# Appendix I
# Mi'Kmaq Ecological Knowledge Study - CMM Environmental Services 2010

# MI'KMAQ ECOLOGICAL KNOWLEDGE STUDY

## Highway 107
## Sackville to Porters Lake

Prepared for
Highway Planning and Design
Transportation and Infrastructure Renewal
1672 Granville Street
Halifax, Nova Scotia
B3N 1X1

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# 1.0 INTRODUCTION

## 1.1 Confederacy of Mainland Mi'kmaq Environmental Services

CMM Environmental Services is a program operated by the Lands, Environment, and Natural Resources Directorate of The Confederacy of Mainland Mi'kmaq (CMM) that provides fee for service environmental consulting services. CMM provides advisory services to six Mi'kmaw communities in the province of Nova Scotia: Paqtnkek First Nation, Annapolis Valley First Nation, Bear River First Nation, Glooscap First Nation, Millbrook First Nation, and Pictou Landing First Nation.

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## 1.2 Project Description

Section 1 – Highway 107 Extension.

The proposed Highway 107 Extension will see the completion between Akerley Boulevard in Burnside westerly to Highway 102 near the Duke Street Exchange, about 1.5 kilometres north of the Highway 101/Bedford Highway interchange. The highway

will cross north of Anderson Lake. This project will commence in 2012 and be finished in two years.

Section 2 – Twinning Burnside to Loon Lake.
This section of Highway 107 involves twinning from Exit 13 to the proposed new interchange at Loon Lake. It is not known what side of the road the twinning will take place on. The approximate length of project is 4.7 kilometres.

Section 3 – Loon Lake to Preston.
This highway is being designed as a four-lane, barriered median, controlled access highway with a design speed of 110 km/hr. The highway may be initially constructed as a two-lane facility to match existing sections of Highway 107. It is approximately 6.5 kilometres in length and is located between the existing Forest Hills Parkway Extension at Loon Lake in Westphal, and the existing Highway 107 near Preston (Exit 17).

Section 4 – Twinning of the existing Highway 107 from Exit 17 to Exit 19.
This section of Highway 107 is currently two lane controlled access. It will be twinned in the future to a four-lane rural freeway standard, i.e. with grassed median. This section is approximately 11 kilometres long.

Research includes the Highway 107 area, east of Halifax, covering Halifax County. For the purposes of this study, use and occupation will demonstrate how the Mi'kmaq have traveled along the major waterways, traveled across the land following both marine and land animals, and maintained a presence in Mi'kma'ki.

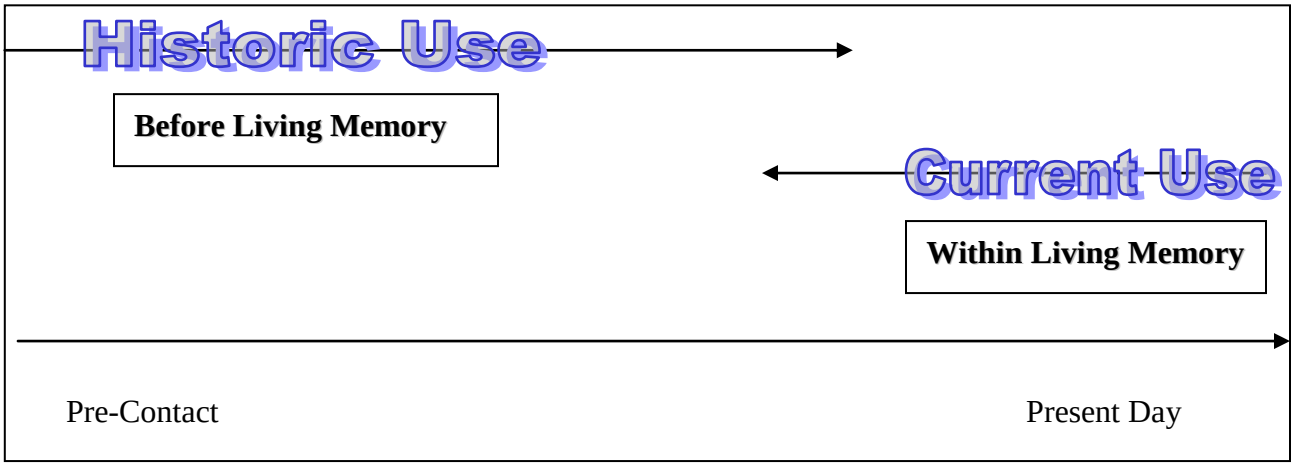
## 2.0 DEFINITION OF TERMS

**Living Memory** is the memory of living Mi'kmaw. The period of time included in living memory varies from knowledge holder to knowledge holder. Living memory often extends to the parent and grandparent of the knowledge holder and can be estimated at three to four generations.

**Current Mi'kmaq Land and Resource Use** occurred within living memory or is occurring at the present day (Figure 1)

**Historic Mi'kmaq Land and Resource Use** occurred before living memory (Figure 1)

**Figure 1: Historic and Current Use Timeline**




**Mi'kmaw Ecological Knowledge** is the collective body of knowledge which Mi'kmaq possess based on their intimate relationship with their natural surroundings, which involves exploitation, conservation and spiritual ideologies, and has been passed on from generation to generation, "*kisaku kinutemuatel mijuijij",* elder to child.

**Mi'kmaq Land and Resource Use Sites** are locations where Mi'kmaq land and resource use activities have taken place or are taking place at present day. These sites may or may not display physical evidence of Mi'kmaq use.

**Mi'kmaw/Mi'kmaq.** *Mi'kmaq* means the Family and is an undeclined form. The variant form, *Mi'kmaw,* plays two grammatical roles: 1) it is the singular of Mi'kmaq, and 2) it is an adjective in circumstances where it precedes a noun.

**Mi'kma'ki** is the Mi'kmaw homeland (Atlantic Provinces and Gaspé Peninsula)

**Specific Land Claim** arises when a First Nation alleges that the federal government has not honoured its treaties, agreements or legal responsibilities. According to federal policy, a valid specific claim exists when a First Nation can prove the government has an "outstanding lawful obligation". The Mi'kmaq are currently pursuing several specific land claims in Nova Scotia.

**Comprehensive Claim** is based on underlying Aboriginal Title to traditional territory that has not been dealt with by treaty or other means. Aboriginal Title to lands exists as a legal right derived from First Nation historical occupation and possession of their tribal lands. The process of negotiating the settlement of comprehensive claims, which is known as modern-day treaty making, clarifies access and ownership to land and resources. Currently, the Mi'kmaq have a comprehensive claim to all lands within the province of Nova Scotia including all inland and adjacent waters.

# 3.0 PURPOSE AND SCOPE OF THE MI'KMAQ ECOLOGICAL KNOWLEDGE STUDY

## 3.1 Purpose of the Mi'kmaq Ecological Knowledge Study

The purpose of the Mi'kmaq Ecological Knowledge Study (MEKS) is to support the integration of Mi'kmaq knowledge of use and occupation of Mi'kma'ki into development decisions via the environmental assessment process.

## 3.2 Scope of the Mi'kmaq Ecological Knowledge Study

The MEKS includes:

1) a study of historic and current Mi'kmaq land and resource use;
2) an evaluation of the potential impacts of the Project on Mi'kmaq use and occupation and constitutionally based rights;
3) an evaluation of the significance of the potential impacts of the Project on Mi'kmaq use and occupation; and
4) recommendations to proponents and regulators that may include recommendations for mitigation measures, further study, or consultation with Mi'kmaq.

## 3.3 Not included in the scope of the Mi'kmaq Ecological Knowledge Study

### *3.3.1 Section 35 Consultation*

This MEKS study is not consultation for justification of the infringement of constitutionally protected aboriginal and treaty rights. If the project involves possible infringements of Mi'kmaq constitutional rights, the MEKS recommends further action.

### *3.3.2 Archaeological Screening and Resource Impact Assessment*

The MEKS study is not an Archaeological Screening or Archaeological Resource Impact Assessment. Results presented in this study can inform and be informed by archaeological screenings and assessments.

### *3.3.3 Notification of Mi'kmaw individuals or communities of the Project*

The MEKS study is not intended to inform or notify Mi'kmaw individuals or communities of the Project, solicit the opinions or concerns of Mi'kmaw individuals or communities on the Project, or promote the Project to Mi'kmaw individuals or communities.

# 4.0 METHODOLOGY

## 4.1 Historic Mi'kmaq Land and Resource Use

Historic Mi'kmaq land and resource use occurred before living memory. The study of historic land and resource use paints a broad portrait of Mi'kmaq use and occupation of Mi'kma'ki in centuries past.

### *4.1.1 Study Area*

The historic land and resource use study area is in the Mi'kmaq district of Eskikewa'kik (skin dresser's territory) and encompasses the area of Guysborough County to Halifax County.

### *4.1.2 Methods*

Research resources from the following institutes were consulted: The Confederacy of Mainland Mi'kmaq Research Department Library, Nova Scotia Public Archives, Dalhousie University, Saint Mary's University, St. Francis Xavier University, and the Nova Scotia Museum.

### *4.1.3 Limitations*

It is, also, important to discuss the limitations of this research. Mi'kmaq history tends to be more of an oral history than a written history, especially during the pre-contact period. This having been said, the information provided about Mi'kmaq history has, for the most part, been written by people of a different culture. This difference means that the available history that exists may not be completely accurate, or some pieces of history may be missing, or not available.

### 4.2 Current Mi'kmaq Land and Resource Use

Current Mi'kmaq land and resource use occurred within living memory or is presently occurring. The MEKS includes a study of:

1) Current Mi'kmaq land and resource use sites
2) Species of significance to Mi'kmaq
3) Mi'kmaw Communities

### *4.2.1 Study Areas*

The study areas are described in Figure 2. Please also see the inserted map at the end.

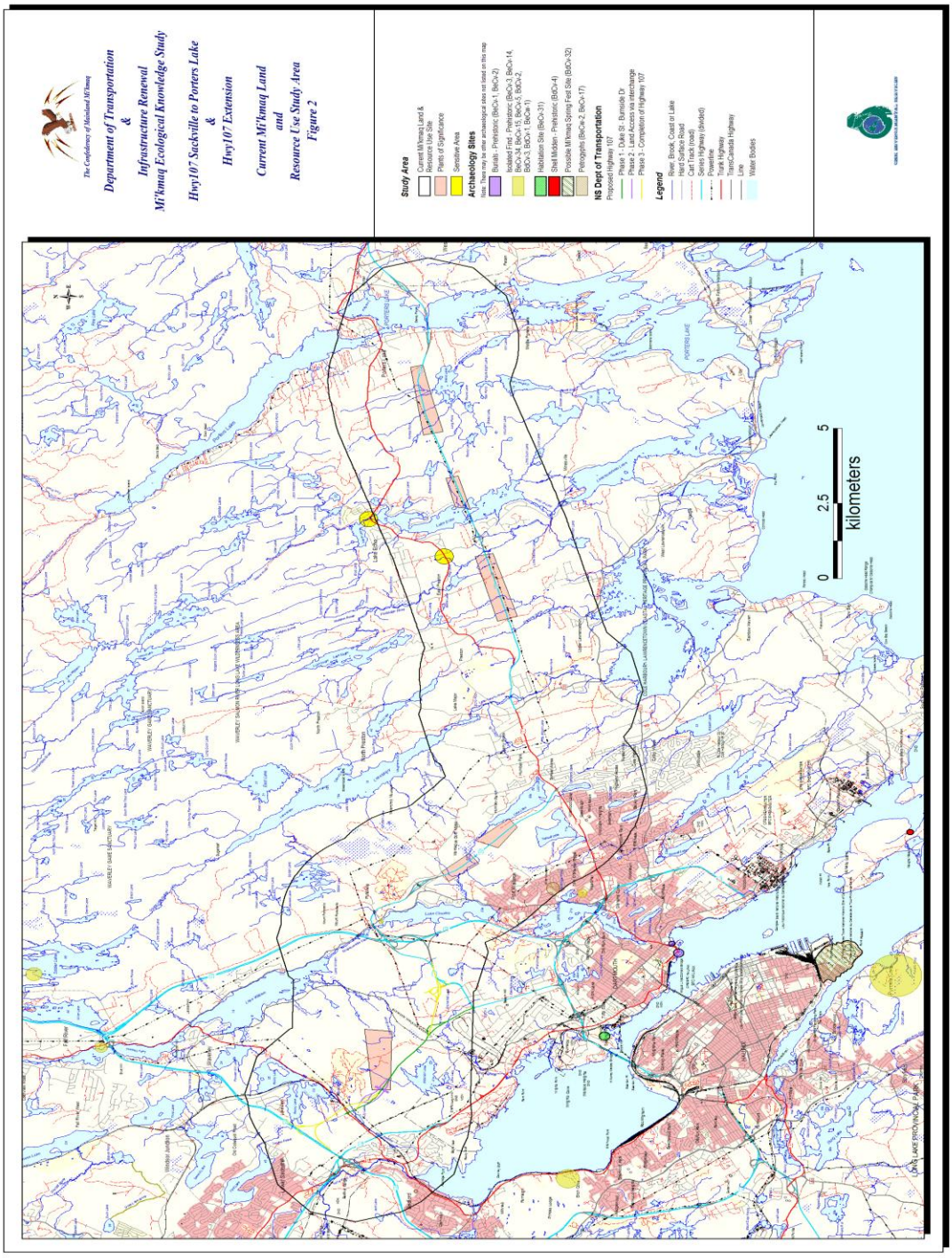



Figure 2

#### 4.2.1.1 Current Mi'kmaq Land and Resource Use Sites

The study area for current Mi'kmaq land and resource use sites is the proposed area of development – five km radius surrounding proposed project site. Please check previous page for Figure 2 or inserted map at the end.

#### 4.2.1.2 Species of Significance to Mi'kmaq

Study areas are marked on Figure 2. Please also see inserted map at the end.

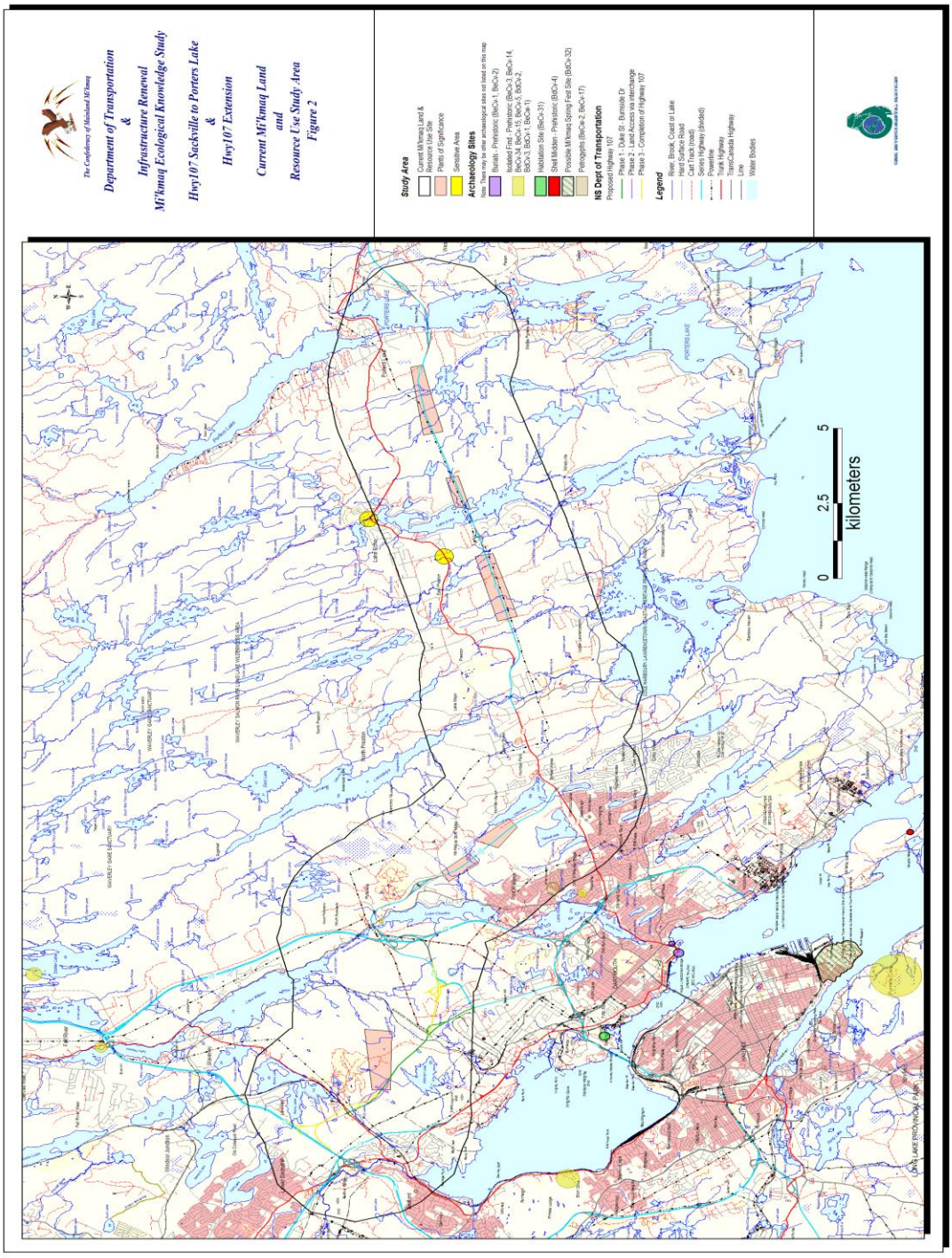



Figure 2

#### 4.2.1.3 Mi'kmaw Communities

The study area for Mi'kmaw communities is a five km radius surrounding the proposed project site.

### *4.2.2 Methods*

#### 4.2.2.1 Current Mi'kmaq Land and Resource Use Sites

Mi'kmaq Knowledge on current land and resource sites will be gathered through a review of information collected through oral interviews with Mi'kmaw knowledge holders.

All individuals, whom will be interviewed, will sign a consent form. Knowledge will be gathered in accordance within the spirit of the *Mi'kmaq Ecological Knowledge Protocol* and an application to this complete research was submitted to Mi'kmaw Ethics Watch.

Knowledge collected is reported in a general format only. No names or specific locations are published. Collected knowledge will be digitized and compiled to allow for an analysis of potential impacts of the project on current Mi'kmaq land and resource use.

#### 4.2.2.2 Species of Significance to Mi'kmaq

A system of stratified random sampling was employed to identify flora species present in the study areas of significance to Mi'kmaq. Plants were surveyed in the spring, 2010 and the fall, 2010. Information collected is reported in a general format only. The names of the species are not recorded.

#### 4.2.2.3 Mi'kmaw Communities

A review of outstanding specific land claims within the study was undertaken by CMM. Presently, there are no known specific land claims identified within the project area.

### *4.2.3 Limitations*

While every attempt was made to document all available Mi'kmaw knowledge, the knowledge gathering process may not have captured some available Mi'kmaw knowledge. It is also recognized that over generations of cultural and political suppression, much Mi'kmaq knowledge has been irretrievably lost.

# 5.0 RESULTS

Results of the study are divided into two categories:

1) historic land and resource use, that is, use that occurred before living memory, and
2) current land and resource use, or use that occurred within living memory or is occurring at the present day

Land and resource use may be for hunting, burial/birth, ceremonial, gathering, or habitation purposes.

## 5.1 Historic Mi'kmaq Land and Resource Use

### *5.1.1 Pre-Contact Introduction*

Mi'kma'ki is the traditional Mi'kmaw Homeland. Historically, the "Mi'kmaw Nation belonged to the Wabanaki Confederacy. This Confederacy included the Mi'kmaq, the Maliseet, the Passamaquoddy, the Penobscot, and the Abenaki tribes" (CMM, 2007, p. 73). "All the tribes respected the territory occupied by the Mi'kmaq, who divided it into seven hunting and fishing districts" (Ibid. p 73). The seven Districts composed of Kespek (last water), Siknikt (drainage area), Epekwitk aq Piktuk (Lying in water and the Explosive place), Kespukwitk (last flow), Eskikewa'kik (skin dresser's territory), and Unama'kik (Mi'kmaw territory) (Native Council, 1994, p. 3). The proposed section of the Highway 107 is within the Eskikewa'kik district (skin dresser's territory).

The Eskikewa'kik district lies within the Meguma Terrane in Nova Scotia. The Meguma Terrane has many different rocks; and with such a variety of rocks and other resources, "the Mi'kmaq and their ancestors acquired an impressive knowledge of the geology of their land by using rocks and minerals to develop one of the first technologies – the working of stone" (Davis and Browne, 1996, vol, p. 322). "The earliest stone tools made by Nova Scotia Indians were large knives, choppers, and scrapers. They were both core

and large flakes. These early tools were simply made by removal of a few large flakes" (Stoddard, 1967 (?), p. 2). "Such tools are found in a few places in the province in the lowest layers of Indian occupation of a campsite" (Ibid. p 2).

"Before the arrival of Europeans, the native Mi'kmaq had long been visiting the Northern Arm, using its waters and shore for fishing and hunting. Their spring migration from the forests of the interior of Chebucto, the greater harbour, was accompanied by celebrations and feasting" (Shea and Watts, 2005, p 11). Before the annual re-establishment of Chebucto, the Mi'kmaq established a camp by first collecting poles that were erected into a pyramid shape; mats, animal skins or birch bark were used to cover the sides. For summer dwellings, the houses were broad and long, mostly covered with birchbark and had more air circulation. Speculatively, the long and broad dwellings could host three or four camp fires. These dwellings had doors on each end, and the buildings were referred to as "long business wigwams" (Hoffman, 1955, pp. 133 - 135).

For the summer harvest, there were forty-six camps, and most of them were located near the mouth of large rivers, and the others were located in saltwater lagoons, coves, and bays. Gtjipotog and Nipmanegatig (both in Halifax harbour area) are two such important villages. Gtjipotog was situated near the mouth of Halifax harbour, where there was a large amount of fish spawning activity. And Nipmanegatig was equally important because of the large amount of shore fish in the area (Hoffman, 1955, pp. 129 - 132 and p. 525). Some of these fish would be consumed shortly after harvesting or dried for later consumption.

John Boileau also writes about Halifax Harbour as a major area: "One of the [Mi'kmaq] favourite spots where they set up their seasonal camps was along the shore 'of the great long harbour,' or Kjipuktuk, as they called it. Their [Mi'kmaq] word has come down…today as Chebucto" (Boileau, 2007, p. 1).

As for Mi'kmaq winter shelter, the dwelling was a cone shaped structure (similar to modern tipi) and covered with birchbark, mats, or animal skins. The sides of the dwellings were painted with many animal shapes like birds, moose, etc. (Hoffman, 1955, p. 136). Another form of dwelling was a lean-to, which was covered with fir branches (Ibid. p 139).

Besides descriptions of dwellings and harvesting areas, there is a reference of a Mi'kmaq travel route. Elsie Tolson writes (without references) about the early history of Bedford, and the Manor House. She writes about a pre-contact, travel route that the Mi'kmaq used. According to her, there was a Mi'kmaq route from Sackville River to Minas (Tolson, 1979, pp. 13 - 14). Tolson also writes about two summer camps on the Sackville River shore. The campsites were where the Sackville River emptied into the Basin at Birch Cove (Ibid. p 17). In the summer, the Mi'kmaq from Shubenacadie, and other areas, would travel to the Sackville River to the Basin to harvest fish (Ibid. p 9).

Similar to Tolson, Thomson and Sheldon write about a Mi'kmaq travel route. In 1990, Thomson and Sheldon did an Archaeological Impact Assessment of the Paper Mill Lake area, which is near the northwestern tip of Bedford Basin: they write that "the river valley may have offered a travel route into and out of the interior" (Thomson and Sheldon, 1993, p. 103). Thomson and Sheldon continue: "…the Sackville and Shubenacadie system offer better interior travel routes to and from the Basin" (Ibid. p 104).

Thomson and Sheldon continue to comment on the surrounding area, specifically the Shubenacadie Canal system which operated between 1831 to 1861. "The canal was built to link ports and communities on the Bay of Fundy to the greater centre of Halifax. [The canal made] use of the existing river and lake system established long before as a travel and trade route by Micmac Indians" (Thomson and Sheldon, 1993, p 113). Additional evidence of Mi'kmaq occupation appears in the "Wellington Lock Archaeological Testing" by Stephen A. Davis who reports about the same area as Thomson and Sheldon. Davis writes that "… the presence of three chalcedony flakes is suggestive of an occupation during the Ceramic Period (circa 2000 – 400 B.P.)" (Davis, 1993, p. 155).

### *5.1.2 General overview of the Study Area*

Geographically, the Mi'kmaq District of Eskikewa'kik lies within the Meguma Terrane in Nova Scotia. The Meguma Zone covers the southern mainland of Nova Scotia, and within the Eskikewa'kik district there is a land formation called the Granite Ridge: the formation is "…along the Eastern Shore [and] forms a feature 80 km long and about 8 – 10 km wide. It rises sharply, sometimes with cliffs, to a narrow plateau 100 m above the Atlantic Coast Region" (Davis and Browne, 1996, vol 2, p 86).

Westward of the Eskikewa'kik district, "[t]he Pennant Barrens include the promontory between Halifax Harbour and the St. Margaret's Bay and part of the Aspotogan Peninsula. The area is underlain entirely by granite which forms knolls elevated up to 150 m, well above the plantation surface" (Davis and Browne, 1996, vol 2, p. 211).

Eastward of Eskikewa'kik district, "[t]he granite has been cut by faults in two places: along the valley from Spider Lake through Lake Major, and along the Porters Lake Valley" (Davis and Browne, 1996, vol 2, p. 86). And the well-drained areas have a variety of trees like: Red Spruce, Balsam Fir, Birch, Eastern Hemlock, and White Spruce. In the semi-barren areas like Lake Charlotte, some Red Oak grow there (Ibid. p 86).

Some of the plants that grow in "[t]he thin soil of the rocky shore…[are]…acid-loving plants and shrubs: witherod, Indian pear, Labrador tea, wintergreen and blueberry. In the spring and summer the woodland is carpeted with arbutus, bunchberry, wild sarsaparilla, pink lady slippers and starflowers. Towering over them are birch, tamarack, maple, oak, beech – and everywhere the magnificent pines that caused the native people to call the Halifax peninsula Gwoarmiktook, the place of great white pines" (Shea and Watts, 2005, p. 11).

With the diverse environment within Eskikewa'kik, specific areas like "Cole Harbour, Chezzetcook Inlet, Petpeswick Inlet, and Musquodoboit Harbour provide important migration and winter habitat for waterfowl. In the spring, particularly mid-March to mid-April, these areas are a stopover for several thousand Black Ducks, and Canada Geese" (Davis and Browne, 1996, vol 2, p. 199). The area of Lawrencetown and Clam Bay "… provides feeding areas and some scattered nesting habitat for the Bald Eagle. Freshwater fishes include White Sucker, shiners, sticklebacks, perch, Banded Killifish, and Brook Trout" (Ibid. p 199).

### *5.1.3 Results*

One of the earlier records of Halifax is by Samuel de Champlain who in 1608, on his return voyage to France, writes about Kjipuktuk (Chibouquetou) as "une baye forte saine" (strong health bay) (Boileau, 2007, p. 3). Chebucto has several spellings, but it was the Mi'kmaq who designated the area as Chebucto (now Halifax).

Later on in 1616, Biard, a Jesuit missionary, writes a description of fish spawning activity: "In the middle of March, fish begin to spawn, and come up from the sea into certain streams, often so abundantly that everything swarms with them. Any one who has seen it could scarcely believe it. You cannot put you hand into the water, without encountering them" (Hoffman, 1955, p. 157). Some of the fish that came were Smelts, Herring, Sturgeon, and Salmon. Some of the methods Mi'kmaq use to fish were fish traps, harpoon, weirs and hook and line (Ibid. p 162). During these times, waterfowl, also, would lay eggs in great numbers (Ibid. p 157).

Nicholas Denys, an entrepreneur from France in 1672, writes about reaching Passepec, which, according to William F. Ganong, could have been the Halifax area. Denys writes about the abundance of Cod, Mackerel, and Herring (Denys 1908, p. 155). He also writes about harvesting many birds that are so abundant that the clouds darken when they flew into the air (Ibid. p 156). Proceeding further eastward, Denys comes to another bay (exact location unknown) where "[t]he Indians are there in great numbers because of the hunting, which is good in the interior of the county, where mountains all abounding with Moose" (Ibid. p 157).

Along with the abundance of fish in the Chebucto (Halifax) area, Hoffman writes about the importance of the place; in 1699, Dierèville, a doctor who had traveled to Acadia, met with three Mi'kmaq Chiefs in the Halifax bay area (Hoffman, 1955, p. 535). The Chiefs took Dierèville to visit Father Louis-Pierre Thury's grave site; Thury had stayed at Il de Chibouquetou (now known as McNab's Island) in 1698. The grave was prepared in Mi'kmaq style with birchbark, and accented with beach pebbles in a French fashion (Boileau, 2007, p. 3).

Ruth Whitehead also writes about Mi'kmaq occupation in the Chebucto area. The Mi'kmaq were camped west of Fairview near a stream at the Bedford Basin. Whitehead writes that in 1746 many Mi'kmaq died from measles. Soon after, the Mi'kmaq called this place Alesooawaygadeek, which means a place of measles (Whitehead, 1991, p. 107).

During the same year, the Mi'kmaq were stricken with more disease with the arrival of French ships, on naval expedition from Europe to Port Louisbourg, N.S., at Chebucto Harbour (Halifax). The Mi'kmaq contacted the disease while in commercial trade with the French, and the disease quickly spread among the Mi'kmaq (Prins, 1996, p. 142).

On May 1749, Colonel Edward Cornwallis arrives in Chebucto Bay. He arrives with approximately twenty-four hundred settlers who settle in the Chebucto area. From here, the settlers spread to the Dartmouth area (Upton, 1979, p. 48) and eastward, and a description of this movement is provided by Mrs. William Lawson. Lawson writes about Captain Lawrence, who in 1754, surveyed land in what is now Lawrencetown. Lawrence found a "good meadowland at the harbour some twelve miles to the eastward of Dartmouth" (Lawson, 1972, p. 247).

After his arrival in 1749, Cornwallis writes to England that Chebucto harbour is full of fish and the forests are full of trees (Whitehead, 1991, p. 111). During the same year, Halifax (Chebucto) is found and the seat of government is moved from Annapolis to Halifax (Prins, 1996, p. 144).

An early description of Chebucto (later Halifax) is provided by Lawson who describes Halifax as an early European settlement: stately trees were cut down, land cleared and blocked off, and the Dartmouth side was also cleared which was "the home and hunting ground of the Micmac Indians. This tribe had for generations wandered through the woods on either side of Chebucto Harbour, the original owners and masters of the great wilderness around them" (Lawson, 1972, pp. 3 - 5).

Shortly after on September 14, 1752, Major Jean-Baptiste Cope of Shubenacadie travels to Halifax to negotiate a treaty with the British; he returns later (November, 1752) to formalize the treaty, and the Treaty of 1726 is reaffirmed. Major Cope "…signed the treaty on a hill which is now Fort Needham, above Richmond" (Whitehead, 1991, pp 126-127). He had lived there in the summer, and he lived in Stewiacke during the winter

(Ibid p 127). As part of Cope's agreement, the Mi'kmaq were invited to come to Halifax anytime for trade as one part of the treaty conditions (Upton, 1979, p. 54). Similar to Cope's action, on April 12, 1753, Glande Gisigash, a Mi'kmaq from La Have went to Halifax to sign an agreement similar as the treaty signed by Major Cope (Atkins, 1973, p. 40).

