel tests. Shovel testing was not completed in the northwest or northeast quadrants as access to the land had not been secured at the time of the site visit. Due to a high level of ground disturbance (e.g., residential development, hay and commercial blueberry fields) in the southeast quadrant of the Assessment Area at the time of the site visit, no further testing was recommended. However, based on our understanding of pre-contact settlement patterns of First Nations peoples and their ancestors along watercourses, testing in the southwest, northwest and northeast quadrants of the Assessment Area is recommended once Project design details are known to determine the level of disturbance in the area. Avoidance of areas with potential for archaeological or heritage resources is recommended. Should it not be possible to avoid this area during construction, further testing will be required.

No known archaeological or heritage sites are recorded within the immediate vicinity of the proposed Project location, although over a dozen sites have been located at the mouth of the Little Tracadie River approximately 5 km east of the Assessment Area. Due to the distance of these recorded sites from the proposed Project, no significant environmental effects on these sites are expected to occur as a result of project activities.

In the event that avoidance of areas with potential for archaeological or heritage resources is not possible, additional archaeological investigation will be required under the 2009 Guidelines for Conducting Heritage Resource Impact Assessment in New Brunswick. Any area within 50 m of the banks or shores or a current or former body of water (*i.e.*, river, lake, bay) is considered to hold high potential for undocumented archaeological or heritage resources and must be subjected to subsurface testing at 5 m intervals across the planned disturbance area. Areas between 50 m and 80 m of the banks or shores or a current or former body of water are considered to hold a moderate potential for undocumented archaeological or heritage resources and must be subjected to subsurface testing at 10 m intervals across the planned disturbance area (Archaeological Services 2009). The Guidelines should be consulted in the specific context of any anticipated disturbance of land identified as having archaeological potential, and any investigative plan must be developed in consultation with and approved by the Archaeological Services Unit of New Brunswick.

In the event that Project personnel encounter any potential archaeological resources, work in the immediate area of the find (10 m radius) must be halted immediately, and the Archaeological Services must be contacted (506-444-4746) in accordance with NBDTI's Environmental Management Manual. Historic and archaeological resources may not be removed by anyone other than a licenced archaeologist.

4.6.2 Paleontological Resources

Although Dr. Randall Miller has not been available to provide information, the nature of the Project (*i.e.*, construction of a replacement watercourse crossing) is such that significant disturbance of bedrock, and therefore potential to adversely affect paleontological resources, is unlikely. In the event that Project personnel encounter any potential Paleontological resources, work in the immediate area of the find (10 m radius) must be halted immediately, and the Curator of Geology and Paleontological services at the NB Museum must be contacted (506-643-2361) in accordance with NBDTI's Environmental Management Manual.

5.0 CLOSING

This report has been prepared for the sole benefit of New Brunswick Department of Transportation and Infrastructure (NB DTI). The report may not be used by any other person or entity, other than for its intended purposes, without the consent of Stantec Consulting Limited (Stantec) and NB DTI.

The information and conclusions contained in this report are based upon work undertaken in accordance with generally accepted engineering and scientific practices current at the time the work was performed. Some of the information provided in this report was compiled from existing documents and data provided by NB DTI. Stantec has assumed that those data are correct and accurately describe the environment of Little Tracadie River at Route 365 crossing in Tracadie, Gloucester County, New Brunswick. If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, Stantec requests that we be notified immediately, and permitted to reassess the conclusions provided herein.

This report was prepared by Julianne Sullivan, M.Sc., Virgil Grecian, M.Sc., Gart Bishop, B.Sc., and Courtney Cameron, M.A., and reviewed by Mary Murdoch, M.Sc., and Malcolm Stephenson, Ph.D. If you have any questions or comments on the contents of this report, please contact the undersigned.

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6.0 References

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6.1 PERSONAL COMMUNICATIONS

Kenny Levi, Metepengiag First Nation. Band Manager. September 30, 2009.



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
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APPENDIX A

Atlantic Canada Conservation Data Centre (ACCDC) Results



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
TRACADIE, NB**

September 22, 2017



DATA REPORT 3602: Little Tracadie River 2, NB

Prepared 21 August, 2009
by S.H. Gerriets

CONTENTS OF REPORT

1.0 Preface

- 1.1 Caveats
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2.0 Study Area Results

- 2.1 Flora
- 2.2 Fauna
- Map 1: Flora and Fauna

3.0 Special Areas

- 3.1 Managed Areas
- 3.2 Significant Areas
- Map 2: Special Areas

4.0 Taxa List

5.0 Source Bibliography

1.0 PREFACE

The Atlantic Canada Conservation Data Centre (ACCDC) is part of a network of circa 85 NatureServe data centres & heritage programs in 10 provinces, 1 territory, 50 states, 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, Newfoundland and Labrador. Although a non-governmental agency, the ACCDC is supported by 6 federal agencies, plus 4 provincial governments, outside grants and data processing fees. URL: www.ACCDC.com.

Upon request, the ACCDC provides known occurrence data for rare and endangered flora and fauna, in and near a specified study area. As a standard supplement to that data, the ACCDC includes locations of managed areas with some level of protection for flora and fauna, and also known sites of ecological interest, e.g. NB DOE Environmentally Significant Areas. Floral, faunal and Special Areas data are attached to our e-mail response as *.dbf files which may be opened from within data software (e.g. Excel, Access) or mapped in GIS (e.g. ArcView, MapInfo, AutoCAD).

1.1 CAVEATS

While the ACCDC makes a strong effort to verify the accuracy of all the data it obtains, generates and manages, it shall not be held responsible for any inaccuracies in any data that it provides. The following CAVEATS apply:

- a.) Data is restricted to use by the specified Data User; any third party requiring data must make its own data request.
- b.) To ensure the currency of data, the ACCDC requires Data Users to cease using data 12 months after receipt; if data is still needed after that term, the ACCDC will supply current data as a replacement.
- c.) ACCDC data responses are restricted to that data in our Data System at the time of the data request.
- d.) Data is qualified as to location (Precision) and time (SurveyDate); cf Data Dictionary for details.
- e.) ACCDC data reports are not to be construed as exhaustive inventories of taxa in an area.
- f.) The non-occurrence of a taxon cannot be inferred by its absence in an ACCDC data report.

1.2 ADDITIONAL INFORMATION

Please direct biological questions about ACCDC data to: Sean Blaney, ACCDC: (506) 364-2658, and technical data queries to: Stefen Gerriets, ACCDC: (506) 364-2657.

For provincial information on rare taxa and protected areas, or information on game animals, deer yards, old growth forest, archeological sites, fish habitat etc, please contact Stewart Lusk, NBDNR: (506) 453-2440.

For more specific information about Peregrine Falcon locations, please contact: Diane Amirault, CWS: (506) 364-5060.

2.0 RARE AND ENDANGERED TAXA

A 5km buffer around the study area contains a relatively moderate-to-large (quintile 4) density of taxa records: 111 records of 39 taxa from 8 sources. (Data Density: 1.41 rec/km²).

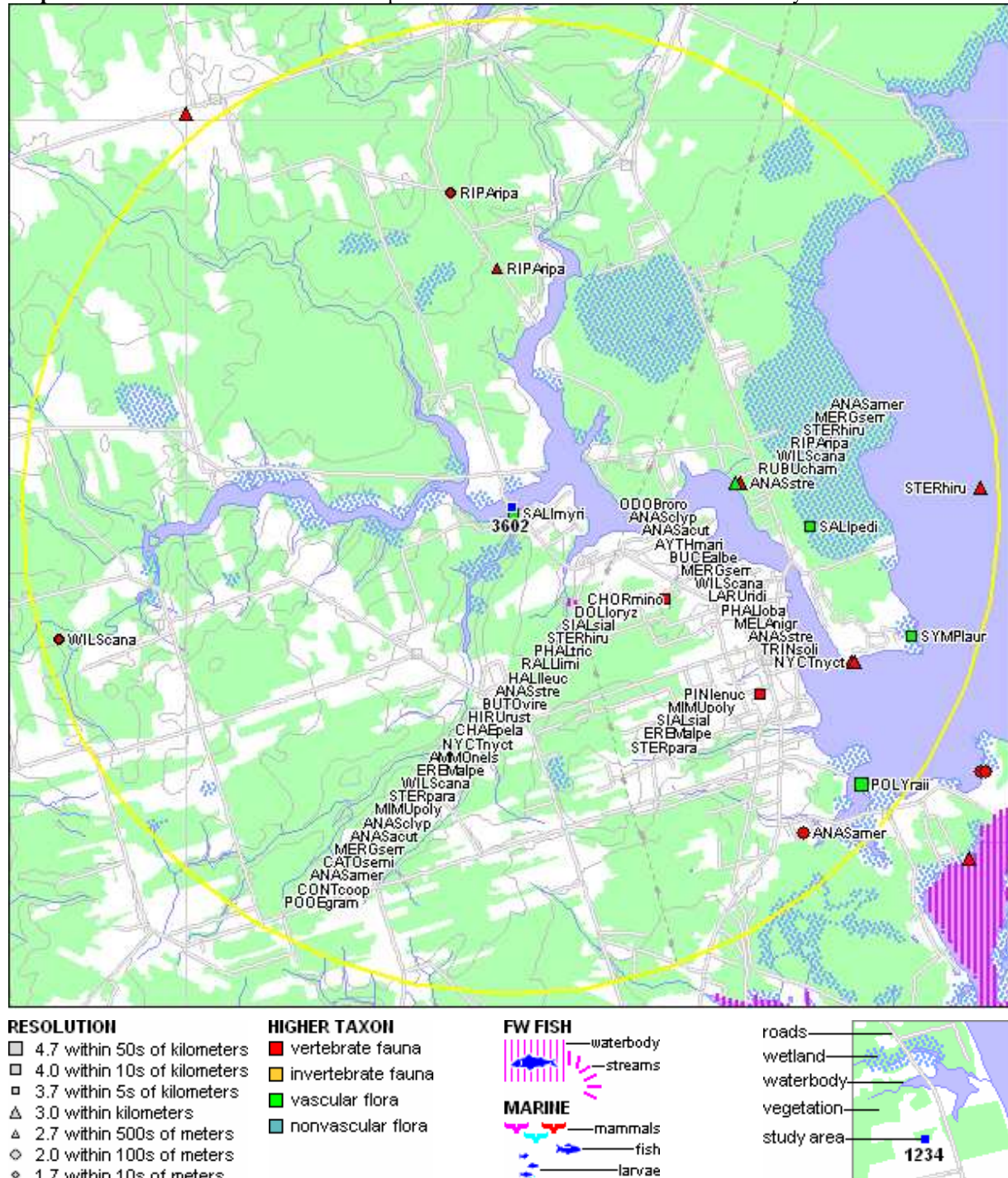
2.1 FLORA

A 5km buffer around the study area contains 6 records of 5 vascular, 0 records of nonvascular flora (see attached *eo.dbf).

2.2 FAUNA

A 5km buffer around the study area contains 105 records of 34 vertebrate, 0 records of invertebrate fauna (cf attached *eo.dbf). No data-sensitive taxa were identified.

Map 1: Known observations of rare and/or protected flora and fauna within buffered study area.



3.0 SPECIAL AREAS

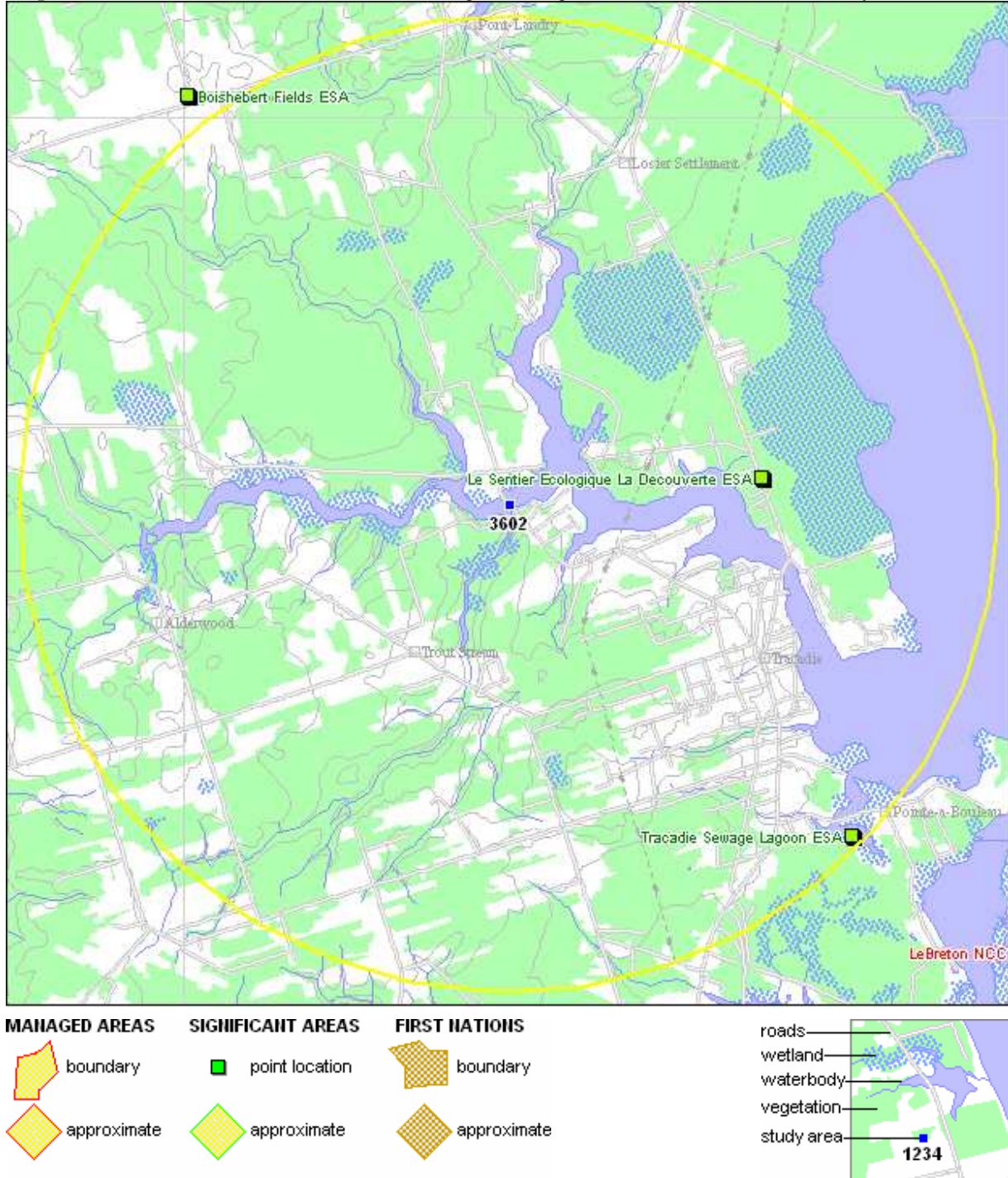
3.1 MANAGED AREAS

No Managed Areas identified.

3.2 SIGNIFICANT AREAS

The GIS scan identified 2 biologically significant areas in the vicinity of the study area; such sites are known for exceptional biotic richness but may or may not have legal status (see attached *sa.dbf).

Map 2: Boundaries and/or locations of known Managed and Significant Areas within 5km of study area.



4.0 TAXON LIST

Flora and fauna within the buffered area listed in order of concern, beginning with any legally listed taxa, including the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation.

Scientific name	Common name	COSEWIC	Provincial	Srank	obs	dist.km
<i>Charadrius melodus melodus</i>	Piping Plover	E	Endangered	S2B	2	2 ±5
<i>Haliaeetus leucocephalus</i>	Bald Eagle	NAR	Reg.Endangered	S3B	2	2 ±5
<i>Ammodramus nelsoni</i>	Nelson's Sharp-tailed Sparrow	NAR		S3B	3	2 ±5
<i>Sialia sialis</i>	Eastern Bluebird	NAR		S3B	8	2 ±5
<i>Sterna hirundo</i>	Common Tern	NAR		S3B	7	2 ±5
<i>Odobenus rosmarus rosmarus</i>	Atlantic Walrus - NW Atlantic pop.	SC		SX	1	4 ±1
<i>Symphyotrichum laurentianum</i>	Gulf of St. Lawrence Aster	T	Endangered	S1	2	4 ±5
<i>Chaetura pelagica</i>	Chimney Swift	T		S2S3B	1	2 ±5
<i>Wilsonia canadensis</i>	Canada Warbler	T		S4B	5	2 ±1
<i>Chordeiles minor</i>	Common Nighthawk	T		S4B	1	2 ±5
<i>Contopus cooperi</i>	Olive-sided Flycatcher	T		S5B	1	2 ±5
<i>Aythya marila</i>	Greater Scaup			S1B,S2N	1	4 ±1
<i>Phalaropus tricolor</i>	Wilson's Phalarope			S1S2B	2	2 ±5
<i>Poocetes gramineus</i>	Vesper Sparrow			S2B	2	2 ±5
<i>Sterna paradisaea</i>	Arctic Tern			S2B	3	2 ±5
<i>Anas strepera</i>	Gadwall			S2B	5	2 ±5
<i>Anas clypeata</i>	Northern Shoveler			S2B	5	2 ±5
<i>Nycticorax nycticorax</i>	Black-crowned Night-heron			S2B	2	2 ±5
<i>Butorides virescens</i>	Green Heron			S2B	1	2 ±5
<i>Tringa solitaria</i>	Solitary Sandpiper			S2B,S5M	1	4 ±1
<i>Larus ridibundus</i>	Black-headed Gull			S2M,S1N	1	4 ±1
<i>Tringa semipalmata</i>	Willet			S2S3B	3	2 ±5
<i>Salix pedicellaris</i>	Bog Willow			S3	1	3 ±5
<i>Salix myricoides</i>	Blue-Leaved Willow			S3	1	0 ±5
<i>Rubus chamaemorus</i>	Cloudberry			S3	1	2 ±1
<i>Pinicola enucleator</i>	Pine Grosbeak			S3	1	3 ±5
<i>Mimus polyglottos</i>	Northern Mockingbird			S3B	4	2 ±5
<i>Hirundo rustica</i>	Barn Swallow			S3B	2	2 ±5
<i>Riparia riparia</i>	Bank Swallow			S3B	3	2 ±1
<i>Eremophila alpestris</i>	Horned Lark			S3B	3	2 ±5
<i>Rallus limicola</i>	Virginia Rail			S3B	1	2 ±5
<i>Anas americana</i>	American Wigeon			S3B	9	2 ±1
<i>Anas acuta</i>	Northern Pintail			S3B	11	2 ±5
<i>Phalaropus lobatus</i>	Red-necked Phalarope			S3M	1	4 ±1
<i>Melanitta nigra</i>	Black Scoter			S3M,S2S3N	1	4 ±1
<i>Bucephala albeola</i>	Bufflehead			S3N	1	4 ±1
<i>Dolichonyx oryzivorus</i>	Bobolink			S3S4B	4	2 ±5
<i>Mergus serrator</i>	Red-breasted Merganser			S3S4B,S4S5M,S4	7	2 ±1
<i>Polygonum raii</i>	Pondshore Knotweed			SX	1	5 ±10

5.0 SOURCE BIBLIOGRAPHY

The recipient of this data shall acknowledge the ACCDC and the data sources of the dataset in any documents, reports, publications or presentations, in which this dataset makes a major contribution. The sources listed below contributed data contained in this report:

recs	source
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**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
TRACADIE, NB**

September 22, 2017

APPENDIX B

Photographs of the Assessment Area



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
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At the Right of Way in 2009



Photo 1 Right of Way showing causeway and bridge structure downstream



Photo 2 Right of Way showing causeway and salt marsh upstream

ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, TRACADIE, NB – Appendix B

September 22, 2017



Photo 3 Existing bridge structure



Photo 4 Existing bridge structure



Photo 5 shoreline on downstream side of existing bridge



Photo 6 Salt Marsh upstream of the existing bridge

Archaeology and Heritage Resources in 2009



Photo 7 View to north from south side of River.



