



GEMTEC

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Appendix H VEC Heritage and Archaeological Resources

TABLE OF CONTENTS

1.0 RATIONALE FOR THE VALUED ENVIRONMENTAL COMPONENT (VEC) 1

2.0 BOUNDARIES FOR THE ENVIRONMENTAL EFFECTS ASSESSMENT 2

 2.1 Spatial Boundaries 2

 2.2 Temporal Boundaries 2

3.0 METHODOLOGY 3

4.0 DESCRIPTION OF EXISTING ENVIRONMENT 4

5.0 SUMMARY OF POTENTIAL EFFECTS 5

 5.1 Construction Phase Potential Effects 5

 5.2 Operational and Maintenance Phase Potential Effects 5

 5.3 Accidents, Malfunctions and Unplanned Events 5

6.0 PROPOSED MITIGATION MEASURES 6

7.0 SUMMARY OF POTENTIAL SIGNIFICANT RESIDUAL EFFECTS 8

8.0 REFERENCES 9

LIST OF TABLES

Table H-1 Summary of Mitigation Measures for Archaeological and Heritage Resources 7

LIST OF ATTACHMENTS

- H-1 Archeological Assessment Report (Desktop + Pedestrian Survey)
- H-2 Archeological Assessment Report (Test Pitting)

1.0 RATIONALE FOR THE VALUED ENVIRONMENTAL COMPONENT (VEC)

Archaeological resources are considered as material remains of past human activity which are of a historical, cultural or scientific interest, while heritage resources are considered natural or cultural features that have been recognized for heritage values (Parks Can, 2017). Any project that involves the disturbance of surface or sub-surface ground should be considered for archaeological and heritage resources. In New Brunswick, streams and rivers have historically been used for food gathering, water resources and transportation. As such, the lands on both sides of the Northwest Miramichi River and Oxford Brook/Jones Cove have an elevated potential for archeological and/or heritage resources.

2.0 BOUNDARIES FOR THE ENVIRONMENTAL EFFECTS ASSESSMENT

2.1 Spatial Boundaries

The assessment of archaeological and heritage resources has been completed for two spatial boundaries:

- The Project Area is defined as footprint of ground disturbance required for the Project activities (PID 40381345, 40381337, 40437121, 40445330, 40495780, 40164808, portion of 40163826, portion of 40143083, portion of 40336240, and portion of 40437139) as presented in Figure H-1; and
- The Assessment Area which is defined as the originally envisioned project area and encompasses the Project Area and PID 40064198 and PID 40141814 and the entire footprint of PID 40143083 (Figure H-1).

2.2 Temporal Boundaries

The assessment of the archaeological and heritage resources has been completed for the following temporal boundaries:

- The construction phase of the Project; and
- The operational and maintenance phase of the Project.



Legend

- PROPERTY LINE
- PROJECT AREA
- ASSESSMENT AREA

Key Map

PROJECT AREA

1:150000

Note

1. THIS DRAWING IS A SCHEMATIC REPRESENTATION. SIZES, LOCATIONS AND DIMENSIONS ARE APPROXIMATE.

Drawn By	CHG	Checked By	JH
Calculations By	---	Checked By	---

Date
JUNE 2018

Project
EIA - NORTHWEST MIRAMICHI RIVER
NO.1 ANDERSON BRIDGE REPLACEMENT

Drawing
ARCHAEOLOGICAL ASSESSMENT
SPATIAL BOUNDARIES

Scale
1:7500

File No. 69214403	Drawing FIGURE H-1	Revision No. 0
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3.0 METHODOLOGY

A three-pronged approach was used to determine the existing archaeological and heritage resources conditions and any potential interactions with the Project, including:

- A desktop study of all existing information for archaeological and heritage resources within the Assessment Area;
- A pedestrian survey, to determine the extent of any heritage or archaeological features within the Assessment Area; and
- Preliminary archaeological test pitting, to determine the presence of any buried archaeological remains, and to confirm the reported surficial geology within the Project Area.

With respect to the Environmental Impact Assessment (EIA) process, interactions or effects of the Project on the archaeological and heritage resources have been identified and are discussed. When residual effects are anticipated, the proposed methods for mitigating the potential effects have been presented.

Jason Jeandron, M.Phil. of Archaeological Prospectors was retained by GEMTEC to complete the desktop and field components of this VEC. The pedestrian survey was completed on October 7, 2017 and the preliminary test pitting was completed on November 21, 2017.

4.0 DESCRIPTION OF EXISTING ENVIRONMENT

Findings of the desktop study and pedestrian survey showed that a portion of the Assessment Area is considered to be an area of high potential for archaeological significance. Excluded from this conclusion are areas located beneath existing roadway beds and embankments. It was determined that the proximity of the Project Area to the shoreline of the Northwest Miramichi River and Oxford Brook/Jones Cove provided an elevated potential for use by Indigenous ancestors. Additionally, quartz flakes and cores were observed within the Assessment Area, and are likely the result of Indigenous flintknapping in the prehistoric period. A report detailing these findings is presented in Attachment H-1.

Following the archaeological pedestrian survey of the Assessment Area, a preliminary archaeological test pitting survey was conducted within the Project Area. At the request of New Brunswick Department of Transportation and Infrastructure (NBDTI), several test pits were excavated on the west side of the existing Route 8 and bridge. The test pits were situated approximately 50 metres apart, and dug to a maximum depth of 1 metre (Figure 2, Attachment H-2). An additional quartz flake was recovered during the test pitting activities. The surficial geology in the excavated pits revealed marine deposits, confirming that the area has high potential for the presence of archeological sites. A report detailing the findings of the test pitting survey are presented in Attachment H-2.

More detailed test pitting is planned to be carried out during the spring and summer of 2018. The locations and density of the test pits will be determined in consultation with the Archaeological Services Branch of the New Brunswick Department of Tourism, Heritage and Culture (NBDTHC).

5.0 SUMMARY OF POTENTIAL EFFECTS

Potential effects to archaeological and heritage resources are detailed in the following subsections during the construction, operational and maintenance phases of the Project.

5.1 Construction Phase Potential Effects

Potential effects to archaeological and heritage resources as a result of the construction phase of the Project are possible as the Project Area is an area of high potential for archaeological findings and significance, as per the conclusions of Archaeological Prospectors. Vegetation clearing, ground disturbance and/or excavation may interfere with surface and sub-surface heritage and archeological resources within the Project Area.

5.2 Operational and Maintenance Phase Potential Effects

Potential effects to archaeological and heritage resources as a result of the operational and maintenance phase of the Project are unlikely as no ground disturbance outside of the final footprint is anticipated during this phase.

5.3 Accidents, Malfunctions and Unplanned Events

There is the potential for accidents to occur during all phases of the Project. Accidents that may impact heritage and archeological resources within the Project Area, including:

- Fire; and
- Accidental release of chemicals or petroleum products (*i.e.*, excavation of contaminated soil).

6.0 PROPOSED MITIGATION MEASURES

The potential effects, standard NBDTI Environment Management Manual (EMM) mitigation measures and any additional mitigation measures, recommended by GEMTEC in order to minimize the potential effects to archaeological and heritage resources during the construction, operational and maintenance phase of the Project are summarized in Table H-1.

Additionally, Archaeological Prospectors recommends that more extensive archaeological test pitting be conducted prior to the commencement of construction activities. This more extensive test pitting campaign is planned for the spring and summer of 2018. A comprehensive archaeological test pitting report will be provided under separate cover once the field testing is complete, in the summer or fall of 2018.

Table H-1 Summary of Mitigation Measures for Archaeological and Heritage Resources

VEC	Summary of Potential Effects	Standard NBDTI EMM Mitigation Measures ¹	Additional Recommended Mitigation Measures
Construction Phase			
Archaeological and Heritage Resources	<ul style="list-style-type: none"> • Ground disturbance could alter or destroy archeological artifacts. 	<ul style="list-style-type: none"> • 5.23 Working Near Environmentally Sensitive Areas. 	No additional mitigation measures are recommended by GEMTEC.
Accidents, Malfunctions and Unplanned Events			
Archaeological and Heritage Resources	<ul style="list-style-type: none"> • Fire; and • Accidental release of chemicals or petroleum products (<i>i.e.</i>, excavation of contaminated soil). 	<ul style="list-style-type: none"> • 5.10 Fire Prevention and Contingency; • 5.12 Spill Management; • 5.13 Storage and Handling of Petroleum Products; and • 5.14 Storage and Handling of Other Hazard Materials. 	No additional mitigation measures are recommended by GEMTEC.

1. Indicates the section of the EMM document where written mitigation measures are presented for each component.

7.0 SUMMARY OF POTENTIAL SIGNIFICANT RESIDUAL EFFECTS

A residual effect to the heritage and archeological resources VEC is considered to be the permanent alteration or destruction of any archaeological artifact or heritage structure(s), location, and/or landscape within the Project Area. In the event that the identified feature is unique to the community, or is known to be rare, the residual effect would be considered significant.