Unsettled conditions continued between the Mi'kmaq and the British, and in 1753, Mi'kmaq lost 40 barrels of provisions to British crew of a schooner anchored at Jeddore. The schooner was soon shipwrecked, and the Mi'kmaq rescued two sailors from the wreck (Prins, 1996, p. 146).

In 1760, Father Manach, who was a missionary in the Richibucto, N.B. area, complied a list of Mi'kmaq Chiefs for the Mi'kmaq Districts, and according to the list, Batelmy Aunqualett was the District Chief of Eskikewa'kik (Keshpugowitk) (Hoffman, 1995, pp. 517 – 522). The boundary lines of the seven Districts have been subject to interpretation, and for this report, the Mi'kmaw Resource Guide is used to define borders and district names.

As significant as Chebucto was to the Mi'kmaq, the British, also, shared a similar sentiment, which is reported in an Inspectional Report, 29th, May, 1761 by order of His Excellency Major Amherst: "the Coast of Nova Scotia, by all accounts, affords the best or rather the only Harbours in North America fit for a numerous Fleet with water for larger ships, and is by far the most commodious coast for protecting and carrying on that fix'd object of our Attention the Cod-Fishing" (Piers, et al 1947, pp. 65 - 66).

In September of 1790, Gersham Tufts is granted 1000 acres of land in the Dartmouth Township, Halifax County. After the land grant, the Mi'kmaq, in the area, were now residing on some lands that were disputed. And much later on June 30, 1906, elections are held and Peter Paul is elected as Chief of Tufts Cove. Through a series of land negotiations, the band of Halifax Mi'kmaq were relocated to other areas, and by March 30, 1920, the Department of Indian Affairs listed the names of Halifax County Mi'kmaq as members of the Truro Band (CMM records, Tufts Cove).

By now (1817), the Mi'kmaq had adopted St. Anne (a Catholic saint) as their patron saint. St Anne's Day was celebrated on July 26, and the day was convenient because the

Mi'kmaq had traditional gatherings anyway. In 1817, such a celebration took place in Chezzetcook where bonfires were light and much celebration followed (Prins, 1996, p. 172).

In the 1800's, Father Vincent de Paul, also, writes about the St Anne's feast celebration in Chezzetcook: "on the eve of St Anne's feast, they [Mi'kmaq] made a bonfire, and while the wood burned they fired gunshots and danced around the fire, clapping their hands in imitation of musical instruments. This lasted for a great part of the night, however, they had previously said their evening prayers, and sung hymns and canticles" (Labelle, 1995, p. 23).

Liliane Bellefontaine, from Chezzetcook, talks about her ancestors (during Acadian Expulsion in 1755) who had moved away from Halifax: "they went into the woods somehow, and they lived with the Micmacs for a while. They were among the Micmacs; they were all right" (Labelle, 1995, p. 17). Bellefontaine continues that during the 1760's, the "French lived here [Chezzetcook] at the time the Micmacs were here, but that's as much as I can tell you. There were lots of Micmacs here in those days" (Ibid. p. 19). Similar to Bellefontaine's relatives living among the Mi'kmaq and a century and half earlier, Sieur de La Tour had "…escaped the English raid on Port Royal in 1613. Retreating into the woods, he [La Tour] found refuge among the Mi'kmaq" (Prins, 1996, p. 68).

It was in Chebucto area (eastern side of First Dartmouth Lake) that We'jitu Isidore, who lived to be 113 years old, had a vision, which is a mental image of the future. He was what the Mi'kmaq called a kinap, a person of extraordinary power; he had a vision that the Mi'kmaq Nation would excel in athletic sports. Another Mi'kmaq, Peter Cope (1816 – 1913), recalls having seen We'jitu (Whitehead, 1991, p. 87).

Mrs. Andrew Paul, who was born in 1831, shared her memories about the Chebucto area. She was born at Tufts Cove and remembers her grandfather who used to trap beavers at Black Duck Pond (Egg Pond) (Whitehead, 1991, p. 184).

During the mid-1800's, the Mi'kmaq, who were accustomed to harvesting their food supply, ignored colonial ordinances that regulated fish and tree harvesting. In 1843, two Mi'kmaq were fined in Halifax County for harvesting trees. Technically, the two

Mi'kmaq were charged for trespassing and fined twenty shillings (Upton, 1979, pp. 144 - 145).

There were two other Mi'kmaq from Nova Scotia who offered a personal recollection about Chebucto: Grand Chief Gabriel Sylliboy, born in 1874, Whycocomagh (Inverness County). Sylliboy recalls picking berries in Halifax. While some of the blueberries were consumed, some were dried for later use in the winter time (DeBlois, 1990, p. 3). Sylliboy also recalls a story about a Mi'kmaq who boarded a ship that eventually takes him to Europe, and on his return voyage, he disembarks in the Halifax area (Ibid. pp 27 - 34).

The other Mi'kmaq, to share a personal recollection, is Benjamin Brooks, who was born in 1902 in Elmdale (sic) (Halifax County) (DeBlois, 1990, p. 57). While born approximately 25 years later than Gabriel Sylliboy, Benjamin Brooks also shares an insight in the Chebucto area. Brooks describes the relationship between the Mi'kmaq and the Iroquois, who were from the Quebec area. It was during a time of misunderstanding when Iroquois spies were on a reconnaissance mission in Mi'kmaq territory. During this mission, several spies were captured in Cape Breton and Pictou, and there was another spy in Dartmouth. Some of the Iroquois were getting married into the Mi'kmaw community; and with these matrimonial unions, a peaceful relationship was affirmed between the Mi'kmaq and Iroquois (DeBlois, 1990, p 61 - 62).

Eskikewa'kik, with its fishing and hunting grounds, would have been an excellent habitation site for the Mi'kmaq. Plus, there was a bird migration path that would have provided a food source for them. As for Eskikewa'kik being a favourable habitation site, there are numerous archaeological records of Mi'kmaq occupation in the surrounding area. Following is a list of some of these sites (quotes and description of these sites are taken directly from the Maritime Archaeological Resource Inventory Site Survey Forms):

Dartmouth side:

BeCv – 1. This site is located in "Dartmouth, about 300 yards south of Lake Banook and about 100 yards east of the outlet to Dartmouth Cove" (Halifax County). The age of this

burial site is unknown. In 1894, " a great number of human remains were unearthed at this location." The site is now destroyed.

BeCv -2. This site is in Dartmouth (Halifax County) and there is speculation that it is at Admiralty (sic) Place. This is a prehistoric site and dates back 500 plus years. "[T]wo blocked end tubes and a large point" were found. The site could be a burial location.

BeCv - 3. This site is by the north end of Lake Charles "at the junction of highway 18 and gravel road to spider lake" (Halifax County). It is a prehistoric site and dates back to 3,000 plus years. The site is a general activity site, and "a stemmed point of ground slate, a chipped side-notched point, and a fragment of a chipped lanceolate stemmed point" were found.

BeCv – 14. This site is near Red Bridge Pond (Dartmouth) at 19 Plymouth Street (Halifax County). It is a prehistoric site and dates back 10,000 plus years. A "chalcedony Palaeo-Indian fluted point preform" was found. This is an isolated find, and the discovery was in landfill from an unknown source.

BeCv-17. This site is at Millers Mountain (Dartmouth) by Red Bridge Pond (Halifax County). The site is a historic site and petroglyphs were found.

BeCv -31. This site is located on the Dartmouth side of Halifax Harbour near Tufts Cove (Halifax County). There is cluster of four sites in the immediate area, and it is recorded as a Post-Confederation site. The cultural description of the area indicates that as a result of "the environmental characteristics of the property…[there is] a very high potential for recovery of pre-contact Mi'kmaq resources."

BeCv – 34. This site is by the western shoreline of Soldier Lake (Halifax County). It is referred to as an Early/Middle Archaic site and dates back 9,000 – 6,000 years old. "A fully grooved gouge" was found, and the function of the site is undetermined. The discovery is labeled as an isolated find.

There is a visually presentation of a Mi'kmaq encampment at Halifax Harbour. A Mi'kmaq dwelling is seen in the opposite ends of the etching (an art process where a print is produced by etching an image on a sheetmetal, applying ink on the sheet metal,

and applying paper on the inked sheet). The etching, done by R. Perley in 1837, depicts the dwelling as conical shape with pole frame work and what appears to be a birch bark covering. A canoe is shown in the middle ground and European ships in the background (Prins, 1996, p. 164).

Halifax side:

BdCu -2. This site is at Hartlen Point, Eastern Passage (Halifax County). It is a prehistoric site and dates back 500 plus years. A "corner-notched projectile point and [an] end scraper" were found. This projectile and scraper are reported as isolated finds.

BdCv -2. The estimated location of this site is Harrietfield, Run Lake (Halifax County). It is a prehistoric find. A single fine point was found and is considered an isolated find.

BdCv – 3. This site is at "Harrietsfield, Moody Lake on the western shore" (Halifax County). Two gouges were found while clearing land. The find is an isolated find.

BdCv -4. This site is located "on the north shore of Back Cove on McNabs Island" (Halifax County). This is a prehistoric site and dates back 500 plus years. The site is a shell midden type, and three flakes were found.

BdCv – 32. This site is located at Point Pleasant Park, Halifax (Halifax County). This is an early post-Confederation (1867 - 1950) and post colonial site (1604 - 1867). There is also speculation that it is a Mi'kmaq spring feast site.

BdCw -1. This site is located at Bayview Park subdivision, Whites Lake in Halifax County. It is a pre-historic site that dates back 500 plus years, and it is recorded as a burial site. The site was destroyed by construction. The site had "…burial ceremonialism involved, and the associated goods indicate an affiliation with the Adena-related Middlesex Phase of the Northwest," which range 2000 – 2500 B.P.

BeCu -3. This site is near Preston, Salmon River (Halifax County). It is a prehistoric site. A plummet was found, and the find is recorded as an isolated find.

BdCv -1. This site is located near Purcells Cove, Halifax Harbour (Halifax County). It is a prehistoric site. "Three arrowheads" and "three arrowhead fragments" were found, and these finds are recorded as isolated finds.

BeCv – 5. This site is located "on the east bank of the narrows between Lake Fletcher and Lake Thomas, [and] about 50 yards west of Highway 2 and 100 feet north of the bridge on the road leading to Fall River." This is a prehistoric site. A gouge was found and is considered an isolated find.

BeCv – 15. This site is located at Prince's Lodge (29 Lodge Drive) in Halifax (Halifax County). It is a prehistoric site and dates back 500 plus years. A stemmed projectile point was found in 1985, and the find is reported as an isolated find.

BeCw – 1. This site is near a "brook which connects Duck Pond and Beaver Pond, about 2000 yards N.N.E. of Beaver Bank station." This is a prehistoric site and dates back 3000 plus years. The find is recorded as an isolated find.

BeCw -2. This site is located at Bedford Barrens, in the vicinity of Division Street and Emmerson Street (Halifax County). Petroglyphs were found.

There are several descriptions about the protocol of a Mi'kmaq burial. Following is an example: "If an Indian [Mi'kmaq] dies during the winter at some place remote from the common burial-place of his ancestors, those of his wigwam enwarp him with much care in barks of painted red and black, place him upon the branches of some tree on the bank of a river, and build around him with logs a kind of fort…"(Hoffman, 1955, p. 319). Usually, the body was later interred in a common burial site. There were two burial sites and one possible burial site found: Lake Banook (BeCv – 1); Whites Lake (BdCw – 1); and Dartmouth (BeCv – 2: possible)

There was one shell midden site found in the area: McNabs Island (BdCv – 4). A more detail description of what can be found in a shell midden is offered by W. J. Wintemberg. He worked on an archaeological excavation called the Eisenhauer Shell-Heap site in the Mahone Bay area (Lunenburg County). Some of the items that Wintemberg found were bone fragments, stone tools, and pottery fragments (Smith and Wintemberg, 1973, pp. 113 – 125). He also found a disk which may have been used in a game (Ibid. p 126). A

possible version of the disk (Altĕstăkŭn – Indian Dice game) is described by Father Chrestien Le Clercq, as translated by William F Ganong (LeClercq, 1910, p. 294). The archaeological site is located approximately seventy kilometers southwest.

Stone tool making was a part of survival, and "[t]he Indians [Mi'kmaq] used any kind of suitable stone which could be found. When they occurred nearby, fine-grained igneous or metamorphic rocks were often used. The type of stone from which the Mi'kmaq made their tools were quartzite, quartz, chalcedony, rhyolite, basalt, diorite, and fine-grained hard slate. The source of material for stone tools might be rounded pebbles picked up from a gravel beach, or pieces knocked from an outcrop of stone" (Stoddard, 1967(?), p. 1(?)). Note: there were several sites where tools were found: Lake Charles (BeCv – 3); Red Bridge Pond (BeCv – 14); Soldiers Lake (BeCv – 34); Hartlen Point (BdCu – 2); Harrietfield (BdCv – 2); Preston (BeCu – 3); Purcells Cove (BdCv -1); Harrietfield (BdCv – 3); Fall River (BeCv – 5); Prince's Lodge (BeCv – 15).

There were petroglyph drawings found in the Bedford Barrens. Claire Poirier prepared a research paper about the presence of petroglyphs. With her research, she writes that "…insight [was gained] into the site's cultural value, that is, how it reflects the beliefs, values and experiences of the Mi'kmaw people. This includes people's ideas about how to connect to the land, the site's spiritual importance and how the Petroglyph images can be interpreted" (Poirier, 2009, p. 4). Note: There were two petroglyph sites found: Millers Mountain (BeCv – 17) and Bedford Barrens (BeCw – 2).

Besides shell midden sites and other artifacts found in the proposed area, there are census records that indicate the Mi'kmaq lived in the vicinity:

In 1688, there was a census taken by Gargas, and at the time there were 438 Mi'kmaq in Nova Scotia and Ilse St Pierre. And more specifically, there were 33 Mi'kmaq at Chebucto (now known as Halifax) (Prins, 1996, p. 91).

In 1772, Thomas Chandler Haliburton reports that there are 865 Mi'kmaq in Nova Scotia (Whitehead, 1991, p. 172).

In 1847, there is a list of Mi'kmaq, who were sick, near Dartmouth and 4 had died (Whitehead, 1991, pp. 232 – 233).

In 1901, Indian Affairs Records indicate there are 81 Mi'kmaq in Halifax County.

In 1903, Indian Affairs Records indicate there are 116 Mi'kmaq in Halifax County.

In 1906, Indian Affairs Records indicate there are 342 Mi'kmaq in Halifax County.

In 1910, Indian Affairs Records indicate there are 211 Mi'kmaq in Halifax County.

In 1913, Indian Affairs Records indicate there are 219 Mi'kmaq in Halifax County.

In 1915, Indian Affairs Records indicate there are 235 Mi'kmaq in Halifax County.

In 1917, there were 21 Mi'kmaq living in Tufts Cove, near Dartmouth (Dec 6, 1917). During the Halifax Explosion, a total of 9 Mi'kmaq died instantly or later from injuries. There were seven shanties in the area. These numbers are based on recollection of Jeremiah Bartlett Alexis, also known as Jerry Lonecloud (Whitehead, 1991, p. 304).

## 5.2 Current Mi'kmaq Land and Resource Use

The study of current Mi'kmaq land and resource use includes the study of current Mi'kmaq land and resource use sites, species of significance to Mi'kmaq, and Mi'kmaw communities.

### *5.2.1 Current Mi'kmaq Land and Resource Use Sites*

Current Mi'kmaq land and resource use activities are divided into five categories:

1) Kill/hunting
2) Burial/birth
3) Ceremonial
4) Gathering food/ medicinal
5) Occupation/habitation

Table 1 provides a description of activities undertaken at the sites.

**Table 1: Description of Activities Undertaken in Current Mi'kmaq Land and Resource Use Sites**

| TYPE OF SITE | DESCRIPTION OF ACTIVITIES IN STUDY AREA |
|---|---|
| HUNTING/KILL | Section 1: Not identified.<br><br>Section 2: Not identified.<br><br>Section 3: Trout, deer, rabbit.<br><br>Section 4: Rabbit, partridge, trout, smelts, deer. |
| BURIAL/BIRTH | Section 1: Not identified.<br><br>Section 2: Not identified.<br><br>Section 3: Not identified.<br><br>Section 4: Burial site. |
| CEREMONIAL | Section 1: Not identified.<br><br>Section 2: Not identified.<br><br>Section 3: Not identified.<br><br>Section 4: Ceremonial plants. |

| | |
|---|---|
| GATHERING | Section 1: Not identified.<br><br>Section 2: Not identified.<br><br>Section 3: Water.<br><br>Section 4: Logs. |
| HABITATION | Section 1: Not identified.<br><br>Section 2: Not identified.<br><br>Section 3: Tree stands.<br><br>Section 4: Overnight campsite, tree stand. |

During the Mi'kmaq Ecological Knowledge Study Interviews, there were two culturally sensitive areas identified: three identified as possible burial sites. One site is on the northern tip of Lake Echo, and the other is also in the Lake Echo area, east of Frog Lake. Both sites are identified on the map included.

### *5.2.2 Species of Significance to Mi'kmaq present in study area*

Species of significance to Mi'kmaq in the study area are divided into three categories:

1) Medicinal
2) Food/Beverage
3) Craft/Art

The following table describes the number of plants of significance present in the study areas during the fall and spring surveys.

**Table 2: Number of Species of Significance to Mi'kmaq Present in the Study Areas Spring 2010**

| TYPE OF USE | NUMBER OF SPECIES PRESENT SPRING 2010 | |
|---|---|---|
| MEDICINAL | Section 1: | 20 |
| | Section 2: | 18 |
| | Section 3: | 25 |
| | Section 4: | 31 |
| FOOD/BEVERAGE | Section 1: | 15 |
| | Section 2: | 10 |
| | Section 3: | 13 |
| | Section 4: | 20 |
| CRAFT/ART | Section 1: | 9 |
| | Section 2: | 5 |
| | Section 3: | 8 |
| | Section 4: | 11 |

**Table 3: Number of Species of Significance to Mi'kmaq Present in the Study Areas Fall 2010**

| TYPE OF USE | NUMBER OF SPECIES PRESENT FALL 2010 | |
|---|---|---|
| MEDICINAL | Section 1: | 38 |
| | Section 2: | 23 |
| | Section 3: | 30 |
| | Section 4: | 43 |
| FOOD/BEVERAGE | Section 1: | 21 |
| | Section 2: | 11 |
| | Section 3: | 15 |
| | Section 4: | 23 |
| CRAFT/ART | Section 1: | 13 |
| | Section 2: | 6 |
| | Section 3: | 10 |
| | Section 4: | 12 |

### *5.2.3 Mi'kmaw Communities*

There are several Mi'kmaw reserves located nearby the study area. Reserves being defined as those lands that had been set-aside for the use and benefit of Indians under Federal legislation of the Indian Act:

Section 1

Cole Harbour IR (Indian Reservation) 30, established 1880, is located approximately 11 kilometers south east of the project. Cole Harbour is in Halifax County.

Shubenacadie IR 13, established 1820, is located approximately 20 kilometers northerly of the Project. Shubenacadie is in Halifax County.

Indian Brook IR 14, established in 1820, is located approximately 36 kilometers northerly of the Project. Indian Brook is in Hants County.

Millbrook IR 27, established in 1886, is located approximately 54 kilometers northerly of the project. Millbrook is in Colchester County.

Section 2

Cole Harbour IR 30, established 1880, is located approximately 6 kilometers south east of the project. Cole Harbour is in Halifax County.

Shubenacadie IR 13, established 1820, is located approximately 24 kilometers northerly of the Project. Shubenacadie is in Halifax County.

Indian Brook IR 14, established in 1820, is located approximately 41 kilometers northerly of the Project. Indian Brook is in Hants County.

Millbrook I R 27, established in 1886, is located approximately 67 kilometers northerly of the project. Millbrook is in Colchester County.

Section 3

Cole Harbour IR 30, established 1880, is located approximately 6 kilometers south east of the project. Cole Harbour is in Halifax County.

Shubenacadie IR 13, established 1820, is located approximately 26 kilometers northerly of the Project. Shubenacadie is in Halifax County.

Indian Brook IR 14, established in 1820, is located approximately 43 kilometers northerly of the Project. Indian Brook is in Hants County.

Millbrook I R 27, established in 1886, is located approximately 68 kilometers northerly of the project. Millbrook is in Colchester County.

Section 4

Cole Harbour IR 30, established 1880, is located approximately 14 kilometers south east of the project. Cole Harbour is in Halifax County.

Shubenacadie IR 13, established 1820, is located approximately 30 kilometers northerly of the Project. Shubenacadie is in Halifax County.

Indian Brook IR 14, established in 1820, is located approximately 47 kilometers northerly of the Project. Indian Brook is in Hants County.

Millbrook I R 27, established in 1886, is located approximately 70 kilometers northerly of the project. Millbrook is in Colchester County.

### *5.2.4 Land Claims*

Currently, there are no land claims within the proposed project area.

The following is a list of Mi'kmaq place names:

Porter's lake - Amaswaqnek
Cole Harbour - Wanpa'a (still water)
Cow Bay - Nuloqtujk
Devil's Island – Kjikujikutk
McNab's Island - Elpesaqtejk
Eastern Passage – Tuitn

Halifax Harbour – Kjipuktuk
Dartmouth – Punamkuatik (salmon place)
Bedford Basin – Asoqmapskiaj
Sackville - Kuipaw
Charles Lake – Asepemk
Waverly - Atupanuek
Kinsack – Kisnaq
Wellington – Tlaqaniku'jk
Shubenacadie / Grand Lake – Tlaqatik
Tuft's Cove – Nipame'katik. Cranberry Place.
Sackville – Aluso'lwe'tatil – a place of measles.

# 6.0 POTENTIAL PROJECT IMPACTS ON MI'KMAQ LAND AND RESOURCE USE

The following table presents potential project impacts on historic and current Mi'kmaq land and resource use.

**Table 4: Potential Project Impacts on Mi'kmaq Land and Resource Use**

| POTENTIAL IMPACTS ON MI'KMAQ LAND AND RESOURCE USE | |
|---|---|
| 6.01 | The historic review of Mi'kmaq use and occupation documents historic Mi'kmaq use and occupation in the study area, and potentially the project area. A potential impact of the project is the disturbance of archaeological resources. |
| 6.02 | Several species of significance to Mi'kmaq have been identified in the study area. Permanent loss of some specimens is an impact of the project. |
| 6.03 | Potential burial sites have been identified within the study area. Permanent loss of site is a potential impact on the project. |

# 7.0 SIGNIFICANCE OF POTENTIAL PROJECT IMPACTS ON MI'KMAQ LAND AND RESOURCE USE

The concept of significance in the Mi'kmaq Knowledge Study is distinct from the concept of significance under the *Canadian Environmental Assessment Act* or the *Nova Scotia Environmental Assessment Regulations*. Significance to Mi'kmaq is evaluated only in accordance with the criteria listed below. The MEKS evaluation of the significance of the potential project impacts on Mi'kmaq should be used by regulators to inform their determination of the significance of the environmental effects of the Project.

## 7.1 Significance Criteria

The following criteria are used to analyze the significance of the potential project impacts on Mi'kmaq use:

1) Uniqueness of land or resource
2) Culture or spiritual meaning of land or resource
3) Nature of Mi'kmaq use of land or resource
4) Mi'kmaq constitutionally protected rights in relation to land and resource

## 7.2 Evaluation of Significance

**Table 5: Significance of Potential Project Impacts on Mi'kmaq Land and Resource Use**

| POTENTIAL IMPACT | EVALUATION OF SIGNIFICANCE |
|---|---|
| 6.01 The historic review of Mi'kmaq use and occupation documents Mi'kmaq use and occupation in the study area, and potentially the project area. A potential impact of the project is the disturbance of archaeological resources. | 7.2.01 Mi'kmaq archaeological resources are extremely important to Mi'kmaq as a method of determining Mi'kmaq use and occupation of Mi'kma'ki and as an enduring record of the Mi'kmaq nation and culture across the centuries. Archaeological resources are irreplaceable. Any disturbance of Mi'kmaq archaeological resources is significant. |
| 6.02 Several species of significance to Mi'kmaq have been identified in the study area. Permanent loss of some species is an impact of the Project. | 7.2.02 The plant species of significance to Mi'kmaq identified within the study area exist within the surrounding area. The destruction of some specimens within the study area does not pose a threat to Mi'kmaq use of the species. The impact of the permanent loss of some specimens of plants species of significance to Mi'kmaq is evaluated as not likely significant. |
| 6.03 Potential burial sites have been identified within the project area. Disturbance of this area is a potential impact on the project. | 7.2.03 Burial sites are extremely important to the Mi'kmaq in Nova Scotia. Any disturbance of these areas is evaluated as significant. |

# 8.0 CONCLUSIONS AND RECOMMENDATIONS

8.01 In the event that Mi'kmaw archaeological deposits are encountered during construction or operation of the Project, all work should be halted and immediate contact should be made with David Christianson at the Nova Scotia Museum and with Dr Donald M. Julien at The Confederacy of Mainland Mi'kmaq.

8.02 There are no land claims registered with the Specific Claims branch of Indian and Northern Affairs Canada in Ottawa for any of the Mi'kmaq communities in Nova Scotia within the project area. However, that does not suggest that any other Mi'kmaw claimants for this area may not submit land claims in the future.

8.02The information regarding the potential burial site is marked in yellow in Figure 2 is limited. Should this sensitive area need to be disturbed during construction or operation then further research regarding this site is recommended.

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# Appendix J
# Archaeological Assessment

**NOVA SCOTIA DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE RENEWAL**

# HIGHWAY 107 EXTENSION ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT 2013 BURNSIDE TO BEDFORD, NOVA SCOTIA

## FINAL REPORT

Submitted to:
**Nova Scotia Department of Transportation and Infrastructure Renewal**
and the
**Special Places Program of the Nova Scotia Department of Communities, Culture and Heritage**

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CRM Group Project Number: 2013-0010-01

JANUARY 2014

CRM Group

*The following report may contain sensitive archaeological site data. Consequently, the report must not be published or made public without the written consent of Nova Scotia's Coordinator of Special Places Program, Department of Communities, Culture and Heritage.*

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# NOVA SCOTIA DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE RENEWAL HIGHWAY 107 EXTENSION ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT 2013

## 1.0 INTRODUCTION

In the late summer of 2013, the Nova Scotia Department of Transportation and Infrastructure Renewal (TIR) retained Cultural Resource Management (CRM) Group Limited through Dillon Consulting Limited to undertake archaeological reconnaissance of the proposed Highway 107 Extension between Burnside Drive and Duke Street, a distance of approximately 7 kilometres. The project is located in the Halifax Regional Municipality (HRM) communities of Burnside and Bedford (***Figure 1***). There will also be two new intersections created with roundabouts at Burnside Drive/Akerley Boulevard and Duke Street/Rocky Lake Drive. The archaeological resource impact assessment focuses on a review of historical and environmental documentation, as well as field reconnaissance to identify any areas of high archaeological potential, which would have to be investigated prior to development.

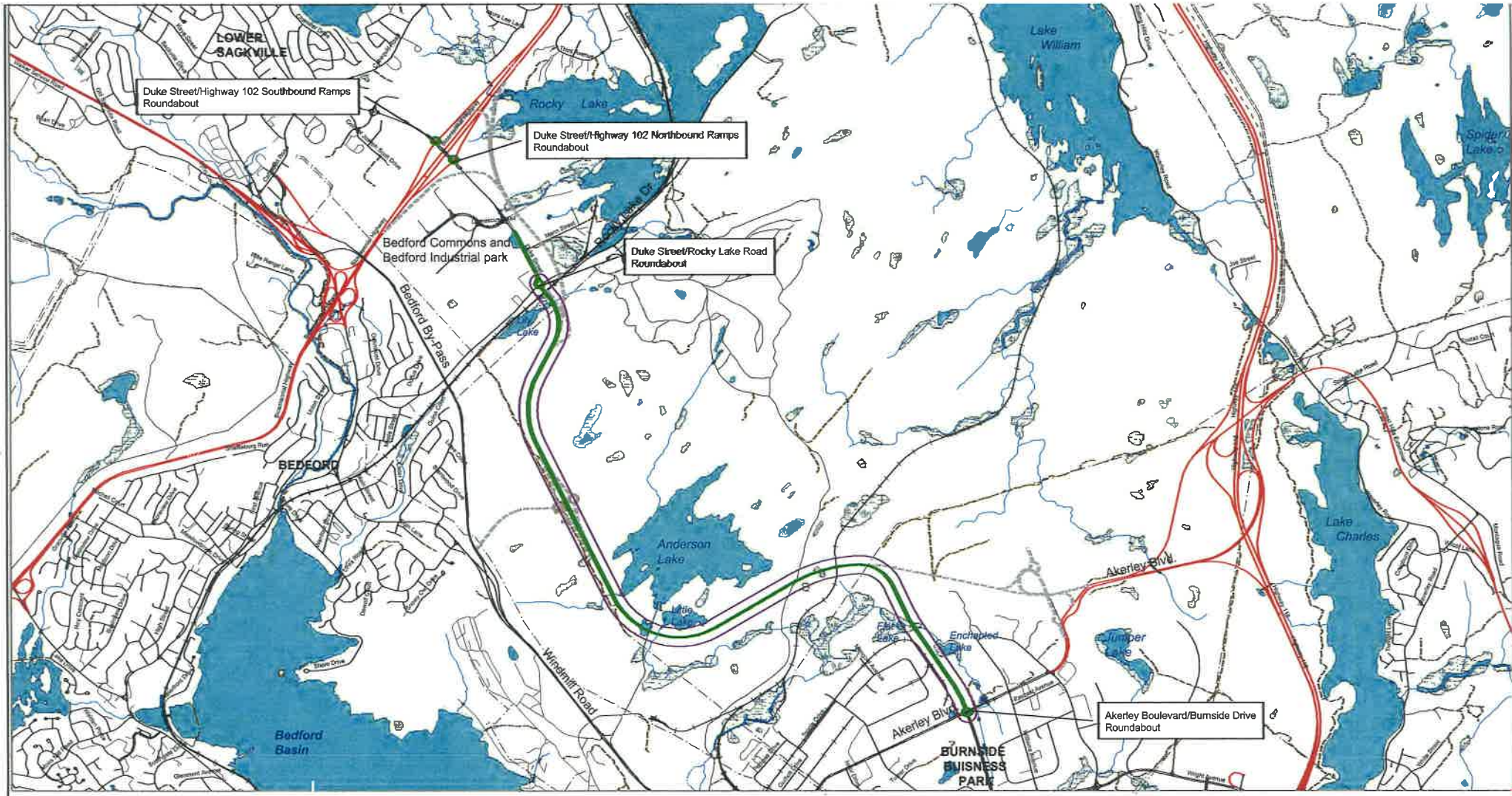
The archaeological resource impact assessment was undertaken by Angela J. Finnie, Staff Archaeologist for CRM Group along with CRM Group Archaeological Technician Kyle Cigolotti. The archaeological screening was conducted according to the terms of Heritage Research Permit A2013NS107 (Category 'C'), issued to Finnie through the Special Places Program. This report describes the archaeological resource impact assessment, presents its results and offers resource management recommendations.

