

## **5.10 Archaeological and Heritage Resources**

### **5.10.1 Rationale for Selection as Valued Environmental Component**

For the purposes of this assessment, archaeological and heritage resources are defined as any physical remnants found on top of and/or below the surface of the ground that inform us of past human use of and interaction with the physical environment. These resources may be from the earliest prehistoric times of human occupation within the proposed RoW, up to the relatively recent past and include both build and depositional resources. Although more related to issues of evolution or biophysical “heritage”, palaeontological resources or fossil bearing rocks are also included within this VEC.

Archaeological and heritage resources are included as a VEC in this assessment in recognition of the interest of potentially affected First Nations, the general public as a whole, and provincial and federal regulatory agencies assuring the effective management of these resources. In this section, the environmental effects of the Project activities on archaeological and heritage resources resulting from construction and operation activities, as well as malfunctions, accidents or unplanned events, will be assessed.

### **5.10.2 Environmental Assessment Boundaries**

#### **5.10.2.1 Spatial and Temporal**

The spatial boundaries for the Project include the locations of all Project related activities associated with construction, operation, and malfunctions and accidents that could involve any ground disturbance. Archaeological and heritage resources may be affected by any surficial or subsurface project-related disturbance of the area within which these resources are located. The assessment of potential Project related environmental effects on archaeological and heritage resources is focused principally on those Project activities (including related geotechnical investigations) that entail ground disturbance, and within the physical limits of those activities.

The temporal boundaries include the construction periods and operation of the Project in perpetuity. Archaeological and heritage resources are relatively permanent features of the environment, however their integrity is highly susceptible to the environmental effects of any ground disturbing activities. Construction activities carried out at any time of year can therefore affect the integrity of any archaeological or heritage site encountered. It should be noted, however, that archaeological fieldwork to mitigate potential adverse environmental effects on heritage resources is more easily carried out between late spring and early autumn, when ground conditions allow for the subsurface testing required in archaeological investigations.



Ground disturbance associated with construction will be relatively short-term. However, any potential adverse environmental effect on archaeological and heritage resources will be permanent, as no archaeological site can be returned to the ground in its original state.

#### **5.10.2.2 Administrative and Technical Boundaries**

Archaeological resources in the province of New Brunswick are administered by Archaeological Services Unit (ASU), within the Heritage Branch, of the Culture and Sports Secretariat. Archaeological sites are considered to be a non-renewable resource and the unauthorized disturbance of such resources may not legally take place except under strictly controlled conditions imposed by terms of an Archaeological Field Research License which is issued to qualified personnel by the provincial government through ASU. ASU is also responsible for approving or modifying recommended mitigation measures. Some archaeological sites can be assigned a “protected” status under the *Historic Sites Protection Act* if so designated by the Minister. The unauthorized disturbance of a protected heritage resource is punishable by a fine. Built heritage resources (*i.e.*, architectural resources) are administered by the Planning and Commencerative Unit, Heritage Branch, Culture and Sports Secretariat. The inventory of palaeontological resources is maintained by the New Brunswick Museum.

Baseline information for this assessment included the Maritime Archaeological Resource Inventory files located at ASU in Fredericton, the inventory of historic buildings, the list of Provincially Designated Historic Sites, research at the Public Archives of New Brunswick, local historical records, documented local histories, local informants, three baseline studies on heritage resources within the RoW, and the knowledge of the various consultant archaeologists involved with the three baseline studies. Limitations imposed on this assessment include the inability to accurately and completely predict the presence of all existing archaeological sites. It is not possible to predict for such features as animal kill sites or isolated burial sites based on the randomness of their locations and/or unknown patterns of distribution.

The EA of the Archaeological and Heritage Resources does have technical boundaries. These pertain mainly to the methodology of field testing implementation and the determination of high potential. The models for determining archaeological potential are designed, based on the professional judgement and experience of the archaeologist and the general knowledge of the archaeological community in the Maritimes. The testing strategies are determined in consultation with the regulatory authority, Archaeological Services Unit, and the professional archaeologist applying for the license to conduct any required field work, in combination with the state of the available data on the location and configuration of known archaeological sites within the general area of the Project. Spacing for the excavation of testpits is based on the nature of the sites sought in the investigation and the interpreted archaeological potential of the area under investigation. Recent Guidelines (New Brunswick Culture and Sport Secretariat, Heritage Branch 2004) provided by the Province suggest a testing interval of 5 to 10 metres depending upon the potential for encountering archaeological sites. The higher the potential the closer



the testing interval. Testpits were 50 cm by 50 cm squares excavated to the glacial till, which is the typical terminus for any potential for cultural material. All soils from the testpits were sieved through 6 mm mesh screens (standard archaeological size) to ensure no cultural material was missed. The determination of archaeological potential is somewhat less universally accepted, however. The reason for this is that, particularly in the Maritimes, so few archaeological sites have been excavated relative to the number of sites that must have existed prior to the arrival of European settlers. Therefore, the interpretation of which areas were desirable for habitation is weighted by the sites that have been discovered. Typically, these sites are in easily accessible areas, and areas that to modern archaeologists seem like reasonable areas for people to have settled, such as along the edges of river, lakes, and coastal areas.