The Project Area has been identified as an area of high potential for archaeological findings and significance. The construction phase of the Project may result in the disturbance and/or destruction of heritage and archeological resources. Currently, this interaction is considered to be non-significant as proposed mitigation measures will minimize any adverse effects. The test pitting campaign that is planned for the spring and summer of 2018 will be extensive. Depending on the findings of that survey, additional mitigation measures relative to construction, operation and maintenance activities may be required. The findings and potential mitigation measures will be discussed with the Archaeological Services Branch of the NBDTHC.

8.0 REFERENCES

Archaeological Assessment of a Proposed Bridge Replacement in Miramichi City, NB. October 2017. Archaeological Prospectors.

Archaeological Assessment of a Proposed Bridge Replacement in Miramichi City, NB. November 2017. Archaeological Prospectors.

New Brunswick Department of Environment and Local Government (NBDELG). 2012a. A Guide to Environmental Impact Assessment in New Brunswick. April 2012.

New Brunswick Department of Transportation (NBDOT). 2010. Environmental Management Manual.

Parks Canada (Parks Can). 2017. Directory of Federal Heritage Designations. Accessed April 12, 2018. Website: <https://www.pc.gc.ca/en/culture/dfhd/glossaire-glossary#H>



ATTACHMENTS

H-1 - Archaeological Assessment Report (Desktop + Pedestrian Survey)

**Archaeological Assessment of a Proposed Bridge Replacement in Miramichi
City, NB**

Permit #: 2017 NB 127

Prepared for

Gemtec Limited

by

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10/10/17



ABSTRACT

On October 7th, 2017, an archaeological pedestrian survey took place at properties around Anderson Bridge in Miramichi City, NB. The pedestrian survey was undertaken to identify any extant heritage/archaeological features of significance, any visible significant artifacts or if any potential exists for the presence of buried archaeological sites.



TABLE OF CONTENTS

ABSTRACT	i
LIST OF FIGURES	iii
INTRODUCTION	1
PREVIOUS RESEARCH	2
METHODS	3
RESULTS	4
CONCLUSIONS & RECOMMENDATIONS	6



LIST OF FIGURES

Figure 1: Approximate location of the proposed bridge replacement (circled in red).

Figure 2: Assessment areas outlined in red.

Figure 3: LiDAR data of project area.

Figure 4: Surficial geology map of the region (Rampton, Paradis & Smith 1981).

Figure 5: Anderson Bridge (from south side of river, facing east).

Figure 6: The shoreline assessed on the north side of the Northwest Miramichi River.

Figure 7: The shoreline assessed on the south side of the Northwest Miramichi River.

Figure 8: Archaeological site identified on north side of river, west of bridge.

Figure 9: Upper end of Jones Cove on north side of river, west of bridge.

Figure 10: Circular depression (former well?) on the south side of river, west of bridge.

Figure 11: Open forest on south side of river, west of bridge.

Figure 12: Artifacts recovered from the north side of the Northwest Miramichi River.

Figure 13: Artifacts recovered from the south side of the Northwest Miramichi River.

Figure 14: Approximate location of area where artifacts were collected.

Figure 15: Approximate location of area where artifacts were collected and suspected well location.

Figure 16: GPS track logs.

Figure 17: Supplied predictive model.



INTRODUCTION

On behalf of New Brunswick Department of Transportation and Infrastructure, Gemtec Ltd. commissioned the work of an archaeologist to mitigate the potential negative effects of construction activity surrounding the replacement of the Anderson Bridge, south of Miramichi City (PIDs 40437139, 40437121, 40336240, 40143083, 40445330, 40495780, 40163826, 0000002, 40141814, 40064198, 40381337 & 40381345). As part of the proposed bridge replacement, 12 parcels of land measuring ~1.3 km long by 600 m wide was assessed for the presence of heritage resources and the potential for buried archaeological resources.



PREVIOUS RESEARCH

There are two previously recorded archaeological sites registered at Archaeological Services New Brunswick within the vicinity of the proposed construction activities. Both sites are approximately 1 km east of the bridge.

The Borden system is a nation-wide, geographically based method for recording sites of archaeological value. In New Brunswick, each Borden block is 10 minutes of latitude by 10 minutes of longitude. Each of these blocks is referred to by a four-letter code, which describes the location of that particular block. Consequently, sites within each Borden block are numbered sequentially in the order in which they are reported. The Borden block that is of concern to this report CfDj.



METHODS

The information presented in this report was gained through research of relevant documents found at Archaeological Services in Fredericton and published materials, including topographic and surficial geology maps & reports, aerial photographs, and the New Brunswick Register of Historic Places. The field component was conducted using intensive visual inspection through pedestrian surveying. The area that is scheduled to be impacted by ground disturbing activities was surveyed (see Figures 1 & 2).



RESULTS

A review of early aerial photographs (1944 7443/055 (snow cover), 1954 1551/029) failed to indicate any extant cultural features of interest. The air photos from 1944 reveal the area prior to the erection of the Anderson Bridge, which eventually appears in the 1954 aerial photos. Also of note from the early images is the appearance of Jones Cove prior to having much of its eastern side filled in to accommodate the new road/bridge (see Figure 3). A surficial geology map of the region from 1981 (Rampton et al.) illustrates that the entire project area was inundated by marine high water at the end of the last glaciation (see Figure 4). The purple area labelled 'sWb' is described as mainly sand marine deposits usually as a blanket over bedrock (0.5-1.5 m thick), which is how it appeared during the pedestrian survey.

The eastern side of the bridge and Route 8, on the north side of the Northwest Miramichi River is exceptionally flat and level – most likely the result of a laydown area for the construction of the bridge or other large-scale activity. On the western side of the road/bridge, the landscape on the southern half of Jones Cove appears to have had many dump trucks drop fill (not leveled) on portions of it. The project area west of the road/bridge (north side of river) is generally flat and suitable for habitation. On the north side shoreline, a large sandy beach is present, along with tabular bedrock fragments. A likely quartz core was recovered on the eastern side of the bridge, and 18 quartz flakes were collected on the sandy beach west of the bridge – along the entire width of the project right-of-way (see Figures 8, 12 & 14). The core and flakes are the result of Indigenous flintknapping in the prehistoric period and may indicate the presence of a habitation site nearby.

On the southern side of the Northwest Miramichi River (west of the bridge), a large block of woods (intersected by power lines) was assessed. This area was generally flat (suggesting some ploughing) and level with a gentle slope down towards the river. Several obvious terraces were present, perhaps from shoreline erosion in this area that is now largely open hardwood forest (see Figure 11). In the south-west corner of the wooded area, a circular depression (1.2 m diameter) was identified (see Figure 10). The organic material within is quite soft for at least 50 cm deep. This may be an abandoned well/privy. A ~2 m drop to the shoreline at low tide revealed four quartz flakes near the centre of the wooded area (see Figures 13 & 15). A sandy beach is located in this area, however a flake was found on the tabular rocky shoreline either side of this beach.



No evidence of significant extant structures was visible during the desktop survey or in the field. Some fairly modern garbage adjacent to the property line on the western edge of the wooded area, south of river was noticed. This garbage included numerous galvanized steel buckets that may have been used to collect maple sap. The road that runs through the centre of this wooded area was likely created as a result of the pipe that runs under it and empties into the river.



CONCLUSIONS & RECOMMENDATIONS

On October 7th, 2017, an archaeological pedestrian survey took place at a proposed bridge replacement in Miramichi City, NB. The assessment of these properties resulted in the recovery of 22 quartz artifacts from at least two different Indigenous archaeological sites.

Virtually the entire project footprint is assessed as holding high potential for the presence of archaeological sites. Given the relationship of the project area to both the modern and former shorelines of the Northwest Miramichi River and Jones Cove/Oxford Brook, there is an elevated potential for New Brunswick's Indigenous ancestors to have lived on or otherwise used the landscape and left behind evidence of their presence. Streams and coastal areas were used for their food/water, other natural resources and for navigation in the past. Consequently, the province requires that these areas be investigated for the presence of past human use.

The Provincial *Guidelines* require that projects that encounter the following natural features have follow-up archaeological test excavation at pre-determined intervals:

(c) extends within 50 metres of the banks or shores of a current or former body of water (i.e., river, lake, bay, etc.) – for areas between 50-80 metres from current or former body of water see: Medium Potential.

(d) extends within 100 metres from the current or former confluence of two watercourses, the current or former head of tide or the current or former inlet/outlet of a lake;

(e) extends onto an active or former floodplain (as determined by most recent and detailed surficial geology maps or data showing alluvial deposits);

(f) extends onto a flat, terrace or intervale located within 100 metres of a river;

(g) extends on or cut through existing or former beaches, remnant terraces or strategic vistas (i.e. a prominent point on an otherwise undifferentiated landscape directly overlooking watercourses or river valleys); (Guidelines 2012, pg 22-23)



The only areas that may be excluded from the recommended test excavation are those areas currently under road fill and likely the area within the triangle between the off-ramp and Route 8 on the north side of the river, as this is likely mostly fill (see LiDAR map Figure 3). However, any ground disturbing activity in that discrete area should be monitored by a permitted archaeologist, at the very least. The remainder of the project area should follow the *Guidelines* and have a test pit excavated on a 5 m grid.