Photo 8 Wetland area in northeast quadrant facing south

ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, TRACADIE, NB – Appendix B

September 22, 2017



Photo 9 Southeast quadrant facing north



Photo 10 Southwest quadrant facing north



Photo 11 Northwest quadrant facing southwest



Photo 12 Northwest quadrant facing north

ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, TRACADIE, NB – Appendix B

September 22, 2017



Photo 13 Northeast quadrant facing south



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
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APPENDIX C

Plant Species Encountered in the Assessment Area



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
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ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, TRACADIE, NB –
Appendix C

September 22, 2017

Table C.1 Plant Species Encountered in the Little Tracadie River Bridge No. 2 Study Area during the Site Visit in 2009

Scientific Name	Common Name	ACCDC SRank
<i>Agrostis stolonifera</i>	Spreading Bentgrass	S5SE
<i>Alnus incana</i>	Speckled Alder	S5
<i>Ambrosia artemisiifolia</i>	Annual Ragweed	S5
<i>Anaphalis margaritacea</i>	Pearly Everlasting	S5
<i>Anemone canadensis</i>	Canada Anemone	S5
<i>Argentina egedii</i>	Egede Cinquefoil	S4S5
<i>Artemisia vulgaris</i>	Common Wormwood	SE
<i>Aster novi-belgii</i>	New Belgium American-Aster	S5
<i>Aster puniceus</i>	Swamp Aster	S5
<i>Aster umbellatus</i>	Parasol White-Top	S5
<i>Atriplex patula</i>	Halberd-Leaf Saltbush	S4S5
<i>Betula papyrifera</i>	Paper Birch	S5
<i>Bidens frondosa</i>	Devil's Beggar-Ticks	S5
<i>Bolboschoenus maritimus</i>	Saltmarsh Bulrush	S5
<i>Bromus inermis</i>	Awnless Brome	SE
<i>Calystegia sepium</i>	Hedge Bindweed	S5
<i>Carex mackenziei</i>	Mackenzie Sedge	S3
<i>Carex vesicaria</i>	Inflated Sedge	S5
<i>Carum carvi</i>	Common Caraway	SE
<i>Chelone glabra</i>	White Turtlehead	S5
<i>Comptonia peregrina</i>	Sweet Fern	S5
<i>Conyza canadensis</i>	Canada Horseweed	S5
<i>Diervilla lonicera</i>	Northern Bush-Honeysuckle	S5
<i>Eleocharis halophila</i>	Salt-Marsh Spike-Rush	S4?
<i>Elytrigia repens</i>	Quackgrass	SE
<i>Epigaea repens</i>	Trailing Arbutus	S5
<i>Epilobium angustifolium</i>	Fireweed	S5
<i>Epilobium ciliatum</i>	Hairy Willow-Herb	S5
<i>Equisetum fluviatile</i>	Water Horsetail	S5
<i>Equisetum sylvaticum</i>	Woodland Horsetail	S5
<i>Euphrasia nemorosa</i>	Common Eyebright	SE?
<i>Euthamia graminifolia</i>	Flat-Top Fragrant-Golden-Rod	S5
<i>Galeopsis tetrahit</i>	Brittle-Stem Hempnettle	SE
<i>Galium mollugo</i>	Great Hedge Bedstraw	SE
<i>Galium palustre</i>	Marsh Bedstraw	S5
<i>Gaultheria procumbens</i>	Teaberry	S5
<i>Gaylussacia baccata</i>	Black Huckleberry	S5
<i>Glaux maritima</i>	Sea Milkwort	S5
<i>Glyceria grandis</i>	American Mannagrass	S5
<i>Hippuris vulgaris</i>	Common Mare's-Tail	S4S5
<i>Impatiens capensis</i>	Spotted Jewel-Weed	S5
<i>Iris versicolor</i>	Blueflag	S5
<i>Juncus arcticus</i>	Baltic Rush	S5
<i>Juncus tenuis</i>	Slender Rush	S5
<i>Kalmia angustifolia</i>	Sheep-Laurel	S5
<i>Linnaea borealis</i>	Twinflower	S5
<i>Malus pumila</i>	Common Apple	SE
<i>Matricaria maritima</i>	False Mayweed	SE
<i>Melilotus officinalis</i>	Yellow Sweetclover	SE
<i>Mentha arvensis</i>	Corn Mint	S5
<i>Myosotis laxa</i>	Small Forget-Me-Not	S5
<i>Oenothera parviflora</i>	Northern Evening-Primrose	S5
<i>Osmunda claytoniana</i>	Interrupted Fern	S5
<i>Persicaria pensylvanica</i>	Pennsylvania Smartweed	S4
<i>Picea glauca</i>	White Spruce	S5

ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, TRACADIE, NB –
Appendix C

September 22, 2017

Table C.1 Plant Species Encountered in the Little Tracadie River Bridge No. 2 Study Area during the Site Visit in 2009

Scientific Name	Common Name	ACCDC SRank
<i>Picea mariana</i>	Black Spruce	S5
<i>Pinus banksiana</i>	Jack Pine	S5
<i>Pinus resinosa</i>	Red Pine	S4S5
<i>Pinus strobus</i>	Eastern White Pine	S5
<i>Plantago major</i>	Nipple-Seed Plantain	SE
<i>Poa palustris</i>	Fowl Bluegrass	S5
<i>Polygonum arenastrum</i>	Oval-Leaf Knotweed	SE
<i>Populus grandidentata</i>	Large-Tooth Aspen	S5
<i>Populus tremuloides</i>	Quaking Aspen	S5
<i>Potamogeton foliosus</i>	Leafy Pondweed	S4
<i>Potamogeton perfoliatus</i>	Clasping-Leaf Pondweed	S4S5
<i>Potentilla erecta</i>	Erect Cinquefoil	
<i>Prunus virginiana</i>	Choke Cherry	S5
<i>Quercus rubra</i>	Northern Red Oak	S5
<i>Ranunculus cymbalaria</i>	Seaside Crowfoot	S4
<i>Raphanus raphanistrum</i>	Wild Radish	SE
<i>Rhinanthus minor</i>	Little Yellow-Rattle	S5
<i>Rosa virginiana</i>	Virginia Rose	S5
<i>Rubus idaeus</i>	Red Raspberry	S5
<i>Rumex crispus</i>	Curly Dock	SE
<i>Ruppia maritima</i>	Ditch-Grass	S5
<i>Salix bebbiana</i>	Bebb's Willow	S5
<i>Salix discolor</i>	Pussy Willow	S5
<i>Salix discolor</i>	Pussy Willow	S5
<i>Schoenoplectus pungens</i>	Three-Square Bulrush	S5
<i>Schoenoplectus tabernaemontani</i>	Soft-Stem Bulrush	S5
<i>Scirpus microcarpus</i>	Small-Fruit Bulrush	S5
<i>Silene vulgaris</i>	Maiden's Tears	SE
<i>Solidago gigantea</i>	Smooth Goldenrod	S5
<i>Solidago rugosa</i>	Rough-Leaf Goldenrod	S5
<i>Solidago sempervirens</i>	Seaside Goldenrod	S5
<i>Sonchus arvensis</i>	Field Sowthistle	SE
<i>Sorbus decora</i>	Northern Mountain-Ash	S4S5
<i>Spartina alterniflora</i>	Saltwater Cordgrass	S5
<i>Spartina pectinata</i>	Fresh Water Cordgrass	S5
<i>Spiraea alba</i>	Narrow-Leaved Meadow-Sweet	S5
<i>Stuckenia pectinata</i>	Sago False Pondweed	S2
<i>Tanacetum vulgare</i>	Common Tansy	SE
<i>Tanacetum vulgare</i>	Common Tansy	SE
<i>Thalictrum pubescens</i>	Tall Meadow-Rue	S5
<i>Tilia americana</i>	American Basswood	S3S4
<i>Trifolium pratense</i>	Red Clover	SE
<i>Triglochin maritima</i>	Common Bog Arrow-Grass	S5
<i>Typha latifolia</i>	Broad-Leaf Cattail	S5
<i>Vaccinium angustifolium</i>	Late Lowbush Blueberry	S5
<i>Vaccinium myrtilloides</i>	Velvetleaf Blueberry	S5

Appendix C

September 22, 2017

Notes:**AC CDC Status Rank Definitions**

- S1 Extremely rare: May be especially vulnerable to extirpation (typically 5 or fewer occurrences or very few remaining individuals).
- S2 Rare: May be vulnerable to extirpation due to rarity or other factors (6 to 20 occurrences or few remaining individuals).
- S3 Uncommon, or found only in a restricted range, even if abundant at some locations (21 to 100 occurrences).
- S4 Usually widespread, fairly common, and apparently secure with many occurrences, but of longer-term concern (e.g., watch list) (100+ occurrences).
- S5 Widespread, abundant, and secure, under present conditions.
- S#S# Numeric range rank: A range between two consecutive ranks for a species/community. Denotes uncertainty about the exact rarity (e.g., S1S2).
- SH Historical: Previously occurred in the province but may have been overlooked during the past 20-70 years. Presence is suspected and will likely be rediscovered; depending on species/community.
- SU Unrankable: Possibly in peril, but status is uncertain - need more information.
- SX Extinct/Extirpated: believed to be extirpated from its former range.
- S? Unranked: not yet ranked.
- SA Accidental: Accidental or casual, infrequent and far outside usual range. Includes species (usually birds or butterflies) recorded once or twice, or only at very great intervals, hundreds or even thousands of miles outside their usual range.
- SE Exotic: An exotic established in the province (e.g., Purple Loosestrife or Coltsfoot); may be native in nearby regions.
- SE# Exotic numeric: An established exotic that has been assigned a rank.
- SP Potential: Potentially occurs, but no occurrences have been reported.
- SR Reported but without persuasive documentation (e.g., misidentified specimen).
- SRF Reported falsely: erroneously reported and the error has persisted in the literature.
- SZ Zero: not of practical conservation concern because there are no definable occurrences, although the species is native and appears regularly. An SZ rank is generally used for long distance migrants that pass through the province occasionally.

Qualifiers

- B Breeding (Migratory species)
- N Non-breeding (Migratory species)
- ? Inexact or uncertain (the "?" qualifies the character immediately preceding it in the S-rank)
- C Captive or cultivated



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
TRACADIE, NB**

September 22, 2017

APPENDIX D

Bird Species Encountered in the Assessment Area with
Notes on Breeding Status and Habitat



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
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ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, TRACADIE, NB –

Appendix D

September 22, 2017

Table D.1 Bird Species Encountered in the Little Tracadie River Bridge No. 2 Study Area during the Site Visit in 2009

Scientific Name	Common Name	New Brunswick Status	Highest Breeding Evidence*	Breeding Status**	Habitat***
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	Secure	0	OB	23
<i>American Bittern</i>	American Bittern	Secure	0	OB	31
<i>Anas crecca</i>	Green-winged Teal	Secure	0	OB	0
<i>Anas discors</i>	Blue-winged Teal	Secure	0	OB	23
<i>Anas rubripes</i>	American Black Duck	Secure	0	OB	23
<i>Ardea herodias</i>	Great Blue Heron	Secure	0	OB	23
<i>Bombycilla cedrorum</i>	Cedar Waxwing	Secure	0	OB	9
<i>Carduelis tristis</i>	American Goldfinch	Secure	0	OB	31
<i>Ceryle alcyon</i>	Belted Kingfisher	Secure	19	PR	31
<i>Circus cyaneus</i>	Northern Harrier	Secure	0	OB	23
<i>Columba livia</i>	Rock Pigeon	Secure	0	OB	31
<i>Corvus brachyrhynchos</i>	American Crow	Secure	0	OB	31
<i>Cyanocitta cristata</i>	Blue Jay	Secure	0	OB	9
<i>Dumetella carolinensis</i>	Gray Catbird	Secure	0	OB	31
<i>Falco columbarius</i>	Merlin	Secure	0	OB	23
<i>Haliaeetus leucocephalus</i>	Bald Eagle	At Risk	0	OB	31
<i>Melospiza melodia</i>	Song Sparrow	Secure	0	OB	0
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	Secure	0	OB	23
<i>Quiscalus quiscula</i>	Common Grackle	Secure	0	OB	10
<i>Tringa melanoleuca</i>	Greater Yellowlegs	Secure	0	OB	23
<i>Zenaidura macroura</i>	Mourning Dove	Secure	0	OB	31
<i>Zenaidura macroura</i>	Mourning Dove	Secure	0	OB	10

Legend:

Highest Breeding Evidence*	Breeding Status**	Habitat***	
0 = No indication Breeding	OB = Observed Only	0 = Mature Softwood	16 = Semi-Barrens
1 =	PO = Possible Breeder	1 = Immature Softwood	17 = Tall Shrub Swamp
2 = Habitat	PR = Probable Breeder	2 = Mature Mixedwood	18 = Low Shrub Swamp
3 = Singing male present	CO = Confirmed Breeder	3 = Immature Mixedwood	19 = Coniferous Treed Swamp
4 =		4 = Mature Hardwood	20 = Deciduous Treed Swamp
5 = Pair in suitable nest		5 = Immature Hardwood	21 = Mixedwood Treed Swamp
6 = Territory		6 = Clear-cut	22 = Fresh Marsh
7 = Courtship		7 = Tallshrub Thicket	23 = Brackish Marsh
8 = Visiting nest site		8 = Lowshrub Thicket	24 = Salt Marsh
9 = Agitated		9 = Disturbed Area	25 = Bog
10 = Brood patch		10 = Residential Area	26 = Treed Bog
11 = Nest building hole		11 = Abandoned Pasture	27 = Wet Meadow
12 =		12 = Pasture	28 = Fen
13 = Nest building		13 = Agriculture Crop Land	29 = Open Water
14 = Distraction display		14 = Hay Field	30 = Habitat Unknown
15 = Used nest		15 = Barrens	31 = Flew Over
16 = Fledged young			
17 = Adult at nesting site			
18 = Adult with fecal sac			
19 = Adult carrying food			
20 = Nest with eggs			
21 = Nest with young			



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
TRACADIE, NB**

September 22, 2017

APPENDIX E

Wetland Delineation Forms



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
TRACADIE, NB**

September 22, 2017

Table Location: East side Little Tracadie Bridge.

PLANT SPECIES OF CONSERVATION CONCERN

Surveyors: Gail Bishop
Virgil Grecian

UTM:

Waypoint: 47.53089 W 64.94806

Date: Sep 5/09

Project Name/Number: 1054964 NB DOT Bridge Jobs

Species Name: *Stuckenia pectinata*

Habitat

Habitat type, Topography, Associated species, Richness, % Forest/Shrub/Ground Cover, Notes:

Downstream side of Little Tracadie Bridge site, along left bank of causeway section. Brackish water, associated Algae, green algae.

Photos: Photos of algal patch w *Stuckenia* sp.

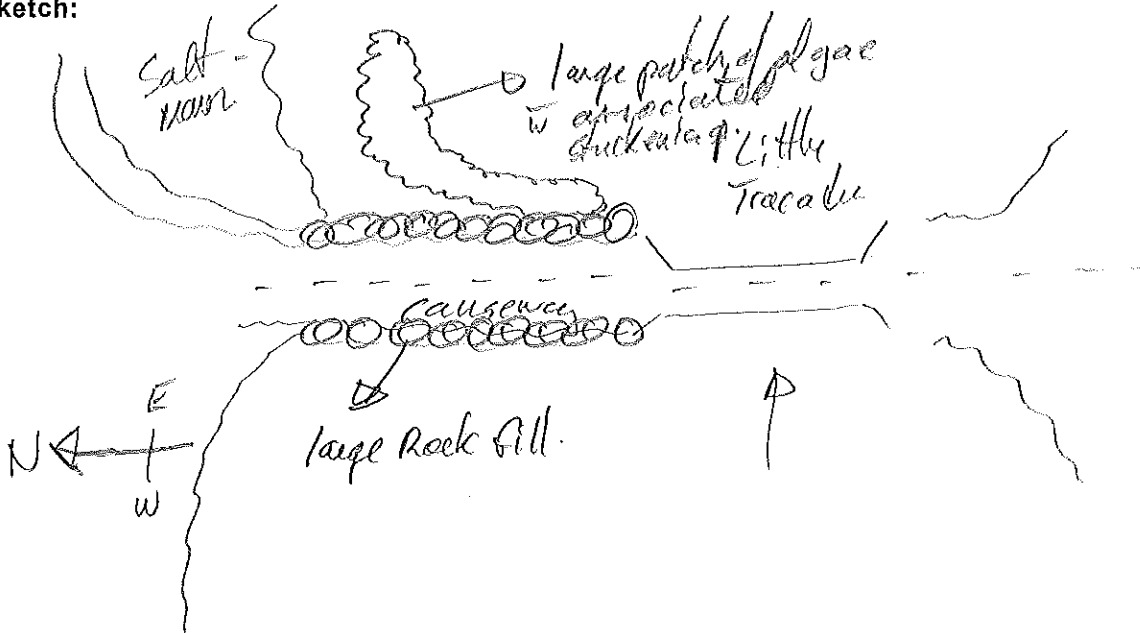
Rare Plant Notes

Description, Abundance, Phenology, Rank (Srank and Grank), Are this species located outside the ROW?

plants in the 1800's

Special Features: e.g., clearcuts, wetlands, watercourses, Project boundaries

Sketch:



Waypoints and Descriptions

Points or Range of Points	Description

Photo Numbers and Description

Number	Description

Notes:

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site Little Tracadie Date Sep 2 / 09 Sample Point JT PP No. 1 Upland
 Applicant/Owner _____ Field Investigator(s) Gert Bishop, Virgil Gossin
 County Gloucester Coordinates 47.53268 W-69.94867
 PID _____ Do normal environmental conditions exist on-site? Yes No
 If no explain: Partial Road Filling Embankment
 Atypical Situation? Yes No Explain _____
 Is this a potential Problem Area? Yes No Explain _____

Wetland Determination
 (Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes No
 Wetland Hydrology Yes No
 Hydric Soils Yes No
 Wetland Type: disturbed upland
 Rational for Determination: _____