## 2.0 STUDY AREA

The proposed Highway 107 Extension runs generally from the Burnside Industrial Park in Dartmouth to the area of Rocky Lake Drive in Bedford (***Figure 1***). The entire alignment falls within the Halifax Regional Municipality. More specifically, the proposed alignment's eastern terminus is at the northern end of Burnside Drive. The alignment then runs generally north-west, crossing south of Anderson Lake across and ending at the intersection of Rocky Lake Drive and Duke Street (***Figure 2***). There will also be two new intersections created with roundabouts at Burnside Drive/Akerley Boulevard and Duke Street/Rocky Lake Drive.

There are various registered archaeological sites within 5 kilometres of the Highway 107 Extension study area. The two sites nearest to the study area are the Bedford Barrens Petroglyphs site (BeCw-2), roughly 3 kilometers west of the study area and Fort Sackville (BeCv-10), which is roughly 2.5 kilometers west of the study area. Both are situated well outside of the Highway 107 Extension impact area. The Bedford Petroglyphs site is also registered as a National Historic Site.


| | | |
|---|---|---|
| CRM Group | *Site Location* | *Figure 1* |
| | HIGHWAY 107 EXTENSION<br>ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT 2013<br>HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA | January 2014<br>Scale 1:50 000 |




Nova Scotia Transportation and Infrastructure Renewal

Highway 107 Extension

0 125 250 500 750 Metres

MAP PROJECTION: NAD 1983 UTM Zone 20N

- Proposed Highway 107 Extension Alignment
- Roundabouts
- Elements of Phase 3
- Highway
- Other Road
- Watercourse
- Trail/Track
- Powerline
- Rail Line
- Wetland
- Open Water
- 75 m Buffer of Proposed Alignment

| | | |
|---|---|---|
| CRM Group | *Archaeological Assessment Area (Hwy 107 Extension Alignment)* | *Figure 2* |
| | HIGHWAY 107 EXTENSION<br>ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT 2013<br>HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA | January 2014 |

# 3.0 METHODOLOGY

## 3.1 Background Study

The archival research component of the archaeological screening and reconnaissance was designed to explore the land use history of the study area and provide information necessary to evaluate the area's archaeological potential. To achieve this goal, CRM Group utilized the resources of various institutions including documentation available through the Nova Scotia Archives, Nova Scotia Land Information Centre, the Department of Natural Resources and the Nova Scotia Museum.

The background study included a review of relevant historic documentation incorporating land grant records, legal survey and historic maps, as well as local and regional histories. Topographic maps and aerial photographs, both current and historic, were also used to evaluate the study area. Previous background research compiled by CRM Group staff for Heritage Research Permit A2009NS87 (Kelman 2010) was also used. This data facilitated the identification of environmental and topographic features that would have influenced human settlement and resource exploitation patterns. The historical and cultural information was integrated with the environmental and topographic data to identify potential areas of archaeological sensitivity.

## 3.2 Field Reconnaissance

The goals of the archaeological field reconnaissance were to conduct a visual inspection of the study area, document any areas of archaeological sensitivity or archaeological sites identified during the course of either the background study or the visual inspection, and design a strategy for testing areas of archaeological potential, as well as any archaeological resources identified within the study area. Although the ground search did not involve sub-surface testing, the researchers were watchful for topographic or vegetative anomalies that might indicate the presence of buried archaeological resources. The process and results of the field reconnaissance were documented in field notes and photographs.

A hand-held Global Positioning System (GPS) unit was used to record UTM coordinates for all survey areas, as well as any identified diagnostic artifacts, formal tools, isolated finds and site locations.

# 4.0 RESULTS

## 4.1 Background Study

### 4.1.1 Environmental Setting

The study area lies within the Quartzite Barrens – Halifax geographical classification region of the province (Davis & Browne 1996: 56). The mantle of quartzite till averages less than 3 metres within this region and there are several large areas of exposed rock where the till has been scraped away by glacial ice. This includes the area around Anderson Lake (Davis & Browne 1996: 56). These bedrock-dominated 'barrens' consist of a noticeable pattern of ridges and depressions in the landscape, in a seemingly endless repetition, which are best described as "ridge-swamp-swale" (Davis & Browne 1996: 56). Where glacial till has developed in greater accumulation, drumlins are found.

The soils within the study area are predominantly *Halifax* series soils. These soils are well to excessively drained, often shallow, stony and porous, and therefore largely unsuitable for agriculture (MacDougall et al 1963: 32-33).

The many glacial lakes in the region vary in size and tend to be dystrophic - acidic waters that contain a high concentration of humic matter and support only limited animal or plant populations (Davis & Browne 1996: 56). The scattered wetlands, mostly bogs and swamps, tend to be biologically productive (Davis & Browne 1996: 56). The entire study area is within 3 kilometres of the Bedford Basin, a deep coastal basin with a shallow depth at its mouth. Coring has determined that the Basin was a freshwater lake at some point in the last 15,000 years (Roland 1982: 94). The most significant water sources within the study area are Anderson Lake, Little Lake (and its out-flow - Wrights Brook), as well as Lily Lake (which drains into the Bedford Basin).

The higher and broader ridges of the Quartzite Barrens – Halifax region are topped with American Beech, Yellow Birch, Red Maple and Sugar Maple. The depressions and swamps are predominated by Black Spruce and Larch. The barrens are dominated by shrubs with Wire Birch, Red Maple and Aspen. Black Spruce and White Pine can be found in the barrens as well, depending on the drainage conditions (Davis & Browne 1996: 56).

Extensive forest cutting within much of the study area has provided good browsing conditions for deer and Snowshoe Hare. The abundance of hare also supports a good population of bobcat. Small-mammal diversity is moderately high in forest habitats, especially along rivers and streams. Elsewhere within the region, it is low (Davis & Browne 1996: 57). Typical fish species include White and Yellow Perch, White Sucker, Brown Bullhead, Brook Trout, Lake Trout and American Eel (Davis & Browne 1996: 57). Anderson Lake features a population of Atlantic Whitefish, an endangered species endemic to Nova Scotia. However, this is due to a Department of Fisheries and Oceans research initiative, and not because the Atlantic Whitefish naturally occurs within the study area (DFO 2006: 26).

### 4.1.2 Native Land Use

Mi'kmaq are known to have settled along the shore of the Bedford Basin and along the waterways, including the Sackville River (outside of the study area), which served as a transportation route to the interior. The Mi'kmaw name for the area that became known as Bedford was *kwebec*; which translates to 'head of the tide' (Edwards 2007: 1). Local histories

make mention of an "Indian graveyard" somewhere in the woods between Fort Sackville and the Church of England cemetery (Harris 1908: 23; Tolson 1979: 9).

Within the Bedford Barrens is a registered Mi'kmaw archaeological site known as the Bedford Barrens Petroglyph site (BeCw-2). The site, also registered as a National Historic Site, is located south of the Bedford Highway, within 3 kilometres of the study area. The site was first reported in 1983 and consists of two distinct petroglyphs: the first being an eight-pointed star contained within a circle; the second being an anthromorph (human-like form) and a vulva (Molyneaux 1993: 193). A survey conducted in 1990 found no further petroglyphs of significance in the area. The majority of the rock surfaces in the area of the known site are "rough and not conducive to the creation of petroglyphs, or, if the ancient surface was suitable, to their preservation" (Molyneaux 1993: 199).

Various dates for the creation of the petroglyphs have been put forward by different experts. Archaeologist Brian Molyneaux, who directed the 1990 survey, suggests that the petroglyphs date from "well before World War I" (Molyneaux 1993: 210), but is unable to be more specific. It has been suggested by Ruth Holmes Whitehead, that the glyphs were created with stone tools, indicating they may have been carved prior to the arrival of Europeans. Edward Lenik however, suggests the images are similar to those from known historic contexts, such as at Kejimkujik National Park (Lenik 2002: 30).

The 1990 survey identified an old path from the mouth of the Sackville River to Jacks Lake that leads right past the petroglyph site (Molyneaux 1993: 212). Additional petroglyphs were reported on a rock near the trail in the vicinity of the confirmed site. The reports indicated that the glyphs were of various things such as animal tracks, pear shaped hollows and circles. The 1990 survey crew investigated these reports and determined that the marks were the product of natural weathering of inclusions of softer minerals in the quartzite boulder, and therefore were not culturally significant (Molyneaux 1993: 198-200).

A reported petroglyph site on the transmission line right-of-way off Rocky Lake Drive was investigated in 1991. The investigation determined that the image contained non-traditional motifs and the design elements cut across old lichens with minor spore regeneration within the lines that formed the image. These factors, combined with consultation with the Nova Scotia Museum, led to the determination that the glyph was not related to Mi'kmaw traditions (DAC 1991: 6).

### 4.1.3 Property History

One of the earliest written descriptions of the Bedford Basin came from Samuel de Champlain: "from *Sesambro* (Sambro) we passed a very safe bay (*Baie Saine*) containing seven or eight leagues, where there are no islands in the route except at the head of it, where there is a small river" (Harris 1908: 12). The 'small river' described by Champlain is the Sackville River. Some early maps identify the Bedford Basin as 'Torrington Bay'; likely named after Admiral Torrington. This name did not last long however, as the Basin was soon renamed in honour of the Duke of Bedford, who was Secretary of State when the town was founded (Mullane 1913: 2).

Soon after establishing the garrison at Halifax in 1749, construction of a road leading to the Minas Basin was initiated. French inhabitants were employed in cutting the road from the head of the Basin to the town (Harris 1908: 21). To protect the route and the workers, and because he saw a 'back entrance' threat of attack, Governor Cornwallis ordered Captain John Gorham and his Rangers to erect a defense post at the head of the Bedford Basin (Piers 1947: 2; Withrow 1999:

33). This was the origin of the outpost that would soon become known as Fort Sackville. A palisaded blockhouse was erected sometime between 1755 and 1784 (Piers 1947: 2).

Land around the Basin and within the study area began to be granted to individuals in the 1760s. The early grants in the area were often quite large (ie: over 250 acres). Most grants that included a portion of the study area also included frontage on the shore of the Basin (***Figure 3***). Joseph Scott was granted a large tract of land, which is crossed by the Highway 107 Extension study area. His grant extended from the Basin to the Shubenacadie Lakes between the Sackville River and what is now called Parker's Brook (McAllister 2006: 9). His grant did not include the 16 acres abutting Fort Sackville however, Scott would acquire that land in 1767 and build his manor house, which still stands today (McAllister 2006: 10).

As mentioned, most of the original grants that included a portion of the Highway 107 Extension study area, also included frontage on the Bedford Basin. As the study area is at least 1 kilometre from the shore of the Basin, it seems unlikely that any of the early grantees would have built anything in its vicinity. It is possible however, that some of the land in the vicinity of the route was being forested. In 1761, it was reported that timber and cordwood were being cut on the "land of Joseph Scott and others at Sackville, also near ... Bedford" (Piers 1947: 10) to supply material for fortification purposes. The early forestry operations led to the development of some early mill operations as well.

Prior to the design and construction of the Shubenacadie Canal, linking Halifax Harbour with the Minas Basin, there were plans to construct a canal between the Bedford Basin and the Minas Basin, by following Parker's Cove through to Rocky Lake and Lake William (Gill 1814; Tolson 1979: 98). This route never made it past the design stage, but a map produced by Valentine Gill in 1814 provides good detail of settlement along the Sackville River including land that has been cleared for agriculture (***Figure 4***). It also indentifies the area around Anderson Lake (identified as *Gough Lake* on the map) as 'rocky barren land'.

Some accounts suggest that during the American Revolution, there were only two roads "worthy of the designation" in Nova Scotia: the Windsor and Truro roads, which divided at Sackville (Harvey 2002: 2). Through the nineteenth century, development tended to stay close to the roads, which lie outside of the study area (Dawson 2009). In the 1920s, the Bedford Highway became the first paved road in the province. This was both the result of, and led to, an increase in motorized traffic (Edwards 2007: 5). However, the discovery of an old road approximately 80 meters south of Rocky Lake Drive and running parallel to it, suggests that there was once an earlier alignment of this modern road, possibly used during the gold mining boom in Waverley in the mid 1800s. Around 1861, the mines were gaining worldwide attention and mining companies from all over the world were setting up operations in the area (waverleycommunity.ca 2013). At this time, Rocky Lake Drive was known as Old Scott's Road (waverleycommunity.ca 2013), and it appears on maps as early as 1855 (***Figure 5***). Although the exact alignment of Old Scott's Road is hard to see on older maps, it is possible that the road discovered during CRM Group's 2013 assessment represents an earlier alignment of Rocky Lake Drive (Old Scott's Road) which would have been a key road leading to Waverley.

In addition, the area of Magazine Hill, located on the periphery of the study area, was greatly affected by the Bedford Magazine Explosion that occurred on July 18, 1945. Approximately one third to one half of the ammunition dump located at Magazine Hill was in ruins following the explosion. By the time the event was complete, the explosions had impacted an area of almost 400 acres (Wright 2008: Chapter 2 Pages 1 and 2). Orders were soon given to evacuate the entire North End of Halifax as far down as North Street, and all Dartmouth residents (approximately

10,000 people) were sent to A-25 Artillery Camp, beyond the Eastern Passage airport (Wright 2008: Chapter 2 Page 11). Wright also asserts that heavy explosions continued until at least midnight on the July 18th, at which point a very heavy detonation took place (2008: Chapter 2 Page 2). Cartridges continued to explode well into the next day (Wright 2008: Chapter 2 Page 2). While unexploded ordinance (UXOs) are a concern in some areas, this explosion occurred on the periphery of the study area and therefore no UXO training or UXO technician supervision was required while conducting the field reconnaissance.

The electrical transmission line corridor south of Anderson Lake was constructed in 1967 (DAC 1991: 6). This transmission line overlaps with a large portion of the northern half of the Highway 107 Extension study area.

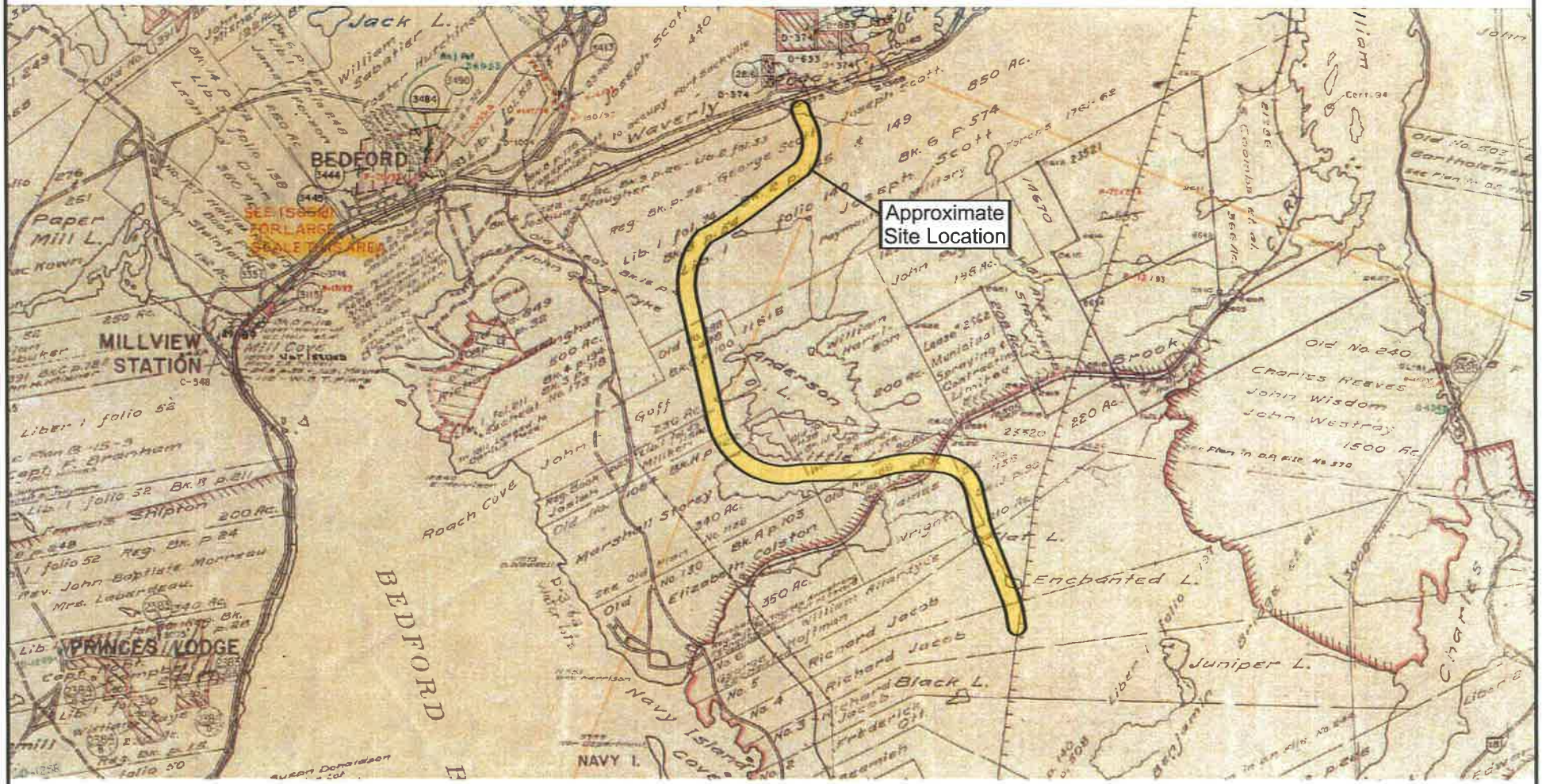
### 4.1.4 Archaeological Potential

Historic research and previous archaeological research in the Bedford Barrens area indicate that it was an important area for the Mi'kmaq. Although there are no known sites of significance in the area of Anderson Lake or Lily Lake, this is possibly due to a lack of research as opposed to a lack of sites.

It should be noted that although reported petroglyphs within the study area have been found to be either natural or modern features (ie: graffiti), this does not mean that there are not petroglyph sites within the area. It should also be noted that natural features of interest or uniqueness may in themselves hold cultural significance. Natural land forms are commonly interpreted by aboriginal groups as having spiritual or supernatural origins (Molyneaux 1993: 200). This is of note particularly because of the known significance already ascribed to the area due to the similarity in land forms.

Previous archaeological assessment of portions of the Highway 107 Extension study area were conducted by Laird Niven in 2011 and by Stephen Davis in 1991 while assessing an earlier alignment for the Extension. The eastern quarter of the study area corridor, from the railway tracks to the western end of Burnside Drive, was ascribed 'no archaeological potential' during the archaeological assessment conducted by Niven under Heritage Research Permit A2011NS52 (Niven 2011: 7), as well as by Davis during his 1991 survey of the area (Davis 1991). It was also asserted that the north-western portion of the corridor, just off of Rocky Lake Drive had no potential for archaeological resources (Niven 2011:7). These areas were re-assessed during CRM Group's 2013 impact assessment, paying particular attention to the north-western portion, due to its proximity to Lily Lake (which drains directly into the Bedford Basin) and mention of an old road found during Niven's 2011 reconnaissance (Niven 2011: 5). In addition, a modeling report written by CRM Group in 2001 for Sempra Atlantic Gas also identified an area of high potential on either side of Wrights Brook which the Highway 107 Extension study area crosses (Stewart & Sanders 2001: 38).

Based on the various components of the background study, including environmental setting, Native land use and historic settlement, a number of locations throughout the study area are considered to exhibit high potential for encountering Precontact and/or historic archaeological resources.

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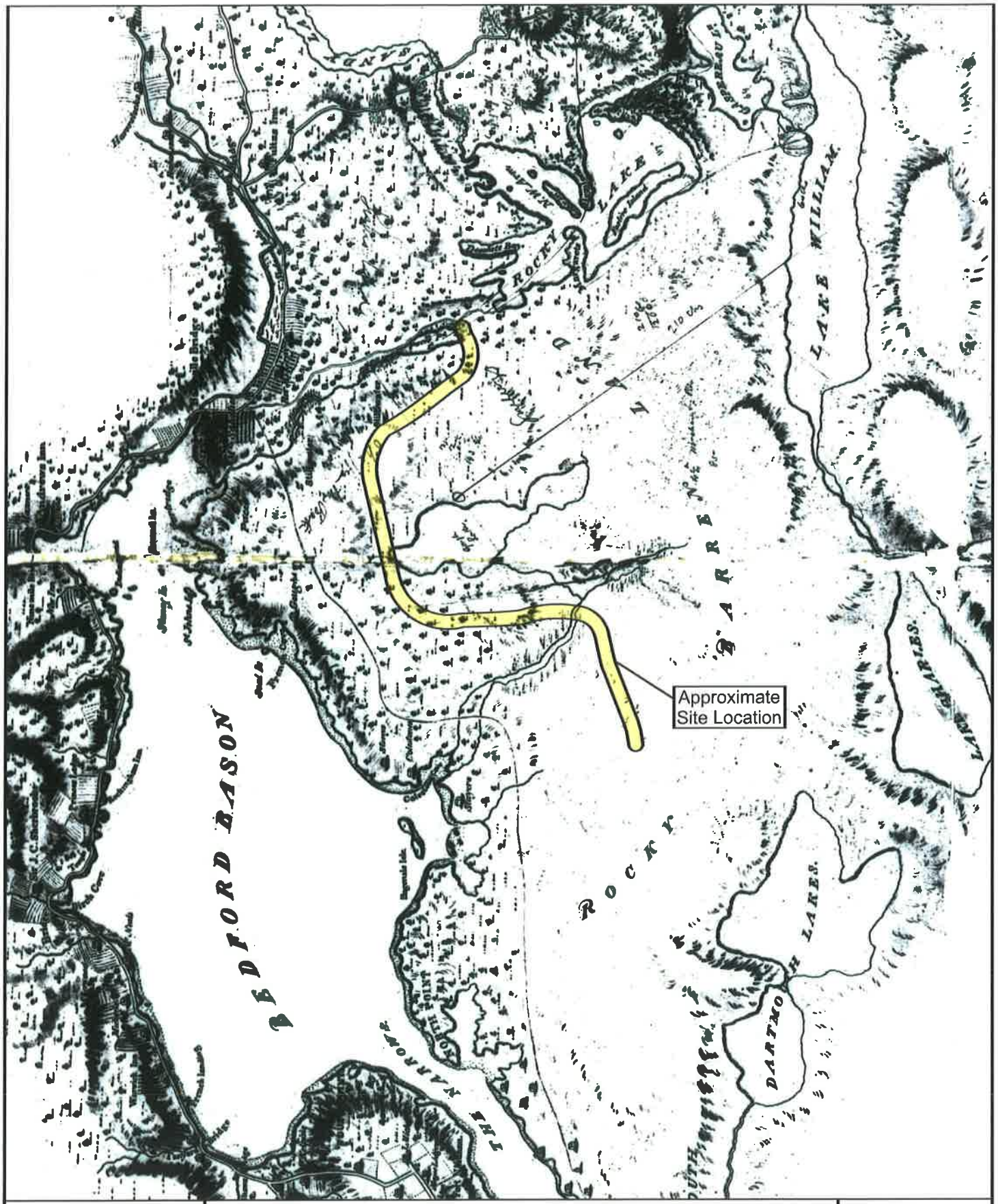
| CRM Group | *Study Area on Grant Index Sheet Number 66* | *Figure 3* |
| | HIGHWAY 107 EXTENSION<br>ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT 2013<br>HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA | January 2014 |

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| CRM Group | *Gill Map, 1814* | *Figure 4* |
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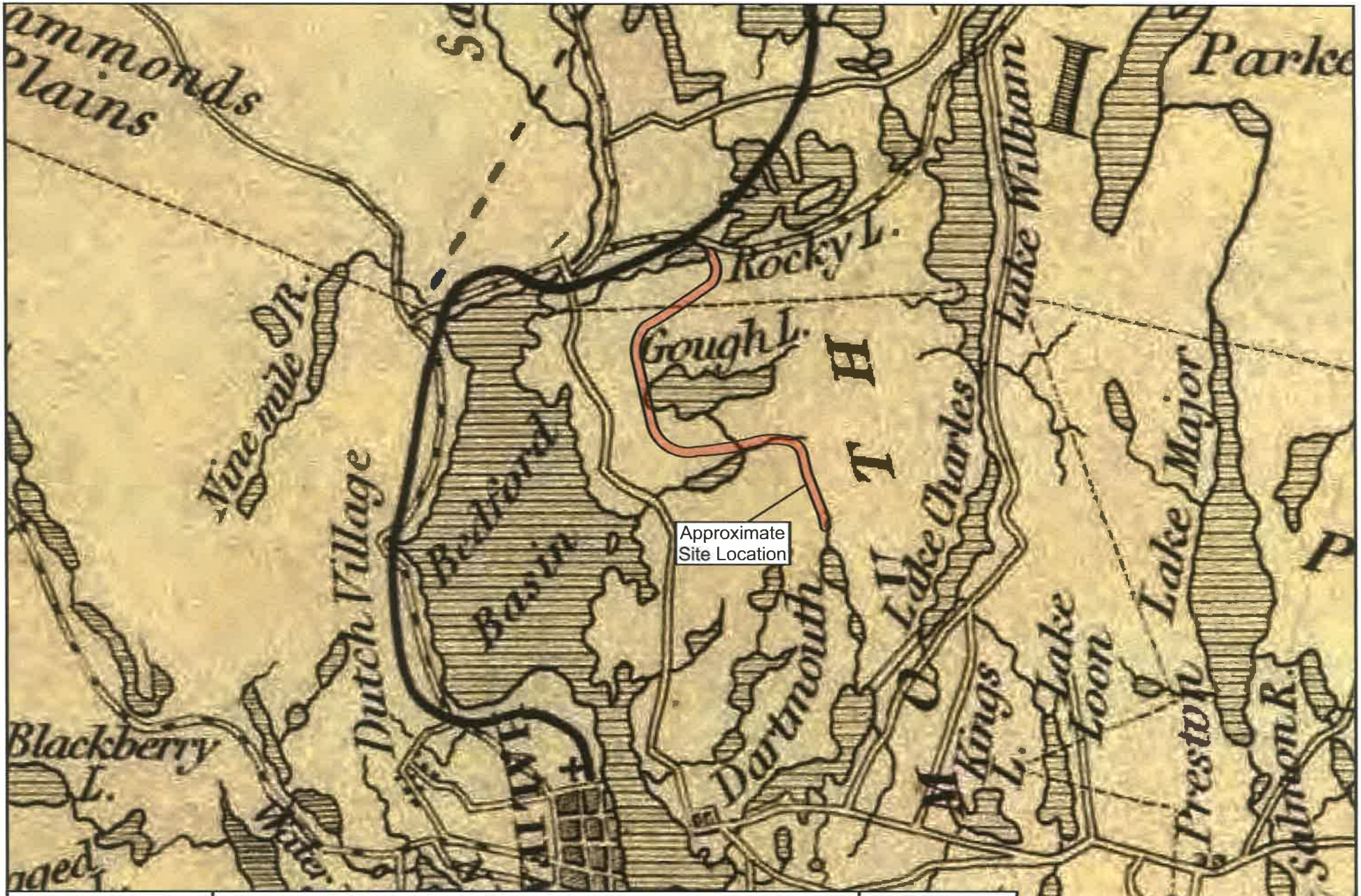


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| CRM Group | *Study Area on 1855 MacKay Map* | *Figure 5* |
| | HIGHWAY 107 EXTENSION<br>ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT 2013<br>HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA | January 2014 |

## 4.2 Field Reconnaissance

Archaeological reconnaissance of the Highway 107 Extension study area was undertaken on November 5 and 6, 2013 under clear conditions. The goal of the visit was to assess the area for archaeological potential and investigate any topographical and/or cultural features that had been identified as areas of elevated potential during the background research. This was achieved through windshield and focussed pedestrian surveys within the entire Highway 107 Extension corridor (***Figure 2***).

The field assessment on the first day began at Pewter Lane, moving east and south across the southern half of the Highway 107 corridor. The field assessment on the second day began at Rocky Lake Drive and moved south-east across the northern half of the Highway 107 corridor to Pewter Lane. Access to Pewter Lane was gained through the Department of National Defence.

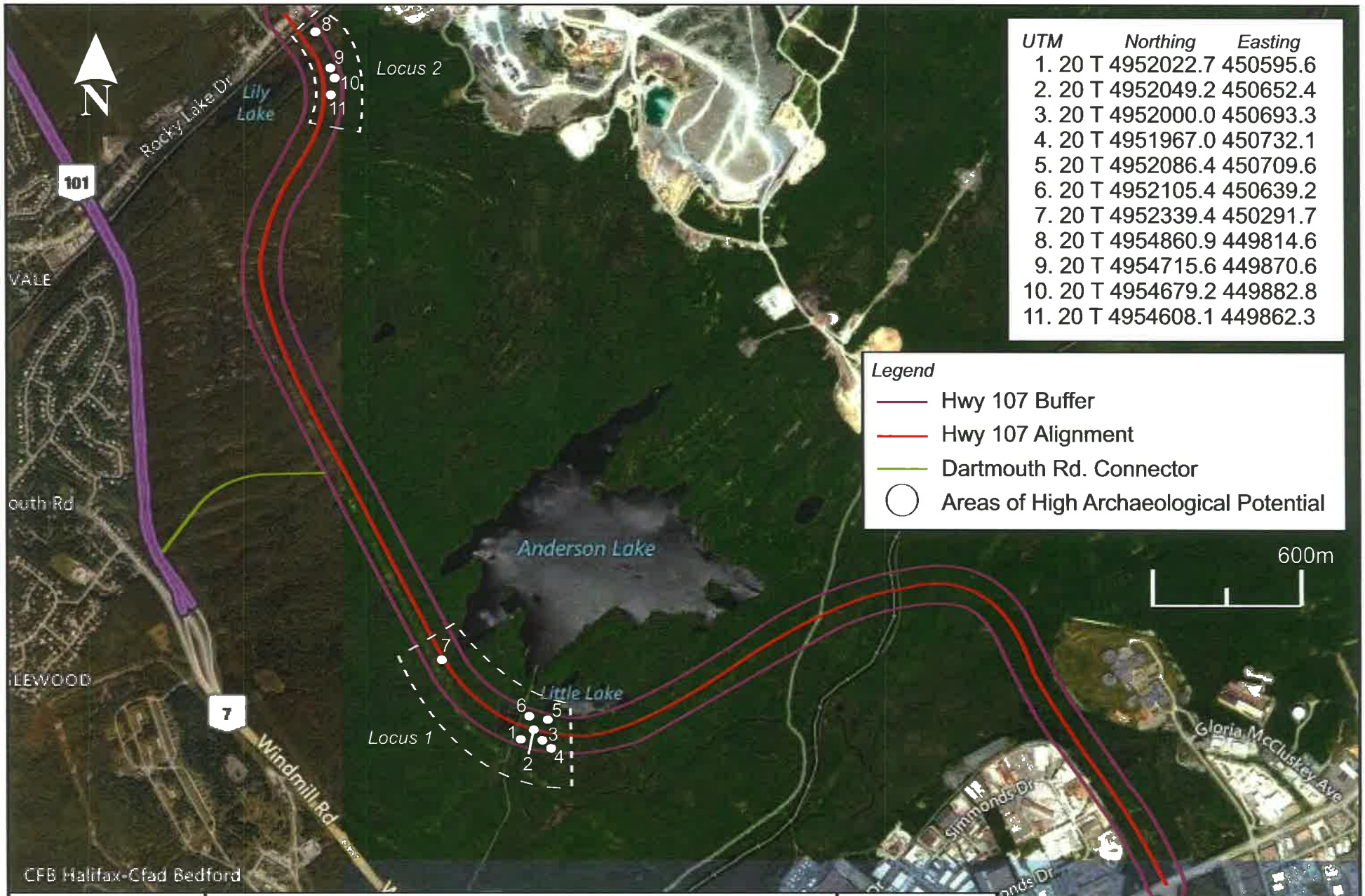
As a result of the background research and field assessment, 11 areas of high archaeological potential, both Precontact and historic, were identified during fieldwork for the Highway 107 Extension (***Figures 6, 7 & 8***). These areas are discussed in more detail below.