Given the potential for finding archaeological sites at these locations, the archaeological work should occur as early as possible, to minimise any possible delay to the construction schedule.

If any change to the proposed footprint of this project is anticipated, then consultation with a permitted archaeologist should occur to ensure a minimal amount of damage to any buried heritage that may be present.



REFERENCES

NB Archaeological Services Unit

2012 *Guidelines and Procedures for Conducting Professional Archaeological Assessments in New Brunswick.* Archaeological Services Unit, Fredericton.

Rampton, V., S. Paradis and D. Smith

1981 *Quaternary Geology - Moncton.* Map 81-002. Province of New Brunswick, Dept. of Natural Resources.



APPENDIX





Figure 1: Approximate location of the proposed bridge replacement (circled in red).

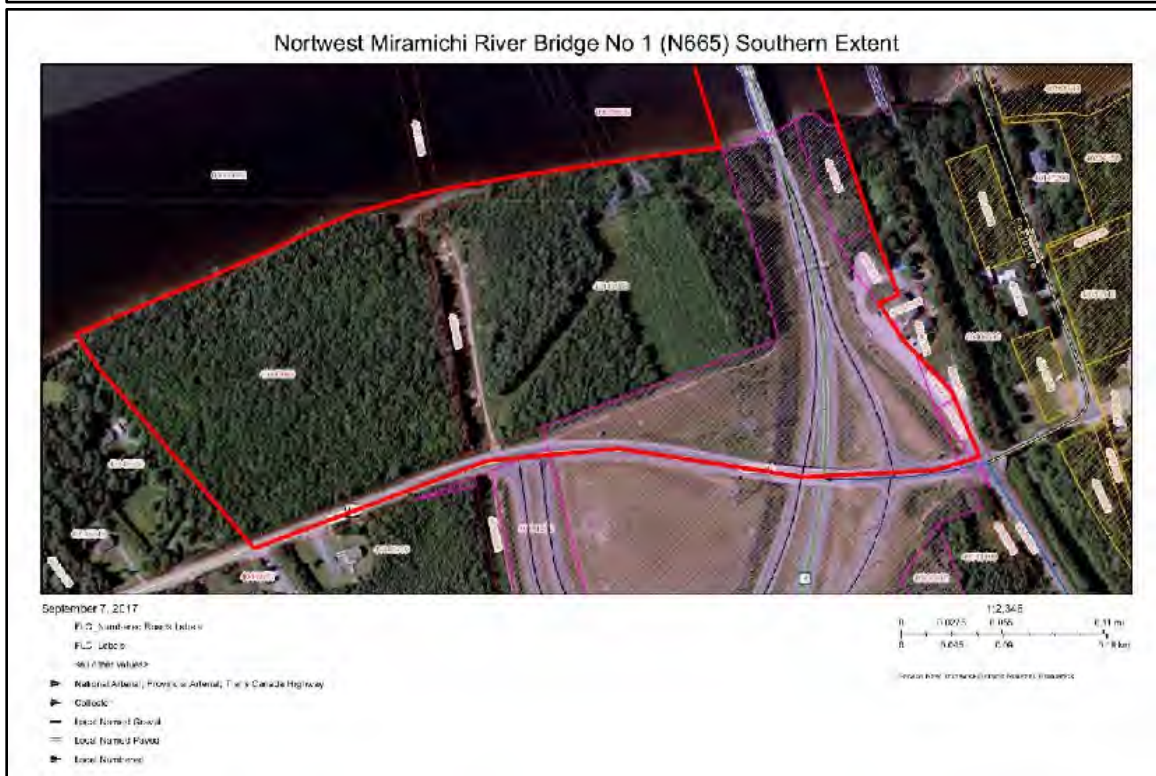
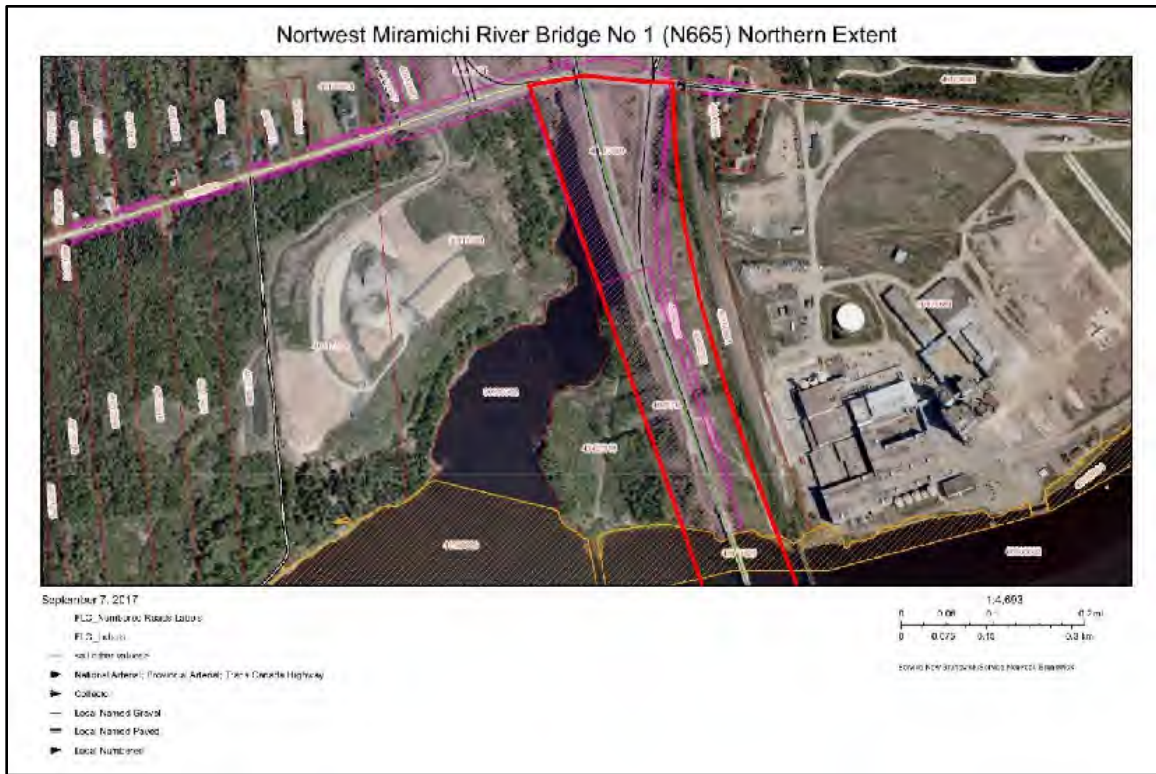


Figure 2: Assessment areas outlined in red.