Wetland Determination

YES NO

Vegetation

Tree Stratum: (Plot size: <u>10</u>)	%Cover	Dominant Species	Indicator Status
1. <u>Populus tremuloides</u>	<u>5</u>	<u>Dominant</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
<u>5</u> = Total Cover			

Shrub Stratum: (Plot size: <u>5</u>)	%Cover	Dominant Species	Indicator Status
1. <u>Viburnus pensylvanicus</u>	<u>25</u>	<u>Dominant</u>	<u>FACU</u>
2. <u>Asplenium sp.</u>	<u>30</u>	<u>Dominant</u>	<u>FACU</u>
3. <u>Rosa virginiana</u>	<u>30</u>	<u>Dominant</u>	<u>FAC</u>
4. <u>Rubus idaeus</u>	<u>10</u>	_____	<u>FAC</u>
5. <u>Ilex verticillata</u>	<u>5</u>	_____	<u>FACU</u>
<u>100</u> = Total Cover <u>50/20</u>			

Herb Stratum: (Plot size: <u>3</u>)	%Cover	Dominant Species	Indicator Status
1. <u>Galium palustre</u>	<u>2</u>	_____	<u>OBL</u>
2. <u>Solidago rugosa</u>	<u>8</u>	<u>Dominant</u>	<u>FAC</u>
3. <u>Thalictrum pubescens</u>	<u>6</u>	_____	<u>FACU</u>
4. <u>Collinsonia canadica</u>	<u>8</u>	<u>Dominant</u>	<u>FACU</u>
5. <u>Asplenium platyneuron</u>	<u>8</u>	<u>Dominant</u>	<u>FACU</u>
<u>2</u> = Total Cover			
<u>Epilobium ciliatum</u>	<u>3</u>	_____	<u>FAC</u>
<u>Fragaria virginiana</u>	<u>3</u>	_____	<u>FACU</u>
<u>Poa pratensis</u>	<u>12</u>	<u>Dominant</u>	<u>FAC</u>
<u>49</u> <u>25/9</u>			

Comments Upland is likely part of fill added to road edge and pasture extension

Dominance Test Worksheet:

of Dominant Species that are OBL, FACW, FAC: 5 (A)

Total # of Dominant Species across all strata: 8 (B)

% of Dominant Species that are OBL, FACW, FAC: 62 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiply by:
OBL Species <u>2</u>	x1 = <u>2</u>
FACW Species <u>22</u>	x2 = <u>44</u>
FAC Species <u>62</u>	x3 = <u>186</u>
FACU Species <u>63</u>	x4 = <u>252</u>
UPL Species _____	x5 = _____
Column Totals: <u>179</u>	x1 = <u>484</u>

Prevalence Index = B/A = 3.36

Hydrophytic Vegetation Indicators:

no Rapid Test for Hydrophytic Vegetation
yes Dominance Test is >50%
no Prevalence Index is ≤3.0¹
 _____ Morphological Adaptations¹ (explain)
 _____ Problematic Hydrophytic Vegetation¹ (explain)
¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes _____ No

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron reduction in tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators: (minimum of two required)

- Surface Soil Cracks (B6)
 - Drainage Patterns (B10)
 - Moss Trim Lines (B16)
 - Dry-Season Water Table (C2)
 - Crayfish Burrows (C8)
 - Saturation Visible on Aerial Imagery (C9)
 - Stunted or Stressed Plants (D1)
 - Geomorphic Position (D2)
 - Shallow Aquitard (D3)
 - Microtopographic Relief (D4)
 - FAC-Neutral Test (D5)
- FACW + OBL = 2*
FAILS - FACW + UPL = 3

Field Observations:

Surface Water Present? Yes No Depth _____
 Water Table Present? Yes No Depth _____
 Saturation Present? Yes No Depth _____

Wetland Hydrology Present? Yes No

Comments: _____

Total depth is 28 cm
Bottom 13 cm

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (cm)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-0								leaf litter
0-15	7YR 4/4	70	7.5YR 5/6	10				Sandy loam
16-28	2.5Y 8/1	50	10YR 6/4	50				Matrix Fine Sandy, fragments to 2cm.

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A6)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 5cm Mucky Peat or Peat (S3)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surfaces (S7)
- Polyvalue Below Surface (S8)
- Thin Dark Surface (S9)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Restrictive Layer (if observed): Type _____ Depth: _____

Hydric Soil Present? Yes No

Comments: _____

Little Tracable.

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site Little Tracable Date Sept/09 Sample Point LT PP No 1 Wet
 Applicant/Owner _____ Field Investigator(s) Gail Bishop Virgil Gleician
 County Cumberland Co. Coordinates 47.53265 W 67.94853
 PID _____ Do normal environmental conditions exist on-site? Yes No
 If no explain: _____
 Atypical Situation? Yes No Explain _____
 Is this a potential Problem Area? Yes No Explain _____

Wetland Determination
 (Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes No
 Wetland Hydrology Yes No
 Hydric Soils Yes No
 Wetland Type: Emergent salt marsh
 Rational for Determination: tidal, no trees or shrubs

Wetland Determination

YES NO

Vegetation

Tree Stratum: (Plot size: <u>10</u>)	%Cover	Dominant Species	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
<u>0</u> = Total Cover			

Shrub Stratum: (Plot size: <u>5</u>)	%Cover	Dominant Species	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
<u>0</u> = Total Cover			

Herb Stratum: (Plot size: <u>3</u>)	%Cover	Dominant Species	Indicator Status
1. <u>Carex vesicaria</u>	<u>95</u>	<u>Dominant</u>	<u>OBL</u>
2. <u>Lythrum alterniflora</u>	<u>12</u>		<u>OBL</u>
3. <u>Chelone glabra</u>	<u>15</u>		<u>OBL</u>
4. <u>Piper nigrum belgii</u>	<u>2</u>		<u>FACW</u>
5. <u>Azorella stolonifera</u>	<u>2</u>		<u>FACW</u>
<u>Galium palustre</u>			<u>OBL</u>
<u>Juncus arcticus</u>	<u>40</u>	<u>Dominant</u>	<u>OBL</u>
<u>Impatiens capensis</u>	<u>2</u>		<u>FACW</u>
<u>Equisetum fluviatile</u>	<u>2</u>		<u>OBL</u>
<u>177</u> = Total Cover			

Comments: 85/34

Dominance Test Worksheet:

of Dominant Species that are OBL, FACW, FAC: 2 (A)
 Total # of Dominant Species across all strata: 2 (B)
 % of Dominant Species that are OBL, FACW, FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of: _____ Multiply by: _____

OBL Species	<u>165</u>	x1 =	<u>165</u>
FACW Species	<u>6</u>	x2 =	<u>12</u>
FAC Species	_____	x3 =	_____
FACU Species	_____	x4 =	_____
UPL Species	_____	x5 =	_____
Column Totals:	<u>177</u>	x1 =	<u>177</u>

Prevalence Index = B/A = 1.04

Hydrophytic Vegetation Indicators:

Yes Rapid Test for Hydrophytic Vegetation
Yes Dominance Test is >50%
Yes Prevalence Index is ≤3.0¹
 _____ Morphological Adaptations¹ (explain)
 _____ Problematic Hydrophytic Vegetation¹ (explain)
¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes No

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron reduction in tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators: (minimum of two required)

- Surface Soil Cracks (B6)
 - Drainage Patterns (B10)
 - Moss Trim Lines (B16)
 - Dry-Season Water Table (C2)
 - Crayfish Burrows (C8)
 - Saturation Visible on Aerial Imagery (C9)
 - Stunted or Stressed Plants (D1)
 - Geomorphic Position (D2)
 - Shallow Aquitard (D3)
 - Microtopographic Relief (D4)
 - FAC-Neutral Test (D5)
- $FAC_{NW} + OF_{BL} = 2$
 $FAC_{U} + U_{pl} = 0$

Field Observations:

Surface Water Present? Yes No Depth 14cm

Water Table Present? Yes No Depth 14cm

Saturation Present? Yes No Depth 0cm

Comments: Total depth is 53cm
Green 10-2 or 3-38cm = organic.

Wetland Hydrology Present? Yes No

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth (cm)	Matrix		Redox Features				Texture	Remarks
	Color(moist)	%	Color(moist)	%	Type ¹	Loc ²		
<u>0-8</u>								<u>green veg.</u>
<u>3-58</u>	<u>5YR 3/1</u>	<u>100</u>						<u>organics decomposed in occasional</u>
<u>29-53</u>	<u>5YR 4/2</u>	<u>80</u>	<u>Gley 2 4/10b 20</u>					<u>course sand to pebbles like roots.</u>
			<u>fragments make remaining 20%</u>					<u>to 3cm.</u>

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 5cm Mucky Peat or Peat (S3)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surfaces (S7)
- Polyvalue Below Surface (S8)
- Thin Dark Surface (S9)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Restrictive Layer (if observed): Type _____ Depth: _____ Hydric Soil Present? Yes No

Comments: _____



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
TRACADIE, NB**

September 22, 2017

APPENDIX F

Fish Licence and Fish Licence Report



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
TRACADIE, NB**

September 22, 2017



Stantec

Jacques Whitford Stantec Limited
711 Woodstock Road
Fredericton NB E3B 5C2
Tel: (506) 457-3200
Fax: (506) 457-7652

September 8, 2009
File: 1054964. Little Tracadie River.

Chief, Licensing
Fisheries and Oceans Canada
Gulf Region, Resource Management
PO Box 5030
Moncton, New Brunswick
E1C 9B6

Via email: jacques.hache@dfo-mpo.gc.ca

Jacques Haché
Area Statistical Coordinator
Fisheries and Oceans Canada
Resource Management
3267 Principale Street
PO Box 3420, Station Main
Tracadie-Sheila, New Brunswick
E1X 1G5

Dear Mr. Haché:

Reference: Report on Licence No. SG-NBT-09-173A to fish for scientific purposes in the Gulf Region, in a tributary of Little Tracadie River at Route 365, Little Tracadie, New Brunswick.

This letter is to provide a report for fishing under licence number SG-NBT-09-173A. This licence was issued to Eva Walker, Aquatic Biologist, for Jacques Whitford Stantec Limited, on August 25, 2009.

Background

A fish habitat survey was conducted on September 1, 2009 in a tributary of Little Tracadie River at Route 365 in Tracadie, NB (Zone 20T, NAD83, 0353392E, 5265961N). The purpose of this study was to collect environmental data in support of an Environmental Background Study for the proposed construction of a new Route 365 bridge over the tributary to Little Tracadie River.

Fish Habitat Assessment

Fish habitat was assessed using the standard NBDNR/DFO Stream Survey Forms. Fish habitat was assessed 200 m upstream and 200 m downstream of the proposed Right of Way (RoW), including the RoW itself. Additional 300 m sections were surveyed upstream and downstream (500 m total) to assess potential for the presence or absence of barriers to fish passage.

September 8, 2009

Page 2 of 3

Reference: Report on Licence No. SG-NBT-09-173A to fish for scientific purposes in the Gulf Region, in a tributary of Little Tracadie River at Route 365, Little Tracadie, New Brunswick.

The assessed fish habitat was divided into two reaches:

- Reach 1 – 200 m downstream (extending from the existing RoW), and
- Reach 2 – 200 m upstream (extending from the existing RoW).

A summary of the NBDNR/DFO Stream Survey habitat assessment is presented below, complete information is appended.

The assessment area was tidally influenced.

Reach 1 is a wide, open water river feeding the Little Tracadie River. It was estimated to be 200 m wide and greater than 1 m in depth at the time of the survey. In the shallow areas close to shore, the substrate was dominated by sand, with some gravel. A few boulders and light fines deposition were also observed. No undercutting or overhanging vegetation was apparent from the shoreline. Bank vegetation was predominantly grasses with small areas of bare ground. Both banks were stable, with the right bank also having bare ground sections. Embeddedness of the substrate in the shallow areas close to shore was less than 20%.

Reach 2 was very similar to Reach 1. It can be characterized as a wide river environment, with a convergence approximately 50 m upstream. The upstream reach was approximately 170 m wide at the time of the survey, deeper than 1 m, with sandy substrate in the shallow areas. Substrate also included fines, gravel and a few boulders. No undercutting was observed on either bank, the left bank supported very limited overhanging vegetation, and both banks were predominantly stable. The right bank had a few areas of bare stable ground. Bank vegetation was dominated by grasses, as seen downstream, although there was more bare ground and some trees as well. In the shallow areas that could be assessed, substrate was embedded less than 20%.

Surface water quality was measured in Reach 1, adjacent to the existing approach span approximately 10 m from the eastern abutment of the bridge. Water quality was sampled late afternoon (15:30), close to high tide. Water temperature was found to be 18.5°C, dissolved oxygen was 11.4 mg/L (127% saturation), specific conductivity was 13.1 µS/cm, salinity was 7.7 ppt, and pH was 8.5. Velocity was not measured given that the site was tidally influenced.

Fish Survey

A fish survey was carried out on September 1, 2009, using a beach seine net. Multiple minnow traps were also set overnight and collected on September 2, 2009. Using both of these methods, three species of fish were caught in the tributary to Little Tracadie River:

- mummichog (*Fundulus heteroclitus*);
- threespine stickleback (*Gasterosteus aculeatus*); and
- ninespine stickleback (*Pungitius pungitius*).

The size range and number of fish sampled in the fish survey are appended.

September 8, 2009

Page 3 of 3

Reference: Report on Licence No. SG-NBT-09-173A to fish for scientific purposes in the Gulf Region, in a tributary of Little Tracadie River at Route 365, Little Tracadie, New Brunswick.

Based on the results of the fish survey, it can be confirmed that the Little Tracadie River supports small-bodied, salt-water tolerant fish and fish habitat. It should be noted that the wetland assessment field team observed large schools (>1,000 fish) of small-medium sized fish underneath the Route 365 bridge on September 3, 2009 during their site visit. It is anticipated that these fish were mummichogs, but their identification was not confirmed at the time of the sighting. Large schools of fish were not observed by the aquatic field crew during their site visit.

If you have any questions, please feel free to contact me at 902-468-7777 or by fax at 902-468-9009.

Sincerely,

JACQUES WHITFORD STANTEC LIMITED

(Original Signed By)

Julianne Sullivan, M.Sc.

Aquatic Biologist

Tel: (902) 468-7777 ext: 7385

Fax: (902) 468-9009

Julianne.Sullivan@stantec.com

Attachment: NBDNR Stream Survey Form
Fish Survey Results



Aquatic Survey Data Collection Form

Job/Phase #: _____1054964_____

GENERAL DATA					
Watercourse Name: Little Tracadie River		Personnel: JSS+MJS		Date: (dd/mm/yy) 01/09/2009	
UTM Coordinates: 0353392E, 5265961N 20T			Weather Observation: Sunny, calm, no precipitation.		
SAMPLING INFORMATION					
Gear Type: Seine Net & Minnow Traps	Dimensions: 210 x 125 cm (seine net)	Dimensions: 3 standard minnow traps	Seine Hauls: 7	Minnow Trap Soak Time: 16.5 hours (16:00 – 08:30)	
Notes: Fished in Reach 1 & 2. Abundant inverts at site. Shrimp also caught in seine net and minnow traps.					
WATER QUALITY					
Air Temp.: (°C) 18	Water Temp.: (°C) 18.46	DO: (mg/l): 11.40	Sp. Conductivity: (µS/cm) 13,110	Salinity: (ppt) 7.65	pH: 8.50
FISH SAMPLING RESULTS					
Seining					
Species	Count 1	Count 2	Count 3	Count 4	Size Range (cm)
mummichog	8				2.2-7.0
stickleback juveniles	4				1.0-2.0
Minnow Traps					
Species	Count 1	Count 2	Count 3	Count 4	Size Range (cm)
mummichog	3				3.0-10.5
3-spine stickleback	4				3.6-4.8
9-spine stickleback	2				4.7-5.4

YSI and pH Meters Calibrated?: _____ Yes _____ Crew Leader Signature: _____ JSS _____

Table 1. Stream Survey forms, Modified from NBDNR/DFO, for Little Tracadie River at Route 365 crossing, New Brunswick.

Watercourse	Coordinates	Reach No	Stream Type	Channel Type	Avg Width (m)		Substrate (%)							Avg. Depth Wet Width (cm)	% Undercut Bank		% Overhanging Bank Vegetation		Large Woody Debris Vegetation	Temp. C			Comments	% Site			Stream Banks										Depth			Pool rating Criteria		Pool Tail				
							Wet	Bank Channel	Bedrock	Boulder	Rock	Rubble	Gravel		Sand	Fines	L	R		L	R	Water		Air	Embeddedness	Riffle / Run	Pools	% Shade	Vegetation %				Bank Erosion Left Bank 0-50%		Bank Erosion Right Bank 0-50%		DO ₂ (mg/L)	pH	Specific Conductivity (µg/cm)	1/4 (cm)	1/2 (cm)		3/4 (cm)	No.	Letter	
					Bare Ground	Grasses																							Shrubs	Trees	Stable	Bare Stable	Eroding	Stable	Bare Stable	Eroding				Wet	Wet		Wet			
					Length (m)		Avg Width (m)																																							
Little Tracadie River	5265961N 0353392E 20T	1	8	1	200	200	210	0	5	0	10	15	50	20	>100	0	0	0	0	0	18.5	18	1	Large, open river. Tidal.	100	0	0	10	90	0	0	50	0	0	30	20	0	11.04	8.5	13,110	-	-	-	N/A	N/A	N/A
		2	11/8	1	200	170	180	0	5	0	0	30	60	5	>100	0	0	2	0	0	-	-	1	Large, open river. Tidal.	100	0	0	15	80	0	5	50	0	0	45	5	0	-	-	-	-	-	-	N/A	N/A	N/A



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
TRACADIE, NB**

September 22, 2017

APPENDIX G

Archaeological Licence and Archaeological Licence Report



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
TRACADIE, NB**

September 22, 2017



**The Province of New Brunswick
Archaeological Field Research Licence**

Under the provisions of Section 7.1 of the
Historic Sites Protection Act,
a licence is hereby granted to:

Courtney Cameron

to undertake the following archaeological
field research project entitled:

**Archaeological Assessment of NBDOT Proposed Structure Replacements at Little Tracadie River, No. 2,
Route 370**

in the county(ies) of:

Gloucester

under the following conditions:

1. The Licence shall be issued on the understanding the investigations are to be conducted for the sole purpose of recovering information and materials for scientific and historical study, and for the preservation of New Brunswick's historic resources; and that the research shall conform to the best scientific standards available.
2. The archaeological field research being carried out under this Licence may be inspected at any reasonable times; and this Licence may be revoked at any time by the Minister.
3. The holder of this Licence will report to Archaeological Services Section, Heritage Branch, any archaeological site found during the archaeological field research being carried out under this Licence within two (2) working days of the find.
4. This License shall be valid until March 31, 2010.
5. A preliminary report of activities under this License shall be available by December 31, 2009.
6. A final technical report will be due March 31, 2010.
7. The holder of this Licence must provide copies to Archaeological Services Section, Heritage Branch, of all field records, notes, maps, drawings, catalogues, and photographs pertaining to the description and context of all objects recovered under this Licence.
8. All cultural material recovered under this Licence must be deposited with Archaeological Services Section, Heritage Branch, upon termination of the Licence.