**Locus #1**

In total, seven areas of high archaeological potential were observed in the vicinity of Anderson Lake and Little Lake (along with its out-flow Wrights Brook) in Locus #1 (***Figures 6 & 7***). All of these areas are considered to exhibit high archaeological potential for Precontact occupation due to their high and flat topography, as well as their proximity to significant water sources.

**Locus #2**

In total, four areas of high archaeological potential were observed in the vicinity of Lily Lake and Rocky Lake Drive in Locus #2 (***Figures 6 & 8***). Of these areas, three are considered to exhibit high archaeological potential for Precontact occupation due to their high and flat topography, as well as their proximity to significant water sources and one area is considered to exhibit high archaeological potential for historic occupation, due to the presence of an old stone road which may appear on maps as early as 1855 (***Figure 5***).




| UTM | Northing | Easting |
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| 2. | 20 T | 4952049.2 450652.4 |
| 3. | 20 T | 4952000.0 450693.3 |
| 4. | 20 T | 4951967.0 450732.1 |
| 5. | 20 T | 4952086.4 450709.6 |
| 6. | 20 T | 4952105.4 450639.2 |
| 7. | 20 T | 4952339.4 450291.7 |
| 8. | 20 T | 4954860.9 449814.6 |
| 9. | 20 T | 4954715.6 449870.6 |
| 10. | 20 T | 4954679.2 449882.8 |
| 11. | 20 T | 4954608.1 449862.3 |

*Legend*

- Hwy 107 Buffer
- Hwy 107 Alignment
- Dartmouth Rd. Connector
- Areas of High Archaeological Potential

| | | |
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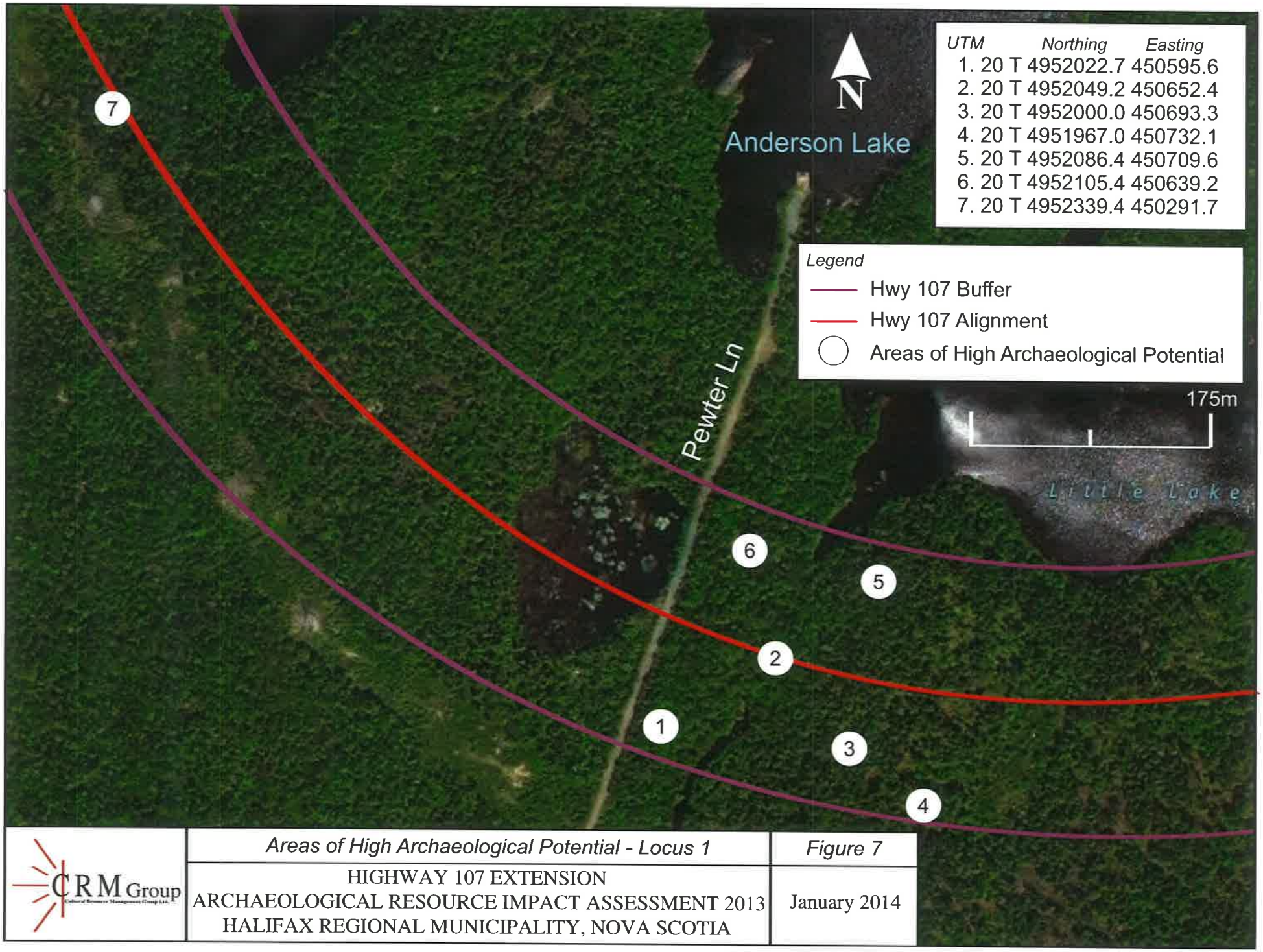
| CRM Group | *Areas of High Archaeological Potential - Loci 1 & 2* | *Figure 6* |
| | HIGHWAY 107 EXTENSION<br>ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT 2013<br>HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA | January 2014 |

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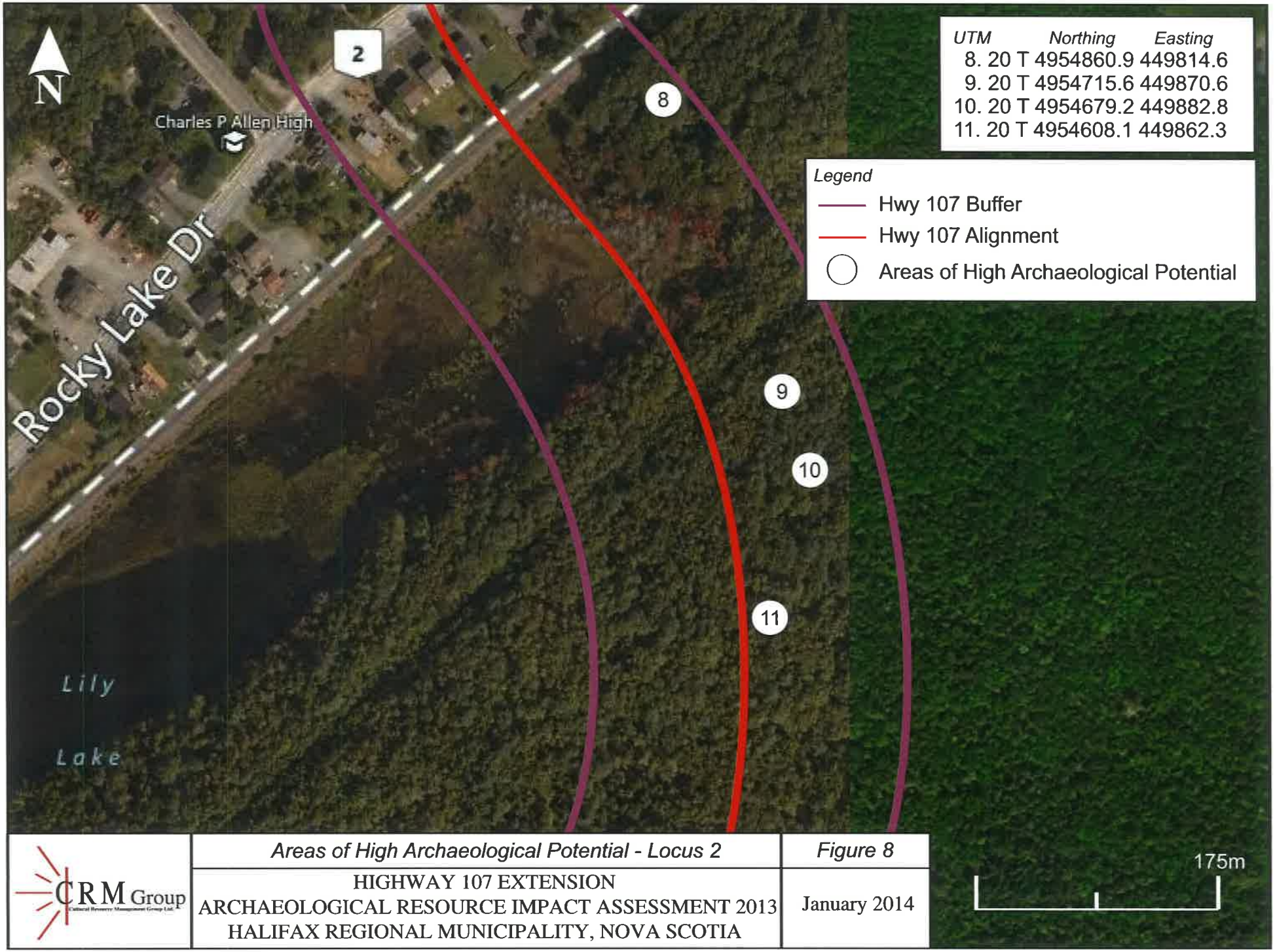
| CRM Group | *Areas of High Archaeological Potential - Locus 1* | *Figure 7* |
| | HIGHWAY 107 EXTENSION<br>ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT 2013<br>HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA | January 2014 |

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| CRM Group | *Areas of High Archaeological Potential - Locus 2* | *Figure 8* |
| | HIGHWAY 107 EXTENSION<br>ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT 2013<br>HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA | January 2014 |

## Area 1

**Locus:** #1

**Location:** See ***Figures 6 & 7***

**UTM Coordinates:** 20 T 4952022.7N 450595.6E

**Description:** Area 1 is located directly east of Pewter Lane, midway between Pewter Road and Wrights Brook in the south-eastern half of the Highway 107 Extension corridor. This area is considered suitable for Precontact habitation due to its flat and dry nature (***Plate 1***), and the proximity of Wrights Brook - the outflow of Little Lake. The periphery of Area 1 is bounded by sloping and wet terrain deemed unsuitable for habitation. Area 1 covers an area measuring approximately 10 meters by 20 meters.

**Potential:** The area is considered to have high potential for encountering Precontact archaeological resources.

**Recommendation:** The area should be subjected to a program of shovel testing following unexploded ordinance clearance.

**Plate 1:** **View north of Area 1; November 5, 2013.**

**Area 2**

**Locus:** #1

**Location:** See ***Figures 6 & 7***

**UTM Coordinates:** 20 T 4952049.2N 450652.4E

**Description:** Area 2 is located on the western and eastern banks of Wrights Brook, directly across from one another in the south-eastern half of the Highway 107 Extension corridor. This area is considered suitable for Precontact habitation due to its flat and dry nature (***Plate 2***), and its location along Wrights Brook - the outflow of Little Lake. Area 2 is bound on the west and east by a dramatic rise in the landscape and the presence of large granite boulders on both sides of the brook - areas deemed unsuitable for habitation. Area 2 covers an area measuring approximately 20 meters by 30 meters.

**Potential:** The area is considered to have high potential for encountering Precontact archaeological resources.

**Recommendation:** The area should be subjected to a program of shovel testing following unexploded ordinance clearance.

**Plate 2:** **View south-west of Area 2; November 5, 2013.**

**Area 3**

**Locus:** #1

**Location:** See ***Figures 6 & 7***

**UTM Coordinates:** 20 T 4952000.0N 450693.3E

**Description:** Area 3 is located south-east of Area 2 in the south-eastern half of the Highway 107 Extension corridor. This area is considered suitable for Precontact habitation due to its high, flat and dry nature (***Plate 3***), and the close proximity of Wrights Brook and Little Lake. Area 3 is bound on all sides by granite stones and boulders and appears to be located in a relatively sheltered area on top of a hill. Area 3 covers an area measuring approximately 15 meters by 15 meters.

**Potential:** The area is considered to have high potential for encountering Precontact archaeological resources.

**Recommendation:** The area should be subjected to a program of shovel testing following unexploded ordinance clearance.

**Plate 3:** **View north from bottom of hill, looking upwards at Area 3 (flat area atop hill); November 5, 2013.**

**Area 4**

**Locus:** #1

**Location:** See ***Figures 6 & 7***

**UTM Coordinates:** 20 T 4951967.0N 450732.1E

**Description:** Area 4 is located directly south-east of Area 3 along the southern limits of the south-eastern half of the Highway 107 Extension corridor. This area is considered suitable for Precontact habitation due to its large flat and dry nature (***Plate 4***), and the proximity of both Wrights Brook and Little Lake. The periphery of Area 4 is bounded by downward sloping terrain and wet areas deemed unsuitable for habitation. Area 4 covers an area measuring approximately 50 meters by 30 meters.

**Potential:** The area is considered to have high potential for encountering Precontact archaeological resources.

**Recommendation:** The area should be subjected to a program of shovel testing following unexploded ordinance clearance.

**Plate 4:** **View east of Area 4; November 5, 2013.**

## Area 5

**Locus:** #1

**Location:** See ***Figures 6 & 7***

**UTM Coordinates:** 20 T 4952086.4N 450709.6E

**Description:** Area 5 is located somewhat near the northern limits of the south-eastern half of the Highway 107 Extension corridor, just east of Wrights Brook and directly south of Little Lake. This area is considered suitable for Precontact habitation due to its high, flat and dry nature (***Plate 5***), and the extremely close proximity of Wrights Brook, as well as Little Lake. The western periphery of Area 5 is bound by the brook and the eastern periphery is bound by sloped terrain, deemed unsuitable for human habitation. Area 5 covers an area measuring approximately 20 meters by 20 meters.

**Potential:** The area is considered to have high potential for encountering Precontact archaeological resources.

**Recommendation:** The area should be subjected to a program of shovel testing following unexploded ordinance clearance.

**Plate 5: View south-west of the southern edge of Area 5; November 5, 2013.**

**Area 6**

**Locus:** #1

**Location:** See ***Figures 6 & 7***

**UTM Coordinates:** 20 T 4952105.4N 450639.2E

**Description:** Area 6 is located directly east of Pewter Lane, midway between Pewter Road and Wrights Brook in the south-eastern half of the Highway 107 Extension corridor, north of Area 1. This area is considered suitable for Precontact habitation due to its flat and dry nature (***Plate 6***), and its positioning between Little Lake/ Anderson Lake and Wrights Brook. Though this area is slightly lower-lying than other areas of high potential, its location between two major water sources greatly raises its archaeological potential. Area 6 covers an area measuring approximately 15 meters by 10 meters.

**Potential:** The area is considered to have high potential for encountering Precontact archaeological resources.

**Recommendation:** The area should be subjected to a program of shovel testing following unexploded ordinance clearance.

**Plate 6: View east of Area 6; November 5, 2013.**

## Area 7

**Locus:** #1

**Location:** See ***Figures 6 & 7***

**UTM Coordinates:** 20 T 4952339.4N 450291.7E

**Description:** Area 7 is located directly north-west of Pewter Lane, at the south-western tip of Anderson Lake in the north-western half of the Highway 107 Extension corridor. This area is considered suitable for Precontact habitation due to its high, flat and dry nature (***Plate 7***), and its perfect view of Anderson Lake to the east. The area is bounded on all sides by heavily sloped terrain, deemed unsuitable for human occupation. Area 7 is small, measuring approximately 10 meters by 10 meters.

**Potential:** The area is considered to have high potential for encountering Precontact archaeological resources.

**Recommendation:** The area should be subjected to a program of shovel testing following unexploded ordinance clearance .

**Plate 7:** **View east of Area 7 with Anderson Lake in the background; November 6, 2013.**

**Area 8**

**Locus:** #2

**Location:** See ***Figures 6 & 8***

**UTM Coordinates:** 20 T 4954860.9N 449814.6E

**Description:** Area 8 is located approximately 80 meters south-east of Rocky Lake Drive, past the railway tracks in the north-western half of the Highway 107 Extension corridor. This area of high potential contains the remnants of an old stone road that is elevated above ground level and built-up with stones on each side (***Plate 8***). There is also a large circular stone structure located alongside the roadway (***Plate 9***). At present it is believed that the road represents an earlier alignment of Rocky Lake Drive, known as Old Scott's Road. This road is depicted on maps as early as 1855 (MacKay 1855). Since Lily Lake drains directly into the Bedford Basin, it is also possible that this road represents a former portage route. The area is bounded to the north-west by the railway tracks, to the south-west by Lily Lake and to the east by low-lying and wet terrain, deemed unsuitable for human occupation. The wet nature of this area is likely the reason that the road is raised. Area 8 (the road and the areas running alongside the road) measures approximately 50 meters by 10 meters.

**Potential:** The area is considered to have high potential for encountering Historic archaeological resources.

**Recommendation:** The area should be subjected to a program of focussed shovel testing alongside the periphery of the roadway.

**Plate 8:** **View south-west of Area 8 (road); November 6, 2013.**

**Plate 9:** **View south of circular stone structure attached to edge of road alignment; photo taken while standing atop the raised road, looking down; November 6, 2013.**

**Area 9**

**Locus:** #2

**Location:** See ***Figures 6 & 8***

**UTM Coordinates:** 20 T 4954715.6N 449870.6E

**Description:** Area 9 is located directly south-east of Lily Lake, in the north-western half of the Highway 107 Extension corridor. This area is considered suitable for Precontact habitation due to its high, flat and dry nature (***Plate 10***), and the close proximity of Lily Lake, which drains into the Bedford Basin. The area overlooks the water and is generally bound by sloped and rocky terrain, deemed unsuitable for human occupation. Area 9 covers an area measuring approximately 30 meters by 10 meters.

**Potential:** The area is considered to have high potential for encountering Precontact archaeological resources.

**Recommendation:** The area should be subjected to a program of shovel testing.

**Plate 10: View south of Area 9; November 6, 2013.**

## Area 10

**Locus:** #2

**Location:** See ***Figures 6 & 8***

**UTM Coordinates:** 20 T 4954679.2N 449882.8E

**Description:** Area 10 is located directly south-east of Lily Lake and Area 9, in the north-western half of the Highway 107 Extension corridor. This area is considered suitable for Precontact habitation due to its high, flat and dry nature (***Plate 11***), and the close proximity of Lily Lake, which drains into the Bedford Basin. The area is generally bound by sloped and rocky terrain, deemed unsuitable for human occupation. Area 10 is large and covers an area measuring approximately 75 meters by 30 meters.

**Potential:** The area is considered to have high potential for encountering Precontact archaeological resources.

**Recommendation:** The area should be subjected to a program of shovel testing.

**Plate 11: View south of Area 10; November 6, 2013.**

**Area 11**

**Locus:** #2

**Location:** See ***Figures 6 & 8***

**UTM Coordinates:** 20 T 4954608.1N 449862.3E

**Description:** Area 11 is located directly south-east of Lily Lake and south-west of Area 10, in the north-western half of the Highway 107 Extension corridor. This area is considered suitable for Precontact habitation due to its high, flat and dry nature along a natural plateau (***Plate 12***), and the close proximity of Lily Lake, which drains into the Bedford Basin. The area is generally bound by sloped and rocky terrain, as it is positioned along a steep rise. Area 11 is small and covers an area measuring approximately 10 meters by 10 meters.

**Potential:** The area is considered to have high potential for encountering Precontact archaeological resources.

**Recommendation:** The area should be subjected to a program of shovel testing.

**Plate 12: View north of Area 11; September 6, 2013.**

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

The 2013 archaeological resource impact assessment of the Highway 107 Extension involved background research and field reconnaissance of a 7 kilometer corridor running from Burnside Drive in Dartmouth to Rocky Lake Drive in Bedford, running south of Anderson Lake. The background research and field reconnaissance conducted by CRM Group Staff Archaeologist Angela Finnie identified 11 areas of high archaeological potential, both Precontact and historic, within the corridor.

Based on these results, CRM Group offers the following management recommendations for the study area:

1. It is recommended that a program of shovel testing at 5 meter intervals be conducted across the 11 high potential areas identified within the Highway 107 Extension corridor following unexploded ordinance clearance for areas 1 through 7. The shovel testing should include all areas identified as being suitable for Precontact and/or historic occupation.

2. It is recommended that the remainder of the Highway 107 Extension corridor be cleared of any further requirement for further archaeological investigation.

3. In the event that archaeological resources or human remains are encountered during construction on any part of the Highway 107 Extension Project, all work in the associated area(s) should be halted and immediate contact made with the Coordinator of Special Places (Sean Weseloh-McKeane: (902) 424-6475).

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**NOVA SCOTIA DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE RENEWAL**

# HIGHWAY 107 EXTENSION ARCHAEOLOGICAL SHOVEL TESTING 2014 BURNSIDE TO BEDFORD, NOVA SCOTIA

## FINAL REPORT

Submitted to:
**Nova Scotia Department of Transportation and Infrastructure Renewal**
and the
**Special Places Program of the Nova Scotia Department of Communities, Culture and Heritage**

Prepared by:
**Cultural Resource Management Group Limited**
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Consulting Archaeologist: Angela J. Finnie
Report Preparation: Angela J. Finnie

Heritage Research Permit Number: A2014NS037

CRM Group Project Number: 2013-0010-02

JULY 2014

CRM Group

*The following report may contain sensitive archaeological site data. Consequently, the report must not be published or made public without the written consent of Nova Scotia's Coordinator of Special Places Program, Department of Communities, Culture and Heritage.*

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# NOVA SCOTIA DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE RENEWAL HIGHWAY 107 EXTENSION ARCHAEOLOGICAL SHOVEL TESTING 2014

## 1.0 INTRODUCTION

In the late summer of 2013, the Nova Scotia Department of Transportation and Infrastructure Renewal (TIR) retained Cultural Resource Management (CRM) Group Limited through Dillon Consulting Limited to undertake archaeological reconnaissance of the proposed Highway 107 Extension between Burnside Drive and Duke Street, a distance of approximately 7 kilometres. The project is located in the Halifax Regional Municipality (HRM) communities of Burnside and Bedford (***Figure 1***). There will also be two new intersections created with roundabouts at Burnside Drive/Akerley Boulevard and Duke Street/Rocky Lake Drive. The archaeological resource impact assessment focused on a review of historical and environmental documentation, as well as field reconnaissance to identify any areas of high archaeological potential, which would have to be investigated prior to development. There were 11 areas of high archaeological potential identified during the reconnaissance.

The archaeological resource impact assessment was undertaken by Angela J. Finnie, Archaeologist for CRM Group along with CRM Group Archaeological Technician Kyle Cigolotti. The archaeological screening was conducted according to the terms of Heritage Research Permit A2013NS107 (Category 'C'), issued to Finnie through the Special Places Program.

In the early spring of 2014, TIR again retained CRM Group Limited through Dillon Consulting Limited to undertake archaeological shovel testing of the 11 areas of high archaeological potential along the Highway 107 extension study area that were identified during the reconnaissance in 2013 (Finnie 2013).

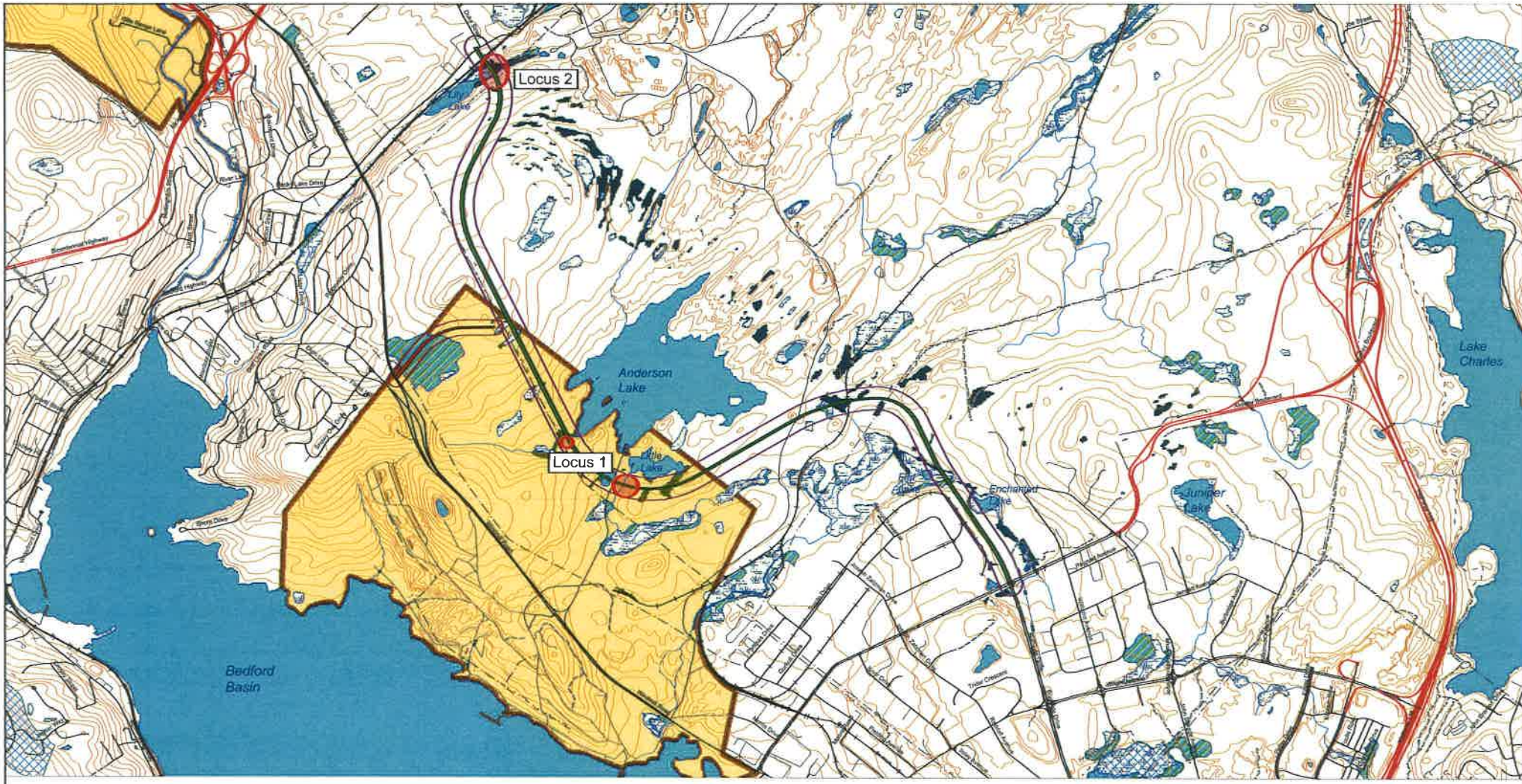
The archaeological shovel testing was undertaken by Angela J. Finnie, Archaeologist for CRM Group along with CRM Group Archaeological Technicians Kyle Cigolotti, Kiersten Green and Kathryn Stewart. CRM Group staff was also accompanied by UXO technician Larry Baillie. The archaeological shovel testing was conducted according to the terms of Heritage Research Permit A2014NS037 (Category 'C'), issued to Finnie through the Special Places Program.

## 2.0 STUDY AREA

The proposed Highway 107 Extension runs generally from the Burnside Industrial Park in Dartmouth to the area of Rocky Lake Drive in Bedford (***Figure 1***). The entire alignment falls within the Halifax Regional Municipality. More specifically, the proposed alignment's eastern terminus is at the northern end of Burnside Drive. The alignment then runs generally north-west, crossing south of Anderson Lake across and ending at the intersection of Rocky Lake Drive and Duke Street (***Figure 2***). There will also be two new intersections created with roundabouts at Burnside Drive/Akerley Boulevard and Duke Street/Rocky Lake Drive.

There are various registered archaeological sites within 5 kilometres of the Highway 107 Extension study area. The two sites nearest to the study area are the Bedford Barrens Petroglyphs site (BeCw-2), roughly 3 kilometers west of the study area and Fort Sackville (BeCv-10), which is roughly 2.5 kilometers west of the study area. Both are situated well outside of the Highway 107 Extension impact area. The Bedford Petroglyphs site is also registered as a National Historic Site.


| | | |
|---|---|---|
| CRM Group | *Site Location* | *Figure 1* |
| | HIGHWAY 107 EXTENSION<br>ARCHAEOLOGICAL SHOVEL TESTING 2014<br>HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA | July 2014<br>Scale 1:50 000 |




Nova Scotia Transportation and Infrastructure Renewal

Highway 107 Extension

0 125 250 500 Metres

MAP PROJECTION: NAD 1983 UTM Zone 20N

- NSDNR Wetlands
- Wetland
- Open Water
- MARLANT Properties
- Proposed Highway 107 Extension Alignment
- Proposed Dartmouth Road Connector Alignment
- 75 m Buffer of Proposed Alignment
- 50 m Buffer of Proposed Dartmouth Rd Connector
- Dillon Field Defined Wetlands ( Sept 2013)
- Stantec Field Defined Wetlands (June 2011)

CRM Group

| *Areas of High Archaeological Potential (Loci 1 & 2)* | *Figure 2* |
|---|---|
| HIGHWAY 107 EXTENSION<br>ARCHAEOLOGICAL SHOVEL TESTING 2014<br>HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA | July 2014 |

# 3.0 METHODOLOGY

## 3.1 Review of Background Research

The archival research component of the study was conducted in 2013 and was designed to explore the land use history of the study area and provide information necessary to evaluate the area's archaeological potential (Finnie 2013). To achieve this goal, CRM Group utilized the resources of various institutions including documentation available through the Nova Scotia Archives, Nova Scotia Land Information Centre, the Department of Natural Resources and the Nova Scotia Museum. This study was reviewed in 2014 prior to re-entering the Highway 107 extension study area.

The background study included a review of relevant historic documentation incorporating land grant records, legal survey and historic maps, as well as local and regional histories. Topographic maps and aerial photographs, both current and historic, were also used to evaluate the study area. Previous background research compiled by CRM Group staff for Heritage Research Permit A2009NS87 (Kelman 2010) was also used. This data facilitated the identification of environmental and topographic features that would have influenced human settlement and resource exploitation patterns. The historical and cultural information was integrated with the environmental and topographic data to identify potential areas of archaeological sensitivity.