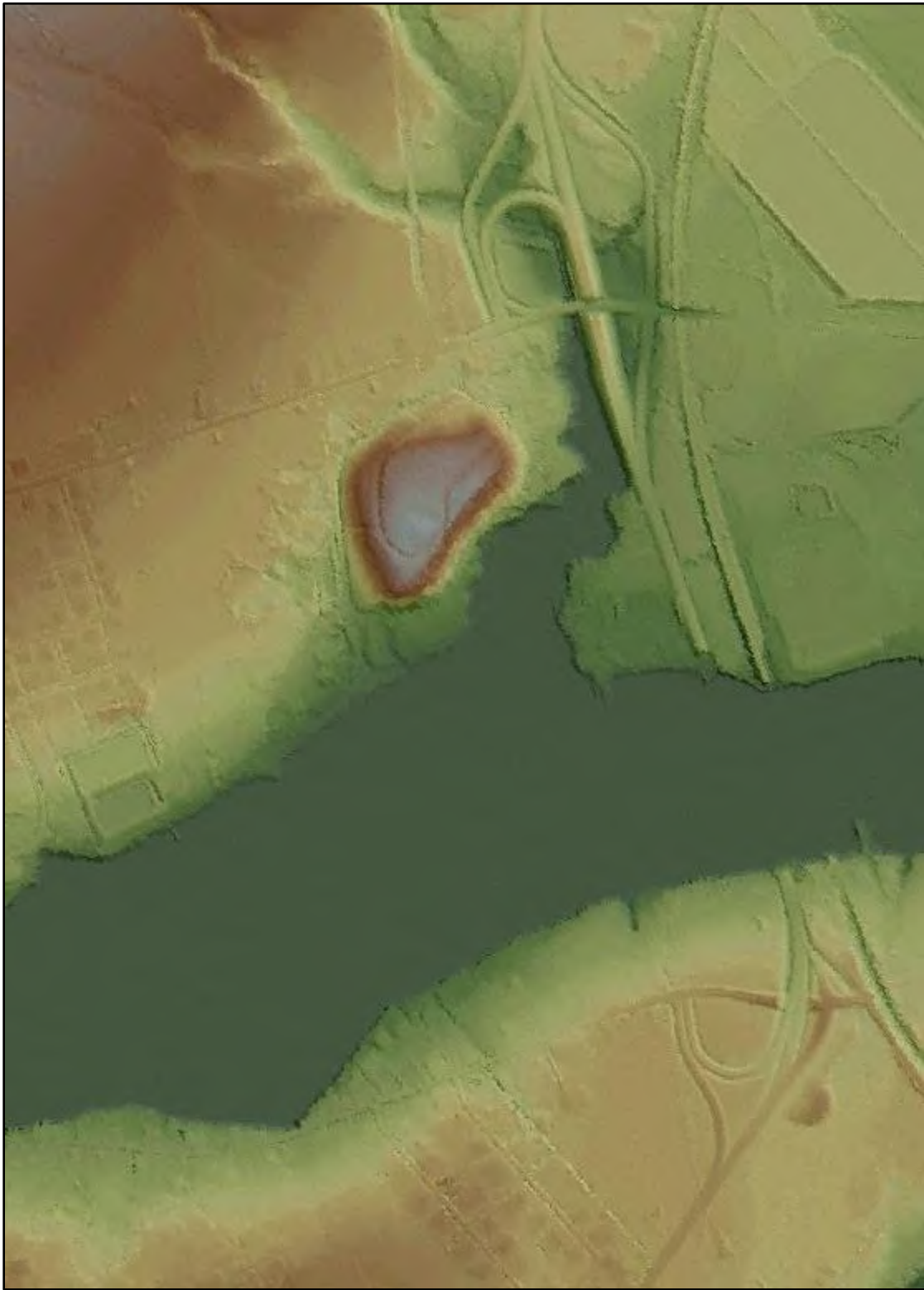


Figure 3: LiDAR data of project area.



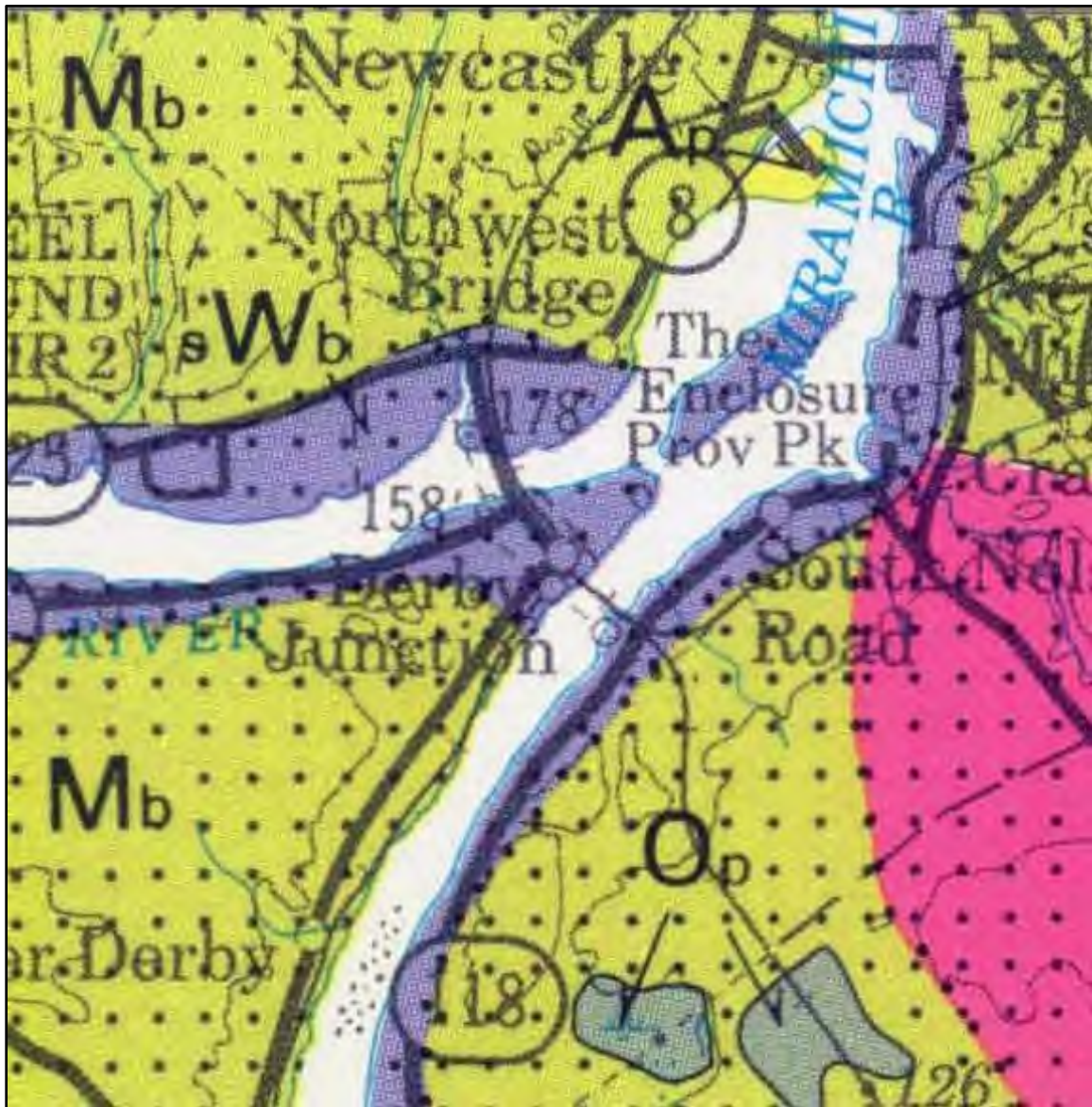


Figure 4: Surficial geology map of the region (Rampton, Paradis & Smith 1981).

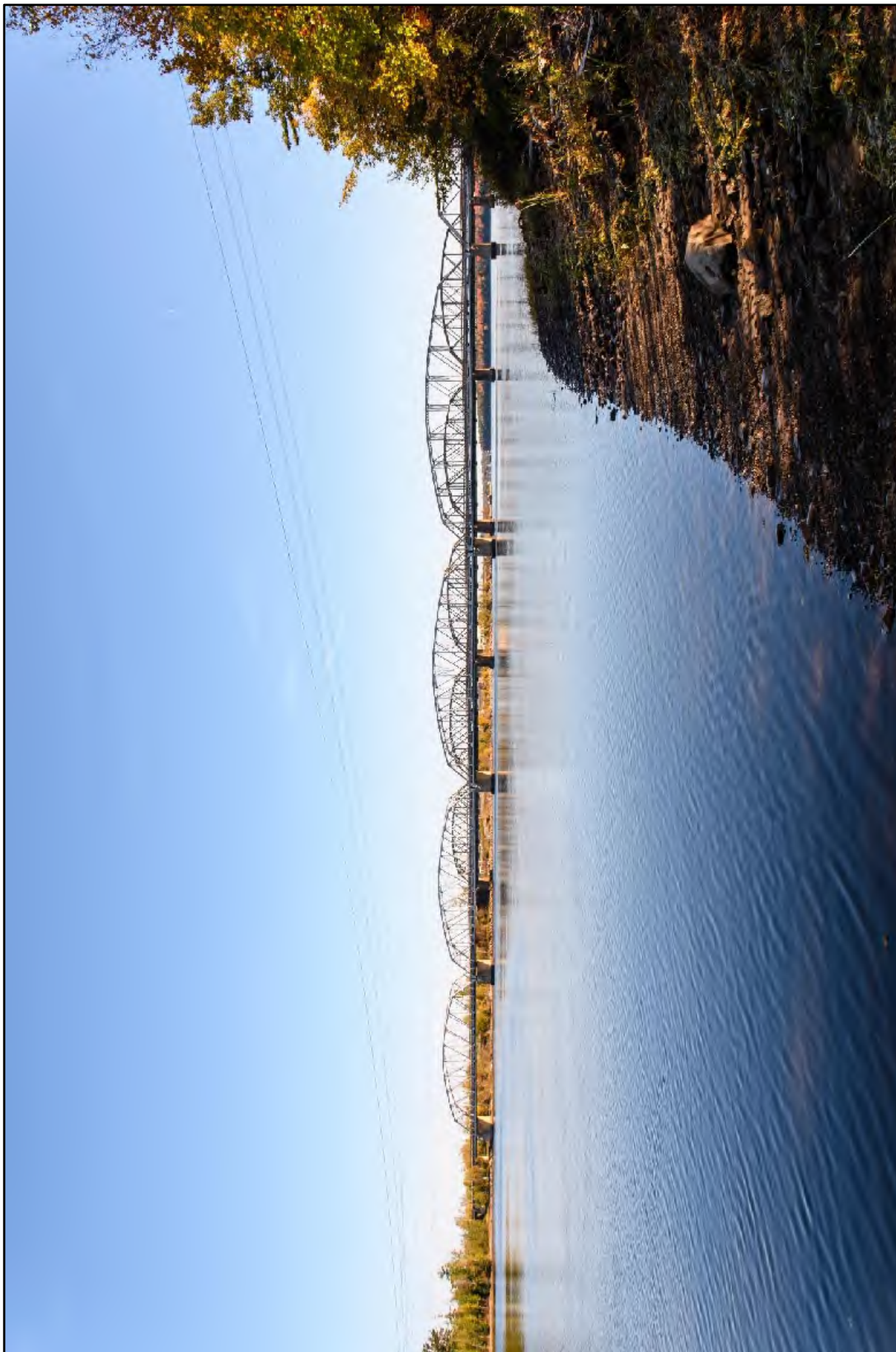


Figure 5: Anderson Bridge (from south side of river, facing east).