**Province du Nouveau-Brunswick
Licence de recherches archéologiques**

En vertu de l'article 7.1 de la
Loi sur la protection des lieux historiques,
une licence est octroyé à :

Courtney Cameron

pour entreprendre le projet de recherches
archéologiques mentionné ci-après et intitulé :

**Archaeological Assessment of NBDOT Proposed Structure Replacements at Little Tracadie River, No. 2,
Route 370**

dans le (s) comté (s) de :

Gloucester

aux conditions suivantes :

1. La licence sera émise à condition que les recherches soient effectuées dans le seul but d'obtenir des renseignements et du matériel pour des études scientifiques et historiques et de préserver les ressources historiques du Nouveau-Brunswick; la recherche se conformera aux normes scientifiques les plus rigoureuses parmi celles disponibles.
2. Les recherches archéologiques menées dans le cadre de cette licence peuvent faire l'objet d'une inspection à n'importe quelle heure raisonnable, et le ministre peut révoquer la licence en tout temps.
3. Le détenteur de la licence signalera à la Section des services d'archéologie de la Direction du patrimoine tout site archéologique trouvé au cours des recherches archéologiques réalisées dans le cadre de la licence et ce, dans un délai de deux jours de travail après la découverte.
4. La licence sera valide jusqu'au 31 mars 2010.
5. Un rapport préliminaire des activités effectuées dans le cadre de la licence sera préparé avant le 31 décembre 2009.
6. Un rapport technique final sera rédigé pour le 31 mars 2010.
7. Le détenteur de la licence fournira à la Section des services d'archéologie, Direction du patrimoine, une copie de tous les documents, dessins et catalogues ainsi que de toutes les notes, cartes et photographies servant à la description et à l'établissement du contexte pour les objets trouvés dans le cadre de la licence.
8. Tout article culturel découvert dans le cadre de la licence doit être confié à la Section des services d'archéologie de la Direction du patrimoine à l'expiration de la licence.

APPROVED: / APPROUVÉ :

Honorable / L'honorable Hédard Albert,
Minister / ministre

2009 09 02
Date granted / Date d'octroi

LICENCE NO: / N° DE LA LICENCE : 2009NB 71 (Impact Study / Étude d'impact)



Stantec

Final Report

NBDOT Environmental Background
Study – Archaeological Assessment
at Little Tracadie River, Route 365,
Little Tracadie,
Gloucester County, NB

Archaeological Field Research
Licence No. 2009NB71

Report to:

Archaeological Services Unit
Department of Wellness,
Culture and Sport
Solider Barracks
P.O Box 6000
Fredericton NB E3B 5H1

Report Prepared for:

New Brunswick Department of
Transportation, Design Branch
440 King Street, 2nd Floor
Kings Place
PO Box 6000
Fredericton NB E3B 5H1

Project No.1054964.006
Date: June 8, 2010

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Field Notes

1.0 Introduction

As part of an Environmental Background Study, the New Brunswick Department of Transportation (NBDOT) Design Branch, contracted Stantec Consulting Ltd. (Stantec) to conduct a Heritage Resource Impact Assessment (HRIA) on the area surrounding the Little Tracadie River Bridge, on Route 365, in Little Tracadie, Gloucester County, New Brunswick (Figure 1, Appendix A and Photographs 1 through 4, Appendix B).

The HRIA included desktop background research and a visual archaeological field survey. The field work for this Project took place under Archaeological Field Research Licence No. 2009NB71 issued to Ms. Courtney Cameron, M.A. The field work was conducted on September 9, 2009 by Ms. Courtney Cameron and Mr. Greg Buchanan.

2.0 Project Description

The existing bridge crossing the Little Tracadie River on Route 365 in Little Tracadie, New Brunswick may be decommissioned and a new bridge may be constructed (the Project). The Project would consist of the removal of some or all of the existing bridge and the construction of a new watercourse crossing at the same location, however, Project design details are not finalized.

The objective of the HRIA was to determine the potential for archaeological resources within the area of the proposed Project and make recommendations regarding the need for test pitting in areas with elevated archaeological potential. The resources considered in this HRIA included any standing, surface or subsurface remnants of past human activities within the Project area.

3.0 Project Area

Route 365 connects the north and south shores of the Little Tracadie River by a combination of causeway and bridge. Photographs 1 through 4 (Appendix B) show the causeway, bridge and Right-of-Way (RoW). The Assessment Area for the proposed Project includes all lands approximately 50 m on either side of Route 365 and extending 200 m up and down the Route 365 from either end of the existing bridge.

The terrestrial habitats surrounding the Little Tracadie River Bridge (Figure 2, Appendix A) include developed rural landscape, cultivated upland, and saltmarsh wetland. Much of the land within the Assessment Area is disturbed to a degree by cultivation, use for pasture/hayfield, and residential development and landscaping. Little upland forest remains in the Assessment Area

due to the predominant agricultural and residential development. A notable exception is a large stand of trees adjacent to the south shore of Little Tracadie River, along Route 365, and forest that extends along the western shore of Trout Stream, a tributary to the Little Tracadie River in the southwest of the Assessment Area comprised of mature white and red spruce, and occasional white pine, white birch and balsam fir. (Figure 2, Appendix A; Photograph 2, Appendix B).

Within the Assessment Area, a thin strip (less than 30 m wide) of saltmarsh wetland extends southwest from the south end of the causeway between the river and a stand of trees, and continues along the right bank of Trout Stream as a more substantial saltmarsh (Photographs 2, 3 and 5, Appendix B). Another more extensive saltmarsh wetland exists in the northeastern portion of the Assessment Area, extending northeast from the causeway along the downstream left bank of the river. A third strip of saltmarsh wetland begins on the northwest side of the causeway and extends upstream along the left bank of the river (Figure 2, Appendix A). Due to infilling from the adjacent upland area, the only remaining wetland at this location is a thin strip along the shoreline (less than 2 m wide).

With the exception of a forested area in the extreme northeastern portion of the Assessment Area (Figure 2, Appendix A), the north side of Little Tracadie River is dominated by rural landscaping and cultivated pasture/hayfields. Several residential properties are located along Route 365, including fields associated with farms, and are in close proximity to the road.

4.0 Methodology

Prior to initiating archaeological fieldwork, background research was conducted to identify the location of any known heritage resources and to assess the landscapes against the modeling in the Guidelines (Archaeological Services 2009b). Preliminary design plans were not available at the time of the HRIA. Based on Stantec's experience with similar projects for NBDOT, it is assumed that no houses or buildings will be affected during construction activities. Therefore, built heritage will not be considered further in this report. This background research incorporated the following resources and exercises:

- consideration of the Project's proximity to known archaeological sites;
- use of a variety of published and unpublished works on relevant local history and environment (Section 8.0), and previous archaeological work carried out in the area (Archaeological Services 2009a);
- use of a variety of online databases of relevant information (CHP 2009; NBRHP 2009); and
- professional experience and judgment of Stantec archaeological personnel.

Following the background research, the Stantec Archaeological Team initiated a visual survey of the Assessment Area. The visual survey was carried out to verify the results of the background research, and to gather additional information about the archaeological potential of the Assessment Area.

5.0 Findings

5.1 PRELIMINARY INVESTIGATION

5.1.1 Documentary Research

Prior to initiating the field component of the HRIA, a literature search and desktop review were undertaken to determine the location of known resources in the general area in addition to identifying areas with a high potential to contain unknown heritage resources along the Project RoW. This background research included information from the Canadian Register of Historic Buildings, the Archaeological Borden Maps, the Maritime Archaeological Resource Inventory (MARI), Archaeological Projects manuscripts, as well as environmental analysis of the Project area.

5.1.2 Environmental Analysis

New Brunswick displays a variety of geography and one of the ways that such diversity can be described is through the use of a land classification system. The Province of New Brunswick's Department of Natural Resources (NBDNR) utilizes the Ecological Land Classification System of New Brunswick (NBDNR 2007). The Ecological Land Classification System of New Brunswick divides the province into seven Ecoregions and further subdivides the Ecoregions into 34 Ecodistricts. The proposed project location falls within the Eastern Lowlands Ecoregion and the Caraquet Ecodistrict as classified by NBDNR. This ecodistrict is characterized by a breezy, dry climate and a coastline of sand dunes, bays and marshes with large estuaries located in areas where rivers empty into the Gulf of St. Lawrence. Soils in the Tracadie region are generally fertile glaciomarine sediments with large areas of organic soils (peat bogs) in some poorly drained areas (NBDNR 2007).

5.1.3 Pre-contact Resources

At the time of European contact, the northeastern area of New Brunswick had been occupied by the Mi'kmaq for at least 3,000 years. Traditional Mi'kmaq territory spanned from the north shore and Gaspé to Nova Scotia, with currently known sites concentrated along the shorelines of streams and rivers. The name Tracadie is derived from the Mi'kmaq word *Tulakadik*, which means "camping ground" (Hamilton 1996).

In general, preliminary background research of the general area indicated elevated potential for Pre-contact archaeological and heritage resources due to its proximity to significant hydrological

features including the Little Tracadie River and the Gulf of St Lawrence. While no previously recorded archaeological sites appear in the immediate vicinity of the proposed Project site, it should be noted that there are over a dozen sites located at the mouth of the Little Tracadie River approximately 5 km east of the proposed Project site.

5.1.4 Historic Resources

Reference to this area was first made by Champlain in 1603 where he refers to *Tregate* (Ganong 1899), an early variation of the name Tracadie (Hamilton 1996). Beginning in 1645 with a small trading post on Miscou Island, the northeastern corner of New Brunswick was an area increasingly used for settlement. In 1725 a small village was established in Caraquet and was expanded in the 1760's with Acadians returning after expulsion (NBDNR 2007).

A search of the Canadian Register of Historic Places listed 28 registered historic places within 3 km of the proposed Project location. Most of these registered sites consist of houses constructed in the late 19th and early 20th centuries, however some notable sites include a Protestant Cemetery established in 1825 as well as monument which lists the surnames of the families who settled in the Tracadie area prior to 1800.

5.1.4.1 Results of Background Research

Although no known archaeological sites exist within the boundaries of the Assessment Area, there are a significant number of sites located at the mouth of the Little Tracadie River. For this reason it is expected that the potential for encountering unknown archaeological or heritage resources during any ground breaking activities associated with the Project remains high. Due to the extensive settlement history of the area in both Pre-contact and historic periods the potential for the presence of resources is considered elevated within and around the Project location.

5.1.5 Direct Consultation

Letters were sent via registered mail to nearby First Nations, on September 11, 2009. Follow up phone calls were made on September 29-30, 2009, to solicit information on any current use of the Assessment Area for traditional purposes by Aboriginal people. No written responses have been received to date in relation to letters that were sent to nearby First Nations on September 11, 2009. The four First Nations identified within 100 km of the Assessment Area included the Mi'kmaq First Nations at Burnt Church, Eel Ground, Metepenagiag, and Pabineau.

Attempts to contact the Chiefs of the First Nations within the vicinity of the Assessment Area resulted in messages being left with at the Band Office's in Burnt Church, Eel Ground and Pabineau First Nations. Contact was made with the Metepenagiag First Nation. Band Manager, Kenny Levi identified no known current use of land or resources for traditional purposes within the Little Tracadie River Assessment Area, nor would any use of the land or resources in the

immediate area, in his opinion, be impaired by the proposed Project (K. Levi, pers. comm. September 30, 2009).

5.1.6 Preliminary Field Examination

On September 9, 2009 a visual survey was conducted by the Stantec Archaeological Team of an Assessment Area extending 50 m on either side of Route 365 and extending 200 m up and down Route 365 where it crosses the Little Tracadie River (Figure 2, Appendix A). The existing structure is comprised of a causeway and bridge that runs in a north-south orientation over the Little Tracadie River (Photograph 1, Appendix B). The river is approximately 150 m wide with a large wetland area on the northeast shore (Photograph 5, Appendix B). For reporting purposes, the Assessment Area was divided into four quadrants: southeast (SE), southwest (SW), northwest (NW) and northeast (NE) (Figure 2, Appendix A). Note: figures and photographs referenced below are provided in Appendix A and Appendix B, respectively.

The causeway itself consists completely of fill material brought to this location and while it is possible this fill material could contain archaeological material, the lack of context means it has little interpretive value. Therefore, the causeway portion of the Assessment Area will not be considered further in the HRIA.

Southeast Quadrant

The southeast quadrant extends along the south side of Little Tracadie River and east of Route 365 (Figure 2). The southeastern portion of the Assessment Area has been extensively disturbed by residential property development, from the banks of the Little Tracadie River to 170 m from the River (Photograph 6). A narrow (approximately 3 m) wide riparian area exists along the edge of the River. Beyond the riparian area the terrain slopes up for approximately 10 m before becoming level. Residential properties are built on the level area along the road and the edge of the Little Tracadie River. Approximately 5 m along the edge of the road is the existing road RoW which incorporates a ditch and transmission line. The beach is rocky and there is no exposed cut bank. The area between 170 m to 200 m south of the watercourse is characterized by hay and blueberry fields.

Despite the level of recent disturbance to this quadrant, it is possible there are pockets of intact ground that could contain archaeological resources in this quadrant. Therefore, should ground-disturbing activities be planned within 200 m of Little Tracadie River in the southeast quadrant, archaeological test pitting of the affected area is recommended.

Southwest Quadrant

The southwest quadrant extends along on the south side of Little Tracadie River and west of Route 365 (Figure 2). The southwestern portion of the Assessment Area is defined by a tall (approximately 2.5 m high) flat terrace. The vegetation is dominated by an open pine forest with immature fir trees (Photograph 7). The terrace extends approximately 30 m before it is truncated by an abandoned quarry. Beyond the quarry is a residential property. The terrace area along the

shoreline holds potential for archaeological resources; however the areas beyond the terrace, have been extensively affected by quarrying operations and a significant amount of soil material has been removed from this area.

One shovel test was dug on the terrace to determine the sub-surface conditions. The shovel test revealed approximately 20 cm of sand with some pebbles overlying a dense pebbly layer in a sandy matrix.

Archaeological test pitting is recommended should ground-disturbing activities be planned in the vicinity of the terrace area.

Northwest Quadrant

The northwest quadrant extends along the north side of Little Tracadie River and west side Route 365 (Figure 2). Portions of the northwestern quadrant of the Assessment Area have been disturbed by residential property development along the existing road (Photographs 8 through 10). A hayfield with a poorly defined terrace exists along the western edge of the Assessment Area. Potential for the presence of heritage resources exists within the hayfield.

Archaeological test pitting is recommended should ground-disturbing activities be planned for the land forms in this area.

Northeast Quadrant

The northeast quadrant extends along the north side of Little Tracadie River and east side Route 365 (Figure 2). The topography of the northeastern portion of the Assessment Area is dominated by a large wetland along the Little Tracadie River (Photograph 5). An abandoned field is located approximately 100 m beyond the wetland area. The field is approximately 1 m above the current water level and is dominated by young poplar and firs.

Potential for the presence of heritage resources exists within the field. Archaeological test pitting is recommended should ground-disturbing activities be planned for the land forms in this area.

5.1.6.1 Summary of Field Investigation

The visual survey of the Assessment Area confirmed the potential for archaeological and heritage resource in all four quadrants of the Assessment Area (Figure 2, Appendix A), due to the proximity of the watercourse and the unconfirmed extent of recent impacts to adjacent landforms.

One preliminary shovel test was completed in the southwest quadrant of the Assessment Area. No archaeological or heritage resources were recovered in the shovel test. Shovel testing was not completed in the northwest or northeast quadrants as access to the land had not been secured at the time of the site visit. Avoidance of areas with potential for archaeological or

heritage resources is recommended. Should it not be possible to avoid these areas during construction, further testing is recommended.

No known archaeological or heritage sites are recorded within the immediate vicinity of the proposed Project location, although over a dozen sites have been located at the mouth of the Little Tracadie River approximately 5 km east of the Assessment Area. Due to the distance of these recorded sites from the proposed Project, the Project is not anticipated to affect these recorded archaeological sites.

The results of the background research were supported by the field component of the HRIA. Although the shovel test pit that was completed resulted in no archaeological or heritage resources being recovered, without further testing the assessment of the archaeological potential in the four areas identified remains elevated.

5.2 RESOURCE INVENTORY

No archaeological or heritage resources were identified in the Assessment Area.

5.3 RESOURCE SIGNIFANCE AND INTEGRITY EVALUATION

No heritage resources were found in the Assessment Area, thus comments on resource significance or integrity are not warranted.

5.4 IMPACT IDENTIFICATION AND ASSESSMENT

No archaeological or heritage resources were identified in the Assessment Area. Portions of all four quadrants hold potential for the presence of Pre-contact archaeological resources due to the presence of flat terraced areas in association with a large watercourse (Figure 2, Appendix A).

6.0 Conclusions and Recommendations

While the Stantec Archaeological Team identified no significant heritage resources in the course of the HRIA, all four quadrants were identified as containing archaeological potential. It is recommended that these areas be avoided by the design team during development of the Project design. Should ground-breaking activities impact these areas, it is recommended that shovel test pitting be done to determine the level of disturbance, if any, prior to construction. The final design for the proposed Project has not been completed. Once the final design has been completed, it is recommended that the results of this survey be taken into consideration for an archaeological test pitting strategy if the areas within the quadrants noted to hold potential for the presence of heritage resources are to be impacted.

7.0 Closing

This report has been prepared as a requirement of Archaeological Field Research Licence No. 2009NB71, for the sole benefit of New Brunswick Department of Transportation, Design Branch, and may not be used by any other person or entity, other than for its intended purposes, without the express written consent of Stantec Consulting Ltd. and New Brunswick Department of Transportation. Any use which a third party makes of this report is the responsibility of such third party.

The information and recommendations contained in this report are based upon work undertaken in accordance with generally accepted scientific practices current at the time the work was performed. Further, the information and recommendations contained in this report are in accordance with our understanding of the Project as it was presented at the time of our report. The information provided in this report was compiled from existing documents, design information provided by New Brunswick Department of Transportation Design Branch, data provided by regulatory agencies and others, as well as visual surveys carried out in 2009 specifically in support of this report. If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, Stantec Consulting Ltd. requests that we be notified immediately, and permitted to reassess the conclusions provided herein. Any follow-up work recommended in this report must be reviewed and approved by Archaeological Services, Heritage Branch, Department of Wellness, Culture and Sport, Province of New Brunswick, which may take several weeks after the submission of the report. Provisions for this review period should be incorporated into anticipated Project schedules. Follow-up work may require an Archaeological Field Research Licence, issued by Archaeological Services.

Stantec Consulting Ltd. cautions that it is possible that buried archaeological resources could exist within the limits of the Project area. Should any archaeological materials be uncovered during Project-related activities, all work in the area of the find should cease immediately and AS personnel should be notified.