## 3.2 Shovel Testing

Shovel tests, averaging 40 centimetres in diameter, were dug in a staggered grid pattern at five metre intervals at the 11 areas of high archaeological potential within Highway 107 extension corridor. The shovel tests were dug through the topsoil into subsoil. All excavated soil was screened through six millimetre mesh hardware cloth in order to standardize artifact recovery from within the excavated soil. Shovel test locations were recorded using tape measurements from established baselines. Field documentation included photography and field notes. In the event that artifacts were identified during the excavation of a shovel test, the digging was halted temporarily to allow recovery of the artifacts and documentation of their context. Unless indications of a grave were noted, digging would resume in order to ensure that the shovel test penetrated through the cultural deposit and into undisturbed subsoil. Artifacts from each shovel test were bagged independently and documented accordingly. The location of positive shovel tests were recorded using GPS technology and once backfilled, were identified with blue flagging tape labeled with the shovel test coordinates.

# 4.0 RESULTS

## 4.1 Review of Background Research

### 4.1.1 Environmental Setting

The study area lies within the Quartzite Barrens – Halifax geographical classification region of the province (Davis & Browne 1996: 56). The mantle of quartzite till averages less than 3 metres within this region and there are several large areas of exposed rock where the till has been scraped away by glacial ice. This includes the area around Anderson Lake (Davis & Browne 1996: 56). These bedrock-dominated 'barrens' consist of a noticeable pattern of ridges and depressions in the landscape, in a seemingly endless repetition, which are best described as "ridge-swamp-swale" (Davis & Browne 1996: 56). Where glacial till has developed in greater accumulation, drumlins are found.

The soils within the study area are predominantly *Halifax* series soils. These soils are well to excessively drained, often shallow, stony and porous, and therefore largely unsuitable for agriculture (MacDougall et al 1963: 32-33).

The many glacial lakes in the region vary in size and tend to be dystrophic - acidic waters that contain a high concentration of humic matter and support only limited animal or plant populations (Davis & Browne 1996: 56). The scattered wetlands, mostly bogs and swamps, tend to be biologically productive (Davis & Browne 1996: 56). The entire study area is within 3 kilometres of the Bedford Basin, a deep coastal basin with a shallow depth at its mouth. Coring has determined that the Basin was a freshwater lake at some point in the last 15,000 years (Roland 1982: 94). The most significant water sources within the study area are Anderson Lake, Little Lake (and its out-flow - Wrights Brook), as well as Lily Lake (which drains into the Bedford Basin).

The higher and broader ridges of the Quartzite Barrens – Halifax region are topped with American Beech, Yellow Birch, Red Maple and Sugar Maple. The depressions and swamps are predominated by Black Spruce and Larch. The barrens are dominated by shrubs with Wire Birch, Red Maple and Aspen. Black Spruce and White Pine can be found in the barrens as well, depending on the drainage conditions (Davis & Browne 1996: 56).

Extensive forest cutting within much of the study area has provided good browsing conditions for deer and Snowshoe Hare. The abundance of hare also supports a good population of bobcat. Small-mammal diversity is moderately high in forest habitats, especially along rivers and streams. Elsewhere within the region, it is low (Davis & Browne 1996: 57). Typical fish species include White and Yellow Perch, White Sucker, Brown Bullhead, Brook Trout, Lake Trout and American Eel (Davis & Browne 1996: 57). Anderson Lake features a population of Atlantic Whitefish, an endangered species endemic to Nova Scotia. However, this is due to a Department of Fisheries and Oceans research initiative, and not because the Atlantic Whitefish naturally occurs within the study area (DFO 2006: 26).

### 4.1.2 Native Land Use

Mi'kmaq are known to have settled along the shore of the Bedford Basin and along the waterways, including the Sackville River (outside of the study area), which served as a transportation route to the interior. The Mi'kmaw name for the area that became known as Bedford was *kwebec*; which translates to 'head of the tide' (Edwards 2007: 1). Local histories

make mention of an "Indian graveyard" somewhere in the woods between Fort Sackville and the Church of England cemetery (Harris 1908: 23; Tolson 1979: 9).

Within the Bedford Barrens is a registered Mi'kmaw archaeological site known as the Bedford Barrens Petroglyph site (BeCw-2). The site, also registered as a National Historic Site, is located south of the Bedford Highway, within 3 kilometres of the study area. The site was first reported in 1983 and consists of two distinct petroglyphs: the first being an eight-pointed star contained within a circle; the second being an anthromorph (human-like form) and a vulva (Molyneaux 1993: 193). A survey conducted in 1990 found no further petroglyphs of significance in the area. The majority of the rock surfaces in the area of the known site are "rough and not conducive to the creation of petroglyphs, or, if the ancient surface was suitable, to their preservation" (Molyneaux 1993: 199).

Various dates for the creation of the petroglyphs have been put forward by different experts. Archaeologist Brian Molyneaux, who directed the 1990 survey, suggests that the petroglyphs date from "well before World War I" (Molyneaux 1993: 210), but is unable to be more specific. It has been suggested by Ruth Holmes Whitehead, that the glyphs were created with stone tools, indicating they may have been carved prior to the arrival of Europeans. Edward Lenik however, suggests the images are similar to those from known historic contexts, such as at Kejimkujik National Park (Lenik 2002: 30).

The 1990 survey identified an old path from the mouth of the Sackville River to Jacks Lake that leads right past the petroglyph site (Molyneaux 1993: 212). Additional petroglyphs were reported on a rock near the trail in the vicinity of the confirmed site. The reports indicated that the glyphs were of various things such as animal tracks, pear shaped hollows and circles. The 1990 survey crew investigated these reports and determined that the marks were the product of natural weathering of inclusions of softer minerals in the quartzite boulder, and therefore were not culturally significant (Molyneaux 1993: 198-200).

A reported petroglyph site on the transmission line right-of-way off Rocky Lake Drive was investigated in 1991. The investigation determined that the image contained non-traditional motifs and the design elements cut across old lichens with minor spore regeneration within the lines that formed the image. These factors, combined with consultation with the Nova Scotia Museum, led to the determination that the glyph was not related to Mi'kmaw traditions (DAC 1991: 6).

### 4.1.3 Property History

One of the earliest written descriptions of the Bedford Basin came from Samuel de Champlain: "from *Sesambro* (Sambro) we passed a very safe bay (*Baie Saine*) containing seven or eight leagues, where there are no islands in the route except at the head of it, where there is a small river" (Harris 1908: 12). The 'small river' described by Champlain is the Sackville River. Some early maps identify the Bedford Basin as 'Torrington Bay'; likely named after Admiral Torrington. This name did not last long however, as the Basin was soon renamed in honour of the Duke of Bedford, who was Secretary of State when the town was founded (Mullane 1913: 2).

Soon after establishing the garrison at Halifax in 1749, construction of a road leading to the Minas Basin was initiated. French inhabitants were employed in cutting the road from the head of the Basin to the town (Harris 1908: 21). To protect the route and the workers, and because he saw a 'back entrance' threat of attack, Governor Cornwallis ordered Captain John Gorham and his Rangers to erect a defense post at the head of the Bedford Basin (Piers 1947: 2; Withrow 1999:

33). This was the origin of the outpost that would soon become known as Fort Sackville. A palisaded blockhouse was erected sometime between 1755 and 1784 (Piers 1947: 2).

Land around the Basin and within the study area began to be granted to individuals in the 1760s. The early grants in the area were often quite large (ie: over 250 acres). Most grants that included a portion of the study area also included frontage on the shore of the Basin (***Figure 3***). Joseph Scott was granted a large tract of land, which is crossed by the Highway 107 Extension study area. His grant extended from the Basin to the Shubenacadie Lakes between the Sackville River and what is now called Parker's Brook (McAllister 2006: 9). His grant did not include the 16 acres abutting Fort Sackville however, Scott would acquire that land in 1767 and build his manor house, which still stands today (McAllister 2006: 10).

As mentioned, most of the original grants that included a portion of the Highway 107 Extension study area, also included frontage on the Bedford Basin. As the study area is at least 1 kilometre from the shore of the Basin, it seems unlikely that any of the early grantees would have built anything in its vicinity. It is possible however, that some of the land in the vicinity of the route was being forested. In 1761, it was reported that timber and cordwood were being cut on the "land of Joseph Scott and others at Sackville, also near ... Bedford" (Piers 1947: 10) to supply material for fortification purposes. The early forestry operations led to the development of some early mill operations as well.

Prior to the design and construction of the Shubenacadie Canal, linking Halifax Harbour with the Minas Basin, there were plans to construct a canal between the Bedford Basin and the Minas Basin, by following Parker's Cove through to Rocky Lake and Lake William (Gill 1814; Tolson 1979: 98). This route never made it past the design stage, but a map produced by Valentine Gill in 1814 provides good detail of settlement along the Sackville River including land that has been cleared for agriculture (***Figure 4***). It also indentifies the area around Anderson Lake (identified as *Gough Lake* on the map) as 'rocky barren land'.

Some accounts suggest that during the American Revolution, there were only two roads "worthy of the designation" in Nova Scotia: the Windsor and Truro roads, which divided at Sackville (Harvey 2002: 2). Through the nineteenth century, development tended to stay close to the roads, which lie outside of the study area (Dawson 2009). In the 1920s, the Bedford Highway became the first paved road in the province. This was both the result of, and led to, an increase in motorized traffic (Edwards 2007: 5). However, the discovery of an old road approximately 80 meters south of Rocky Lake Drive and running parallel to it, suggests that there was once an earlier alignment of this modern road, possibly used during the gold mining boom in Waverley in the mid 1800s. Around 1861, the mines were gaining worldwide attention and mining companies from all over the world were setting up operations in the area (waverleycommunity.ca 2013). At this time, Rocky Lake Drive was known as Old Scott's Road (waverleycommunity.ca 2013), and it appears on maps as early as 1855 (***Figure 5***). Although the exact alignment of Old Scott's Road is hard to see on older maps, it is possible that the road discovered during CRM Group's 2013 assessment represents an earlier alignment of Rocky Lake Drive (Old Scott's Road) which would have been a key road leading to Waverley.

In addition, the area of Magazine Hill, located on the periphery of the study area, was greatly affected by the Bedford Magazine Explosion that occurred on July 18, 1945. Approximately one third to one half of the ammunition dump located at Magazine Hill was in ruins following the explosion. By the time the event was complete, the explosions had impacted an area of almost 400 acres (Wright 2008: Chapter 2 Pages 1 and 2). Orders were soon given to evacuate the entire North End of Halifax as far down as North Street, and all Dartmouth residents (approximately

10,000 people) were sent to A-25 Artillery Camp, beyond the Eastern Passage airport (Wright 2008: Chapter 2 Page 11). Wright also asserts that heavy explosions continued until at least midnight on the July 18th, at which point a very heavy detonation took place (Wright 2008: Chapter 2 Page 2). Cartridges continued to explode well into the next day (Wright 2008: Chapter 2 Page 2). While unexploded ordinance (UXOs) are a concern in some areas, this explosion occurred on the periphery of the study area and therefore no UXO training or UXO technician supervision was required while conducting the field reconnaissance.

The electrical transmission line corridor south of Anderson Lake was constructed in 1967 (DAC 1991: 6). This transmission line overlaps with a large portion of the northern half of the Highway 107 Extension study area.

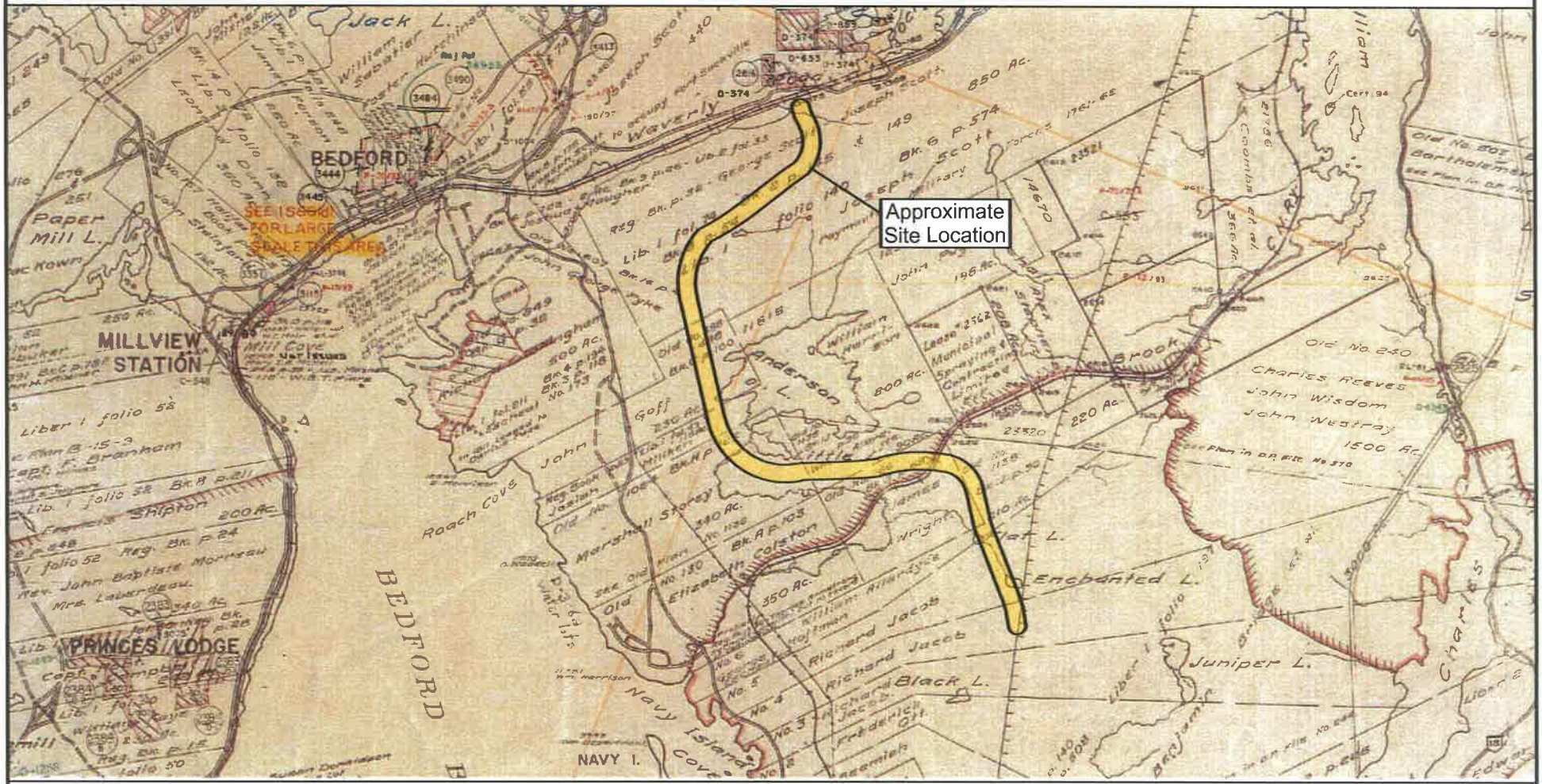
### 4.1.4 Archaeological Potential

Historic research and previous archaeological research in the Bedford Barrens area indicate that it was an important area for the Mi'kmaq. Although there are no known sites of significance in the area of Anderson Lake or Lily Lake, this is possibly due to a lack of research as opposed to a lack of sites.

It should be noted that although reported petroglyphs within the study area have been found to be either natural or modern features (ie: graffiti), this does not mean that there are not petroglyph sites within the area. It should also be noted that natural features of interest or uniqueness may in themselves hold cultural significance. Natural land forms are commonly interpreted by aboriginal groups as having spiritual or supernatural origins (Molyneaux 1993: 200). This is of note particularly because of the known significance already ascribed to the area due to the similarity in land forms.

Previous archaeological assessment of portions of the Highway 107 Extension study area were conducted by Laird Niven in 2011 and by Stephen Davis in 1991 while assessing an earlier alignment for the Extension. The eastern quarter of the study area corridor, from the railway tracks to the western end of Burnside Drive, was ascribed 'no archaeological potential' during the archaeological assessment conducted by Niven under Heritage Research Permit A2011NS52 (Niven 2011: 7), as well as by Davis during his 1991 survey of the area (Davis 1991). It was also asserted that the north-western portion of the corridor, just off of Rocky Lake Drive had no potential for archaeological resources (Niven 2011:7). These areas were re-assessed during CRM Group's 2013 impact assessment, paying particular attention to the north-western portion, due to its proximity to Lily Lake (which drains directly into the Bedford Basin) and mention of an old road found during Niven's 2011 reconnaissance (Niven 2011: 5). In addition, a modeling report written by CRM Group in 2001 for Sempra Atlantic Gas also identified an area of high potential on either side of Wrights Brook which the Highway 107 Extension study area crosses (Stewart & Sanders 2001: 38).

Based on the various components of the background study, including environmental setting, Native land use and historic settlement, a number of locations throughout the study area are considered to exhibit high potential for encountering Precontact and/or historic archaeological resources.

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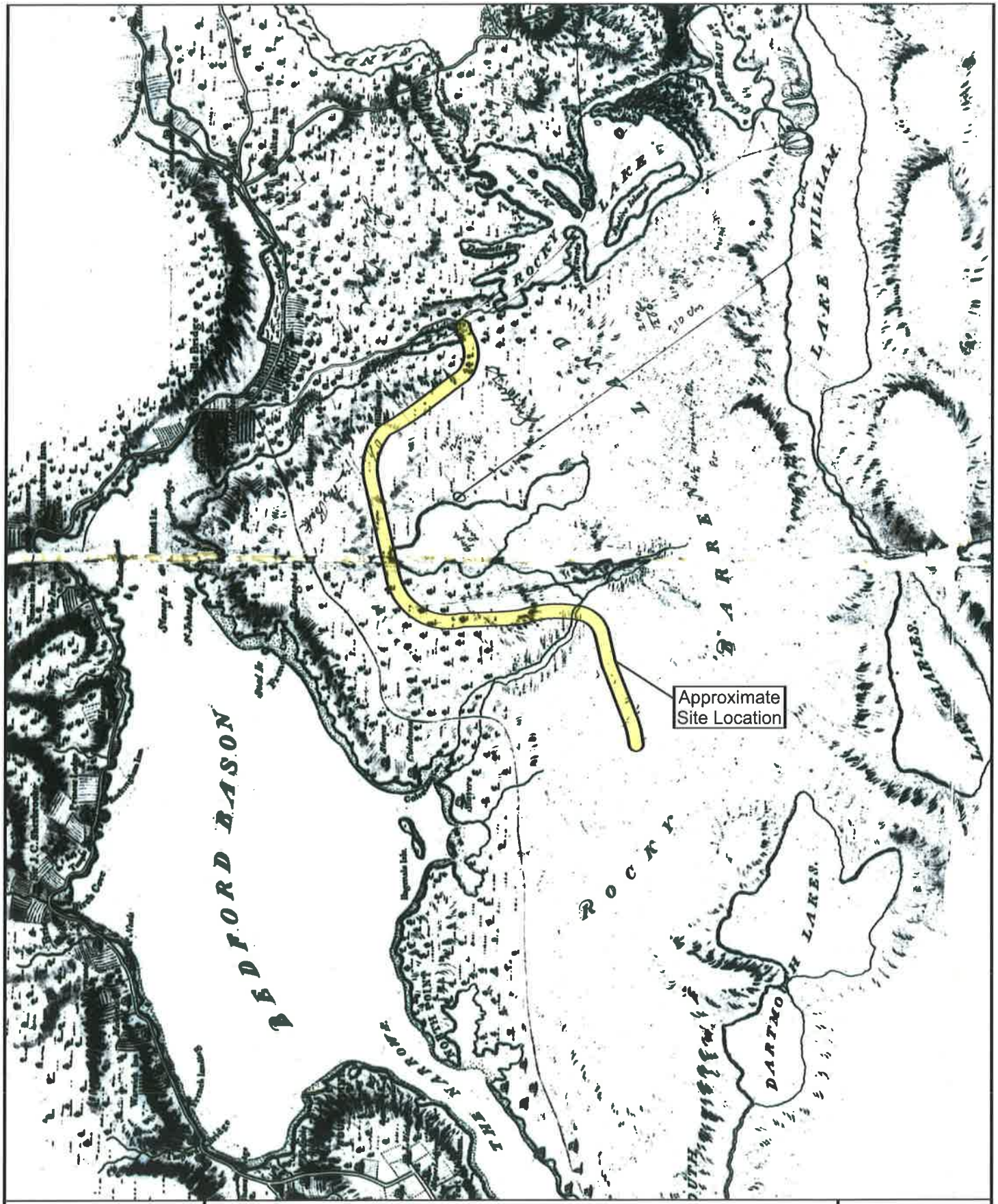
|---|---|---|
| CRM Group | *Study Area on Grant Index Sheet Number 66* | *Figure 3* |
| | HIGHWAY 107 EXTENSION<br>ARCHAEOLOGICAL SHOVEL TESTING 2014<br>HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA | July 2014 |

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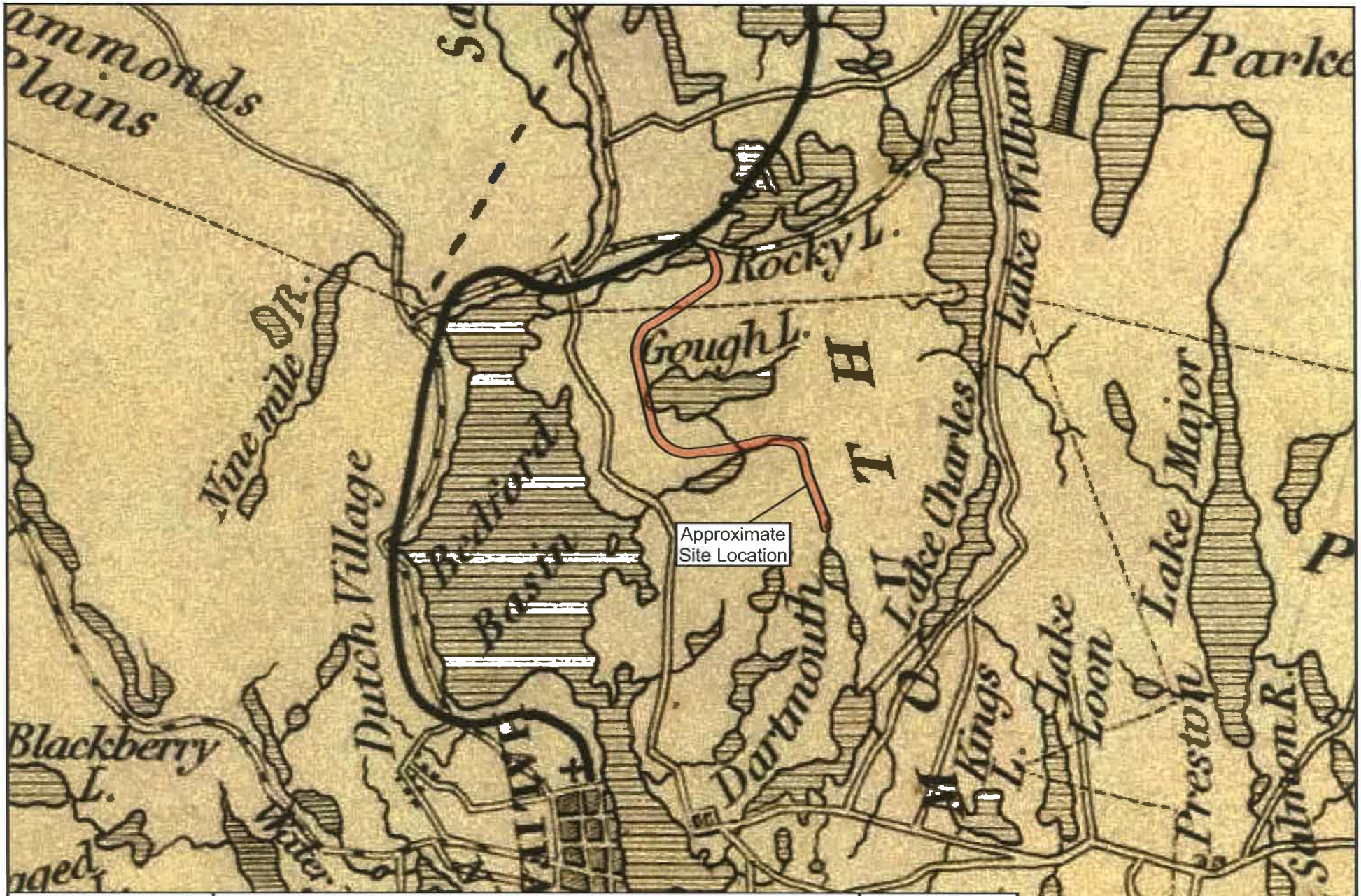
|---|---|---|
| CRM Group | *McGill Map, 1814* | *Figure 4* |
| | HIGHWAY 107 EXTENSION<br>ARCHAEOLOGICAL SHOVEL TESTING 2014<br>HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA | July 2014 |




| | | |
|---|---|---|
| CRM Group | *Study Area on 1855 MacKay Map* | *Figure 5* |
| | HIGHWAY 107 EXTENSION<br>ARCHAEOLOGICAL SHOVEL TESTING 2014<br>HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA | July 2014 |

## 4.2 Shovel Testing

Archaeological shovel testing of the 11 areas of high archaeological potential within the Highway 107 Extension study area was undertaken on May 20 and 21, 2014 under clear conditions. The goal of the fieldwork was to identify the presence or absence of topographical and/or cultural features or artifacts in areas that had been identified as areas of elevated potential during the reconnaissance (***Figure 6***). These high potential areas were split into two Loci, Locus #1 and Locus #2. Areas 1 through 11 were shovel tested, under the supervision of UXO technician Larry Baillie (***Plate 1***). The shovel testing program consistently revealed that the areas of high archaeological potential as identified during the reconnaissance stage were actually smaller than initially suggested. Therefore, the areas were redefined when subjected to shovel testing.

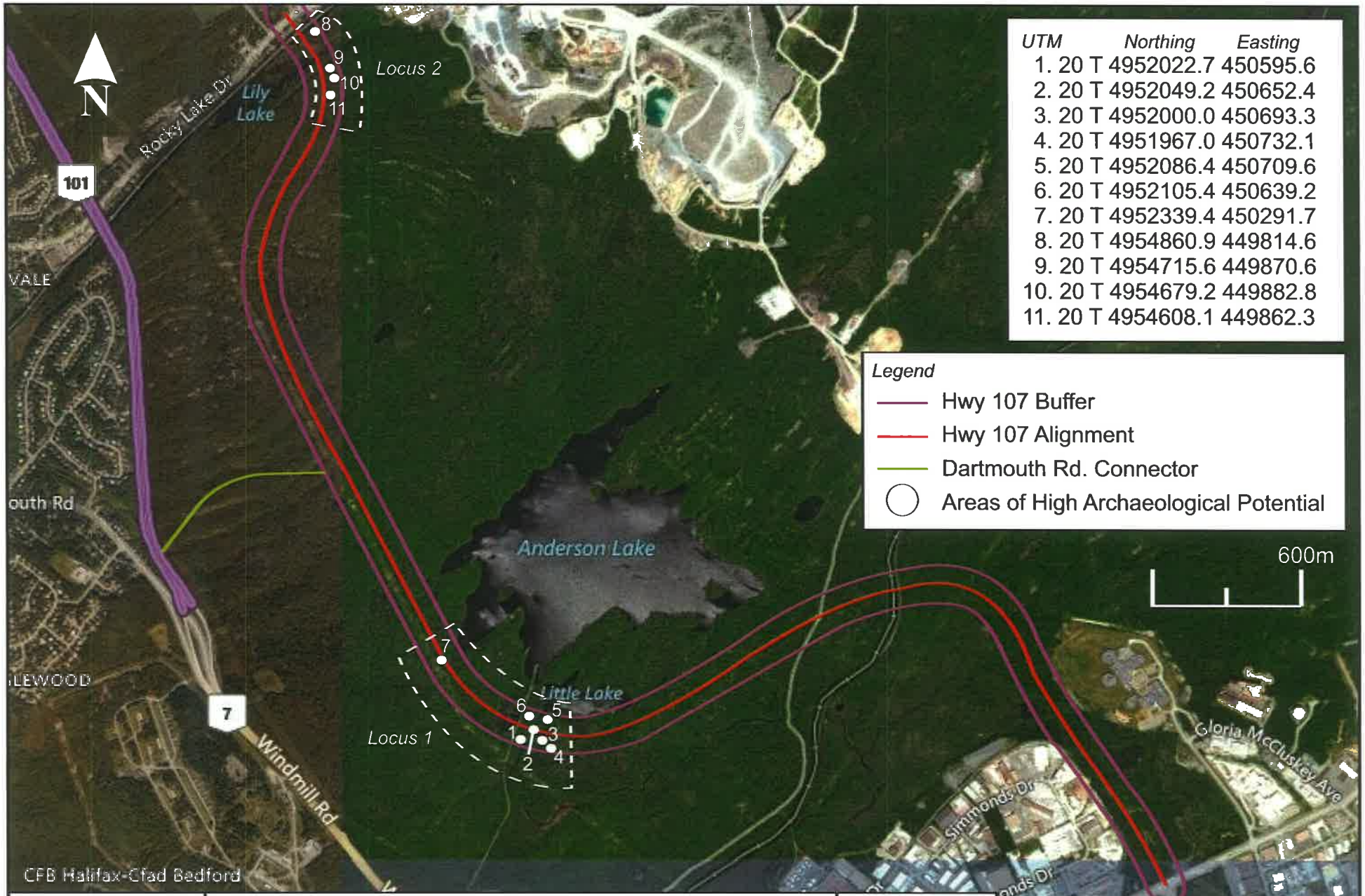
**Locus #1**

In total, seven areas of high archaeological potential were observed in the vicinity of Anderson Lake and Little Lake (along with its out-flow Wrights Brook) in Locus #1 (***Figures 6 & 7***). All of these areas are considered to exhibit high archaeological potential for Precontact occupation due to their high and flat topography, as well as their proximity to significant water sources.