Figure 6: The shoreline assessed on the north side of the Northwest Miramichi River.



Figure 7: The shoreline assessed on the south side of the Northwest Miramichi River.





Figure 8: Archaeological site identified on north side of river, west of bridge.



Figure 9: Upper end of Jones Cove on north side of river, west of bridge.





Figure 10: Circular depression (former well?) on the south side of river, west of bridge.



Figure 11: Open forest on south side of river, west of bridge.





Figure 12: Artifacts recovered from the north side of the Northwest Miramichi River.



Figure 13: Artifacts recovered from the south side of the Northwest Miramichi River.





Figure 14: Approximate location of area where artifacts were collected.

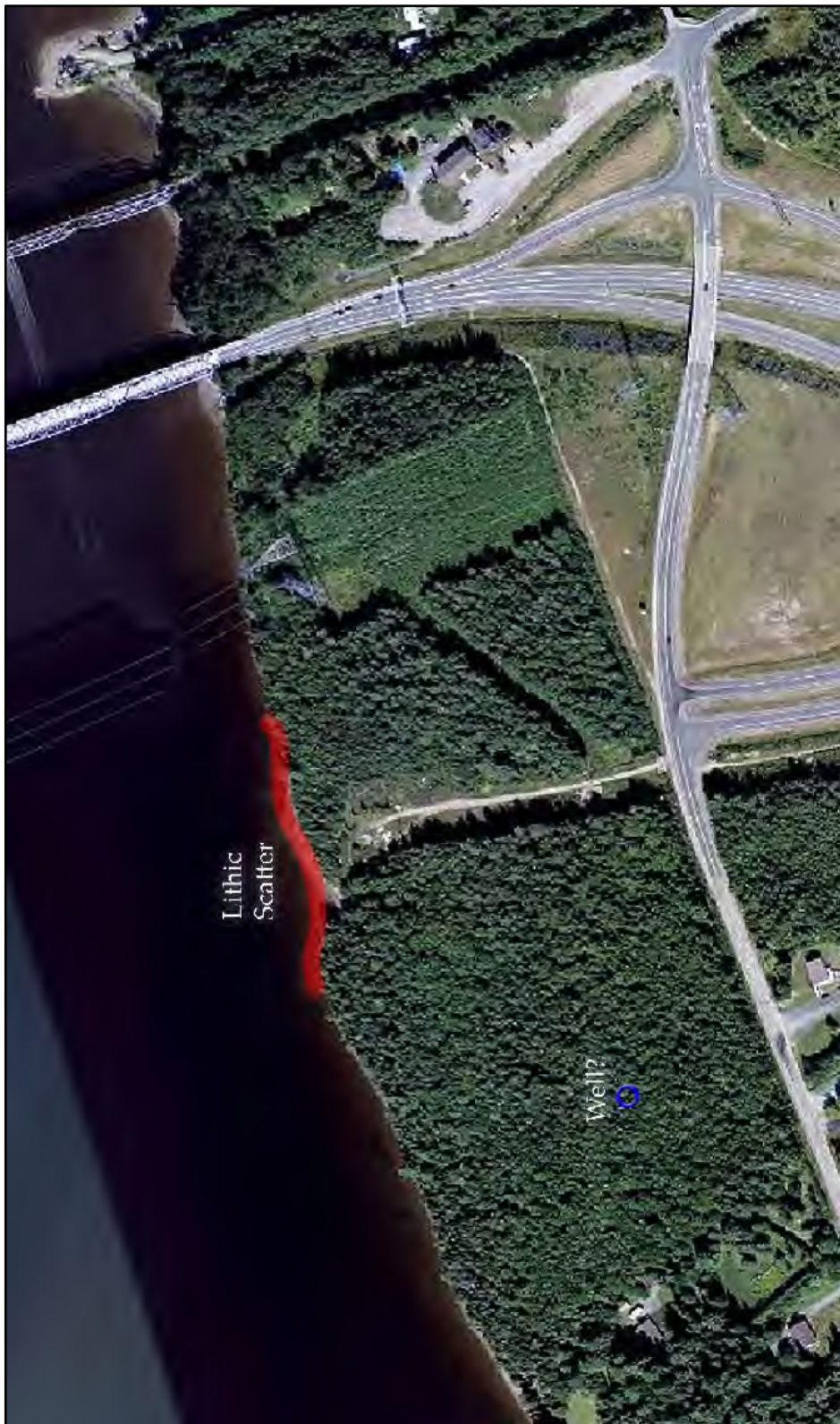
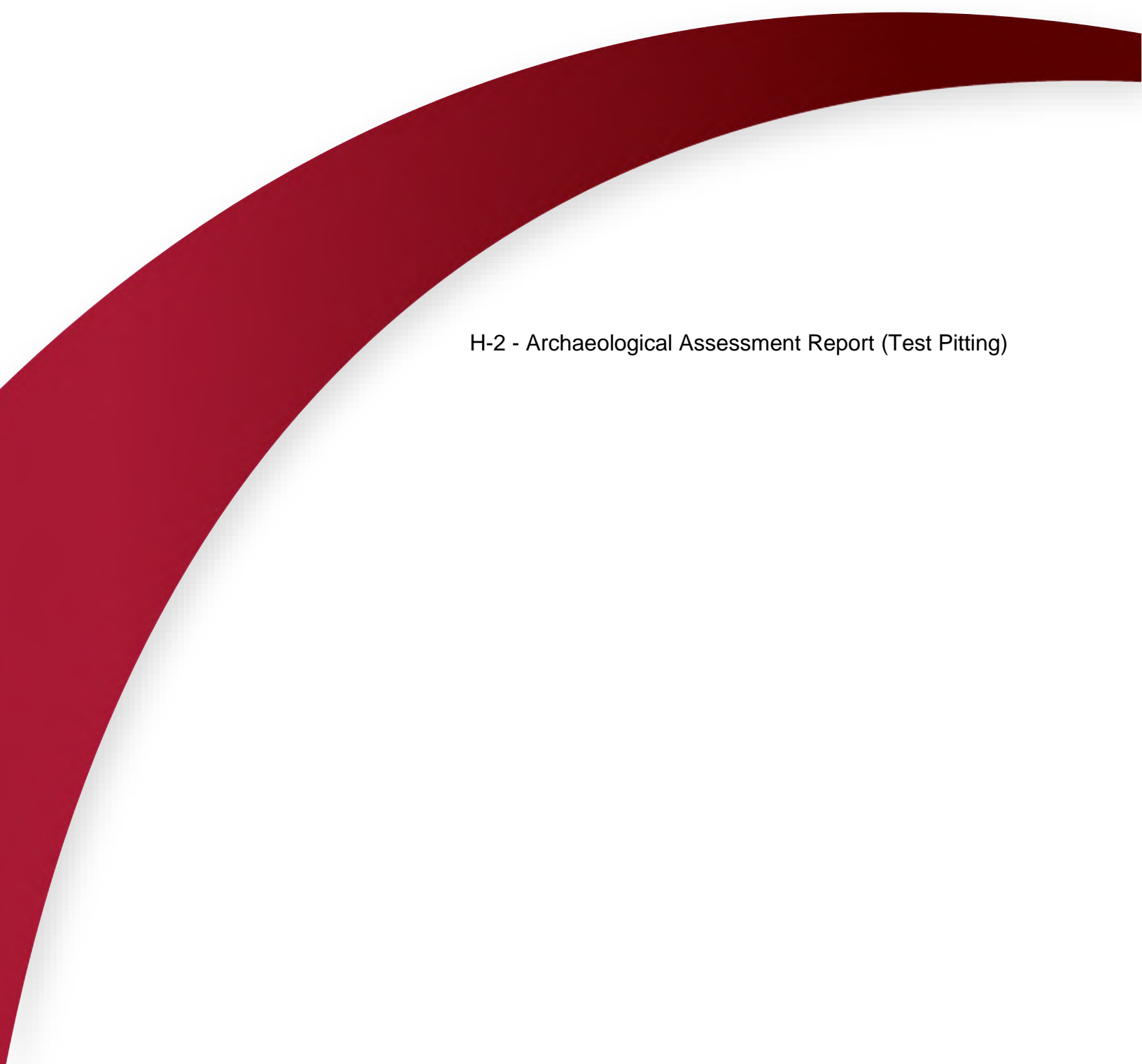


Figure 15: Approximate location of area where artifacts were collected and suspected well location.





Figure 16: GPS track logs.



H-2 - Archaeological Assessment Report (Test Pitting)

**Archaeological Assessment of a Proposed Bridge Replacement in Miramichi
City, NB**

Permit #: 2017 NB 127

Prepared for

Gemtec Limited

by

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23/11/17



ABSTRACT

On November 21st, 2017, limited archaeological testing took place at properties west of Anderson Bridge in Miramichi City, NB. The limited archaeological testing was undertaken at the client's request, to identify any archaeological remains and to confirm the reported surficial geology.