This report was prepared by Ms. Courtney Cameron, M.A., Mr. Greg Buchanan, M.Sc., Mr. Greg Holland, B.A., and senior review was performed by Mr. Christopher R. Blair, B.A. Should you have any questions or comments on the contents of this report, please contact the undersigned.

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8.0 References Cited

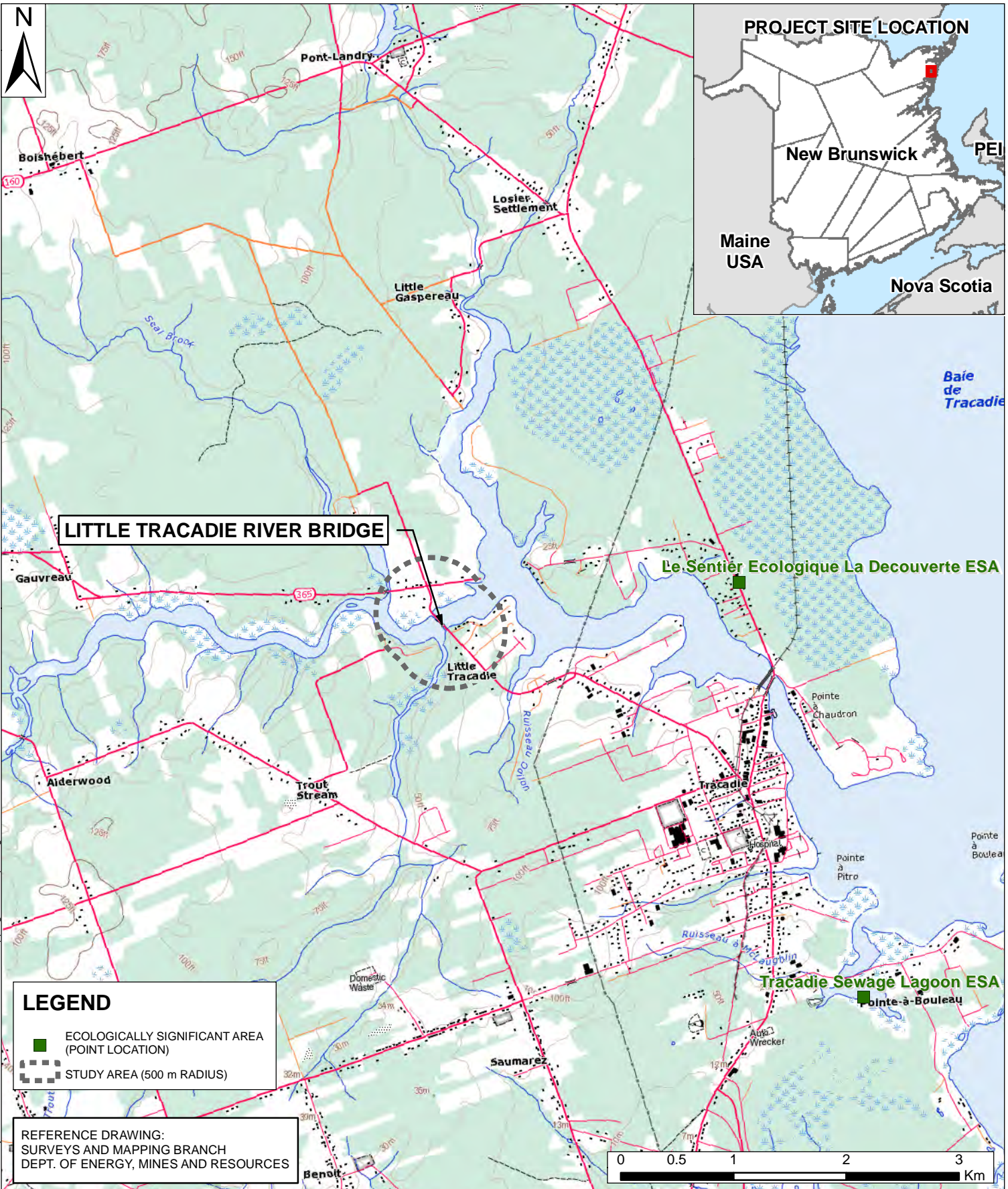
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8.1 PERSONAL COMMUNICATIONS

Levi, Kenny. 2009. Personal Communication, September 11, 2009. Band Manager, Metepenagiag First Nation

APPENDIX A

Figures

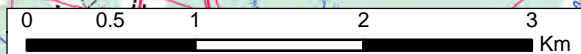


File Path: X:\Projects\NewBrunswick\1054964\Mapping\WDX\Report\Figures\SITE LOCATION PLAN.mxd

LEGEND

- ECOLOGICALLY SIGNIFICANT AREA (POINT LOCATION)
- STUDY AREA (500 m RADIUS)

REFERENCE DRAWING:
SURVEYS AND MAPPING BRANCH
DEPT. OF ENERGY, MINES AND RESOURCES



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

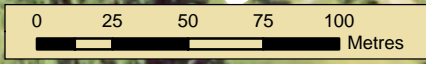
<p>SITE LOCATION PLAN ENVIRONMENTAL BACKGROUND STUDY LITTLE TRACADIE RIVER BRIDGE GLOUCESTER COUNTY, NEW BRUNSWICK</p>				Scale: NTS	Job No.: 1054964	Fig. No.: 1	<p>Stantec</p>
Client: NB DEPARTMENT OF TRANSPORTATION				Date: Jan. 21 2010	Dwn. By: RJS	Appd. By: MS	

LEGEND

- NE ARCHAEOLOGICAL QUADRANT
- BRIDGE LOCATION
- SHOVEL TEST PIT
- APPROXIMATE AREA WITH ARCHAEOLOGICAL POTENTIAL
- ARCHAEOLOGICAL ASSESSMENT AREA
- WATERBODY (NBDNR)
- ➔ WATER FLOW DIRECTION



DATA SOURCE: NBDNR, SNB
AERIAL PHOTO 2002



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

HERITAGE AND ARCHAEOLOGICAL RESOURCES ENVIRONMENTAL BACKGROUND STUDY

LITTLE TRACADIE RIVER
GLOUCESTER COUNTY, NEW BRUNSWICK

Client: NB DEPARTMENT OF TRANSPORTATION

Scale: NTS

Job No. 1054964

Fig. No.

2

Date: May 9, 2010

Dwn. By: RJS

Appd. By: MS



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APPENDIX B

Photographs

Archaeology and Heritage Resources



Photograph 1 Right of Way showing causeway and bridge structure facing west



Photograph 2 Right of Way showing causeway and saltmarsh facing east



Photograph 3 View to north from south side of River



Photograph 4 Existing bridge and causeway facing west



Photograph 5 Wetland area in northeast quadrant facing south



Photograph 6 Southeast quadrant facing north



Photograph 7 Southwest quadrant facing north



Photograph 8 Northwest quadrant facing southwest



Photograph 9 Northwest quadrant facing north



Photograph 10 Northeast quadrant facing south

APPENDIX C

Field Notes

HERITAGE RESOURCES

AFRL No. 2009NB71
 Issued to: Courtney Cameron

Watercourse Assessment Forms

Last Updated September 4, 2008

Job #	1054964	Phase #	
Project Name	Bridges Jobs		
Date	Sept 9/09		
Recorder(s)	C & GH		

Watercourse Description

Watercourse Name	Little Tracadie River
Watercourse #	
Location (chainage & GPS)	20T 753389 5265971
Width/Depth	150m wide, depth unknown
Flow (direction & strength)	to east, moderate
Drainage/Confluence	To the Gulf of St. Lawrence
Features (riffles, waterfalls, pool, deadwater, seep or associated with wet area or riparian area.)	large wetland on N side
Seasonal Factors	
Additional Information	Smells like salt water.

Associated Landforms

Slope	St. Slope
Valley/Gully/Draw	
Terrace/Ridge	high 1 to 2.5 m high.
Soil Type/Substrata	Sandy
Vegetation	mixed
Aspect	
Additional Information	

Assessed Archaeological Potential

<input checked="" type="checkbox"/> Elevated	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Notes/Explanations Only elevated in a few areas because it is highly disturbed from residences		

Photographs	
-------------	--



711 Woodstock Road,
 Fredericton, NB E3B 5N8
 Tel: 506 457 3200

K:\BIOPHYSICAL\Archaeology\FORMS\Master Forms\Watercourse_Assessment_Form.doc

Heritage Resources Shovel Test-Pit Survey Record

Page 1 of 1 for this testing area
 Date: Sept 9/09
 Field Site: _____

Project Number & Phase 1054964
 Project Name Bridge Oaks
 Recorder Name CCO & LB
 AFRL # AFRL No. 2009NB71

Location Tranadie
 Field Site _____
 Chainage _____
 Transect Loc/ Azimuth _____

Transect # _____ STP# 1
 GPS: 19T/20T 20T E: 0353442 N: 5265863
 GPS Accuracy ±6 Datum NAD83

Comments: (e.g. vegetation, topography, why did you stop digging etc...)
*stopped at compact
 pebbly layer*

DBS (cm)	Grain Size	Soil Colour	Cultural Material
<u>0-2</u>	<u>SOD</u>	<u>dk brown</u>	
<u>2-14</u>	<u>sand & some pebbles</u>	<u>light brown</u>	
<u>14-19</u>	<u>sand & some pebbles</u>	<u>light gray</u>	
<u>19-50"</u>	<u>sandy pebbles</u>	<u>orange brown</u>	

Transect # _____ STP# _____
 GPS: 19T or 20T E: _____ N: _____
 GPS Accuracy _____ Datum _____

Comments: (e.g. vegetation, topography, why did you stop digging etc...)

DBS (cm)	Grain Size	Soil Colour	Cultural Material

Last Updated June 25, 2008



711 Woodstock Road,
 Fredericton, NB E3B 5N8
 Tel: 506 457 3200

Sept 9/09 Tracodine Road.

SWS side.

Slope slightly down to the west. High alpine water level (2.5m) sediment is sandy with pebbles. Good exposure along bank. To top of study area we

see massive to moderate sized pieces that look like mud in the center with a pebble along edge. Lots of horizontal pieces high between pieces. Lots of charcoal.

No shrapnel. Terrace is same height as surrounding today. so if is probably not full sediment beds consisting of water.

There is a road through the SWS quad. To the NW we dug out into the terrace.

Sept 9/09
Road leads to dumpings area with cement & brush.

SSE Quad

All residential except last 20m are farmland

NE Quad

Carlson field that is requiring with others and phase Burrows (large) appears very well developed. About 1.5m above water level.

photo 227 STP.



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
TRACADIE, NB**

September 22, 2017

APPENDIX H

Well Water Questionnaires and Water Quality Data



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
TRACADIE, NB**

September 22, 2017

ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, TRACADIE, NB –
Appendix H

September 22, 2017

Table H.1 Land Use within 200 meters Assessment Area of Little Tracadie River Bridge No. 2 in 2009

Property PID	Farm	Residence	Vacant
20156964			X
20156402		X	
20155651		X	
20413050		X	
20153615		X	
20153607		X	
20153383		X	
20805867		X	
20806808		X	
20157012	Agricultural (Blueberries)		
20635280		X	
20157814		X	
20413175			X
20152914		X	
20155867			X
00000002			X
20133971			X
20157954		X	
20148334		X	
20134177		X	
20782462		X	
20134805			X
20151809		X	
20429106			X
20151791		X	
20812970			X
20574117		X	
20148342		X	

Table H.2 NBENV Historical Water Chemistry Results for Little Tracadie River Study Area

Parameter	GCDWQ	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8	Sample 9	Sample 10	Sample 11
ALK_T(mg/L)	ne	38.1	16.9	55.6	68.4	50.7	32.1	58.6	50.6	27.6	36.9	91.1
Al(mg/L)	100/200 ^{AO}	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
As(µg/L)	10	<1.5	<1.5	<1.5	<1.5	<1	<1.5	<1	<1.5	<1.5	<1.5	<1.5
B(mg/L)	5	<0.01	0.012	0.014	0.07	<0.2	<0.2	<0.2	<0.2	<0.01	<0.01	<0.01
Ba(mg/L)	1	0.105	0.143	0.105	0.047	0.04	0.091	0.051	0.075	0.028	0.102	0.124
Br(mg/L)	ne	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.122	<0.1	0.159
COND(µSIE/cm)	ne	129	140	135	378	147	206	192	174	91.4	122	220
Ca(mg/L)	ne	13.3	9.26	17	38	12	19.2	24.1	20.3	4.58	14	37.3
Cd(µg/L)	5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cl(mg/L)	250 ^{AO}	7.28	25	5.61	10.3	10.1	35.4	7.77	9.59	7.32	4.31	7.94
Cr(µg/L)	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cu(µg/L)	1000 ^{AO}	<10	12	13	<10	<10	11	<10	<10	43	<10	<10
F(mg/L)	ne	0.242	<0.1	0.102	0.155	0.12	<0.1	0.12	0.103	<0.1	0.229	<0.1
Fe(mg/L)	0.3 ^{AO}	0.664	<0.01	0.079	0.078	0.013	0.108	0.062	<0.05	0.957	0.722	0.136
HARD(mg/L)	500	44.2	34.8	56.2	122	-	-	-	63.9	17.7	47.2	84.7
K(mg/L)	ne	0.5	0.7	1.2	1.6	0.384	0.54	0.47	0.58	0.526	0.619	0.547
Mg(mg/L)	ne	2.68	2.83	3.35	6.53	7	2.81	3.4	3.18	1.52	3	2.9
Mn(mg/L)	0.05 ^{AO}	0.79	<0.005	<0.005	0.067	0.021	0.039	<0.01	<0.005	0.104	0.719	0.015
NO2(mg/L as N)	ne	-	-	-	-	<0.05	<0.05	<0.05	-	-	-	-
NO2(mg/L)	3.2	<0.05	<0.05	<0.05	<0.05	-	-	-	<0.05	<0.05	<0.05	<0.05
NO3(mg/L as N)	10	-	-	-	-	0.58	0.3	0	-	-	-	-
NO3(mg/L)	45	<0.05	1.1	<0.05	<0.05	-	-	-	0.07	0.93	<0.05	0.97
NOX(mg/L as N)	ne	-	-	-	-	0.63	0.35	<0.05	-	-	-	-
NOX(mg/L)	ne	<0.05	1.1	0.05	<0.05	-	-	-	0.07	0.93	<0.05	0.97
Na(mg/L)	200 ^{AO}	4.71	11.6	4.79	33.4	6.6	10.3	7.5	9.63	5.6	5.42	5.45
PH(pH)	6.5-8.5 ^{AO}	7.59	6.69	7.88	8.02	7.5	7.47	8.14	7.98	7.01	7.7	8.04
Pb(µg/L)	10	<1	1.4	3.8	<1	<1	<1	<1	<1	10.1	<1	<1
SO4(mg/L)	500 ^{AO}	12.7	3.94	4.92	105	6	6.56	23.3	21.5	4.12	13.9	4.4
Sb(µg/L)	6	<1	<1	<1	<1	<1	<1	<1	<1	1.1	<1	<1
Se(µg/L)	10	<1.5	<1.5	<1.5	<1.5	<1	<1.5	<1	<1.5	<1.5	<1.5	<1.5
TURB(NTU)	1 ^{AO}	3.76	<0.2	0.54	0.37	0	0.7	0.2	0	9.8	5.1	1.2
Tl(µg/L)	ne	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
U(µg/L)	20	<0.5	<0.5	<0.5	<0.5	-	-	-	-	<0.5	<0.5	<0.5
Zn(µg/L)	5000 ^{AO}	<5	<5	12	6	41	28	<10	<5	7040	5.4	7.7
Calculated Parameters												
COND(µSIE/cm)	ne	116.312	128.929	126.781	396.54	-	-	-	175.255	75.971	120.287	211.494
TDS(mg/L)	500 ^{AO}	66.088	68.601	70.791	236.534	-	-	-	95.649	52.625	65.322	117.789
AN(Epm)	ne	1.25	1.237	1.383	3.858	-	-	-	1.742	0.918	1.166	2.214
CAT(Epm)	ne	1.17	1.222	1.371	3.937	-	-	-	1.714	0.886	1.265	2.362
CO3(mg/L)	ne	0.1	0	0.4	0.7	-	-	-	0	0	0	0
DIFTDS(%)	ne	-	-	-	-	-	-	-	-100	-100	-100	-100
HCO3(mg/L)	ne	37.9	16.9	55.2	67.7	-	-	-	50.6	27.6	36.9	91.1
OH(mg/L)	ne	0	0	0	0.1	-	-	-	0	0	0	0
SIN(no units)	ne	-0.955	-2.362	-0.401	0.103	-	-	-	-0.471	-2.35	-1.049	0.109
HARD(mg/L as CaCO3)	ne	-	-	-	-	58.8	59.5	74.2	-	-	-	-

Notes:

GCDWQ=Health Canada, 2006. Summary of Guidelines for Canadian Drinking Water Quality, 2008 Update.

AO=Aesthetic Objective

ne=no guideline established

Bold= sample exceeds guideline

Table H.3 NBENV Historical Water Microbiology Results for Little Tracadie River Study Area

Parameter	E.coli Presence/Absence	Total Coliform Presence/Absence
GCDWQ	Absent	Absent
Sample A	Ab	Ab
Sample B	Ab	Ab
Sample C	Ab	Ab
Sample D	Ab	Ab
Sample E	Ab	Pr
Sample F	Ab	Ab
Sample G	Ab	Ab
Sample H	Ab	Ab
Sample I	Ab	Pr
Sample J	Ab	Ab
Sample K	Ab	Ab
Sample L	Ab	Ab

Notes:

GCDWQ=Health Canada, 2006. Summary of Guidelines for Canadian Drinking Water Quality, 2008 Update.