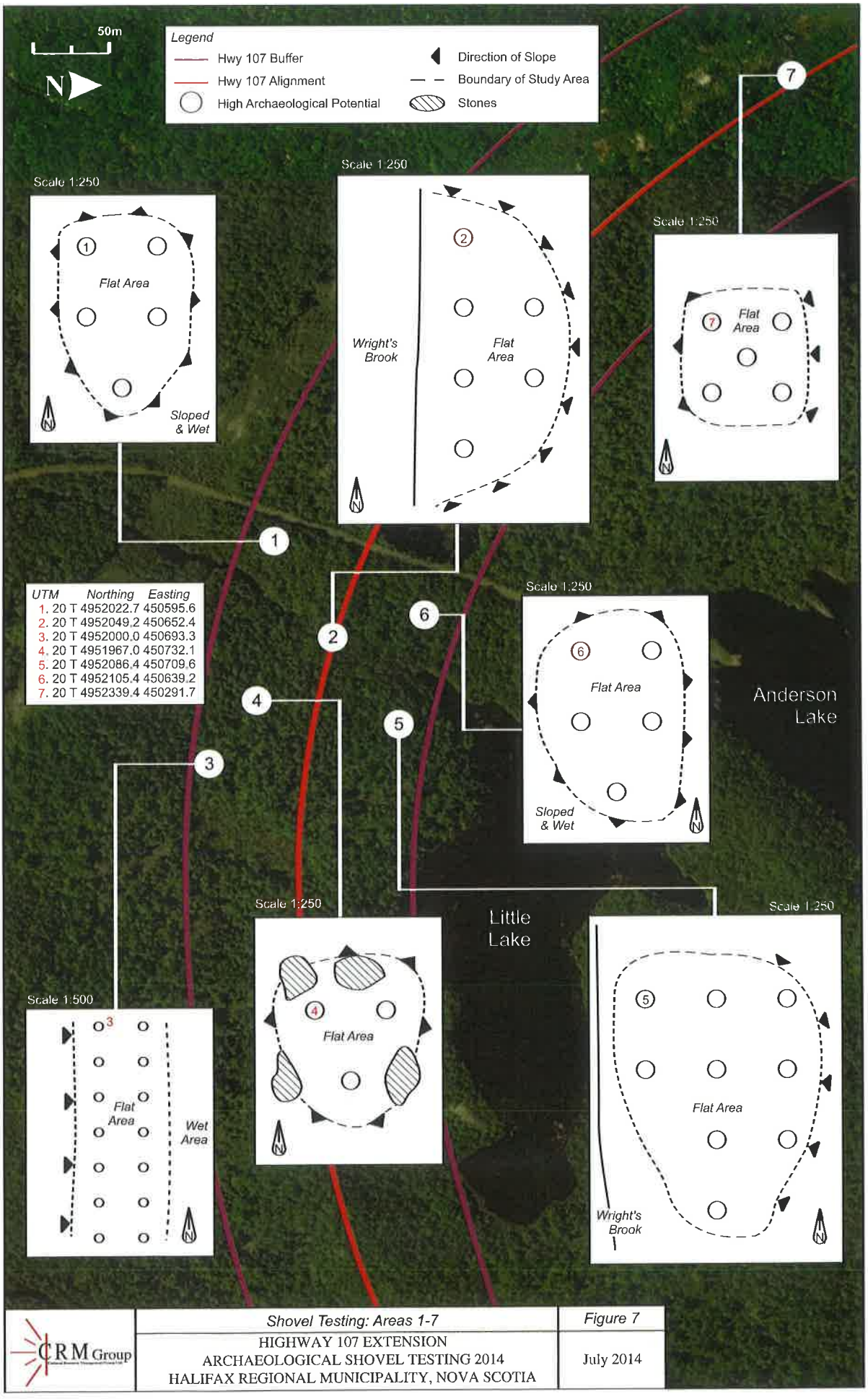
**Locus #2**

In total, four areas of high archaeological potential were observed in the vicinity of Lily Lake and Rocky Lake Drive in Locus #2 (***Figures 6 & 8***). Of these areas, three are considered to exhibit high archaeological potential for Precontact occupation due to their high and flat topography, as well as their proximity to significant water sources and one area is considered to exhibit high archaeological potential for historic occupation, due to the presence of an old road bed which appears on maps as early as 1855 (***Figure 5***).

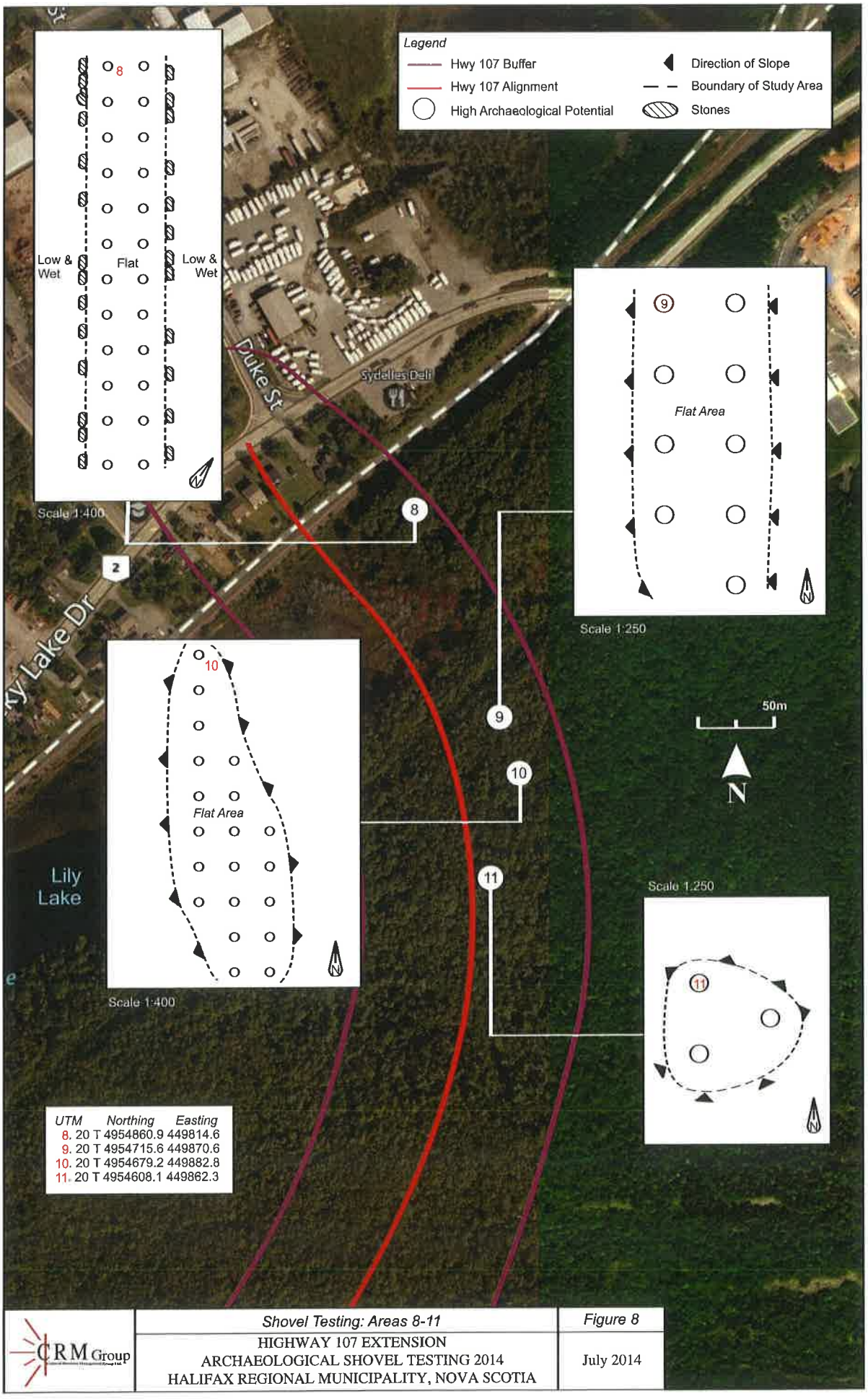
**PLATE 1:** **UXO technician Larry Baillie surveying the area with a metal detector; Facing southwest; May 20, 2014.**




| | | |
|---|---|---|
| CRM Group | *Areas of High Archaeological Potential - Loci 1 & 2* | *Figure 6* |
| | HIGHWAY 107 EXTENSION<br>ARCHAEOLOGICAL SHOVEL TESTING 2014<br>HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA | July 2014 |




| | | |
|---|---|---|
| CRM Group | *Shovel Testing: Areas 1-7* | *Figure 7* |
| | HIGHWAY 107 EXTENSION<br>ARCHAEOLOGICAL SHOVEL TESTING 2014<br>HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA | July 2014 |




| | | |
|---|---|---|
| CRM Group | *Shovel Testing: Areas 8-11* | *Figure 8* |
| | HIGHWAY 107 EXTENSION<br>ARCHAEOLOGICAL SHOVEL TESTING 2014<br>HALIFAX REGIONAL MUNICIPALITY, NOVA SCOTIA | July 2014 |

**Area 1**

**Locus:** #1

**Location:** See ***Figures 6 & 7***

**UTM Coordinates:** 20 T 4952022.7N 450595.6E

**Description:** Area 1 is located directly east of Pewter Lane, midway between Pewter Road and Wrights Brook in the south-eastern half of the Highway 107 Extension corridor. This area is considered suitable for Precontact habitation due to its flat and dry nature, and the proximity of Wrights Brook - the outflow of Little Lake. The periphery of Area 1 is bounded by sloping and wet terrain deemed unsuitable for habitation. The shovel testing program consistently revealed that the areas of high archaeological potential as identified during the reconnaissance stage were actually smaller than initially suggested. Therefore, the areas were redefined when subjected to shovel testing. Area 1 was initially thought to cover an area measuring approximately 10 meters by 20 meters, but in actuality measured 15 metres by 10 metres.

**Outcome:** No archaeological resources were recovered from the 5 shovel tests excavated in Area 1 (***Figure 7, Plate 2***).

**Recommendation:** The area should be cleared of any further archaeological assessment.

**PLATE 2: Crew shovel testing Area 1; Facing west; May 20, 2014.**

## Area 2

**Locus:** #1

**Location:** See ***Figures 6 & 7***

**UTM Coordinates:** 20 T 4952049.2N 450652.4E

**Description:** Area 2 is located on the western and eastern banks of Wrights Brook, directly across from one another in the south-eastern half of the Highway 107 Extension corridor. This area is considered suitable for Precontact habitation due to its flat and dry nature, and its location along Wrights Brook - the outflow of Little Lake. Area 2 is bound on the west and east by a dramatic rise in the landscape and the presence of large granite boulders on both sides of the brook - areas deemed unsuitable for habitation. The shovel testing program consistently revealed that the areas of high archaeological potential as identified during the reconnaissance stage were actually smaller than initially suggested. Therefore, the areas were redefined when subjected to shovel testing. Area 2 was initially thought to cover an area measuring approximately 20 meters by 30 meters, but in actuality measured 20 metres by 10 metres.

**Outcome:** No archaeological resources were recovered from the 6 shovel tests excavated in Area 2 (***Figure 7, Plate 3***).

**Recommendation:** The area should be cleared of any further archaeological assessment.

**PLATE 3: Crew shovel testing Area 2. Facing south. May 20, 2014.**

## Area 3

**Locus:** #1

**Location:** See ***Figures 6 & 7***

**UTM Coordinates:** 20 T 4951967.0N 450732.1E

**Description:** Area 3 is located directly south-east of Area 4 along the southern limits of the south-eastern half of the Highway 107 Extension corridor. This area is considered suitable for Precontact habitation due to its large flat and dry nature, and the proximity of both Wrights Brook and Little Lake. The periphery of Area 3 is bounded by downward sloping terrain and wet areas deemed unsuitable for habitation. The shovel testing program consistently revealed that the areas of high archaeological potential as identified during the reconnaissance stage were actually smaller than initially suggested. Therefore, the areas were redefined when subjected to shovel testing. Area 3 was initially thought to cover an area measuring approximately 50 meters by 30 meters, but in actuality measured 35 metres by 10 metres. Area 3 was switched with Area 4 in the reconnaissance report, as they were incorrectly labelled previously.

**Outcome:** No archaeological resources were recovered from the 14 shovel tests excavated in Area 3 (***Figure 7, Plate 4***).

**Recommendation:** The area should be cleared of any further archaeological assessment.

**PLATE 4: Crew shovel testing Area 3; Facing east; May 20, 2014.**

## Area 4

**Locus:** #1

**Location:** See ***Figures 6 & 7***

**UTM Coordinates:** 20 T 4952000.0N 450693.3E

**Description:** Area 4 is located south-east of Area 2 in the south-eastern half of the Highway 107 Extension corridor. This area is considered suitable for Precontact habitation due to its high, flat and dry nature (***Plate 3***), and the close proximity of Wrights Brook and Little Lake. Area 3 is bound on all sides by granite stones and boulders and appears to be located in a relatively sheltered area on top of a hill. The shovel testing program consistently revealed that the areas of high archaeological potential as identified during the reconnaissance stage were actually smaller than initially suggested. Therefore, the areas were redefined when subjected to shovel testing. Area 4 was initially thought to cover an area measuring approximately 15 meters by 15 meters, but in actuality measured 7.5 metres by 7.5 metres. Area 4 was switched with Area 3 in the reconnaissance report, as they were incorrectly labelled previously.

**Outcome:** No archaeological resources were recovered from the 3 shovel tests excavated in Area 4 (***Figure 7, Plate 5***).

**Recommendation:** The area should be cleared of any further archaeological assessment.

**PLATE 5: Crew shovel testing Area 4; Facing west; May 20, 2014.**

**Area 5**

**Locus:** #1

**Location:** See ***Figures 6 & 7***

**UTM Coordinates:** 20 T 4952086.4N 450709.6E

**Description:** Area 5 is located somewhat near the northern limits of the south-eastern half of the Highway 107 Extension corridor, just east of Wrights Brook and directly south of Little Lake. This area is considered suitable for Precontact habitation due to its high, flat and dry nature, and the extremely close proximity of Wrights Brook, as well as Little Lake. The western periphery of Area 5 is bound by the brook and the eastern periphery is bound by sloped terrain, deemed unsuitable for human habitation. The shovel testing program consistently revealed that the areas of high archaeological potential as identified during the reconnaissance stage were actually smaller than initially suggested. Therefore, the areas were redefined when subjected to shovel testing. Area 5 was initially thought to cover an area measuring approximately 20 meters by 20 meters, but in actuality measured 20 metres by 15 metres.

**Outcome:** No archaeological resources were recovered from the 9 shovel tests excavated in Area 5 (***Figure 7, Plate 6***).

**Recommendation:** The area should be cleared of any further archaeological assessment.

**PLATE 6: Crew shovel testing Area 5; Facing east; May 20, 2014.**

**Area 6**

**Locus:** #1

**Location:** See ***Figures 6 & 7***

**UTM Coordinates:** 20 T 4952105.4N 450639.2E

**Description:** Area 6 is located directly east of Pewter Lane, midway between Pewter Road and Wrights Brook in the south-eastern half of the Highway 107 Extension corridor, north of Area 1. This area is considered suitable for Precontact habitation due to its flat and dry nature, and its positioning between Little Lake/ Anderson Lake and Wrights Brook. Though this area is slightly lower-lying than other areas of high potential, its location between two major water sources greatly raises its archaeological potential. Area 6 covers an area measuring approximately 15 meters by 10 meters.

**Outcome:** No archaeological resources were recovered from the 5 shovel tests excavated in Area 6 (***Figure 7, Plate 7***).

**Recommendation:** The area should be cleared of any further archaeological assessment.

**PLATE 7: Crew shovel testing Area 6; Facing west; May 20, 2014.**

**Area 7**

**Locus:** #1

**Location:** See ***Figures 6 & 7***

**UTM Coordinates:** 20 T 4952339.4N 450291.7E

**Description:** Area 7 is located directly north-west of Pewter Lane, at the south-western tip of Anderson Lake in the north-western half of the Highway 107 Extension corridor. This area is considered suitable for Precontact habitation due to its high, flat and dry nature, and its perfect view of Anderson Lake to the east. The area is bounded on all sides by heavily sloped terrain, deemed unsuitable for human occupation. Area 7 is small, measuring approximately 10 meters by 10 meters.

**Outcome:** No archaeological resources were recovered from the 5 shovel tests excavated in Area 7 (***Figure 7, Plate 8***).

**Recommendation:** The area should be cleared of any further archaeological assessment.

**PLATE 8: Crew shovel testing Area 7; Facing northwest; May 20, 2014.**

**Area 8**

**Locus:** #2

**Location:** See ***Figures 6 & 8***

**UTM Coordinates:** 20 T 4954860.9N 449814.6E

**Description:** Area 8 is located approximately 80 meters south-east of Rocky Lake Drive, past the railway tracks in the north-western half of the Highway 107 Extension corridor. This area of high potential contains the remnants of a road bed that is elevated above ground level and built-up with stones on each side. There is also a large circular stone structure located alongside the roadway. At present it is believed that the road represents an earlier alignment of Rocky Lake Drive, known as Old Scott's Road. This road is depicted on maps as early as 1855 (MacKay 1855). Since Lily Lake drains directly into the Bedford Basin, it is also possible that this road represents a former portage route. The area is bounded to the north-west by the railway tracks, to the south-west by Lily Lake and to the east by low-lying and wet terrain, deemed unsuitable for human occupation. The wet nature of this area is likely the reason that the road is raised. Area 8 (the road and the areas running alongside the road) was thought to measure approximately 50 meters by 10 meters, however, during the shovel testing program Area 8 was actually identified as 60 metres by 10 metres.

**Outcome:** No archaeological resources were recovered from the 24 shovel tests excavated in Area 8 (***Figure 8, Plate 9***).

**Recommendation:** The area should be cleared of any further archaeological assessment.

**PLATE 9: Crew shovel testing Area 8; Facing north; May 21, 2014.**

**Area 9**

**Locus:** #2

**Location:** See ***Figures 6 & 8***

**UTM Coordinates:** 20 T 4954715.6N 449870.6E

**Description:** Area 9 is located directly south-east of Lily Lake, in the north-western half of the Highway 107 Extension corridor. This area is considered suitable for Precontact habitation due to its high, flat and dry nature, and the close proximity of Lily Lake, which drains into the Bedford Basin. The area overlooks the water and is generally bound by sloped and rocky terrain, deemed unsuitable for human occupation. The shovel testing program consistently revealed that the areas of high archaeological potential as identified during the reconnaissance stage were actually smaller than initially suggested. Therefore, the areas were redefined when subjected to shovel testing. Area 9 was initially thought to cover an area measuring approximately 30 meters by 10 meters, but in actuality measured 25 metres by 10 metres.

**Outcome:** No archaeological resources were recovered from the 9 shovel tests excavated in Area 9 (***Figure 8; Plate 10***).

**Recommendation:** The area should be cleared of any further archaeological assessment.

**PLATE 10: View south of Area 9; November 6, 2013.**

**Area 10**

**Locus:** #2

**Location:** See ***Figures 6 & 8***

**UTM Coordinates:** 20 T 4954679.2N 449882.8E

**Description:** Area 10 is located directly south-east of Lily Lake and Area 9, in the north-western half of the Highway 107 Extension corridor. This area is considered suitable for Precontact habitation due to its high, flat and dry nature, and the close proximity of Lily Lake, which drains into the Bedford Basin. The area is generally bound by sloped and rocky terrain, deemed unsuitable for human occupation. The shovel testing program consistently revealed that the areas of high archaeological potential as identified during the reconnaissance stage were actually smaller than initially suggested. Therefore, the areas were redefined when subjected to shovel testing. Area 10 was initially thought to cover an area measuring approximately 75 meters by 30 meters, but in actuality measured 50 metres by 15 metres.

**Outcome:** No archaeological resources were recovered from the 20 shovel tests excavated in Area 10 (***Figure 8; Plate 11***).

**Recommendation:** The area should be cleared of any further archaeological assessment.

**PLATE 11: Crew shovel testing Area 10; Facing east; May 21, 2014.**

## Area 11

**Locus:** #2

**Location:** See ***Figures 6 & 8***

**UTM Coordinates:** 20 T 4954608.1N 449862.3E

**Description:** Area 11 is located directly south-east of Lily Lake and south-west of Area 10, in the north-western half of the Highway 107 Extension corridor. This area is considered suitable for Precontact habitation due to its high, flat and dry nature along a natural plateau and the close proximity of Lily Lake, which drains into the Bedford Basin. The area is generally bound by sloped and rocky terrain, as it is positioned along a steep rise. Area 11 is small and covers an area measuring approximately 10 meters by 10 meters.

**Outcome:** No archaeological resources were recovered from the 3 shovel tests excavated in Area 11 (***Figure 8; Plate 12***).

**Recommendation:** The area should be cleared of any further archaeological assessment.

**PLATE 12: Crew shovel testing Area 11; Facing south; May 21, 2014.**

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

The 2013 archaeological resource impact assessment of the Highway 107 Extension involved a review of background research and shovel testing of 11 areas of high archaeological potential located along a 7 kilometer corridor running from Burnside Drive in Dartmouth to Rocky Lake Drive in Bedford, running south of Anderson Lake. The shovel testing conducted by CRM Group Staff Archaeologist Angela Finnie did not identify any archaeological resources.

Based on these results, CRM Group offers the following management recommendations for the study area:

1. It is recommended that the Highway 107 Extension corridor be cleared of any further requirement for further archaeological investigation.

2. In the event that archaeological resources or human remains are encountered during construction on any part of the Highway 107 Extension Project, all work in the associated area(s) should be halted and immediate contact made with the Coordinator of Special Places (Sean Weseloh-McKeane: (902) 424-6475).

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# Appendix K

**Previous Consultation Exerpts**

NOVA SCOTIA
Transportation and Infrastructure Renewal

HALIFAX
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# Public Information Sessions

## BAYERS ROAD / HIGHWAY 102 / HIGHWAY 107 CORRIDOR STUDY

There will be two Public Information Sessions for the Bayers Road / Highway 102 / Highway 107 Corridor Study. NSTIR, HRM and Consultant staff will be in attendance at the Public Information Sessions to discuss the study and answer questions. A presentation will be made.

The objective of the study is to identify transportation infrastructure needs and preserve the corridor for potential expansion of the roadways sometime in the future. This process does not imply that construction will take place.

**The schedule is as follows:**

Wednesday, March 25, 2009 at the Sackville High School, 1 Kingfisher Way, Lower Sackville, from 6pm to 9pm with a presentation at 6:30pm

Thursday, March 26, 2009 at the Park Plaza Hotel and Conference Centre, Ramada Plaza, 240 Brownlow Avenue, Dartmouth, from 4pm to 6pm.

**Project Description**

The Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) and Halifax Regional Municipality (HRM) are exploring the future best use of the Bayers Road / Highway 102 Corridor from Windsor Street, Halifax to Fall River. The study includes traffic projections and functional designs which could be implemented in stages over a 30 year period. The location of the proposed Highway 107 from Akerley Blvd in Burnside to Highway 102 near Duke Street (Exit 4C) has also been updated and evaluated. The study, conducted by Stantec Consulting Ltd. on behalf of NSTIR and HRM, commenced in March, 2007.

**Background**

The main purpose of the 100 series highway network in Nova Scotia is the safe and efficient movement of large volumes of people and goods at high speeds over long distances while minimizing negative economic, social and environmental impacts. Highway 102 is an important primary highway link for northern and eastern parts of the province, linking HRM to the Trans Canada Highway 104 in Truro. Highway 102 within the study area serves HRM as an urban commuter highway. Highway 102 includes the full length of Bayers Road from Windsor Street on the Halifax peninsula to the start of the access controlled Highway 102 at Joseph Howe Drive a distance of approximately 2.5 kilometres. The controlled access Highway within the study area; from Joseph Howe Drive to Exit 5 is approximately 24 km in total length with a total of nine (9) existing interchanges with arterial roadways or other 100 series Highways. The full project study area is shown on the attached ***Figure 1.0***

The study has three main components with specific objectives:

- Complete Traffic Projections for Highway 102 and 107 (Component 1)
- Identify Highway 102 Upgrade Requirements based on Component 1 (Component 2)
- Review the Highway 107 Extension to Highway 102 (Component 3)

**Transportation Infrastructure Forecasts**

The study has identified many potential changes to the corridor over a long section. The study analysis is based on modeling of population growth, trip generation and includes projected transit use. The results of the study indicate that ultimately in the 30 year design horizon, the existing four-lane Highway 102 would require to be expanded to a six lane highway to maintain an acceptable level of service. The expanded Highway 102 and new Highway 107 would be divided, controlled access highways with narrow medians and design speeds of up to 120 km/h. Construction would be phased over 30 years. Additional auxiliary lanes to interchange ramps would be provided as warranted.

At this stage in the planning, economic, environmental, and social impacts have been considered at a high level. Further study is required. This study has focused on traffic impacts and the safe transportation of the travelling public.

**Public Information Session**

Several factors including, but not limited to public input, environmental impact, and design issues play a vital role in the development of highway infrastructure. The purpose of these Public Information Sessions is to explain the study and obtain information and feedback from local residents, businesses, and land owners. Public involvement in this project will enable us to continue with planning for the future.

**Time Line / Next Steps**

The phases required prior to consideration of any future construction include further study, further public Information Sessions, and environmental assessment. The next step is to finalize the study report and conduct a cost / benefit analysis for the proposed Highway 107 extension. As well, a Transit Corridor Study will be undertaken by HRM.

**Additional Information**

For Additional Information, please contact:

Dwayne Cross, P. Eng.
NSTIR , Highway Planning and Design
Tel: 424-2940 or by e-mail at crossdw@gov.ns.ca

Dave McCusker, P.Eng.
HRM Regional Transportation
Tel: 490-6696 or by email at mccuskd@halifax.ca

Or visit: www.halifax.ca

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Transportation and Infrastructure Renewal

# PUBLIC INFORMATION SESSIONS
# BAYERS ROAD / HIGHWAY 102 / HIGHWAY 107 CORRIDOR STUDY
# COMMENT FORM

Thank you for taking the time to visit us today. Your input is a valuable tool which will help us move forward with infrastructure planning which best satisfies the needs of the communities and the travelling public. We would appreciate if you would take a few minutes to answer the following questions. Either complete this form today and leave in the drop-off box, or return by mail or fax **by April 03, 2009.** Contact information is at the bottom of Page 2

**PLEASE NOTE: The results of the comment forms will be summarized in a Report, but individual forms and names will be kept private and confidential.**

**Name:** _____

**Organization (if any):** _____

**Mailing address:** _____

_____

**Telephone:** _____
**E-mail:** _____

**A) Which potential impacts concern you the most regarding the functional drawings presented?** Please rank from 1 to 6, with **1** being the ***most important*** and **6** being the ***least important***.

| | |
|---|---|
| ____ Local Business | ____ Property |
| ____ Natural Resources | ____ Environment |
| ____ Community Life | ____ Health and Safety |

**B)** We are early in the study process, and **we want to be made aware of any information, concerns, environmental features, etc.** you may have or know of that will assist us with defining the scope of future studies. Use the back of the form if more space is required.

_____

_____

_____

_____

_____

_____

_____

_____

**C)** The following statements review a few issues **related to the Bayers Road / Highway 102 / Highway 107 Corridor Study** and allow you to rank their importance in relation to your personal opinion. **Please circle the answer that best reflects your views.**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | The Corridor is being studied as one unit since the roadways are linked and influence each other. This is a good approach in the initial study. | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | No Opinion |
| | Comment: | | | | | | |
| 2 | Congestion at some locations in the existing corridor is having a negative affect on public health and safety. | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | No Opinion |
| | Comment: | | | | | | |
| 3 | The expanded roadways will have a positive impact on public health and safety and community life. | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | No Opinion |
| | Comment: | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4 | The expanded roadways will increase economic development activities and opportunities. | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | No Opinion |
| | Comment: | | | | | | |
| 5 | Some of the suggested roadway changes will improve the current conditions | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | No Opinion |
| | Comment (which changes do you agree with?): | | | | | | |
| 6 | Some of the suggested roadway changes will degrade the current conditions | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | No Opinion |
| | Comment (which changes do you disagree with?): | | | | | | |

**D)** The following statements review a number of issues related to **today's session** and allow you to rank their importance in relation to your personal opinion. **Please circle the answer that best reflects your views.**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | Having a presentation at the start of the information session was useful. | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | No Opinion |
| | Comment: | | | | | | |
| 2 | The information session was well organized and easy to understand. | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | No Opinion |
| | Comment: | | | | | | |
| 3 | There was enough background information regarding the study to provide an informed opinion on the results and what might be considered in future study. | Agree | Somewhat Agree | Neutral | Somewhat Disagree | Disagree | No Opinion |
| | Comment: | | | | | | |

**E)** Please answer the following questions on today's working session:

1. How did you **first** find out about the public consultation? **Please check one.**

   ( ) Information in mailbox ( ) Radio
   ( ) Newspaper ( ) From someone you know

2. We will be returning to the public at future dates with more information regarding specific areas of the overall study. Is there a change in the format of the event you would like to see?

   _____
   _____
   _____
   _____

3. Do you have any additional comments which have not been discussed or requested of you today?

   _____
   _____
   _____
   _____
   _____
   _____
   _____

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Dartmouth NS B3B 2C4
Tel: (902) 434-7331
Fax: (902) 462-1660

March 16, 2009
File: 1333-20639/3A

«Owner1»
«MailingAddress1»
«MailingAddress2»

Dear Sir / Madame:

**RE: Bayers Road / Highway 102 / Highway 107 Corridor Study**

Stantec Consulting Ltd. is working on behalf of The Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) and Halifax Regional Municipality (HRM). We are studying the Bayers Road/ Highway 102 Corridor from Windsor Street, Halifax, to Fall River and Highway 107 from Burnside to Bedford. A description of the study is included on the attached Fact Sheet and map. The objective of the study is to identify transportation infrastructure needs and preserve the corridor for potential expansion of the roadways sometime in the future. This process does not imply that construction will take place.

The purpose of the Public Information Sessions is to provide an opportunity for land owners and the general public to review the results of the study and have input in the process. Our staff, as well as NSTIR and HRM representatives, will be in attendance at the Public Information Sessions to discuss the study and answer any questions.

The study team has located properties that may be affected by the changes being considered for the roadways. You have been identified as the owner of a property which may be affected. The following Public information Sessions will be held:

- **Wednesday, March 25, 2009 at the Sackville High School, 1 Kingfisher Way, Lower Sackville, from 6pm to 9pm with a presentation at 6:30pm,**
- **Thursday, March 26, 2009 at the Park Plaza Hotel and Conference Centre, Ramada Plaza, 240 Brownlow Avenue, Dartmouth, from 4pm to 6pm.**

If you have questions regarding the upcoming public information sessions, please do not hesitate to contact me at 434-7331 or by e-mail at bernadette.landry@stantec.com As well contacts for NSTIR and HRM respectively are Mr. Dwayne Cross at 424-2940, crossdw@gov.ns.ca and Mr. Dave McCusker at 490-6696, mccuskd@halifax.ca .

Sincerely,

**STANTEC CONSULTING LTD.**

B. Landry

Bernadette Landry, P.Eng., Project Manager
Attachments: Fact Sheet and Study Area Map

## Bayers Road / Highway 102 / Highway 107

## Corridor Study

Public Information Session Presentation

**February 11th & 12th, 2009**

One Team. Infinite Solutions

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## Study Team (Steering Committee)

NOVA SCOTIA Transportation and Infrastructure Renewal

**TIR**
Dwayne Cross
Mike Croft
Brian Ward

HALIFAX REGIONAL MUNICIPALITY

**HRM**
Dave McCusker
Alan Taylor

Stantec
MRC

**STANTEC**
Bernadette Landry
Jamie Copeland
Pat Chouinard
Gerry Boulos

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## Study Area

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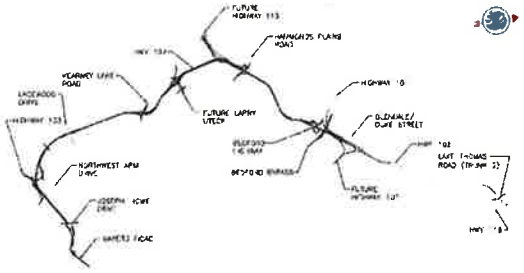
## Study Area and Existing Conditions



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## Scope of the Study

**The study has three main components with specific objectives:**

- **Component 1:** Traffic Projections for Bayers Road / Highway 102 and Highway 107
- **Component 2:** Identify Bayers Rd / Highway 102's lane requirements
- **Component 3:** Review the Highway 107 Extension to Highway 102

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## Context of the Study

- The Study has a defined scope
- The Study has a defined Study Area
- Traffic Projections (forecasting the future)
- Roadway Widening and New Roads
- Regional Planning Considerations

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## Context of the Study

**Other studies and work done:**
- Regional planning work
- Harbour crossing studies
- Armdale Rotary and Chebucto Road work

**The network beyond the Study Area may require changes to provide the desirable performance within the corridor**
- Peninsular Halifax, Highway 103, Hammonds Plains Road

**Suggested changes may be considered too severe and conscious decisions to not implement the changes might be made**
- Unacceptable Property or Environmental Impacts

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## Study Objectives

**Objectives:**
- to identify transportation infrastructure needs
- to preserve the corridor for potential expansion of the roadways sometime in the future.