TABLE OF CONTENTS

ABSTRACT	i
LIST OF FIGURES	iii
INTRODUCTION	1
PREVIOUS RESEARCH	2
METHODS	3
RESULTS	4
CONCLUSIONS & RECOMMENDATIONS	5



LIST OF FIGURES

Figure 1: Approximate location of the proposed bridge replacement (circled in red).

Figure 2: Approximate location of test pits.

Figure 3: LiDAR data of project area.

Figure 4: Surficial geology map of the region (Rampton, Paradis & Smith 1981).

Figure 5: Anderson Bridge (from north side of river, facing east).

Figure 6: South wall of STP N100 E100 – South side.

Figure 7: South wall of STP N150 E100 – South side.

Figure 8: South wall of STP N200 E100 – South side.

Figure 9: North wall of STP N100 E100 – North side.

Figure 10: South wall of STP N150 E100 – North side.

Figure 11: West wall of STP N250 E100 – North side.

Figure 12: South wall of STP N300 E100 – North side.

Figure 13: East wall of STP N350 E100 – North side.

Figure 14: West wall of STP N400 E100 – North side.

Figure 15: South wall of STP N450 E100 – North side.

Figure 16: Test pit form – south side.

Figure 17: Test pit form – north side.

Figure 18: Test pit form – north side.

Figure 19: Supplied predictive model.



INTRODUCTION

On behalf of New Brunswick Department of Transportation and Infrastructure, Gemtec Ltd. commissioned the work of an archaeologist to mitigate the potential negative effects of construction activity surrounding the replacement of the Anderson Bridge, south of Miramichi City (PIDs 40437139, 40437121, 40336240, 40143083, 40445330, 40495780, 40163826, 0000002, 40141814, 40064198, 40381337 & 40381345). As part of the proposed bridge replacement, 12 parcels of land measuring ~1.3 km long by 600 m wide was assessed for the presence of heritage resources and the potential for buried archaeological resources.



PREVIOUS RESEARCH

There are four previously recorded archaeological sites registered at Archaeological Services New Brunswick within the vicinity of the proposed construction activities. Two sites are approximately 1 km east of the bridge, and two are approximately 1.3 km west of the bridge. A pedestrian survey was undertaken on October 7th, 2017, resulting in the recording of at least 2 new sites.

The Borden system is a nation-wide, geographically based method for recording sites of archaeological value. In New Brunswick, each Borden block is 10 minutes of latitude by 10 minutes of longitude. Each of these blocks is referred to by a four-letter code, which describes the location of that particular block. Consequently, sites within each Borden block are numbered sequentially in the order in which they are reported. The Borden block that is of concern to this report CfDj.



METHODS

The information presented in this report was gained through research of relevant documents found at Archaeological Services in Fredericton and published materials, including topographic and surficial geology maps & reports, aerial photographs, and the New Brunswick Register of Historic Places. The field component was conducted using intensive visual inspection through pedestrian surveying and a client directed testing strategy. Test pits were placed on a line that was west of the highway and bridge, and at ~50 m apart. The area that is scheduled to be impacted by ground disturbing activities was previously surveyed (see Figures 1 & 2).

The subsurface testing portion was performed by digging square, standardised test pits (STPs) measuring 50 cm a side and up to the maximum depth that is practical with hand shovels (~1 m). Test pits were excavated with round-nose shovel and trowel and all material passed through a bipedal screen with 6 mm mesh. Both the locations and the stratigraphy of the STPs were recorded (see Figures 16-18) and one wall of each test pit was photographed (see Figures 6-15).



RESULTS

A review of early aerial photographs (1944 7443/055 (snow cover), 1954 1551/029) failed to indicate any extant cultural features of interest. The air photos from 1944 reveal the area prior to the erection of the Anderson Bridge, which eventually appears in the 1954 aerial photos. Also of note from the early images is the appearance of Jones Cove prior to having much of its eastern side filled in to accommodate the new road/bridge (see Figure 3). A surficial geology map of the region from 1981 (Rampton et al.) illustrates that the entire project area was inundated by marine high water at the end of the last glaciation (see Figure 4). The purple area labelled 'sWb' is described as mainly sand marine deposits usually as a blanket over bedrock (0.5-1.5 m thick), which is how it appeared during the pedestrian survey and in the subsequently excavated 10 STPs.

On the south side of the river, the two southern-most STPs revealed a similar stratigraphy of sand to a depth of 78 cm dbs (depth below surface). The STP (N200 E100) closest to the river (~25 m south of edge) also consisted of sand as its major sediment constituent but also included an elevated amount of gravel, pebbles and cobbles (often tabular) and likely ended very close to bedrock.

A total of seven STPs were excavated on the north side of the river, beginning with N100 E100 placed ~25 m from the river's edge and each one after at ~50 m apart. STP N100 E100 had ~33 cm of local fill over the original surface. Once the original "A" horizon was removed, a single quartz flake was recovered in screen, at ~50 cm dbs. A fragment of brown bottle glass and white refined earthenware was recovered from the upper disturbed layer (not retained). Numerous quartz flakes were recovered from the shoreline, nearest this test pit on the October 7th pedestrian survey. Moving north, the majority of the STPs were similar with a couple of exceptions; STP N250 E100 exhibited ~38 cm of sand over silty-clay. All of the excavated portion of STP N300 E100 was also silty-clay. It is likely that much of the original surface here was altered through construction activity associated with the nearby power line. One test pit (N200 E100) was skipped as it was in the middle of a 'wetland'.



CONCLUSIONS & RECOMMENDATIONS

On November 21st, 2017, a limited archaeological excavation took place along the west side of a proposed bridge replacement in Miramichi City, NB. The assessment of these properties resulted in the recovery of an additional quartz flake from the recently recorded Indigenous archaeological site on the north side of the river.

As expected, the surficial geology exhibited in the excavated test pits revealed the marine deposits described in the results from the pedestrian survey and continue to hold high potential for the presence of archaeological sites. Considering the depositional process involved, test pit excavation can be limited to ~60 cm in depth, unless other factors disrupt the natural stratigraphy, or perhaps test pits quite close to the Northwest Miramichi River.

Given the relationship of the project area to both the modern and former shorelines of the Northwest Miramichi River and Jones Cove/Oxford Brook, there is an elevated potential for New Brunswick's Indigenous ancestors to have lived on or otherwise used the landscape and left behind evidence of their presence. Streams and coastal areas were used for their food/water, other natural resources and for navigation in the past. Consequently, the province requires that these areas be investigated for the presence of past human use.

The only areas that may be excluded from the recommended test excavation are those areas currently under road fill and likely the area within the triangle between the off-ramp and Route 8 on the north side of the river, as this is likely mostly fill (see LiDAR map Figure 3). However, any ground disturbing activity in that discrete area should be monitored by a permitted archaeologist, at the very least. The remainder of the project area should follow the *Guidelines* and have a test pit excavated on a 5 m grid.

Given the potential for finding archaeological sites at these locations, the archaeological work should occur as early as possible, to minimise any possible delay to the construction schedule. If any change to the proposed footprint of this project is anticipated, then consultation with a permitted archaeologist should occur to ensure a minimal amount of damage to any buried heritage that may be present.



REFERENCES

NB Archaeological Services Unit

2012 *Guidelines and Procedures for Conducting Professional Archaeological Assessments in New Brunswick.* Archaeological Services Unit, Fredericton.

Rampton, V., S. Paradis and D. Smith

1981 *Quaternary Geology - Moncton.* Map 81-002. Province of New Brunswick, Dept. of Natural Resources.



APPENDIX





Figure 1: Approximate location of the proposed bridge replacement (circled in red).



Figure 2: Approximate location of test pits.