Pr= sample exceeds guideline

Table H.4 Well Water Sample Results

Parameter	Units	CDWQ Guidelines ¹	T-1	T-2
Sodium	mg/L	200 ^{AO}	17.7	16.3
Potassium	mg/L	ne	0.88	0.94
Calcium	mg/L	ne	37.5	67.3
Magnesium	mg/L	ne	5.46	3.09
Iron	mg/L	0.3 ^{AO}	< 0.02	0.04
Manganese	mg/L	0.05 ^{AO}	< 0.001	< 0.001
Copper	mg/L	1.0 ^{AO}	0.01	0.002
Zinc	mg/L	5.0 ^{AO}	0.003	0.003
Ammonia (as N)	mg/L	ne	< 0.05	< 0.05
pH (units)	units	6.5-8.5	7.5	7.6
Alkalinity (as CaCO ₃)	mg/L	ne	60	130
Chloride	mg/L	250 ^{AO}	36.1	42.5
Sulfate	mg/L	500 ^{AO}	44	5
Nitrate + Nitrite (as N)	mg/L	10	< 0.05	1.16
o-Phosphate (as P)	mg/L	ne	< 0.01	< 0.01
r-Silica (as SiO ₂)	mg/L	ne	10	7.4
Total Organic Carbon	mg/L	ne	1.3	0.7
Turbidity (NTU)	NTU	1	0.3	0.3
Conductivity (uS/cm)	uS/cm	ne	331	442
Bicarbonate as CaCO ₃	mg/L	ne	59.8	129
Carbonate as CaCO ₃	mg/L	ne	0.178	0.485
Hydroxide as CaCO ₃	mg/L	ne	0.016	0.02
Cation sum (meq/L)	meq/L	ne	3.11	4.35
Anion sum (meq/L)	meq/L	ne	3.13	3.98
% difference	mg/L	ne	-0.32	4.37
Theoretical Conductivity	mg/L	ne	329	402
Hardness (mg/L as CaCO ₃)	mg/L	500	116	181
Ion Sum (mg/L)	mg/L	500 ^{AO}	178	220
Saturation pH (5°C)	mg/L	ne	8.3	7.7
Langelier Index (5°C)	mg/L	ne	-0.76	-0.09
Total Coliforms	MPN/100mL	0	0	0
Escherichia coli	MPN/100mL	0	0	0

Table H.4 Well Water Sample Results

Parameter	Units	CDWQ Guidelines ¹	T-1	T-2
Aluminum	µg/L	100/200 ^{AO}	1	< 1
Antimony	µg/L	6	< 0.1	< 0.1
Arsenic	µg/L	10	< 1	< 1
Barium	µg/L	1000	71	143
Beryllium	µg/L	ne	< 0.1	< 0.1
Bismuth	µg/L	ne	< 1	< 1
Boron	µg/L	5000	27	17
Cadmium	µg/L	5	< 0.01	< 0.01
Calcium	µg/L	ne	37500	67300
Chromium	µg/L	50	< 1	< 1
Cobalt	µg/L	ne	< 0.1	< 0.1
Copper	µg/L	1000 ^{AO}	10	2
Iron	µg/L	300 ^{AO}	< 20	40
Lead	µg/L	10	0.3	0.1
Lithium	µg/L	ne	3.4	1.2
Magnesium	µg/L	ne	5460	3090
Manganese	µg/L	50 ^{AO}	< 1	< 1
Molybdenum	µg/L	ne	0.1	< 0.1
Nickel	µg/L	ne	< 1	< 1
Potassium	µg/L	ne	880	940
Rubidium	µg/L	ne	0.4	0.5
Selenium	µg/L	10	< 1	< 1
Silver	µg/L	ne	< 0.1	< 0.1
Sodium	µg/L	200000 ^{AO}	17700	16300
Strontium	µg/L	ne	92	187
Tellurium	µg/L	ne	< 0.1	< 0.1
Thallium	µg/L	ne	< 0.1	< 0.1
Tin	µg/L	ne	< 0.1	< 0.1
Uranium	µg/L	20	0.2	0.2
Vanadium	µg/L	ne	< 1	< 1
Zinc	µg/L	5000 ^{AO}	3	3

Notes:

1. Health Canada, 2006. Summary of Guidelines for Canadian Drinking Water Quality, 2008 Update.

^{AO} - Aesthetic Objective

ne - none established

Bold= Sample exceeds guideline

Well Driller's Report

Date printed **2009/08/27**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	06/23/2003

Casing Information		Casing above ground 1ft			Drive Shoe Used? Yes
Well Log	Casing Type	Diameter	From	End	Slotted?
3860	Steel	6 inch	0ft	60ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	18ft	10 igpm	0hr 30min	18ft	10 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	N/A	N/A
		Qty 0 ig	Intake Setting (BTC) 0ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	63ft
3860	0ft	8ft	Brown	Fill Sand	Bedrock Level 58ft
3860	8ft	17ft	Brown	Medium Sandstone	
3860	17ft	58ft	Brown	Fine Sandstone and Shale	
3860	58ft	63ft	Grey	Medium Sandstone	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
3860	62ft	10 igpm

Setbacks
There is no Setback information.

Well Driller's Report

Date printed **2009/08/27**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	05/26/2005

Casing Information		Casing above ground 1ft 6in			Drive Shoe Used? Yes
Well Log	Casing Type	Diameter	From	End	Slotted?
5060	Steel	6 inch	0ft	36ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	20ft	7 igpm	0hr 30min	20ft	7 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	Bleach (Javex)	N/A
		Qty 0 ig	Intake Setting (BTC) 0ft

Driller's Log					Overall Well Depth 45ft
Well Log	From	End	Colour	Rock Type	Bedrock Level 0ft
5060	0ft	1ft	Brown	Topsoil	
5060	1ft	22ft	Brown	Fine Sandstone and Sand	
5060	22ft	29ft	Brown	Medium Sandstone and Sand	
5060	29ft	34ft	Brown	Shale	
5060	34ft	45ft	Brown	Medium Sandstone	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
5060	41ft	3 igpm
5060	44ft	4 igpm

Setbacks		
Well Log	Distance	Setback From
5060	55ft	Septic Tank
5060	80ft	Leach Field
5060	150ft	Right of any Public Way Road

Well Driller's Report

Date printed **2009/08/27**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	10/28/2005

Casing Information		Casing above ground 1ft 6in			Drive Shoe Used? Yes
Well Log	Casing Type	Diameter	From	End	Slotted?
5611	Steel	6 inch	0ft	30ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	20ft	8 igpm	0hr 30min	20ft	8 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	Bleach (Javex)	N/A
		Qty 0 ig	Intake Setting (BTC) 0ft

Driller's Log					Overall Well Depth 50ft
Well Log	From	End	Colour	Rock Type	Bedrock Level 0ft
5611	0ft	5ft	Brown	Fine Sandstone and Sand	
5611	5ft	15ft	Brown	Medium Sandstone	
5611	15ft	27ft	Brown	Medium Sandstone and Sand	
5611	27ft	43ft	Brown	Medium Sandstone	
5611	43ft	50ft	Grey	Medium Sandstone	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
5611	38ft	1 igpm
5611	43ft	2 igpm
5611	49ft	5 igpm

Setbacks		
Well Log	Distance	Setback From
5611	50ft	Septic Tank
5611	75ft	Leach Field
5611	200ft	Right of any Public Way Road

Well Driller's Report

Date printed **2009/08/27**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	09/24/2008

Casing Information		Casing above ground 1ft			Drive Shoe Used? Yes
Well Log	Casing Type	Diameter	From	End	Slotted?
19730	Steel	6 inch	0ft	18ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	17ft	15 igpm	0hr 30min	17ft	15 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	Bleach (Javex)	Submersible
		Qty 1.0 ig	Intake Setting (BTC) 28ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	31ft
19730	0ft	2ft	Green	Fill	Bedrock Level 0ft
19730	2ft	8ft	Green	Sand and Sandstone	
19730	8ft	17ft	Grey	Medium Sandstone	
19730	17ft	25ft	Grey	Shale	
19730	25ft	31ft	Grey	Sandstone	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
19730	27ft	5 igpm
19730	29ft	10 igpm

Setbacks		
Well Log	Distance	Setback From
19730	50ft	Septic Tank
19730	75ft	Leach Field
19730	100ft	Right of any Public Way Road

Well Driller's Report

Date printed **2009/08/27**

Drilled by			
Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well	Rotary	09/25/2008

Casing Information		Casing above ground 1ft			Drive Shoe Used? Yes
Well Log	Casing Type	Diameter	From	End	Slotted?
19731	Steel	6 inch	0ft	31ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	15 igpm	0hr 30min	0ft	15 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	Water	Bleach (Javex)	Submersible
		Qty 1.0 ig	Intake Setting (BTC) 55ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	60ft
19731	0ft	1ft	Brown	Topsoil	Bedrock Level 0ft
19731	1ft	9ft	Green	Sand and Sandstone	
19731	9ft	28ft	Brown and grey	Shale	
19731	28ft	60ft	Grey	Fine Sandstone	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
19731	51ft	5 igpm
19731	55ft	10 igpm

Setbacks		
Well Log	Distance	Setback From
19731	50ft	Septic Tank
19731	75ft	Leach Field
19731	97ft	Right of any Public Way Road

Well Driller's Report

Date printed **2009/08/27**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	06/26/2007

Casing Information		Casing above ground 1ft			Drive Shoe Used? Yes
Well Log	Casing Type	Diameter	From	End	Slotted?
20419	Steel	6 inch	0ft	29ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	13ft	16 igpm	1hr	13ft	10 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	Bleach (Javex)	Submersible
		Qty 1.0 ig	Intake Setting (BTC) 44ft

Driller's Log					Overall Well Depth 47ft
Well Log	From	End	Colour	Rock Type	Bedrock Level 0ft
20419	0ft	1ft	Green	Fill	
20419	1ft	11ft	Brown	Clay and Sand	
20419	11ft	25ft	Yellow	Sandstone	
20419	25ft	28ft	Grey	Fine Sandstone	
20419	28ft	29ft	Grey	Medium Sandstone	
20419	29ft	47ft	Grey	Sandstone	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
20419	42ft	3 igpm
20419	45ft	15 igpm

Setbacks		
Well Log	Distance	Setback From
20419	51ft	Septic Tank
20419	75ft	Leach Field
20419	105ft	Right of any Public Way Road

Well Driller's Report

Date printed **2009/08/27**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	12/05/1994

Casing Information		Casing above ground 1ft 6in	Drive Shoe Used? Yes
Well Log	Casing Type	Diameter	From
90200500	Steel	6 inch	0ft
			End
			58ft
			Slotted?

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	40ft	15 igpm	1hr	60ft	15 igpm	No	0 igpm
	<i>(BTC - Below top of casing)</i>						

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	Other	Bleach (Javex)	Submersible
		Qty 1.0 ig	Intake Setting (BTC) 5ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	60ft
90200500	0ft	4ft	Brown	Topsoil	Bedrock Level 0ft
90200500	4ft	30ft	Brown	Sand	
90200500	30ft	55ft	Brown	Gravel	
90200500	55ft	60ft	Brown	Sandstone	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
90200500	60ft	15 igpm

Setbacks
There is no Setback information.

Well Driller's Report

Date printed **2009/08/27**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	09/12/1997

Casing Information		Casing above ground 1ft	Drive Shoe Used? Yes		
Well Log	Casing Type	Diameter	From	End	Slotted?
90920100	Steel	6 inch	0ft	19ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	1.5 igpm	0hr 20min	0ft	1.5 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	Water	Bleach (Javex)	N/A
		Qty 0 ig	Intake Setting (BTC) 40ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	42ft
90920100	0ft	8ft	Brown	Till	Bedrock Level 0ft
90920100	8ft	40ft	Brown	Sandstone	
90920100	40ft	42ft	Grey	Sandstone	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
90920100	33ft	1.5 igpm

Setbacks
There is no Setback information.

Well Driller's Report

Date printed **2009/08/27**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	06/08/1998

Casing Information		Casing above ground 1ft	Drive Shoe Used? Yes
Well Log	Casing Type	Diameter	From End Slotted?
91068600	Steel	6 inch	0ft 19ft

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	10 igpm	0hr 20min	0ft	10 igpm	No	0 igpm
<i>(BTC - Below top of casina)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	Water	Bleach (Javex)	N/A
		Qty 1.0 ig	Intake Setting (BTC) 60ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	80ft
91068600	0ft	12ft	Brown	Broken Sandstone	Bedrock Level 12ft
91068600	12ft	50ft	Brown	Sandstone	
91068600	50ft	57ft	Grey	Sandstone	
91068600	57ft	71ft	Brown	Sandstone	
91068600	71ft	80ft	Grey	Sandstone	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
91068600	75ft	10 igpm

Setbacks
There is no Setback information.

Well Driller's Report

Date printed **2009/08/27**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	09/11/1998

Casing Information		Casing above ground 0ft	Drive Shoe Used? Yes		
Well Log	Casing Type	Diameter	From	End	Slotted?
91370100	Steel	6 inch	0ft	29ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	24ft	3 igpm	1 hr 30min	40ft	2 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	Bleach (Javex)	N/A
		Qty 3.0 ig	Intake Setting (BTC) 40ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	50ft
91370100	0ft	27ft	Brown	Sand	Bedrock Level 29ft
91370100	27ft	39ft	Brown	Sandstone	
91370100	39ft	40ft	Brown	Fill Gravel and Rock	
91370100	40ft	50ft	Brown	Sandstone	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
91370100	1ft	39 igpm
91370100	2ft	46 igpm

Setbacks
There is no Setback information.

Well Driller's Report

Date printed **2009/08/27**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	05/19/1999

Casing Information	Casing above ground 2in	Drive Shoe Used? Yes			
Well Log	Casing Type	Diameter	From	End	Slotted?
91373000	Steel	6 inch	0ft	30ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	31ft	6 igpm	1hr 30min	0ft	4 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	Other	N/A	N/A
		Qty 0 ig	Intake Setting (BTC) 40ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	30ft
91373000	0ft	30ft	Brown	Sand and Gravel	Bedrock Level
					0ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
91373000	49ft	6 igpm

Setbacks
There is no Setback information.

Well Driller's Report

Date printed **2009/08/27**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	05/25/1999

Casing Information		Casing above ground 1ft	Drive Shoe Used? Yes		
Well Log	Casing Type	Diameter	From	End	Slotted?
91393300	Steel	6 inch	0ft	19ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	5 igpm	0hr 20min	0ft	5 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	Water	Bleach (Javex)	N/A
		Qty 1.0 ig	Intake Setting (BTC) 35ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	45ft
91393300	0ft	1ft	Brown	Gravel	Bedrock Level 8ft
91393300	1ft	3ft	Brown	Topsoil	
91393300	3ft	8ft	Brown	Broken Sandstone	
91393300	8ft	45ft	Brown	Sandstone	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
91393300	40ft	5 igpm

Setbacks
There is no Setback information.

Well Driller's Report

Date printed **2009/08/27**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	06/16/1999

Casing Information		Casing above ground 1ft	Drive Shoe Used? Yes		
Well Log	Casing Type	Diameter	From	End	Slotted?
91394000	Steel	6 inch	0ft	44ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	8 igpm	0hr 20min	0ft	8 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	Water	Bleach (Javex)	N/A
		Qty 1.0 ig	Intake Setting (BTC) 55ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	65ft
91394000	0ft	3ft	Brown	Sand	Bedrock Level 16ft
91394000	3ft	16ft	Brown	Till	
91394000	16ft	26ft	Brown	Sandstone	
91394000	26ft	42ft	Brown	Shale	
91394000	42ft	65ft	Brown	Sandstone	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
91394000	58ft	8 igpm

Setbacks
There is no Setback information.

Well Driller's Report

Date printed **2009/08/27**

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	11/10/2000

Casing Information		Casing above ground 1ft 6in			Drive Shoe Used? Yes
Well Log	Casing Type	Diameter	From	End	Slotted?
92100100	Steel	6 inch	0ft	42ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft <i>(BTC - Below top of casina)</i>	0 igpm	0hr	20ft	20 igpm	No	0 igpm

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	N/A	N/A
		Qty 0 ig	Intake Setting (BTC) 0ft

Driller's Log					Overall Well Depth
Well Log	From	End	Colour	Rock Type	50ft
92100100	0ft	1ft	Brown	Topsoil	Bedrock Level 0ft
92100100	1ft	34ft	EMPTY VALUE	Sand and Gravel	
92100100	34ft	40ft	Brown and grey	Shale	
92100100	40ft	50ft	Brown	Medium Sandstone	

Water Bearing Fracture Zone		
Well Log	Depth	Rate
92100100	45ft	3 igpm
92100100	48ft	17 igpm

Setbacks
There is no Setback information.



Residential Well Inventory Questionnaire

Project: NBDOT Bridges Project No. 1054964
 Location: _____ PID No.: 20155651
 Bridge: _____ Address: _____
 Water Sample No.: Tracadie 1 Date: 9/1/2009

1. Owner

Name: Roland Hache
 Address: 17 chemin Pont Odilon Postal Code: E1X 3P8
 Telephone: (H) _____ (W) _____ (C) _____

2. Well Data

Type: dug _____ drilled _____ screened _____ drive point _____ spring _____
 rooftop collector _____ other (describe) _____
 Year Drilled: _____ Drilled by: _____
 Well Depth: _____ Casing Length: _____ Well Diameter: _____
 Well Yield: _____ Static Water Level: _____
 Well Log Available: Yes _____ No _____ Built 2000 _____

3. Pump Data

Type: jet X submersible _____ X other _____ Location: _____
 Pump Intake Depth: _____ Age of Pump: _____
 Has the pump been serviced/replaced? Yes _____ No _____ Date: _____

4. Water Quality Data

What is the general quality of the water: Good
 Previous water quality analysis: Yes _____ No X Date: _____
 Type: Bacteria _____ Chemical _____ Other _____
 Sample/Analysis by: _____
 Results: _____
 Water Treatment Unit: Yes _____ No X If Yes Give Type: _____

5. History of Past Water Supply Problems? Yes _____ No X

Taste _____ Odour _____ Colour _____ Staining _____
 Salt _____ Corrosion _____ Encrustation _____ Hardness _____
 Silt _____ Bacteria _____ Blasting _____

(Refer to next page for detailed explanation of past water supply problems.)

Has your well ever gone dry? Yes _____ No X Details: _____
 Were there previous wells on the property? Yes _____ No _____

Notes:



Residential Well Inventory Questionnaire

Project: NBDOT Bridges Project No. 1054964

6. Details of Past Water Supply Problems

a) Taste, colour, odour, staining:

b) Hardness, corrosion, encrustation, turbidity (salt/silt/sediment):

c) Bacteria:

d) Other water quality issues:

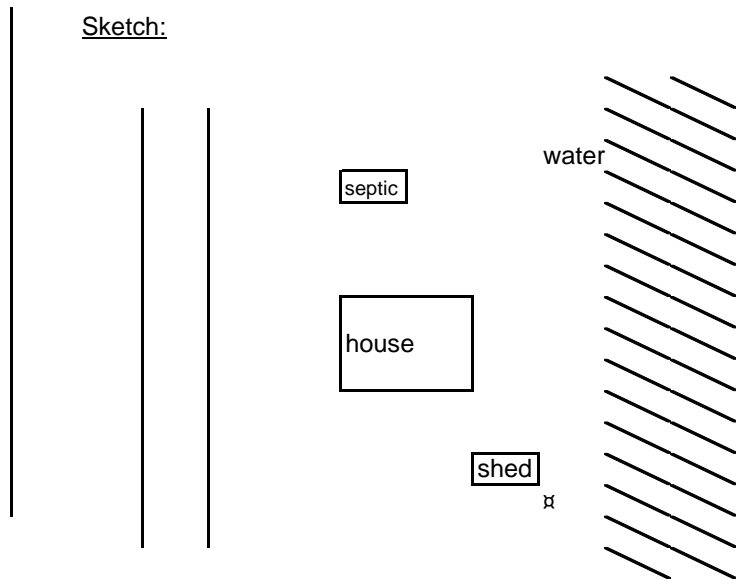
e) Quality or quantity problems due to blasting, or other activity:

f) Well is or has been dry in the past, or limited water available:

7. General Comments and Sketch of Well & Septic Location on Property

Comments:

Sketch:





Residential Well Inventory Questionnaire

Project: NBDOT Bridges Project No. 1054964
 Location: _____ PID No.: 20134177
 Bridge: _____ Address: _____
 Water Sample No.: Tracadie 2 Date: 9/1/2009

1. Owner

Name: Jacinthe Kenney
 Address: 1727 Rte 365 Petite - Tracadie Postal Code: E1X 2P7
 Telephone: (H) _____ (W) _____ (C) _____

2. Well Data

Type: dug _____ drilled _____ screened _____ drive point _____ spring _____
 rooftop collector _____ other (describe) _____
 Year Drilled: 1942 Drilled by: _____
 Well Depth: _____ Casing Length: _____ Well Diameter: _____
 Well Yield: _____ Static Water Level: _____
 Well Log Available: Yes _____ No _____ Changed 3-4 yrs ago

3. Pump Data

Type: jet _____ submersible X other _____ Location: _____
 Pump Intake Depth: _____ Age of Pump: _____
 Has the pump been serviced/replaced? Yes _____ No _____ Date: _____

4. Water Quality Data

What is the general quality of the water: Good
 Previous water quality analysis: Yes X No _____ Date: 6 yrs
 Type: Bacteria X Chemical X Other _____
 Sample/Analysis by: _____
 Results: Good
 Water Treatment Unit: Yes _____ No X If Yes Give Type: _____

5. History of Past Water Supply Problems? Yes _____ No X

Taste _____ Odour _____ Colour _____ Staining _____
 Salt _____ Corrosion _____ Encrustation _____ Hardness _____
 Silt _____ Bacteria _____ Blasting _____

(Refer to next page for detailed explanation of past water supply problems.)