**Note:**
- This process does not imply that construction will take place.

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# Component 1
# Traffic Projections

**Modeling – HRM QRSII**
- Demographics: Population Forecasts and Employment Distribution
- Single Vehicles versus Transit Use

**Regional Planning**
- Projected transit use is aggressive
- Funding is allocated for Transit Initiatives
- Funding is not allocated for the roadwork suggested here

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Component 1 – Traffic Projections

## Analysis Methodology - Scenarios and Time Horizons

**Future Road Network Scenarios**

**Scenario A** – Existing road infrastructure + currently planned network upgrades (traffic signals, new roads, etc)

**Scenario B** – All the upgrades in Scenario A with Highway 113 + Highway 107 extension connecting at Exit 4C (Duke Street)

**Scenario C** – All the upgrades in Scenario A + Highway 113 + Highway 107 extension connecting directly with Highway 101 (Bedford Cloverleaf Interchange)

| Time Horizons | Peak Hours |
|---|---|
| 2016 | AM |
| 2026 | PM |
| 2036 | |

This resulted in 18 model scenarios

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Component 1 – Traffic Projections

## Traffic Analysis Results

*Exhibit 1 Forecast number of mainline lanes for Scenario A (both directions)**

| Location | Forecast Mainline Lanes - Scenario A | | |
|---|---|---|---|
| | 2016 | 2026 | 2036 |
| Windsor St to Connaught | 4 | 6 | 6 |
| Connaught to Joseph Howe Dr | 6 | 6 | 6 |
| Joseph Howe Dr to Hwy 102 | 6 | 6 | 6 |
| Hwy 102 to Hammonds Plains | 4 | 6 | 6 |
| Hammonds Plains to Hwy 101 | 4 | 4 | 6 |
| Hwy 101 to Hwy 118 | 4 | 4 | 4 |

*Exhibit 2: Forecast number of mainline lanes for Scenarios B & C (both directions)**

| Location | Forecast Mainline Lanes - Scenarios B & C | | |
|---|---|---|---|
| | 2016 | 2026 | 2036 |
| Windsor St to Connaught | 4 | 4 | 6 |
| Connaught to Joseph Howe Dr | 4 | 6 | 6 |
| Joseph Howe Dr to Hwy 102 | 6 | 6 | 6 |
| Hwy 102 to Hwy 113 | 4 | 6 | 6 |
| Hwy 113 to Hwy 101/107 | 4 | 6 | 6 |
| Hwy 101/107 to Hwy 118 | 4 | 4 | 4 |

*The forecast number of lanes is based on accommodating the peak flow for both directions. Reversing lanes are not considered.

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# Component 2
## Bayers Road and Hwy 102

- Infrastructure Needs Assessment
- Potentials and Constraints
- HOV (High Occupancy Vehicle) Lanes
- Design Criteria
- Concept Drawings

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Component 2 – Bayers Road and Highway 102

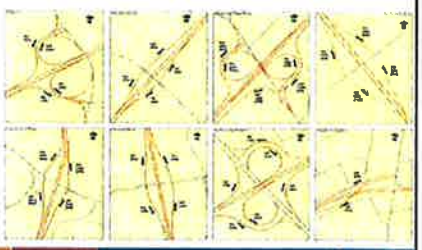
## Forecast of Infrastructure Needs – Intersections

Intersection Needs and Staging
- Laning requirements for 19 intersections,
- Three road network scenarios and
- Three time horizons per intersection

Component 2 – Bayers Road and Highway 102

## Forecast of Infrastructure Needs - Ramps

Forecast Corridor Ramp Volumes
- Laning requirements for 12 interchanges (9 existing and 3 new)
- Approximately 50 ramps
- Three network scenarios and three time horizons per ramp



Component 2 – Bayers Road and Highway 102

## Expansion Potential and Constraints

**Some Key Considerations at the Outset:**
- **The current right-of-way limits**
- **Adjacent property that is owned by HRM or NSTIR**
- **Adjacent property that is currently developed**
- **Environmental**
- **Power transmission lines**
- **Trunk municipal infrastructure**
- **Horizontal and vertical road geometry**
- **Bridge structures**
- **Rock outcrops**
- **Active Transportation paths / bikeways**

Component 2 – Bayers Road and Highway 102

## Expansion Potential and Constraints

**Environmental**

**Major Water Bodies within the Study Area**
- **The Sackville River**
- **Kearney Run**
- **Wetland at Highway 113**
- **Lake Thomas**
- **Anderson Lake**

Component 2 – Bayers Road and Highway 102

## Expansion Potential and Constraints

**Structures**
- 29 existing bridge structures within the study area
- Age varies. Many constructed in the 1960's
- Replacement and Rehabilitation

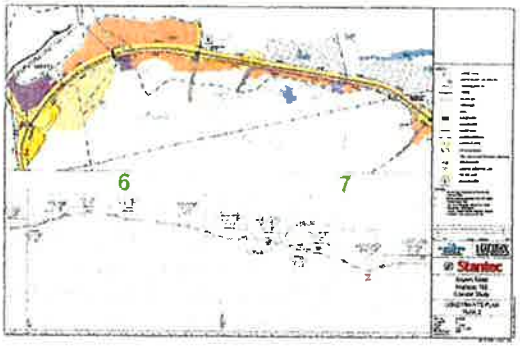
Component 2 – Bayers Road and Highway 102

## Expansion Potential and Constraints

**Other Built Infrastructure and Natural Features**
- *Power Transmission Lines*
- Water Transmission Mains
- Rock

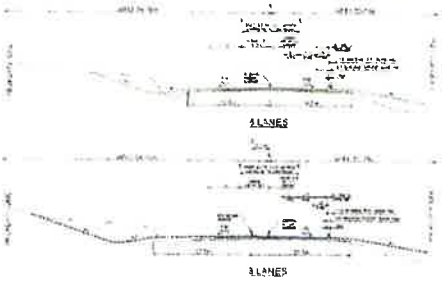
Component 2 – Bayers Road and Highway 102

## Expansion Potential and Constraints




Component 2 – Bayers Road and Highway 102

## Expansion Potential and Constraints



Typical Cross Section of Highway 102
- Red line represents existing ground
- Green and Blue lines show new roadway

Component 2 – Bayers Road and Highway 102

## Expansion Potential and Constraints

**Commercial and Private Properties**
- Bayers Road
- School Avenue in Fairview
- Other Properties along Highway 102 and Highway 107

Component 2 – Bayers Road and Highway 102

## Expansion Potential and Constraints

**In summary, the primary objectives for the expansion design concepts are:**
- to provide sufficient capacity for horizon traffic
- to maximize safety features (correction of sub-standard features)
- to minimize environmental impact
- to avoid impact to developed properties
- to minimize property acquisition
- to minimize impact to other municipal and power infrastructure

Component 2 – Bayers Road and Highway 102

## A Strategic Review of HOV (High Occupancy Vehicle) Lane Use

**Objective:**
Is there a benefit to adding HOV lanes in the corridor?

**General Findings**
- Corridor appears well suited to HOV lanes
- Highway 102 & Bayers Road are candidate sites
- Additional infrastructure could be deferred
- Will require constant management and enforcement
- More detailed analysis required – Region-wide Plan

Component 2 – Bayers Road and Highway 102

## Conceptual Drawings

The purpose of producing conceptual drawings is to apply the results of the Needs Assessment at the ultimate build-out year (2036 for this Study) and see what this looks like.

The results outlined so far including

- Mainline Lane Needs
- Intersection and Interchange Ramp Needs
- Design Criteria

were applied to terrain mapping of the corridor.

# Component 3
# Highway 107

- History
- Connection to Highway 102 Options
- Alignment Options
- Design Criteria
- Phasing

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Component 3 – Highway 107

## Highway 107 Connection to Highway 102

**Two key options considered**

- Connection to the Duke Street Interchange (Exit 4C)
- Connection to the Highway 101 / Highway 102 Interchange (Exit 4)

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Component 3 – Highway 107

## Phasing Evaluation - 1

**Burnside Drive Extension Concept**
- Extend Burnside Drive to Duke Street
- Major Intersection at Akerley Blvd and Rocky Lake Rd
- No other connection points

**General Findings**
- Strong desire for drivers to use facility
- 4-lane cross-section to the 2026 horizon
- The following upgrades should be considered:
  - The Highway 111/Burnside Drive interchange by 2016
  - The Akerley Boulevard intersection by 2026

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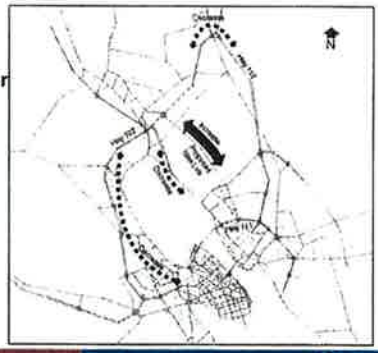
Component 3 – Highway 107

## Phasing Evaluation - 2

**Impacts to the Travel Behaviour**



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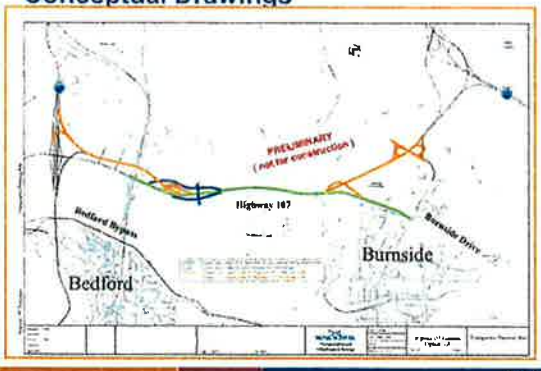
Component 3 – Highway 107

## Conceptual Drawings

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## Next Steps

- **Finalize the Study Report**
- **Conduct a Cost Benefit Analysis for Highway 107 Extension**

**The Study Report will guidance for future work such as**
- **Overpass and Interchange ramp rehabilitation**
- **Design of Larry Uteck Interchange**
- **Design of Washmill Lake Court (Bayers Lake) Underpass**
- **Development of HRM's Transit Corridor**
- **Review of development applications**

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Questions?
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# Executive Summary

## E-1 INTRODUCTION

The Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) and Halifax Regional Municipality (HRM) have contracted the Stantec, Delphi-MRC team to undertake a study of the Bayers Road / Highway 102 Corridor and the proposed extension of Highway 107 to Highway 102. The team has undertaken transportation planning, traffic analysis, functional design and overall project management for the corridor study.

The purpose of the study is to determine the ultimate capacity and best use of the Highway 102 corridor and to study the alignment and connection options for the future Highway 107. The primary objectives of the Project are to determine:

- Traffic Projections (Component 1)
- Highway 102 Upgrades (Component 2)
- Highway 107 Extension (Component 3)

This report (the second of three) provides an overview of the **Component 2** process and summarizes key findings from the analysis. The following is a description of the study objectives for Component 2.

- Review of Expansion Potential (additional lanes) of Highway 102 – to establish constraints and potential for the physical expansion.
- Infrastructure Needs Assessment – to apply the Component 1 traffic volume forecasts and establish ramp lanes and intersection needs for the horizon years.
- HOV Lane Strategic Review – to assess the feasibility and benefits of HOV (High Occupancy Vehicles) lanes on Highway 102
- Establish a Design Criteria – to set the parameters for the physical expansion of Highway 102 and associated ramps and crossing roads.
- Preparation of Conceptual Plans – to apply the recommendations from the Infrastructure Needs Assessment.
- VE Session for 107 Connection – to establish / review the options for the Highway 107 connection with Highway 102
- Conduct a Public Information Session – to present the results of the study and obtain feedback on the conceptual plans.
- Costing and Implementation – to determine approximate costs for the work and a concept schedule for implementation.

- Comparative Review and Ultimate Capacity Forecast – to re-examine the model results and to estimate a point in time when the capacity of the corridor would be reached.

## E-2 REVIEW OF EXPANSION POTENTIAL

The existing conditions in the corridor were evaluated to determine the potential and constraints within the corridor. The purpose of the task was to identify and document factors that would influence the design.

The design team conducted site visits and reviewed aerial photography, right-of-way plans, property mapping and construction plans and profiles for Highway 102. Plans summarizing these constraints are included in ***Appendix B.***

Some of the key items include:

- Property Constraints: The current transportation corridor and right-of-way limits shown highlighted in yellow on the plans. Adjacent property owned by HRM or NSTIR is identified which may present an opportunity for expansion. Adjacent property that is currently developed is identified and represents a constraint to expansion.
- Environmental and Natural Features are noted as potential constraints to expansion such as water bodies and water courses that present environmental concerns. Significant water bodies within the study area include: The Sackville River which crosses Highway 102 in Bedford (Highway 102 / 101), Kearney Run, just south of the proposed Highway 113 interchange location, Lake Thomas in the Fall River area, The wetland at the Highway 102/113 junction which has been identified in the Environmental Assessment of the Highway 113. At this point in the process, these are only identified as significant. No specific work has been done to measure the impacts. With the exception of those noted above, water crossings of the Highway 102 are limited to minor culverts.
- Horizontal and vertical road geometry which may need to be up-graded to provide a safe facility.
- Bridge structures. Age and size were documented to determine potential for additional lanes. There are a total of 29 existing bridge structures within the study area. The minimum design life requirement for new bridges for TIR is specified at a minimum of 75 years, without major rehabilitation. A number of bridges on Highway 102 were constructed in the early 1960's and will reach the estimated design life of 75 years in the horizon year of 2036 for this study. This is based on the assumption that the initial design of these structures was also 75 years. Other bridges located within the study area will reach their estimated design life within 10 to 15 years past the horizon year of this study. Therefore, many of these bridges will be in need of major repair or replacement by the horizon year of this study. Careful consideration will be required on the decision to widen or upgrade existing structures for which the design life may be exceeded within the next 20 to 30 years as compared to the replacement of existing bridges by new bridges with the required number of lanes both on Highway 102 or the crossing roads.

- Other built infrastructure and natural features: Existing power transmission lines and trunk municipal infrastructure (watermain and trunk sewers) may complicate the widening of the highway at specific locations. Rock outcrops were noted to be considered in the overall cost of an expanded facility.
- Active Transportation Paths / Bikeways were added to the plans based on the HRM Active Transportation Plan. This includes bikeways within the arterial roadways that cross the 102 as well as a few suggested locations for pedestrian over or underpasses.

The objectives for the development of the concept plans were established as follows:

- to provide sufficient capacity for horizon traffic
- to maximize safety features (correction of sub-standard features)
- to minimize environmental impact
- to avoid impact to developed properties
- to minimize property acquisition
- to minimize impact to other municipal and power infrastructure

## E-3 INFRASTRUCTURE NEEDS ASSESSMENT

This infrastructure needs analysis for the components of the corridor forms the crucial link between the planning and design tasks. The forecast demand volumes developed in Component 1 - were used as input to the infrastructure needs assessment task. In this task, the major corridor intersections were evaluated – using Highway Capacity Manual methodologies – to determine the number of lanes and auxiliary lanes required to accommodate the forecast demand.

The study area intersections (19 in total) were analyzed during the AM and PM peak hour for each of the 2016, 2026 and 2036 planning horizons and each of the three road network scenarios. Likewise, each ramp (approximately 50 in total) in the study area was evaluated.

The ramp volume forecasts are contained in ***Appendix E*** for each of the planning horizons. The findings of the intersection infrastructure needs and staging are illustrated in ***Appendix F***.

The following points should be considered when applying the findings of the Infrastructure Needs Assessment in any future work.

- The application of traditional 4-step transportation demand models - like the model used in this study – are intended to provide roadway link-level information for long-term strategic decisions. The use of detailed turning movement volumes from any model should consider their course level of findings.

- It is expected that the HRM Regional Plan will change and evolve over time. However, the transportation demand model is based on the current knowledge of land use and demographic information. Any future changes to the land use and demographic information will impact the transportation demand forecasts in the region.

- It must be noted that the intersection infrastructure needs analysis was carried out for individual intersections and did not review the upstream/downstream impacts of adjacent signals. Consideration of the impacts associated with adjacent intersections was discussed with the Project Steering Committee; however, the decision was made to move forward with the original workplan and only focus on individual intersections.

## E-4 TRAVEL DEMAND MANAGEMENT REVIEW

As part of Component 2, a strategic level review of HOV (High Occupancy Vehicle) lanes was undertaken. The objective of this analysis was to determine the feasibility of HOV lanes in the context of the Highway 102 Bayers Road corridor and determine the impact of the initial implementation at specific points in time within this study's future planning horizon. In examining the potential impacts of HOV lanes on the Highway 102 corridor, we applied the analysis technique outlined in NCHRP Report 365.

Some of the benefits typically associated with HOV lanes include:

- A travel time savings relative to general purpose lanes;
- An improved operational reliability relative to general purpose lanes;
- Move more people (not cars) relative to general purpose lanes;
- Increase the use of ride-sharing and public transit;
- Reduce the number of single-occupant vehicles;
- The potential to reduce overall vehicle emissions due to fewer single occupant cars on the road.

The strategic-level review of HOV lanes on Highway 102 was carried out using two specific and distinct concepts of HOV lane implementation – and their subsequent impact – in order to provide a range of findings. The first concept is an early implementation of HOV lanes that would occur at the time of widening the Highway 102 corridor to a 6-lane cross section – this is termed the add-a-lane scenario. The second concept examines the impact of implementing HOV lanes some period of time after the Highway 102 corridor has been widened to a 6-lane cross-section – this is termed the take-a-lane scenario.

The general findings of the review indicate that:

- The Highway 102 corridor is well suited to HOV lanes if implemented properly;
- Bayers Road is a potential candidate site and would complete an HOV corridor from Highway 102 onto the peninsula;
- If managed effectively, additional infrastructure in the corridor could be deferred - such as the need to widen to 8 lanes on Highway 102 between Joe Howe and Hwy 103;
- The success of HOV lanes would require constant management, enforcement, and performance monitoring and really requires a detailed region-wide, long-term vision for HOV lanes.

## E-5 DESIGN CRITERIA AND CONCEPTUAL PLANS

The primary objective of the study is to establish, at a conceptual level, the infrastructure required in the horizon year (year 2036). To this end, drawings were developed using

- the number of core lanes (determined in Component 1),
- the intersection and ramp requirements as well as
- Standard design criteria based on TIR and HRM have design guidelines as well as National Standards set by the Transportation Association of Canada

The drawings, encompassing over 30 kilometers of roadway, are included in ***Appendix I.*** The plans show a design of Bayers Road / Highway 102 with 6 core lanes from the peninsula to Exit 4, the Bedford interchange. From Exit 4 to Exit 5, the current 4-lane core lane design is maintained.

The Highway 102 right-of-way varies in width from approximately 90 to 100 meters. As observed from the mapping, most of Highway 102 has been constructed offset from the centerline of the right-of-way allowing more room on the inbound side for widening of the highway.

The typical cross-sections ***(Sheets 40-42, Appendix I)*** illustrate how the roadway would typically be widened. At locations where more than 6 lanes are required – for ramp approach lanes for example, most of the widening will need to occur on the inbound side to make use of the existing right-of-way.

*Bayers Road Concept Plans*

The corridor between Windsor Street to Joseph Howe Drive in Fairview is generally divided into four (4) distinct areas and each one has specific features and restrictions to widening. These four areas include:

- Section 1: Bayers Road from Windsor Street to Connaught Avenue which is an existing three lane street. From Windsor to Oxford, there may be potential to widen on the DND side, avoiding numerous properties on the south side. Between Oxford and Connaught any effects of widening would be felt on both sides of the roadway.
- Section 2: Bayers Road from Connaught Avenue to Romans Avenue. Widening would occur primarily on the inbound side. But retaining walls would be required to minimize property impacts.
- Section 3: Bayers Road from Romans Avenue to Ashburn Avenue this is where the arterial street transitions to an access controlled highway and where access to adjacent properties is very awkward and difficult as it exists now. This is a challenging area and two potential re-construction alternatives have been presented on ***Sheets 05a and 05b in Appendix I.*** The second alternative is a suggestion that was made by residents who attended the information sessions to bring the inbound lanes adjacent to the outbound lanes, which would cause less disruption to properties and improve access to the Ralston, Wellington Row properties by re-joining these streets to the larger residential neighbourhood.

- Section 4: Bayers Road from Ashburn Avenue to Joseph Howe Drive to Fairview. School Avenue in Fairview is tight up against the Highway on a steep grade. There is considered to be no potential for expansion along this side of the Highway. Widening is proposed for the opposite side of the highway (the Ashburn Golf Course side)

The Access Controlled Highway within the study area; from Joseph Howe Drive to Exit 5 is approximately 24 km in total length with a total of nine (9) existing interchanges with arterial roadways or other 100 series Highways. The following is a list of the existing and proposed interchanges within the study area. A detailed description of the changes at each interchange is included in ***Chapter 6***:

- Exit 0 -Highway 102/Joseph Howe Drive
- Exit 1A -Highway 102/Northwest Arm Drive
- Exit 1 - Highway 102/Highway 103
- Exit 2A - Highway 102/Lacewood Drive
- Exit 2 - Highway 102/Kearney Lake Road
- New Exit - Highway 102/Larry Uteck Drive
- New Exit - Highway 102/Highway 113
- Exit 3 - Highway 102/Hammonds Plains Road
- Exit 4 - Highway 102/Highway 1 (Bedford Highway) and Hwy 101
- New Exit - Highway 102/Highway 107
- Exit 4C - Highway 102/Glendale and Duke Street
- Exit 5 - Highway 102/Lake Thomas Drive

## E-6 HIGHWAY 107 CONNECTION TO HIGHWAY 102

It was recognized at the outset that a connection at Exit 4 would be challenging given the existing network and terrain in the area. A four-day working session (the Value Engineer (VE) session) was held with NSTIR and HRM staff to capitalize on the experience and knowledge of the full Project Team. Various draft conceptual design options were developed through this session where recognized value engineering concepts were applied to the task.

The full report for the VE session was submitted to NSTIR following the VE process. It is identified as ***Appendix J*** and bound separately. The following is a summary of the session and results. The Value Engineering (VE) session was facilitated by Delphi-MRC and Lewis & Zimmerman Associates, Inc on behalf of Stantec for NSTIR and HRM.

The goal of this VE workshop, was to develop and evaluate a series of potential interchange configurations to identify candidates to carry forward to a functional design stage. At the start of

the workshop, the VE team was presented with three interchange alternatives prepared by MRC. These alternatives were prepared to provide the VE team with a practical starting point upon which modifications could be made and alternate configurations could be explored.

Using the performance evaluation criteria and construction cost estimates developed during the VE workshop, the independent specialists of the VE Panel conducted a performance measurement review and prepared a detailed risk-based safety evaluation for each of the six scenarios developed during the VE workshop. The results of this evaluation are summarized in ***Exhibit E.1.***

*Exhibit E.1: Final Performance Evaluation Matrix*

| | Scenario Description | Total Performance | % Performance Improvement | Initial Cost ($ millions) | Value Index (Perf/Cost) | % Value Improvement |
|---|---|---|---|---|---|---|
| 1 | Initial Design Concept A - Base Case | 495 | ~ | 44.4 | 11 | ~ |
| 2 | Initial Design Concept B | 464 | -6% | 45.9 | 10 | -9% |
| 3 | Initial Design Concept C | 481 | -3% | 44.7 | 11 | -3% |
| 4 | Scenario 1: Alt DCB-22 Cloverstack/Roundabout | 227 | -54% | 90 | 3 | -77% |
| 5 | Scenario 2: Alt DCB-1A, Alt DCB-1B, and Alt DCB-7 | 339 | -32% | 60.8 | 6 | -50% |
| 6 | Scenario 3: Alt DCB-13 Cloverstack | 239 | -52% | 89.7 | 3 | -76% |
| 7 | Scenario 4: Alt DCC-8A Larger Ramp W of Hwy 102 | 582 | 18% | 65.2 | 9 | -20% |
| 8 | Scenario 5: Alt DCC-8B Variant of Scenario 6 | 465 | -6% | 77.1 | 6 | -46% |
| 9 | Scenario 6: Alt DCB-14 Collector Distributor & Loop ramps | 322 | -35% | 65.2 | 5 | -56% |

The performance criteria for each of the chosen VE design scenarios were compared to the original project performance rating to arrive at a total score. The difference between the score for each of the interchange design scenarios developed during the workshop (highlighted in green) and the score of the selected baseline concept (Alternative A) was expressed as a percentage. A positive value for the percent difference value indicates an improvement over the base case.

According to the criteria selection, weightings and the ratings established by the VE team, the project values are best achieved by the initial design Concept A (the base case). Of the design scenarios developed as part of the workshop, Scenario 4 provided improved performance with slightly degraded value due to a higher cost of implementation.

## E-7 PUBLIC INFORMATION SESSIONS

Public Information Sessions were held to explain the study and obtain information and feedback from local residents, businesses, and landowners. The public sessions were advertised in local newspapers. Elected officials were invited by letter or e-mail. Based on the concept plans, a number of property owners were identified who might be directly impacted by the work and were invited to the sessions by letter. As well, meeting notices were delivered door to door for residents in the Bayers Road area.

Prior to the sessions, the study team discussed the format of the sessions and considered separate sessions with only specific information for the Bayers Road area, and then other sessions specific to the Highway 102 and Highway 107 areas. However, it was decided to present the study as it was conducted – as a single corridor where changes to specific sections may have an influence on the whole. The intent was to relay to the public how the corridor areas were linked. The full study scope was presented in different geographic areas with the understanding that concerns expressed would be more local to the attendees at particular sessions. There was considerable criticism of this approach especially from the Bayers Road residents who generally felt that the Highway 102 and Highway 107 work was irrelevant to their concerns. This was considered in the review of comments received.

The following sessions were held:

**February Sessions**

- Wednesday, February 11, 2009 at the St. Andrew's Centre, 6955 Bayer's Road, Halifax, from 6pm to 9pm with a presentation at 6:30pm
- Thursday, February 12, 2009 at the LeBrun Community Centre, 36 Holland Avenue, Bedford, from 6pm to 9pm with a presentation at 6:30pm.

Following the February sessions, two additional sessions were conducted in response to requests for better coverage of the Sackville and Burnside areas.

**March Sessions**

- Wednesday, March 25, 2009 at the Sackville High School, 1 Kingfisher Way, Lower Sackville, from 6pm to 9pm with a presentation at 6:30pm
- Thursday, March 26, 2009 at the Park Plaza Hotel and Conference Centre, Ramada Plaza, 240 Brownlow Avenue, Dartmouth, from 4pm to 6pm.

From the questionnaires and comments received, it may be inferred that the public are generally commenting on opposite ends of the project (i) Bayers Road and (ii) Highway 107. As a result the questionnaires were collated to reflect this division. In effect the Bayers Road comments are collated as one unit (***Appendix K, Table K-1***) and the Highway 102 / 107 comments are collated as a separate unit (***Appendix K, Table K-2***)

The tables are a color-coded compilation of the responses to visually display the level of agreement or disagreement with the project. The pink color represents agreement and gray tone represents disagreement. The following observations are made:

- ***Table K-1*** shows responses 1-41, which were received at the February 11, 2009 meeting or shortly following the meeting. They are primarily residents of the Bayers Road area (including adjacent streets or peninsula residents)
    - Property impacts and Community Life are clearly the main concerns (76% and 52% respectively indicated this as their primary concern).
    - The majority of those who provided comments at the February 11th session disagreed with the project. It is assumed that this disagreement applies primarily to the Bayers Road component.
- ***Table K-2*** shows responses 42-63 which were received at the February 12, 2009 and the March 25, 2009 sessions are primarily Bedford and Sackville residents.
    - Health and Safety was indicated most often as the number one priority (47%)
    - The majority of those who provided comments at the February 12 2009 and March 25, 2009 sessions agree with the project.

As a result of the public input received and subsequent discussions with the steering committee, the following changes to the plans are considered appropriate:

- Revise the "transition area" of Bayers Road to bring the inbound lanes adjacent to the outbound lanes, which would cause less disruption to properties and improve access to the neighbourhood.
- Revise the Bayers Road design in the area of the Halifax Shopping Centre to provide for all widening on the outbound side of the road.

In addition to the above, careful consideration of the Highway 107 phase 1 is required. This phase would direct traffic directly to Glendale from the new Highway 107 and this has been identified as a primary concern.

## E-8 COSTING AND IMPLEMENTATION

*Property Impacts*

Property impacts at various areas in the corridor are discussed in **Chapter 6.0**, as a primary factor in the development of the concept design. The concept plans in ***Appendix I*** show the properties which may be impacted by construction. The approximate area of impact is shown on

the drawings. As well, individual properties are numbered. This information along with HRM GIS data base information was used to notify these property owners of the public information session as described in **Chapter 8.0**. An estimated 90 properties along the Bayers Road Corridor would be directly impacted by the construction. A further 42 properties along the Highway 102 corridor would be directly impacted.

*Approximate Costs*

Based on the functional designs that have been completed, the design team prepared an opinion of capital costs for the major components of construction. Costs are identified for each phase of the project, and identified in present day (2009) dollars. These are 'order of magnitude' conceptual level costs.