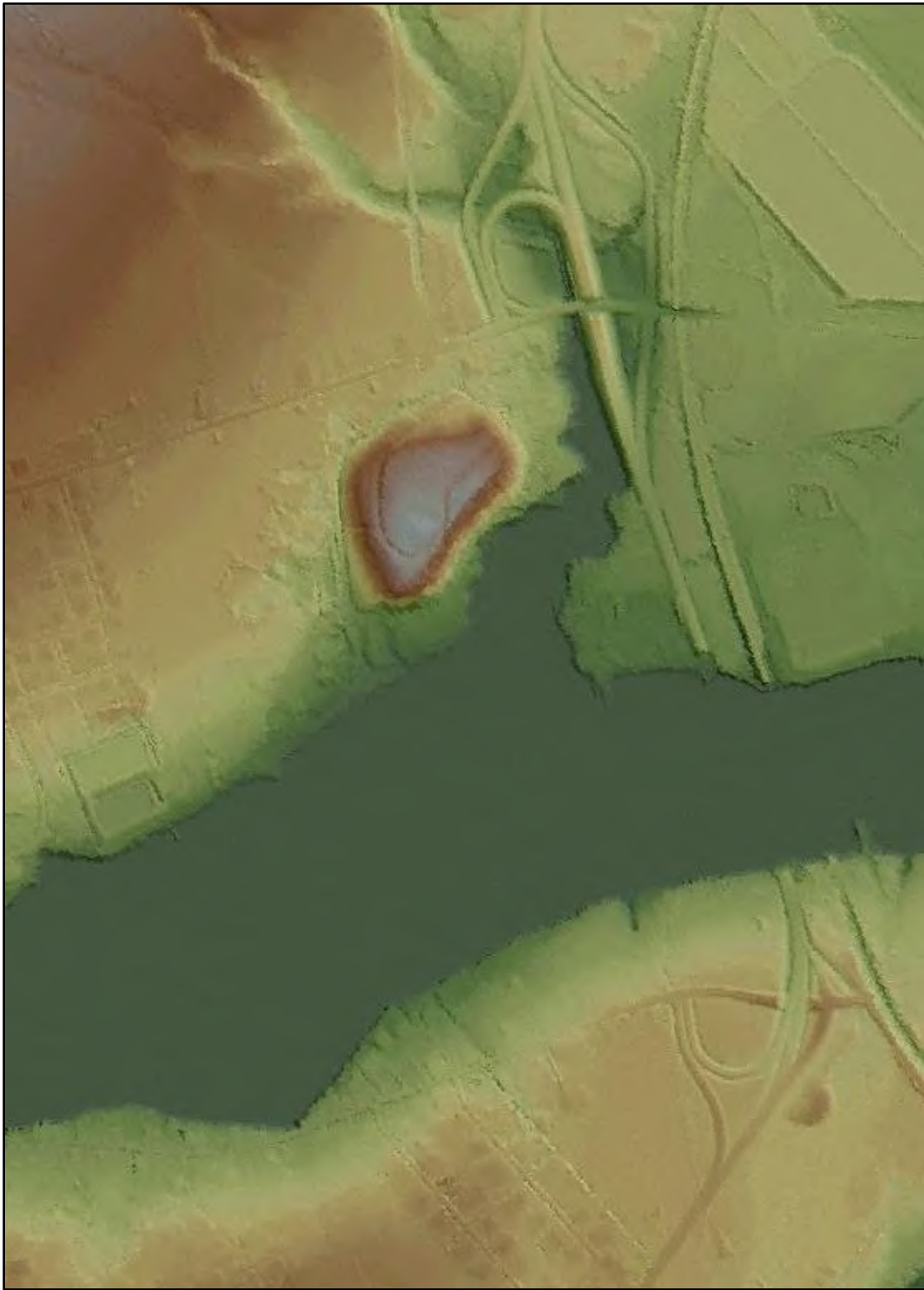


Figure 3: LiDAR data of project area.



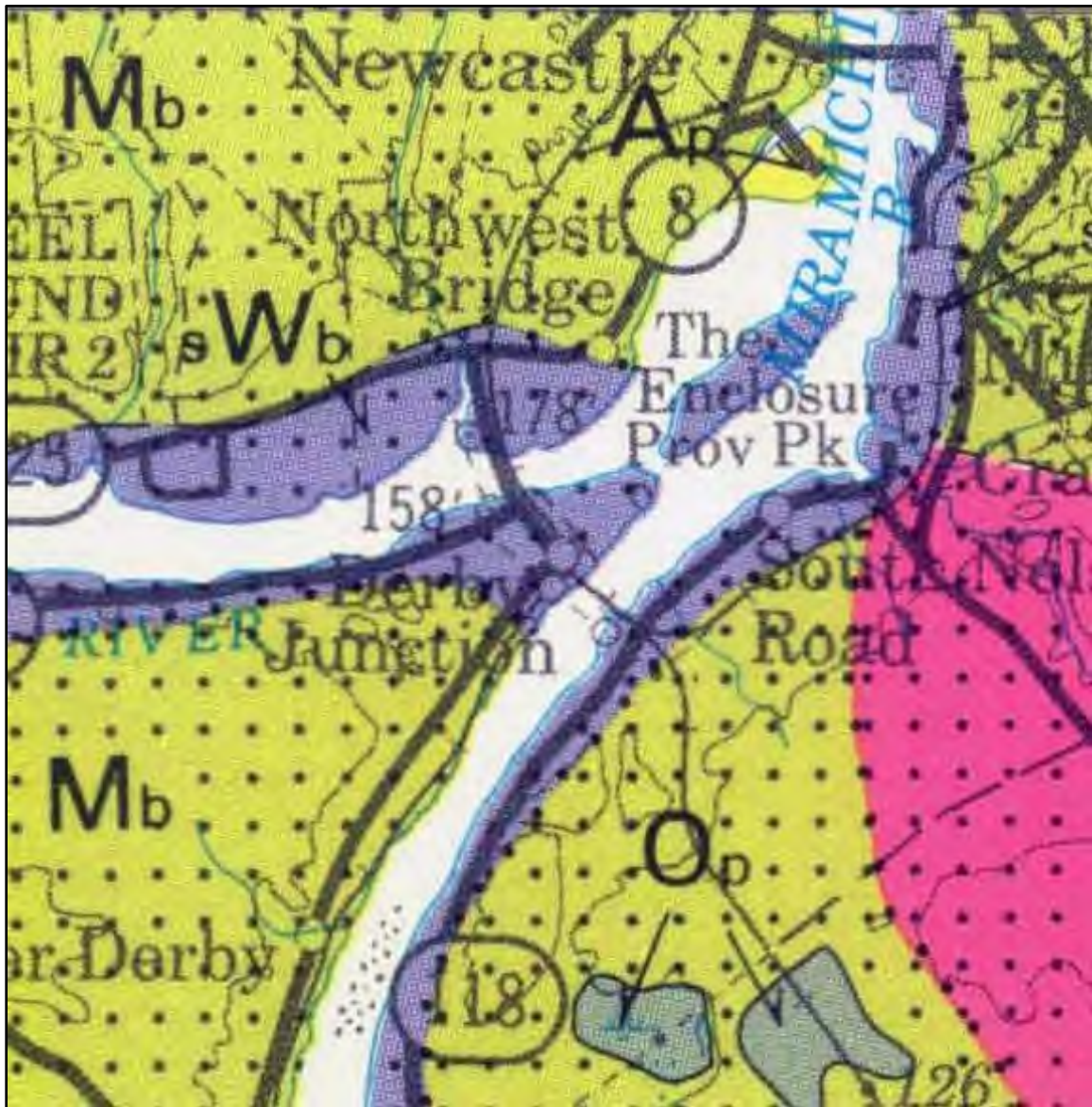


Figure 4: Surficial geology map of the region (Rampton, Paradis & Smith 1981).

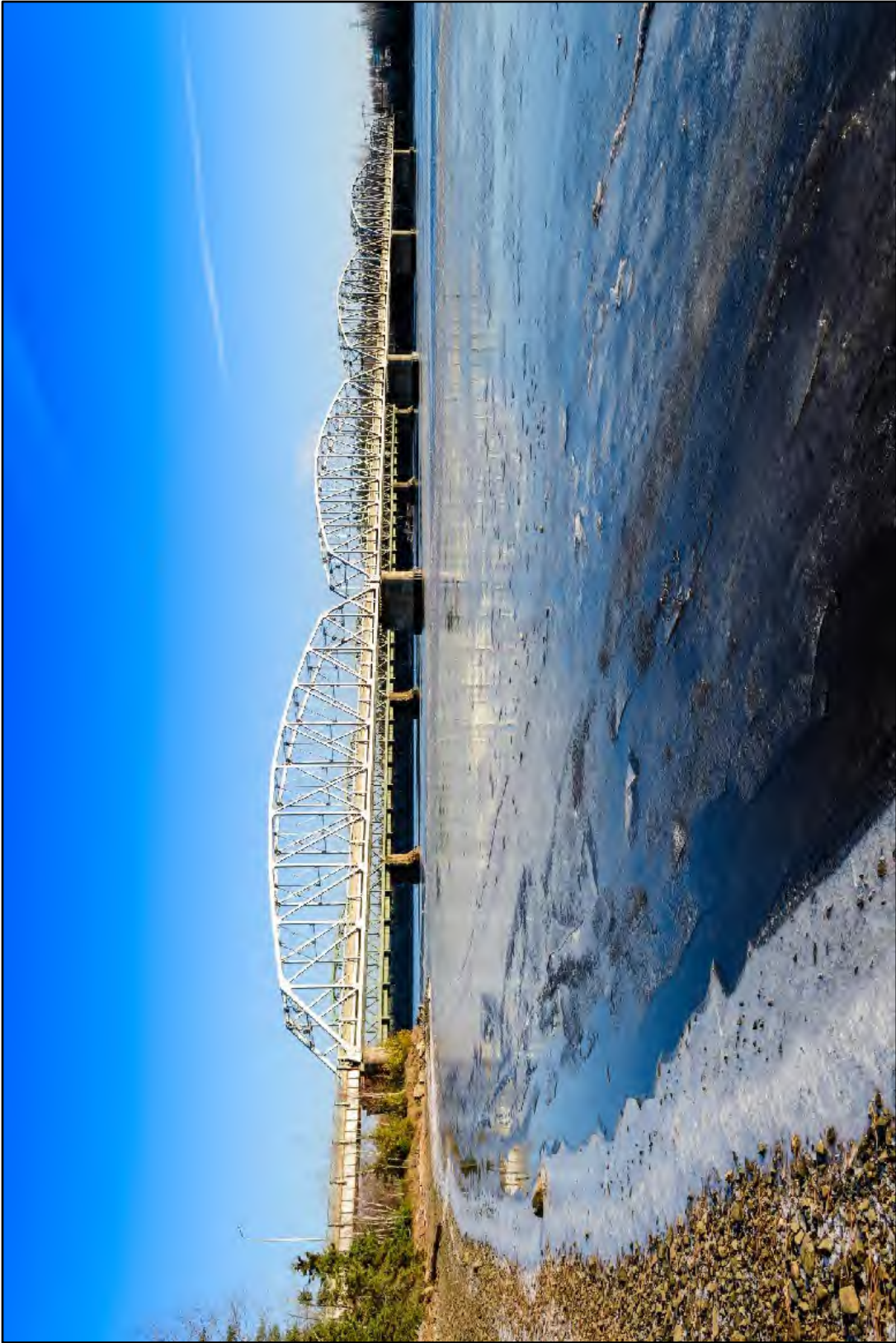


Figure 5: Anderson Bridge (from north side of river, facing east).