Has your well ever gone dry? Yes _____ No X Details: _____
 Were there previous wells on the property? Yes _____ No _____

Notes:



Residential Well Inventory Questionnaire

Project: NBDOT Bridges Project No. 1054964

6. Details of Past Water Supply Problems

a) Taste, colour, odour, staining:

b) Hardness, corrosion, encrustation, turbidity (salt/silt/sediment):

c) Bacteria:

d) Other water quality issues:

e) Quality or quantity problems due to blasting, or other activity:

f) Well is or has been dry in the past, or limited water available:

7. General Comments and Sketch of Well & Septic Location on Property

Comments:

Sketch:

septic

house

⌘ - well

Road



Residential Well Inventory Questionnaire

Project: NBDOT Bridges Project No. 1054964
 Location: _____ PID No.: 20156402
 Bridge: _____ Address: _____
 Water Sample No.: Tracadie 3 Date: 9/1/2009

1. Owner

Name: Odette leBreton
 Address: 11 Chemin Pont Odilon Postal Code: E1X 3P8
 Telephone: (H) _____ (W) _____ (C) _____

2. Well Data

Type: dug _____ drilled _____ screened _____ drive point _____ spring _____
 rooftop collector _____ other (describe) _____
 Year Drilled: approx 5 yrs ago Drilled by: _____
 Well Depth: unknown Casing Length: _____ Well Diameter: _____
 Well Yield: _____ Static Water Level: _____
 Well Log Available: Yes _____ No _____

3. Pump Data

Type: jet X submersible _____ other _____ Location: _____
 Pump Intake Depth: _____ Age of Pump: _____
 Has the pump been serviced/replaced? Yes _____ No X Date: _____

4. Water Quality Data

What is the general quality of the water: Good
 Previous water quality analysis: Yes X No _____ Date: when drilled
 Type: Bacteria X Chemical _____ Other _____
 Sample/Analysis by: Health
 Results: _____
 Water Treatment Unit: Yes _____ No X If Yes Give Type: _____

5. History of Past Water Supply Problems?

Yes _____ No X

Taste _____ Odour _____ Colour _____ Staining _____
 Salt _____ Corrosion _____ Encrustation _____ Hardness _____
 Silt _____ Bacteria _____ Blasting _____

(Refer to next page for detailed explanation of past water supply problems.)

Has your well ever gone dry? Yes _____ No X Details: _____
 Were there previous wells on the property? Yes X No _____

Notes:

Renovated cottage
 lots of people fish trout



Residential Well Inventory Questionnaire

Project: NBDOT Bridges Project No. 1054964

6. Details of Past Water Supply Problems

a) Taste, colour, odour, staining:

b) Hardness, corrosion, encrustation, turbidity (salt/silt/sediment):

c) Bacteria:

d) Other water quality issues:

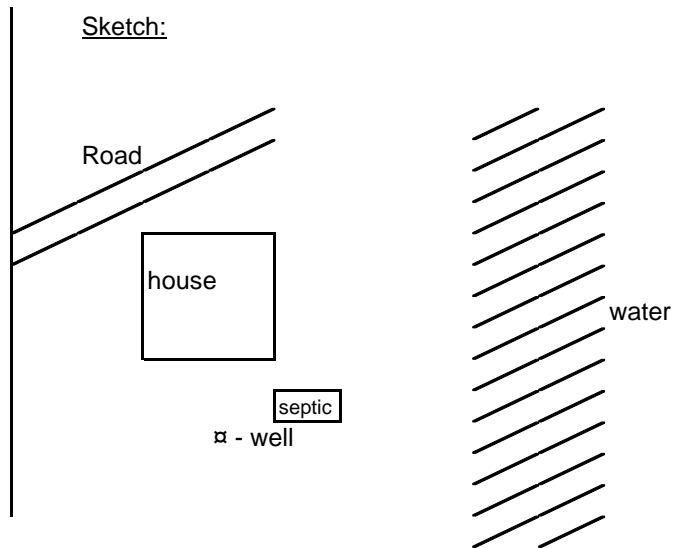
e) Quality or quantity problems due to blasting, or other activity:

f) Well is or has been dry in the past, or limited water available:

7. General Comments and Sketch of Well & Septic Location on Property

Comments:

Sketch:





Residential Well Inventory Questionnaire

Project: NBDOT Bridges Project No. 1054964
 Location: _____ PID No.: 20636072
 Bridge: _____ Address: _____
 Water Sample No.: Tracadie 4 Date: 9/2/2009

1. Owner

Name: Marc Savoie
 Address: 1892 Rte 365 Pitit Tracadie Postal Code: E1X 2R3
 Telephone: (H) _____ (W) _____ (C) _____

2. Well Data

Type: dug _____ drilled _____ screened _____ drive point _____ spring _____
 rooftop collector _____ other (describe) _____
 Year Drilled: approx 1990 Drilled by: _____
 Well Depth: 150' Casing Length: _____ Well Diameter: _____
 Well Yield: _____ Static Water Level: _____
 Well Log Available: Yes _____ No _____

3. Pump Data

Type: jet _____ submersible X other _____ Location: _____
 Pump Intake Depth: _____ Age of Pump: _____
 Has the pump been serviced/replaced? Yes _____ No X Date: approx 1990

4. Water Quality Data

What is the general quality of the water: iron staining
 Previous water quality analysis: Yes _____ No X Date: _____
 Type: Bacteria _____ Chemical X Other _____
 Sample/Analysis by: Health
 Results: _____
 Water Treatment Unit: Yes X No _____ If Yes Give Type: softener approx. 15 yrs

5. History of Past Water Supply Problems?

Yes X No _____

Taste _____ Odour _____ Colour _____ Staining X
 Salt _____ Corrosion _____ Encrustation _____ Hardness _____
 Silt _____ Bacteria _____ Blasting _____

(Refer to next page for detailed explanation of past water supply problems.)

Has your well ever gone dry? Yes _____ No X Details: _____
 Were there previous wells on the property? Yes _____ No _____

Notes:



Residential Well Inventory Questionnaire

Project: NBDOT Bridges Project No. 1054964

6. Details of Past Water Supply Problems

a) Taste, colour, odour, staining:

b) Hardness, corrosion, encrustation, turbidity (salt/silt/sediment):

c) Bacteria:

d) Other water quality issues:

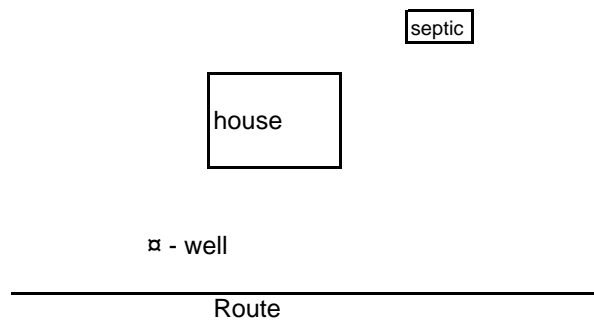
e) Quality or quantity problems due to blasting, or other activity:

f) Well is or has been dry in the past, or limited water available:

7. General Comments and Sketch of Well & Septic Location on Property

Comments:

Sketch:





Residential Well Inventory Questionnaire

Project: NBDOT Bridges Project No. 1054964
 Location: _____ PID No.: 20154613
 Bridge: _____ Address: _____
 Water Sample No.: Tracadie 5 Date: 0/0/2009

1. Owner

Name: Jean Guy Robichaud
 Address: 51 ch Leo Petit Tracadie Postal Code: E1X 3P9
 Telephone: (H) 363-6365 (W) _____ (C) _____

2. Well Data

Type: dug drilled _____ screened _____ drive point _____ spring _____
 rooftop collector _____ other (describe) _____
 Year Drilled: approx 30 yrs Drilled by: _____
 Well Depth: app 15' Casing Length: _____ Well Diameter: _____
 Well Yield: _____ Static Water Level: _____
 Well Log Available: Yes _____ No _____

3. Pump Data

Type: jet submersible _____ other _____ Location: _____
 Pump Intake Depth: _____ Age of Pump: new in 2001
 Has the pump been serviced/replaced? Yes No _____ Date: _____

4. Water Quality Data

What is the general quality of the water: Good lots of spring
 Previous water quality analysis: _____ No _____ Date: 2000
 Type: Bacteria Chemical _____ Other _____
 Sample/Analysis by: Good
 Results: _____
 Water Treatment Unit: Yes _____ No If Yes Give Type: _____

5. History of Past Water Supply Problems? Yes No _____

Taste _____ Odour _____ Colour _____ Staining _____
 Salt _____ Corrosion _____ Encrustation _____ Hardness _____
 Silt _____ Bacteria _____ Blasting _____

(Refer to next page for detailed explanation of past water supply problems.)

Has your well ever gone dry? Yes _____ No Details: _____
 Were there previous wells on the property? Yes _____ No _____

Notes:



Residential Well Inventory Questionnaire

Project: NBDOT Bridges Project No. 1054964

6. Details of Past Water Supply Problems

a) Taste, colour, odour, staining:

b) Hardness, corrosion, encrustation, turbidity (salt/silt/sediment):

c) Bacteria:

d) Other water quality issues:

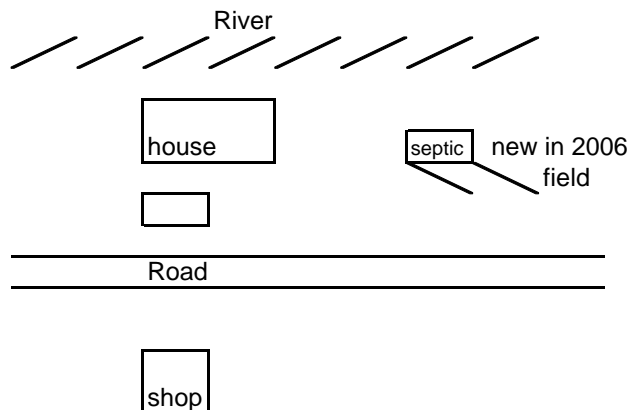
e) Quality or quantity problems due to blasting, or other activity:

f) Well is or has been dry in the past, or limited water available:

7. General Comments and Sketch of Well & Septic Location on Property

Comments:

Sketch:





Residential Well Inventory Questionnaire

Project: NBDOT Bridges Project No. 1054964
 Location: Pitit Tracadie PID No.: 20157954
 Bridge: _____ Address: _____
 Water Sample No.: Tracadie 6 Date: 0/02/2009

1. Owner

Name: Alma Thomas
 Address: 1703 Rte 365 Postal Code: E1X 2P7
 Telephone: (H) 395-9392 (W) _____ (C) _____

2. Well Data

Type: dug _____ drilled _____ screened _____ drive point _____ spring _____
 rooftop collector _____ other (describe) _____
 Year Drilled: approx 29 yrs Drilled by: _____
 Well Depth: app 50' Casing Length: _____ Well Diameter: _____
 Well Yield: _____ Static Water Level: _____
 Well Log Available: Yes _____ No _____

3. Pump Data

Type: jet _____ submersible X other _____ Location: _____
 Pump Intake Depth: _____ Age of Pump: new in 2001
 Has the pump been serviced/replaced? Yes _____ No X Date: _____

4. Water Quality Data

What is the general quality of the water: Good
 Previous water quality analysis: Yes X No _____ Date: approx 2007
 Type: Bacteria X Chemical _____ Other _____
 Sample/Analysis by: Good
 Results: _____
 Water Treatment Unit: Yes _____ No X If Yes Give Type: _____

5. History of Past Water Supply Problems? Yes _____ No X

Taste _____ Odour _____ Colour _____ Staining _____
 Salt _____ Corrosion _____ Encrustation _____ Hardness _____
 Silt _____ Bacteria _____ Blasting _____

(Refer to next page for detailed explanation of past water supply problems.)

Has your well ever gone dry? Yes _____ No X Details: _____
 Were there previous wells on the property? Yes _____ No X

Notes:



Residential Well Inventory Questionnaire

Project: NBDOT Bridges Project No. 1054964

6. Details of Past Water Supply Problems

a) Taste, colour, odour, staining:

b) Hardness, corrosion, encrustation, turbidity (salt/silt/sediment):

c) Bacteria:

d) Other water quality issues:

e) Quality or quantity problems due to blasting, or other activity:

f) Well is or has been dry in the past, or limited water available:

7. General Comments and Sketch of Well & Septic Location on Property

Comments:

Sketch:

⊗ well

house

septic

Road



Residential Well Inventory Questionnaire

Project: NBDOT Bridges Project No. 1054964
 Location: Pitit Tracadie PID No.: 20218558
 Bridge: _____ Address: _____
 Water Sample No.: Tracadie 7 Date: 0/02/2009

1. Owner

Name: Sylvie Thomas
 Address: 45 Rue Liboire Basque Postal Code: E1X 3L9
 Telephone: (H) 393-6545 (W) _____ (C) _____

2. Well Data

Type: dug _____ drilled _____ screened _____ drive point _____ spring _____
 rooftop collector _____ other (describe) _____
 Year Drilled: approx 24 yrs Drilled by: _____
 Well Depth: ?? Idea Casing Length: _____ Well Diameter: _____
 Well Yield: _____ Static Water Level: _____
 Well Log Available: Yes _____ No _____

3. Pump Data under minihome

Type: jet X submersible _____ other _____ Location: _____
 Pump Intake Depth: _____ Age of Pump: new in 2001
 Has the pump been serviced/replaced? Yes X No _____ Date: changed about 10 yrs ago

4. Water Quality Data

What is the general quality of the water: Good - Best in the world (many in area have hard water, not here)
 Previous water quality analysis: Yes X No _____ Date: 1990
 Type: Bacteria X Chemical _____ Other _____
 Sample/Analysis by: Good
 Results: _____
 Water Treatment Unit: Yes _____ No X If Yes Give Type: _____

5. History of Past Water Supply Problems? Yes _____ No X

Taste _____ Odour _____ Colour _____ Staining _____
 Salt _____ Corrosion _____ Encrustation _____ Hardness _____
 Silt _____ Bacteria _____ Blasting _____

(Refer to next page for detailed explanation of past water supply problems.)

Has your well ever gone dry? Yes _____ No X Details: _____
 Were there previous wells on the property? Yes _____ No X

Notes:



Residential Well Inventory Questionnaire

Project: NBDOT Bridges Project No. 1054964

6. Details of Past Water Supply Problems

a) Taste, colour, odour, staining:

b) Hardness, corrosion, encrustation, turbidity (salt/silt/sediment):

c) Bacteria:

d) Other water quality issues:

e) Quality or quantity problems due to blasting, or other activity:

f) Well is or has been dry in the past, or limited water available:

7. General Comments and Sketch of Well & Septic Location on Property

Comments:

Sketch:

septic

house

∩ well under patio

Road



Residential Well Inventory Questionnaire

Project: NBDOT Bridges Project No. 1054964
 Location: Pitit Tracadie PID No.: 20134771
 Bridge: Tracc Address: _____
 Water Sample No.: Tracadie 8 Date: 0/02/2009

1. Owner

Name: Carmella Thomas
 Address: 1684 Tue 365 Postal Code: E1X 3H4
 Telephone: (H) 395-6651 (W) _____ (C) _____

2. Well Data

Type: dug _____ drilled _____ screened _____ drive point _____ spring _____
 rooftop collector _____ other (describe) _____
 Year Drilled: approx 5 yrs Drilled by: _____
 Well Depth: approx 50 yrs Casing Length: _____ Well Diameter: _____
 Well Yield: _____ Static Water Level: _____
 Well Log Available: Yes _____ No _____

3. Pump Data under minihome

Type: jet _____ submersible X other _____ Location: _____
 Pump Intake Depth: _____ Age of Pump: 5 years
 Has the pump been serviced/replaced? Yes X No _____ Date: new w/new well

4. Water Quality Data

What is the general quality of the water: Good - Calcium
 _____ (not here)
 Previous water quality analysis: Yes X No _____ Date: 2007
 Type: Bacteria X Chemical _____ Other _____
 Sample/Analysis by: GNB
 Results: Good
 Water Treatment Unit: Yes _____ No X If Yes Give Type: Softener

5. History of Past Water Supply Problems? Yes _____ No X

Taste _____ Odour _____ Colour _____ Staining _____
 Salt _____ Corrosion _____ Encrustation _____ Hardness X calcium
 Silt _____ Bacteria _____ Blasting _____

(Refer to next page for detailed explanation of past water supply problems.)

Has your well ever gone dry? Yes _____ No X Details: _____
 Were there previous wells on the property? Yes X No _____

Notes:

Previous well - too far from house, not enough pressure so drilled new.



Residential Well Inventory Questionnaire

Project: NBDOT Bridges Project No. 1054964

6. Details of Past Water Supply Problems

a) Taste, colour, odour, staining:

b) Hardness, corrosion, encrustation, turbidity (salt/silt/sediment):

c) Bacteria:

d) Other water quality issues:

e) Quality or quantity problems due to blasting, or other activity:

f) Well is or has been dry in the past, or limited water available:

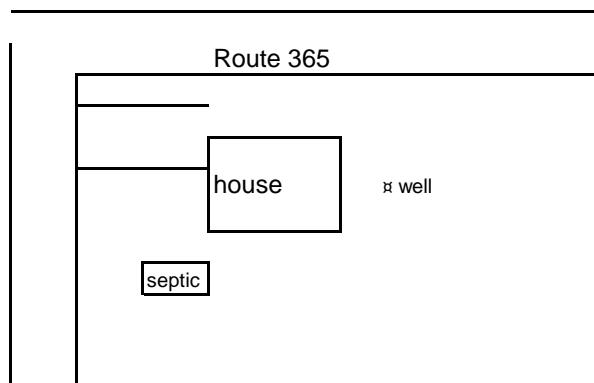
7. General Comments and Sketch of Well & Septic Location on Property

Comments:

Wells in area have salt problem - road salt.