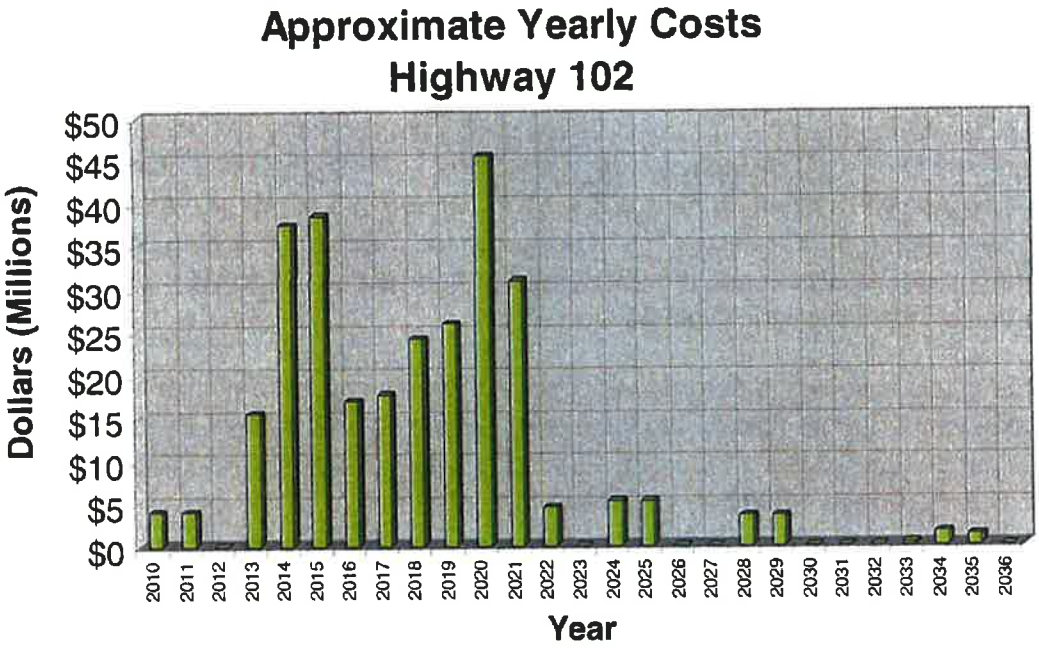
**Exhibit E.2 - Cost Summary Table**

| Section | Location | Approximate Cost |
|---|---|---|
| | BAYERS ROAD | |
| 1.0 | Bayers Road - Windsor Street to Connaught Avenue | $ 2,000,000 |
| 2.0 | Bayers Road - Connaught Avenue to Roman's Avenue | $ 4,000,000 |
| 3.0 | Bayers Road - Roman's Avenue To Ashburn Avenue (Transition Section) | $10,000,000 |
| | SECTION 4 | |
| 4.1 | Interchange: Joseph Howe Drive | $23,000,000 |
| 4.2 | Highway 102 from Joseph Howe Drive to Northwest Arm Drive | $ 5,000,000 |
| 4.3 | Interchange: Northwest Arm Drive | $11,000,000 |
| | SECTION 5 | |
| 5.1 | Highway 102 from Northwest Arm Drive to Highway 103 | $ 3,000,000 |
| 5.2 | Interchange: Highway 103 | $20,000,000 |
| | SECTION 6 | |
| 6.1 | Highway 102 from Highway 103 to Lacewood Drive | $13,000,000 |
| 6.2 | Interchange: Lacewood Drive | $ 3,000,000 |
| | SECTION 7 | |
| 7.1 | Highway 102 from Lacewood Drive to Kearney Lake Road | $14,000,000 |
| 7.2 | Interchange: Kearney Lake | $12,000,000 |
| | SECTION 8 | |
| 8.1 | Highway 102 from Kearney Lake Road to Larry Uteck Drive | $10,000,000 |
| 8.2 | Interchange: Larry Uteck Drive | $ 9,000,000 |
| | SECTION 9 | |
| 9.1 | Highway 102 from Larry Uteck Drive to Highway 113 | $ 7,000,000 |
| 9.2 | Interchange: Highway 113 | $11,000,000 |
| | SECTION 10 | |
| 10.1 | Highway 102 from Highway 113 to Hammonds Plains Road | $ 7,000,000 |
| 10.2 | Interchange: Hammonds Plains Road | $21,000,000 |
| | SECTION 11 | |
| 11.1 | Highway 102 from Hammonds Plains Road to Bedford Highway | $34,000,000 |
| 11.2 | Bedford Exit 4 Interchange (Option 1 Costing) | $38,000,000 |
| | SECTION 12 | |
| 12.1 | Highway 102 from Bedford Highway to Glendale Drive | $ 7,000,000 |
| 12.2 | Interchange: Glendale / Duke | $0 |
| 12.3 | Interchange: Highway 107 at Exit 4C (Option 1 Costing) | $14,000,000 |

| Section | Location | Approximate Cost |
|---|---|---|
| | SECTION 13 | |
| 13.1 | Highway 102 from Glendale to Trunk 2 | $ 8,000,000 |
| 13.2 | Interchange: Trunk 2 at Fall River | $ 6,000,000 |
| | Approximate Total Cost | $292,000,000 |

Based on the approximate costs for each component of the project and the projected timeline, the following ***Exhibit E.3*** shows the resulting yearly costs.

Exhibit E.3 Approximate Yearly Costs – Highway 102



## E-9 A COMPARATIVE REVIEW AND ULTIMATE CAPACITY FORECAST

Infrastructure upgrades to the Highway 102 / Bayers Road corridor were identified in the functional design workshop and the infrastructure needs assessment tasks. These upgrades were then incorporated into the design drawings. At the request of NSTIR the following tasks were carried out:

- The final upgrades were fed back into the transportation demand model. This yielded a new roadway model that reflected the final design and was termed the proposed ultimate lane configuration.
- The modeling software was then executed to determine an estimated point in time when the capacity of the corridor would be reached.

As expected there is a slight increase in demand with the proposed ultimate lane configuration network compared to the initial Scenario B roadway network. All of the midblock sections continue to function with a volume-to-capacity (v/c) ratio of less than 1.0 with the exception of the Joseph Howe-to-Northwest Arm Drive section during the weekday AM peak hour. This section is forecast to operate at capacity with a v/c ratio of 1.04 by the 2036 planning horizon. We recommend that this section of the corridor be monitored into the future. As discussed in earlier sections of this report there may be opportunities to defer the widening of the corridor beyond 6 lanes (three lanes in each direction) through the success of public transit initiatives or the introduction of high occupancy vehicle lanes.

The final step in this task was to determine the point in time when each section of the corridor may reach capacity – if there was residual capacity remaining. We applied an average growth rate of 1.6% per annum (based on the modeled traffic growth from 2001 to 2036) to calculate the results. The results are contained in ***Exhibit E.4***

*Exhibit E.4: Capacity timetable beyond 2036 using a 1.6% yearly growth*

| | 2036 Ultimate Lane Configuration | | | | | | |
|---|---|---|---|---|---|---|---|
| Description | AM Peak Volumes | PM Peak Volumes | Highest Volume | # of Basic Lanes | V/C Ratio | Years Beyond 2036 | Ultimate Year |
| Windsor - Connaught | 2400 | 1800 | 2400 | 2 | 0.67 | >20 | **>2056** |
| Connaught - Joe Howe | 4200 | 4100 | 4200 | 3 | 0.88 | 9 | **2045** |
| Joe Howe - NW Arm Dr. | 5000 | 4500 | 5000 | 3 | 1.04 | 0 | **2036** |
| NW Arm Dr - Hwy 103 | 4800 | 4100 | 4800 | 3 | 1.00 | 0 | **2036** |
| Hwy 103 - Lacewood | 3300 | 3200 | 3300 | 3 | 0.69 | >20 | **>2056** |
| Lacewood - Kearney Lake | 3900 | 3600 | 3900 | 3 | 0.81 | 14 | **2050** |
| Kearney Lake - Larry Uteck | 4000 | 4000 | 4000 | 3 | 0.83 | 13 | **2049** |
| Larry Uteck - Hwy 113 | 3000 | 3600 | 3600 | 3 | 0.75 | >20 | **>2056** |
| Hwy 113 - Hammonds Pl. | 3200 | 3500 | 3500 | 3 | 0.73 | >20 | **>2056** |
| Hammonds Pl. - Hwy 101 | 2500 | 3400 | 3400 | 3 | 0.71 | >20 | **>2056** |
| Hwy 101 - Duke/Glendale | 2200 | 2100 | 2200 | 2 | 0.61 | >20 | **>2056** |
| Duke/Hwy 107 - Tk 2 | 1200 | 1300 | 1300 | 2 | 0.36 | >20 | **>2056** |

This particular analysis is considered to be an academic exercise given the expected levels of uncertainty associated with very long term forecasting. As such, all results that extend beyond the 55 year horizon (more than 20 years after the year 2036) have not been specifically identified. Caution should be used when interpreting the results.

# 8.0 Public Information

## 8.1 INFORMATION SESSIONS

Public Information Sessions were held to explain the study and obtain information and feedback from local residents, businesses, and landowners. The public sessions were advertised in the Chronicle Herald, the Metro News, as well as the Burnside News. The project team members in attendance are listed in ***Table 8.1*** Elected officials as listed in ***Tables 8.2 and 8.3*** were invited by letter or e-mail. Based on the concept plans, a number of property owners were identified who might be directly impacted by the work and were invited to the sessions by letter. As well, meeting notices were delivered door to door for residents in the Bayers Road area.

Prior to the sessions, the study team discussed the format of the sessions and considered separate sessions with only specific information for the Bayers Road area, and then other sessions specific to the Highway 102 and Highway 107 areas. However, it was decided to present the study as it was conducted – as a single corridor where changes to specific sections may have an influence on the whole. The intent was to relay to the public how the corridor areas were linked. The full study scope was presented in different geographic areas with the understanding that concerns expressed would be more local to the attendees at particular sessions. There was considerable criticism of this approach especially from the Bayers Road residents who generally felt that the Highway 102 and Highway 107 work was irrelevant to their concerns. This was considered in the review of comments received.

The following sessions were held:

**February Sessions**

- Wednesday, February 11, 2009 at the St. Andrew's Centre, 6955 Bayer's Road, Halifax, from 6pm to 9pm with a presentation at 6:30pm
- Thursday, February 12, 2009 at the LeBrun Community Centre, 36 Holland Avenue, Bedford, from 6pm to 9pm with a presentation at 6:30pm.

Following the February sessions, two additional sessions were conducted in response to requests for better coverage of the Sackville and Burnside areas.

**March Sessions**

- Wednesday, March 25, 2009 at the Sackville High School, 1 Kingfisher Way, Lower Sackville, from 6pm to 9pm with a presentation at 6:30pm
- Thursday, March 26, 2009 at the Park Plaza Hotel and Conference Centre, Ramada Plaza, 240 Brownlow Avenue, Dartmouth, from 4pm to 6pm.

Stantec organized and conducted the sessions on behalf of NSTIR and HRM. Members of the consulting team as well as staff from NSTIR and HRM attended the sessions to answer questions.

The following people from the study team attended:

**Table 8.1 Project Team in Attendance**

| NSTIR and HRM | |
|---|---|
| Dwayne Cross | NSTIR, Steering Committee Chair |
| Mike Croft | NSTIR |
| Brian Ward | NSTIR |
| Dave McCusker | HRM |
| Consulting Team | |
| Bernadette Landry P.Eng. | Stantec Project Manager |
| James Copeland, P.Eng | Delphi – MRC Traffic Analysis Manager |
| Patrick Chouinard, P.Eng | Stantec Highway Design Technical Advisor |
| Gerry Boulos | Stantec Presenter |

**Table 8.2 Provincial MLAs Invited**

| | |
|---|---|
| Barry Barnet | Hammonds Plains – Upper Sackville |
| Len Goucher | Bedford – Birch Cove |
| David Wilson | Sackville - Cobequid |
| Graham Steele | Halifax, Fairview |
| Howard Epstein | Halifax, Chebucto |
| Percy Paris | Waverly – Fall River – Beaver Bank |
| Diana Whalen | Halifax, Clayton Park |
| Trevor Zinck | Dartmouth North |

**Table 8.3 Halifax Regional Municipality Councilors Invited**

| | |
|---|---|
| Steve Streatch | Dist 1 |
| Barry Dalrymple | Dist 2 |
| David Hendsbee | Dist 3 |
| Lorelei Nicoll | Dist 4 |
| Gloria McCluskey | Dist 5 |
| Andrew Younger | Dist 6 |
| Bill Karsten | Dist 7 |
| Jackie Barkhouse | Dist 8 |
| Jim Smith | Dist 9 |
| Mary Wile | Dist 10 |
| Jerry Blumenthal | Dist 11 |
| Dawn Sloane | Dist 12 |
| Sue Uteck | Dist 13 |
| Jennifer Watts | Dist 14 |
| Russell Walker | Dist 15 |
| Debbie Hum | Dist 16 |

| | |
|---|---|
| Linda Mosher | Dist 17 |
| Stephen Adams | Dist 18 |
| Brad Johns | Dist 19 |
| Bob Harvey | Dist 20 |
| Tim Outhit | Dist 21 |
| Reg Rankin | Dist 22 |
| Peter Lund | Dist 23 |

## 8.2 PRESENTATION MATERIAL

The presentation material at all the sessions included:

- The Bayers Road / Highway 102 concept drawings as presented in ***Appendix I*** of this report including:
    - 1:1000 scale functional design drawings for Bayers Road showing the existing as well as the ultimate build out for the facility in the 2036 horizon year.
    - 1:5000 scale functional design drawings for the Bayers Road - Highway 102 Corridor showing the existing as well as the ultimate build out for the facility (2036 horizon year). These plans showed the existing as well as the proposed configuration of each interchange and intersection within the corridor.
    - Constraints plans as contained in ***Appendix B*** of this report.
- Design drawings for the new Highway 107 Extension (included in the component 3 report) including:
    - 1:5000 scale functional design drawings for the new Highway 107 Extension showing the ultimate build out for the facility in the 2036 horizon year and the proposed connections at Highway 102
    - Constraints plans showing developed land and natural features
    - 1:5000 scale functional design drawings for the new Highway 107 Extension showing the proposed three phases to achieve the ultimate build-out.

In addition to the functional plans, a fact sheet explaining the purpose of the study and the results of the traffic analysis was available for distribution to attendees. Questionnaires were available for attendees to voice their opinion. Samples of the fact sheet, questionnaires and letters of invite are in ***Appendix K.*** In addition to the maps presented a power-point presentation was made to explain the purpose and process of the study. A copy of the presentation slides is also in ***Appendix K***. Following the power-point presentation; the attendees had an opportunity to ask questions of the study team.

## 8.3 SUMMARY OF FEBRUARY 11, 2009 SESSION

For the February 11th session (the Bayers Road meeting) there were 143 persons who signed the guest book. The vast majority were from the immediate Bayers Road neighbourhood or the peninsula. From those who indicated their address on the guest book, more than 90% were from the peninsula. Our greeters at the door provided each attendee with a fact sheet, map and questionnaire, which were collected at the end of the session. The following is a summary of the feedback received:

Hard – Copy Comment Sheets Received

- 18 comment sheets were deposited in the box at the Information Session on February 11, 2009.
- An additional 21 comment sheets were later mailed or faxed to Stantec. Of the comment sheets that were mailed, only 2 were from the Bedford / Sackville area. The rest were from the Bayers Road area. Therefore, it can be assumed that most of the mailed-in or faxed comments were from people who attended the Bayers Road meeting (February 11th meeting). Therefore, approximately 37 out of the 143 persons attending the February 11th session provided written comments (26%).
- The comment sheet responses are summarized in ***Table K-1*** in ***Appendix K***. Responses 1 through 41.

Question and Answer Periods

- 24 persons presented their concerns and / or asked questions of the panel at the meeting.
- The comments and questions are summarized in ***Appendix K***.

Some Key Concerns Expressed / Questions Asked

- Comment: *The presentation was far too technical for the audience.*
- Comment: *The presentation should be focused on Bayers Road only.*
- **Q: *How are property owners who would be directly impacted by the construction compensated?***
  **A:** Homeowners would receive a sum per square foot for their property as a sum for injurious affection. Both HRM and NSTIR have a process that is followed for the purchase of properties or partial properties.
- ***Q: What about compensation for properties in the vicinity that are not directly impacted by construction?***
  **A:** Homeowners that are not directly impacted will not be compensated for a reduction in property values due to the project.

- ***Q: What is the timeline for construction?***
  **A:** The study estimates the time when expansions in certain sections of the study area would be required based on growth projections. However, when projects are done depends on many more factors including funding and political decisions. No funding for Bayers Road / Highway 102 projects is allocated for the next five years.

- ***Q: What happens after this study?***
  **A:** The study has been done to provide a framework for future and on-going work – including further study for more localized areas. For example, the Larry Uteck interchange is now being planned and designed and the results of this study feed into the planning of that connection.

- **Q*: What is the cost of construction?***
  **A:** Approximate (ball park) costs for the construction will be included in the final reports.

- **Q*: Why not improve transit instead of widening Bayers Road?***
  **A:** This study accounts for a percentage of transit ridership. This is based on what was included in the Regional Plan which includes a significant projected increase in transit ridership. As well, HRM has allocated funding for transit initiatives.

- **Q*: What is the impact of allowing more traffic on the peninsula? Where will they park?***
  **A:** The Regional Plan allows for employment growth on the peninsula. As well the Regional Plan allows for a population growth of 18,000 on the peninsula.
  The employment growth on the peninsula results in more trips to the peninsula. Following the regional planning exercise, the previous plan to expand other roadways was changed. However, the need to widen Bayers Road was not changed and has always been part of the Regional Plan. On the peninsula, beyond Bayers Road, the 25 year planning indicates that existing roads have adequate lane capacity, notwithstanding that localized expansions may be required (such as turning lanes, etc.).

- **Q*: What about the increase in greenhouse gasses due to the increase in traffic? Has this been considered?***
  **A:** The study has not included an analysis of green house gas emissions. However, the regional plan has studied this. The long term projected increase in transit ridership results in an over reduction in greenhouse gasses.

- **Q*: Congestion is not so bad, so why is this project required?***
  **A:** The widening is not intended to reduce existing travel times or improve the flow of traffic. The expansion in the future is required to maintain the current level of service so conditions do not degrade further.

- ***Q: What about Pedestrian, Bicycles, Community and Neighbourhood Issues?***
  **A:** The Study focused on vehicular traffic to determine the lanes required in the corridor. Pedestrian, bicycle and neighborhood access issues were addressed at a high level and

included grade separated pedestrian crossings at Romans Avenue and other locations along Highway 102 as were suggested in HRM's Active Transportation Plan. It is acknowledged that additional work will be required at a more detailed level to address these issues. This is a concept level study.

## 8.4 SUMMARY OF FEBRUARY 12, 2009 SESSION

At the February 12th session, 31 persons signed the guest book. The majority of these attendees were from the Bedford and/or Sackville area. Again, our greeters at the door provided each attendee with a fact sheet, map and questionnaire, which were collected at the end of the session.

Hard – Copy Comment Sheets Received

- 9 comment sheets were deposited in the box at the Information Session on February 12, 2009.
- The comment sheet responses are summarized in ***Table K-2*** in ***Appendix K***.

Question and Answer Periods

- 24 persons presented their concerns and / or asked questions of the panel.
- The comments and questions are summarized in ***Appendix K***.

Some Key Concerns Expressed / Questions Asked (in addition to February 11, 2009 list)

- ***Q: The Burnside Bypass is needed and overdue, but the phasing is a concern. Why not go directly to Phase 3?***
  **A:** the phasing will make this a better candidate project for funding

- **Q:** ***Is the Atlantic Gateway motivating this?***
  **A:** The current plan is to locate an inland terminal close to the proposed Akerley interchange. The new roadway would provide service to Halifax Inland Terminal

- **Q:** ***The money for highways should be spent on paths and bikeways. Will there be a walkway?***
  **A:** Details for trails and pedestrian access have note been worked out yet, but it is anticipate that the new highway 107 will include a multi-purpose trail in the corridor.

## 8.5 SUMMARY OF MARCH 25, 2009 SESSION

At the March 25, 2009 session, 43 persons signed the guest book. The majority of these attendees were from the Bedford, Sackville or Fall River areas. Attendees were provided with a fact sheet, map and questionnaire, which were collected at the end of the session.

Hard – Copy Comment Sheets Received

- 12 comment sheets were deposited in the box at the Information Session on March 25, 2009.
- The comment sheet responses are summarized in ***Table K-2*** in ***Appendix K.***

Question and Answer Periods

- 13 persons presented their concerns and / or asked questions of the panel.
- The comments and questions are summarized in ***Appendix K.***

Some Key Concerns Expressed / Questions Asked

- **Q:** ***Natural areas adjacent to Highway 102 should be preserved.***
  **A:** There are private landowners adjacent to the Highway, where preservation of the natural features may not be possible. There is some opportunity to preserve lands in the Kearney Lake area.
- ***Q: How much traffic can the lights at Glendale handle? Where is the majority of traffic projected to go?***
  **A:** There are two sets of lights. The supplementary modeling looked at this. Based on the model, the system reaches capacity by year 2026.
  The majority of traffic is projected to take the 107 to the 102 and then to the 101.
- **Q.** ***What about the option to take the 107 directly into the cloverleaf – exit 4. Much of the traffic is going to the 101. What about the 107 connecting to the Bedford Bypass?***
  **A:** Extensive exercise was undertaken to look at this option. The connection to Exit 4 would be a very complicated, 3 level interchange. A technically suitable connection was not achieved in the study

## 8.6 SUMMARY OF MARCH 26, 2009 SESSION

The format of the March 26, 2009 session was changed from the three preceding sessions. Since representatives of the business community were expected, the session was held as an open house from 4pm to 6pm. Forty-four persons signed the guest book. While there was no formal presentation, the power-point, as well as all the display material, was available. Attendees were also provided with a fact sheet, map and questionnaire. There were no written comments received at this session. Most of the attendees were interested in the new Highway 107 construction and considered it a benefit for the Burnside area.

## 8.7 QUESTIONNAIRE RESULTS

### 8.7.1 Format of the Questionnaire

The questionnaire was developed based on a format used by NSTIR for past projects. The form is included in ***Appendix K.*** The following was on the form:

- Asked attendees to rank their priorities with respect to Local Business, Natural Resources, Community Life, Property, Environment, Health and Safety
- Provided 6 statements with respect to the project and asked attendees to indicate agreement or disagreement with the statements.
- Provided 3 statements regarding the public session in order to gauge the success of the session in relaying the study information.
- Provided opportunity to provide additional comments

### 8.7.2 Questionnaire Results

As previously noted, the study team gave consideration to presenting only individual components to individual communities, However, it was decided to present the study as it was conducted – as a single corridor, which was not received well by the Bayers Road community. This may be considered a lesson learned. Also from the questionnaires and comments received, it may be inferred that the public are commenting on essentially opposite ends of the project (i) Bayers Road and (ii) Highway 107. As a result the questionnaires were collated to reflect this division. In effect, the Bayers Road comments are collated as one unit (***Table K-1***) and the Highway 107 comments are collated as a separate unit (***Table K-2***)

The tables are a color-coded compilation of the responses to visually display the level of agreement or disagreement with the project. The pink color represents agreement and gray tone represents disagreement. The following observations are made:

- ***Table K-1*** shows responses 1-41, which were received at the February 11, 2009 meeting or shortly following the meeting. They are primarily residents of the Bayers Road area (including adjacent streets or peninsula residents)
    - Property impacts and Community Life are clearly the main concerns (76% and 52% respectively indicated this as their primary concern).
    - The majority of who provided comments at the February 11$^{th}$ session disagreed with the project. It is assumed that this disagreement applies primarily to the Bayers Road component.

- ***Table K-2*** shows responses 42-63 which were received at the February 12, 2009 and the March 25, 2009 sessions are primarily Bedford and Sackville residents.
    - Health and Safety was indicated most often as the number one priority (47%)
    - The majority of those who provided comments at the February 12, 2009 and March 25, 2009 sessions agree with the project.

## 8.8 SUMMARY

As a result of the public input received and subsequent discussions with the steering committee, the following changes to the plans are considered appropriate:

- Revise the "transition area" of Bayers Road to bring the inbound lanes adjacent to the outbound lanes, which would cause less disruption to properties and improve access to the Ralston, Wellington Row properties by re-joining these streets to the larger residential neighbourhood.
- Revise the Bayers Road design in the area of the Halifax Shopping Centre to provide for all widening on the outbound side of the road.

In addition to the above, careful consideration of the Highway 107 phase 1 is required. This phase would direct traffic directly to Glendale from the new Highway 107 and this has been identified as a primary concern.

TABLE K-2

| Response No. | PRIORITIES | | | | | | C1 | C2 | C3 | C4 | C5 | C6 | D1 | D2 | D3 | Source |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Local Business | Natural Resources | Community Life | Property | Environment | Health and Safety | Corridor studied as one unit is good idea | Congestion at some locations in the corridor is having a negative affect on health and safety | Expansion will have positive impact on health and Safety, Community | Expansion will have positive impact on Economy | Expansion will improve health and safety conditions | Expansion will degrade health and safety conditions | Presentation at Start was useful | Session was well organized | There was sufficient background info | Mailbox / Radio / Newspaper / Friend |
| 42 | 6 | 4 | 1 | 5 | 3 | 2 | Agree | Agree | Agree | Agree | Somewhat Agree | Somewhat Agree | Agree | Agree | Agree | Radio |
| 43 | - | - | - | - | - | - | Agree | Disagree | Agree | - | - | - | - | - | - | - |
| 44 | 3 | 6 | 1 | 5 | 2 | 4 | Agree | Agree | Agree | Somewhat Agree | Agree | Neutral | Agree | Somewhat Disagree | Agree | Other Person |
| 45 | 5 | 3 | 2 | 4 | 1 | 5 | No Opinion | Neutral | Disagree | No Opinion | No Opinion | No Opinion | Agree | Agree | Disagree | Other Person |
| 46 | 6 | 4 | 2 | 5 | 3 | 1 | Agree | Agree | Agree | Agree | Agree | Somewhat Agree | Agree | Somewhat Agree | Somewhat Agree | Newspaper |
| 47 | 6 | 4 | 2 | 5 | 3 | 1 | Somewhat Agree | Agree | Agree | No Opinion | Agree | No Opinion | Agree | Agree | Agree | Newspaper |
| 48 | 6 | 3 | 4 | 5 | 2 | 1 | Neutral | Agree | Somewhat Agree | Agree | Agree | Agree | Agree | Somewhat Agree | Neutral | Radio |
| 49 | - | 1 | 1 | - | 1 | - | Agree | Agree | Neutral | Neutral | Somewhat Agree | Neutral | Agree | Agree | Somewhat Agree | Newspaper |
| 50 | 5 | 4 | 3 | 6 | 1 | 2 | Agree | Somewhat Agree | Disagree | Somewhat Disagree | Somewhat Agree | Somewhat Agree | Agree | Somewhat Agree | Somewhat Agree | Newspaper |
| 51 | 5 | 4 | 2 | 6 | 3 | 1 | - | Agree | Somewhat Agree | Agree | Agree | Somewhat Agree | Agree | Somewhat Agree | Agree | Other Person |
| 52 | 3 | 5 | 2 | 6 | 4 | 1 | Agree | Agree | Agree | Agree | Agree | Disagree | Agree | Agree | Agree | Other Person |
| 53 | 4 | 6 | 1 | 5 | 2 | 3 | Agree | Agree | Agree | Agree | Agree | Somewhat Agree | Somewhat Agree | Somewhat Agree | - | Newspaper |
| 54 | 6 | 2 | 3 | 5 | 1 | 4 | No Opinion | No Opinion | Disagree | No Opinion | No Opinion | Agree | Agree | Agree | Agree | Other Person |
| 55 | - | - | - | - | - | - | Agree | - | - | - | - | - | Agree | Agree | Disagree | Newspaper |
| 56 | 2 | 6 | 3 | 4 | 5 | 1 | Disagree | Agree | Agree | Agree | Agree | Disagree | Agree | Neutral | Somewhat Agree | Newspaper |
| 57 | - | - | - | - | 1 | - | Agree | Somewhat Agree | Agree | Somewhat Agree | - | - | Agree | Somewhat Agree | Somewhat Agree | Newspaper |
| 58 | 6 | 1 | 3 | 5 | 2 | 4 | Somewhat Disagree | Neutral | Somewhat Disagree | Somewhat Agree | Somewhat Agree | Somewhat Agree | No Opinion | Somewhat Agree | Somewhat Agree | Other Person |
| 59 | 3 | 5 | 2 | 4 | 6 | 1 | Agree | Neutral | Agree | Agree | Agree | Neutral | Agree | Agree | Agree | Newspaper |
| 60 | 6 | 1 | 1 | 6 | 1 | 1 | Neutral | Somewhat Agree | Somewhat Disagree | Agree | Agree | Agree | Agree | Agree | Agree | - |
| 61 | 1 | 4 | 6 | 5 | 2 | 3 | Neutral | Agree | Agree | Agree | Agree | Disagree | - | - | - | - |
| 62 | 1 | 6 | 4 | 3 | 5 | 2 | Disagree | Agree | Agree | Agree | Agree | Somewhat Agree | No Opinion | Somewhat Agree | Somewhat Agree | Newspaper |
| 63 | 5 | 4 | 2 | 6 | 3 | 1 | Agree | Agree | Somewhat Agree | Somewhat Agree | Somewhat Agree | Neutral | - | Somewhat Agree | Neutral | Other Person |
| | | | | | | | | | | | | | | | | |
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| | | | | | | |
|---|---|---|---|---|---|---|
| Total Responses | 19 | 20 | 20 | 19 | 21 | 19 |
| 1st Priority Indicated | 11% | 15% | 25% | 0% | 29% | 47% |

| | | | | | | | | | | Average |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Responses | 21 | 22 | 22 | 21 | 20 | 19 | 21 | 21 | 20 | 21 |
| % Negative wt Study and Results | 14% | 5% | 23% | 5% | 0% | 42% | 0% | 5% | 10% | 11% |
| % Positive wt Study and Results | 62% | 77% | 73% | 76% | 90% | 26% | 90% | 90% | 80% | 74% |
| % Neutral / No Opinion | 24% | 18% | 5% | 19% | 10% | 32% | 10% | 5% | 10% | 15% |

From: Cross, Dwayne
Sent: Tuesday, September 16, 2014 2:03 PM
To: Fitzner, Bruce; Hackett, Peter; Ward, Brian; Miles-Dunn, Bonnie L; Boddy, Keith W
Cc: Dennis, Darren T; MacKenzie, Stephen M
Subject: Hwy 107 - Duke Street stakeholder meeting

On September 12th, Darren Dennis, Keith, and I met with several of the business representatives fronting Duke Street and Mann Street. See attached plan.

Business representation at the meeting included Strescon, Wilson's Fuel, Kel-Ann Organics, Allstar Rebar, Larex Properties (the Bird Building), Braemar Pest Control, Fraserway RV, First Mutual Property (Holcim, and speaking on behalf of the concrete plants), Halifax Water, Goodwood Fuels. I estimate about 80% turnout was received.

A summary of concerns as expressed:

- How will a triaxle tractor trailer be able to exit their driveway if the raised median is present?

- Will be difficult to swing right from exiting driveway on Duke Street.

- To make a right turn and U-turn to go the way you want to go is ludicrous.

- U-turn and right turns might be ok for cars and trucks, but not for the volume of industrial traffic in the area.

- Will be a 30 minute wait to make a U-turn (because of the increase in traffic volumes). Concrete/cement trucks pull out very slow, will not be able to find a break in traffic.

- Afternoon peak hour will be the most challenging time of day.

- How will my business impacts be reduced (customers may go elsewhere for their product).

- Girders up to 200 feet long and Dexter's bag house need to be accommodated all along Duke St.

- Rocky Lake Road is currently a truck restricted road, and removing this restriction might help. This comment was also suggested for periods during construction when congestion and delays are occurring on Duke Street.

- 20 Duke St, the Bird Building: concerns for loss of customer parking at the front, loss of aesthetically pleasing landscaping at the front, relocation of pylon sign required. Consider shifting roundabout to impact other side of Duke Street.

Outcomes:

- Detailed traffic modelling was offered to ease some of the concerns. This offer was welcomed by some of the attendees.
- Swept path modelling of large vehicles, equipment, and girders was requested.
- The design might result in upgrades to driveways to accommodate new swept paths in and out of businesses.
- Alternate routing from Duke Street to Rocky Lake Road needs to be considered.
- Cement distribution owner wants to take staff for a drive to appreciate the challenges.

Dwayne