Figure 6: South wall of STP N100 E100 – South side.



Figure 7: South wall of STP N150 E100 – South side.



Figure 8: South wall of STP N200 E100 – South side.



Figure 9: North wall of STP N100 E100 – North side.



Figure 10: South wall of STP N150 E100 – North side.



Figure 11: West wall of STP N250 E100 – North side.



Figure 12: South wall of STP N300 E100 – North side.



Figure 13: East wall of STP N350 E100 – North side.



Figure 14: West wall of STP N400 E100 – North side.



Figure 15: South wall of STP N450 E100 – North side.

STANDARDISED TEST PIT RECORD

Area: Anderson bridge
 Co-ord (N188-E188): _____

Date: 2/11/17
 Page: 1 of 3

N _____ E _____
 Wall N E S W
 Recorder(s): _____

Positive probiotic
 Positive historic
 Negative

0 cm 10 20 30 40 50
 Maximum Depth _____ cm dbt
 Material Bags Collected _____

Material	Depth

Name: _____

N 100 E 100
 Wall N E S W
 Recorder(s): WJL

Positive probiotic
 Positive historic
 Negative

0 cm 10 20 30 40 50
 Maximum Depth 76 cm dbt
 Material Bags Collected _____

Material	Depth

Name: popokly on road
18c 209/192 019

N 150 E 100
 Wall N E S W
 Recorder(s): _____

Positive probiotic
 Positive historic
 Negative

0 cm 10 20 30 40 50
 Maximum Depth 78 cm dbt
 Material Bags Collected _____

Material	Depth

Name: 101 H
18c 2095 + 76

N 100 E 100
 Wall N E S W
 Recorder(s): WJL

Positive probiotic
 Positive historic
 Negative

0 cm 10 20 30 40 50
 Maximum Depth 78 cm dbt
 Material Bags Collected _____

Material	Depth

Name: 101 D
18c 2093 + 94

Soil Textures: VF-very fine F-fine M-medium C-coarse VC-very coarse
 Cl-clay Si-silt S-sand L-loam
 gr-gravel pb-pebbles cb-cobbles b-boulders tl-till

Material: 1-gray 2-black 3-orange 4-red 5-yellow 6-olive 7-brown 8-light 9-dark
 Macellaneas: ch-charcoal ant-antennae n-organic o-root ● disturbance

1968

Jason Jandron 2013

Figure 16: Test pit form – south side.



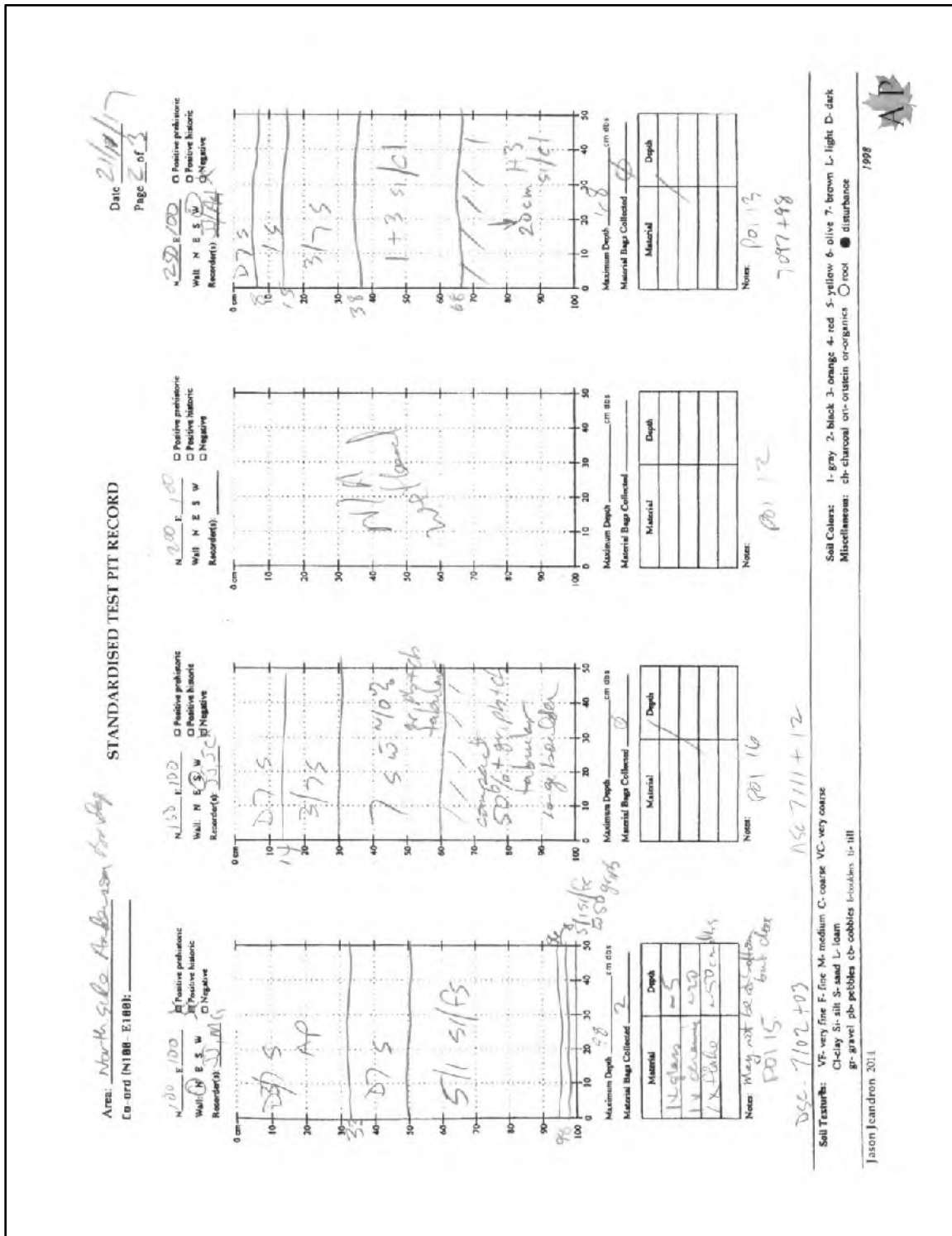


Figure 17: Test pit form – north side.



Testpit Record

Area: N Side Anderson Probe
 Co-ord (N188- E188): _____

Date: 2/1/17
 Page: 3 of 3

N: 450 E: 100
 Wall: N E S W
 Recorder(s): JDG

N: 400 E: 100
 Wall: N E S W
 Recorder(s): JDG

N: 350 E: 100
 Wall: N E S W
 Recorder(s): JDG

N: 200 E: 100
 Wall: N E S W
 Recorder(s): JDG

0 cm
 10
 20
 30
 40
 50
 60
 70
 80
 90
 100 cm

0 cm
 10
 20
 30
 40
 50
 60
 70
 80
 90
 100 cm

0 cm
 10
 20
 30
 40
 50
 60
 70
 80
 90
 100 cm

0 cm
 10
 20
 30
 40
 50
 60
 70
 80
 90
 100 cm

Material Bag Collected: 0

Material	Depth

Notes: POI 18

Maximum Depth: 90 cm OBS

Material Bag Collected: 0

Material	Depth

Notes: POI 19

Maximum Depth: 90 cm OBS

Material Bag Collected: 0

Material	Depth

Notes: POI 17

Maximum Depth: 43 cm OBS

Material Bag Collected: 0

Material	Depth

Notes: POI 14

Photo # DS 7100+01

Photo # DS 7117-7118

Photo # DS 7113+14

Photo # DS 7115+16

Soil Textures: VF-very fine F-fine M-medium C-coarse VC-very coarse
 Cl-clay Si-silt S-sand L-loam
 g-gravel pb-pebbles cb-cobbles ll-tilt

Jason Leandron

Figure 18: Test pit form – north side.