Are careful not to waste water

Sketch:





**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
TRACADIE, NB**

September 22, 2017

APPENDIX I

Public Consultation Summary and First Nation Engagement



**ENVIRONMENTAL BACKGROUND STUDY – LITTLE TRACADIE RIVER BRIDGE NO. 2, ROUTE 365,
TRACADIE, NB**

September 22, 2017



Jacques Whitford Stantec Limited
711 Woodstock Road
PO Box 1116
Fredericton, NB E3B 5C2
Tel: (506) 457-3200
Fax: (506) 457-7652

Stantec

September 8, 2009
File: 1054964.

Chief Wilbur Dedam
Mi'kmaq Nation at Burnt Church
620 Bayview Drive,
Burnt Church, New Brunswick
E2G 2A8

Dear Chief Dedam:

Reference: NBDOT Proposed Bridge/Culvert Upgrade

This letter is to inform you that the New Brunswick Department of Transportation (NBDOT) is considering the replacement of several bridges or culverts at locations within your area (see attached maps). The projects would include the removal of the existing structure, and construction of a new structure over the watercourse, at the same location.

Locations in your area are:

- Little Tracadie River No 2, Route 365, Gloucester County;
- Five Fingers Brook No 4, Route 180, Five Fingers, Restigouche County;
- Tributary to Five Fingers Brook, Route 180, Five Fingers, Restigouche County;
- Little South Branch Tomogonops, Route 430 Heath Steel Mines, Northumberland County; and
- Shillelagh Cove, Route 420 Southesk Parish, Northumberland County.

NBDOT is currently carrying out environmental background studies, in order that any environmentally sensitive features can be identified for planning purposes in advance of the work. The Department is also seeking input from the public, First Nations, and stakeholders, to help identify any concerns regarding the projects. The environmental background studies will investigate a variety of topics including but not limited to the presence of rare plants, wildlife, wetlands, watercourses (including navigability), fish and fish habitat, groundwater quality, archaeological and heritage resources, and current public and First Nations use of resources within the Project areas.

The purpose of this letter is to inform you of these activities, and to give you an opportunity to ask questions or identify any concerns you or members of your community may have. NBDOT also hopes that you will take this opportunity to identify any current use of land or resources by your community within the Project areas, in order that we can work with you to ensure that such use is not compromised.

September 8, 2009

Chief Wilbur Dedam, Mi'kmaq Nation at Burnt Church

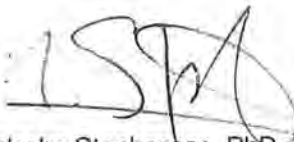
Page 2 of 2

Reference: NBDOT Proposed Bridge/Culvert Upgrade

Jacques Whitford Stantec Limited, on behalf of NBDOT, will be following up this letter with a telephone call to determine what type of communication would be preferred to receive your input in relation to these projects. Meanwhile, if you have any questions regarding this project, please feel free to contact me directly.

Sincerely,

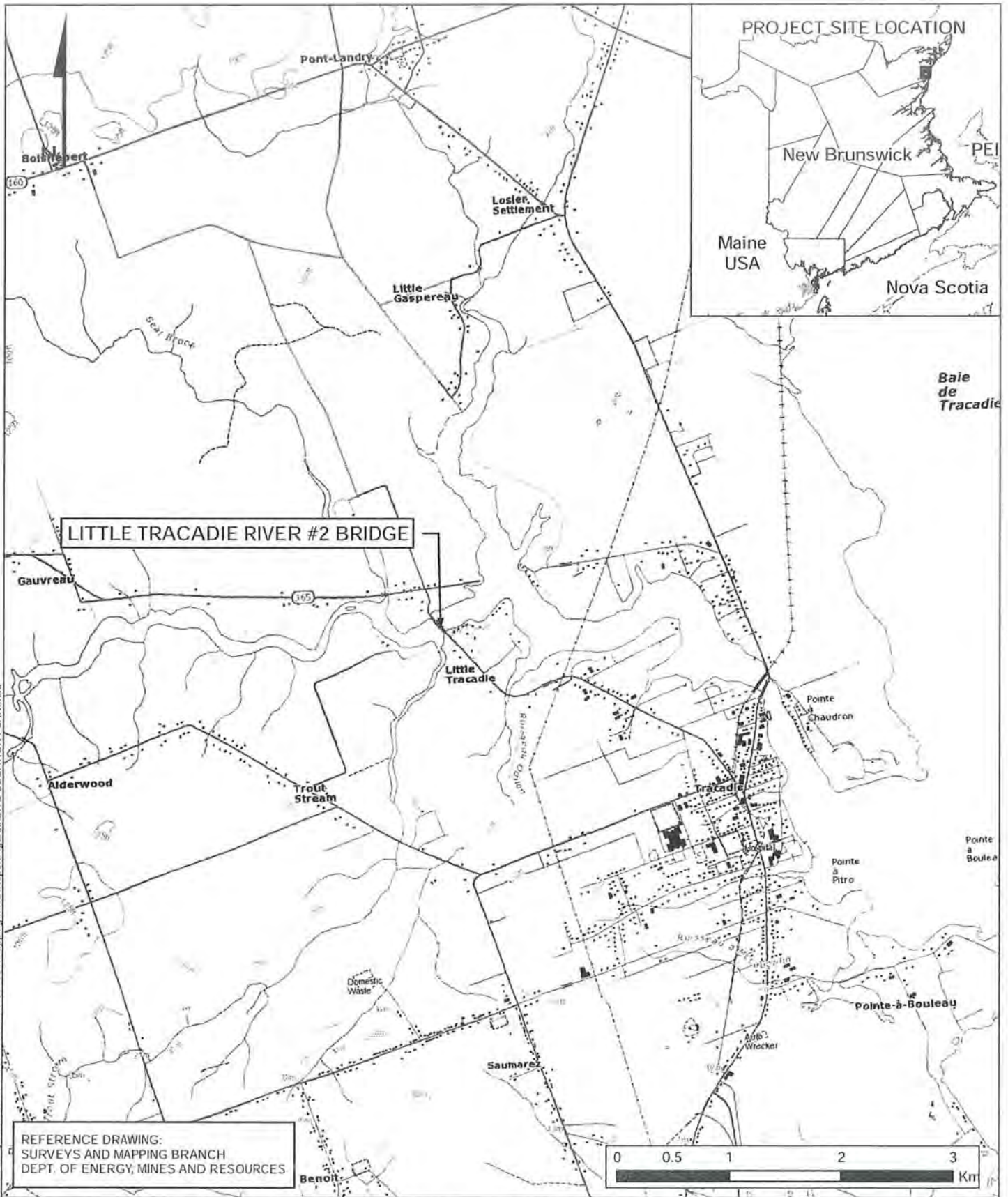
JACQUES WHITFORD STANTEC LIMITED



Malcolm Stephenson, PhD, Principal
Project Manager
Tel: (506) 457-3200 x 9623
Fax: (506) 457-7652
malcolm.stephenson@stantec.com

Attachment: Project Location Figures

cc. Robert Sharpe, P.Eng., Assistant Director, Design Branch, NBDOT



File Path: X:\Projects\NewBrunswick\1054xxx\1054964\Mapping\MXD\Report\Figures\SITE_LOCATION_PLAN.mxd

REFERENCE DRAWING:
SURVEYS AND MAPPING BRANCH
DEPT. OF ENERGY, MINES AND RESOURCES

NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES

SITE LOCATION PLAN ENVIRONMENTAL BACKGROUND STUDY LITTLE TRACADIE RIVER BRIDGE GLOUCESTER COUNTY, NEW BRUNSWICK	Scale:	Job No.:	Dwg. No.: 1.1	 Stantec	
		1:45,000			1054964
	Date:	Dwn. By:	Appd. By:		
Client:	NB DEPARTMENT OF TRANSPORTATION		10/09/2009	RJS	MS



Jacques Whitford Stantec Limited
711 Woodstock Road
PO Box 1116
Fredericton, NB E3B 5C2
Tel: (506) 457-3200
Fax: (506) 457-7652

Stantec

September 8, 2009
File: 1054964.

Chief George H. Ginnish
Mi'kmaq Nation at Eel Ground
47 Church Road,
Eel Ground, New Brunswick
E0K 1B0

Dear Chief Ginnish:

Reference: NBDOT Proposed Bridge/Culvert Upgrade

This letter is to inform you that the New Brunswick Department of Transportation (NBDOT) is considering the replacement of several bridges or culverts at several locations within your area (see attached maps). The projects would include the removal of the existing structure, and construction of a new structure over the watercourse, at the same location.

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September 8, 2009

Chief George H. Ginnish, Mi'kmaq Nation at Eel Ground

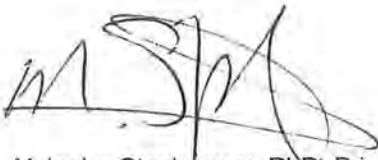
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Sincerely,

JACQUES WHITFORD STANTEC LIMITED

A handwritten signature in black ink, appearing to read 'M. Stephenson', written over a horizontal line.

Malcolm Stephenson, PhD, Principal
Project Manager
Tel: (506) 457-3200 x 9623
Fax: (506) 457-7652
malcolm.stephenson@stantec.com

Attachment: Project Location Figures

cc. Robert Sharpe, P.Eng., Assistant Director, Design Branch, NBDOT



Stantec

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711 Woodstock Road
PO Box 1116
Fredericton, NB E3B 5C2
Tel: (506) 457-3200
Fax: (506) 457-7652

September 8, 2009

File: 1054964.

Chief Noah Augustine
Mi'kmaq Nation at Metepenagiag
PO Box 293, Stn Main
Red Bank, New Brunswick
E9E 2P2

Dear Chief Augustine:

Reference: NBDOT Proposed Bridge/Culvert Upgrade

This letter is to inform you that the New Brunswick Department of Transportation (NBDOT) is considering the replacement of several bridges or culverts located in your area (see attached maps). The projects would include the removal of the existing structure, and construction of a new structure over the watercourse, at the same location.

Locations in your area are:

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September 8, 2009
Chief Noah Augustine, Mi'kmaq Nation at Metepenagiag
Page 2 of 2

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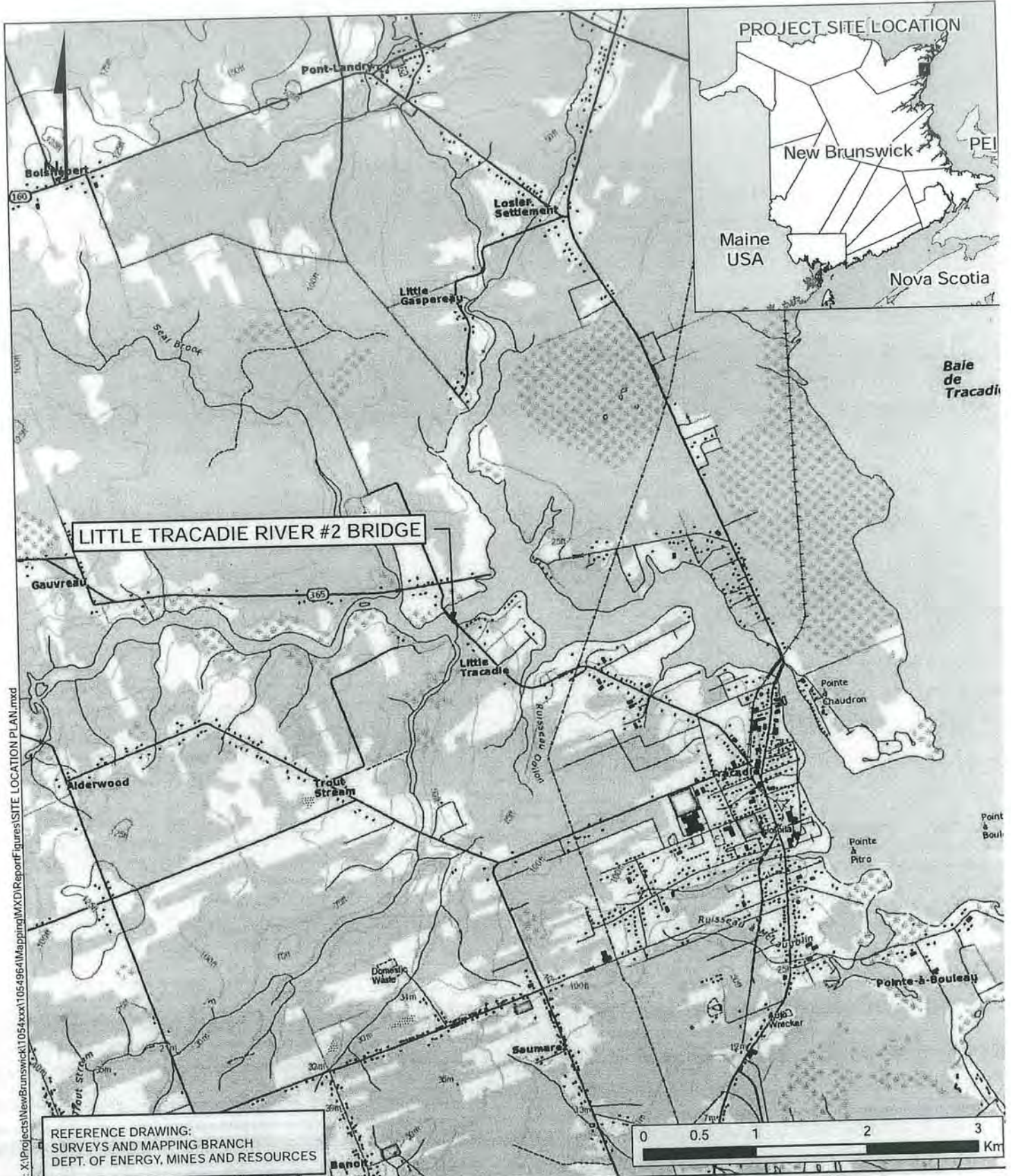


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Stantec

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711 Woodstock Road
PO Box 1116
Fredericton, NB E3B 5C2
Tel: (506) 457-3200
Fax: (506) 457-7652

September 8, 2009
File: 1054964.

Chief David Peter-Paul
Mi'kmaq Nation at Pabineau
1290 Pabineau Falls Road,
Pabineau First Nation, New Brunswick
E2A 7M3

Dear Chief Peter-Paul:

Reference: NBDOT Proposed Bridge/Culvert Upgrade

This letter is to inform you that the New Brunswick Department of Transportation (NBDOT) is considering the replacement of several bridges or culverts at locations in your area (see attached maps). The projects would include the removal of the existing structure, and construction of a new structure over the watercourse, at the same location.

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Stantec

September 8, 2009

Chief David Peter-Paul, Mi'kmaq Nation at Pabineau

Page 2 of 2

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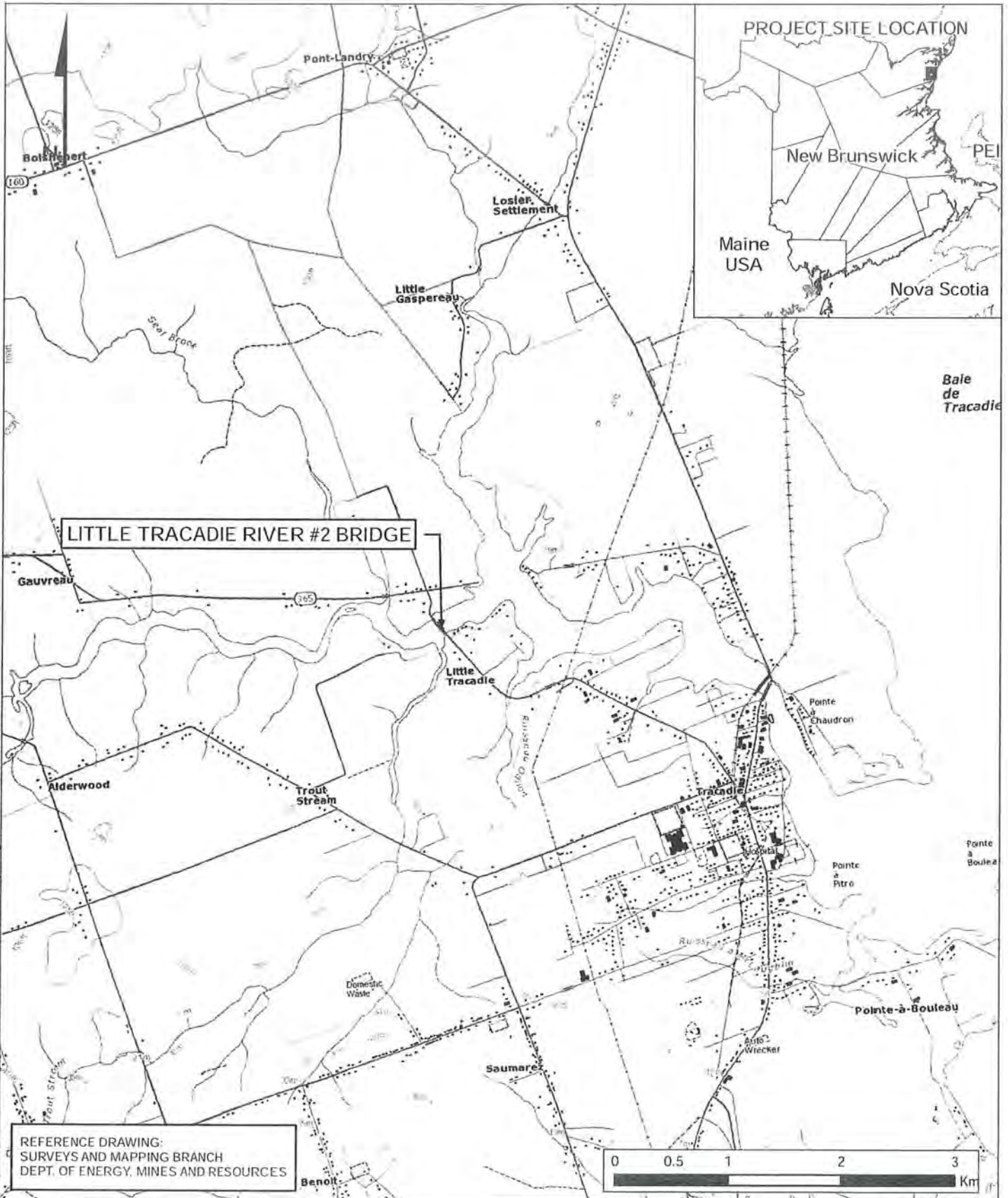
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