Although archaeological sites have been discovered in what would be characterized as “unusual” areas (areas considered “in the middle of no-where”), archaeologists have yet to determine why people would have used these areas, and therefore no models exist that could predict for the presence of such sites. The location of such sites may be somewhat explained as palaeo-environmental reconstruction’s become more accurate and geologists and archaeologists have a better understanding of the location of old river channels and other desirable topographical features. Only since 1987 has New Brunswick’s *Environmental Impact Assessment Regulation 87-83* of the *Clean Environment Act* required proponents, where appropriate, to consider archaeological and heritage issues during any environmental assessment of their project, thus giving archaeologists the potential to investigate previously inaccessible areas, and have the funding to support this research. To date, archaeological research has tended to reinforce previous attitudes about what constitutes a “high potential” archaeological area, and thus professionals can only base their predictions on the knowledge at hand.

For this Project, 5 m to 10 m intervals were established as the standard for field-testing in areas of elevated potential. With respect to archaeological potential, availability of potable water, suitability for habitation (*e.g.*, ground conditions), proximity to desirable resources (such as workable stone), and proximity to water transportation routes, portage routes and food supplies were used as determining factors. In addition to testpitting (or testing) various other methods were used to examine the subsurface soils along the proposed alignment. These include an examination of tree-throws, slope failures, and of course the erosional face of all substantial watercourses, in particular areas where testing would be undertaken as well.

### **5.10.3 Residual Environmental Effects Rating Criteria**

For this VEC, a *significant residual environmental* effect is a project-related disturbance to, or destruction of, an archaeological or heritage resource considered by the provincial heritage and archaeological regulators to be of major importance due to factors such as rarity, undisturbed condition, spiritual importance, or research importance, and that cannot be mitigated.



The residual environmental effects rating criteria for Archaeological and Heritage Resources was based on the regulations and spirit contained within the *Historic Sites Protection Act* and the archaeological license application process. Heritage professionals and resources regulators (Archaeological Services Unit) tend to use two main criteria for determining the significance of an archaeological site. These are: age and integrity. For example, the area of the proposed TCH may have been used in the past by pre- and post-contact Maliseet, Acadians, Loyalists, early British colonials, and more recent Euro-Canadian migrants. Because of the low number of known archaeological sites throughout the province, sites of First Nation and Acadian affiliation may be determined to be of greater importance than those sites from the later arrivals. This would be based solely on the number of known and perceived intact archaeological sites, not on the relative importance of a specific culture in the history of the province or region. For example, there is only one known, intact cellar feature of a pre-expulsion Acadian homestead that has been discovered in the Saint John River valley of New Brunswick and hence another site of this era and affiliation would likely be considered “significant” by ASU, despite the fact that there are undoubtedly other such sites in existence in the province.

Further, the integrity of an archaeological site is defined as the site remaining as close to its original state as possible, allowing for a certain amount of weathering and natural decomposition of the structures and artifacts that make up the site. These latter processes tend to act in predictable and accountable ways so that an archaeologist excavating a site can consider and allow for their potential to alter a site’s appearance. The activities of heavy equipment during such groundbreaking activities as grade and excavation work, on the other hand, can have an irreversible environmental effect on the integrity of an archaeological site that would not allow for the reconstruction of the site’s original appearance. Artifacts and features (non-artifact remnants of past human activities) are able to provide the most information about the sites original occupants when they have not been subject to any anthropogenic or substantive natural destructive forces. The initial phases of construction typically include grading, excavation, and the preparation of the surface for the successive phases of construction. Therefore, it is the earliest phases of construction that have the most potential to have negative environmental effects on any sites within the area of construction.

In summary, in the evaluation of the significance of environmental effects, the “significance” of the archaeological or heritage resources that may be affected as a result of the project must be determined. This determination is made by the regulating heritage authority, with input from the public, other professional archaeologists, and appropriate First Nations communities, where warranted.

#### **5.10.4 Existing Conditions**

Archaeological and heritage resources that were considered within this VEC consisted of any standing, surface or subsurface remnants from past human activities within the area proposed to be affected by the



Project. It also included palaeontological (fossil) resources. This section will briefly describe the findings of the survey and research.

Typically there are two methods for determining the existing conditions of the archaeological and heritage resources within the proposed RoW. These are:

- determine the known resources through a review of the provincial archives, provincial heritage records, documented archaeological sites, provincial and local museum records, local historical societies; community historians, and Aboriginal people; and
- undertake a search for those resources that exist, but of which we do not currently have knowledge.

### **Archaeological and Heritage Resources**

The alignment of the proposed TCH was largely planned to avoid existing settlements and inhabited areas in order to avoid the situation of the existing TCH, that is: the presence of numerous driveways and side roads having access to the highway. In addition to this, NBDOT attempted to disrupt as few homes and homesteads as possible with the new alignment. Therefore to the degree reasonably possible, the proposed TCH is located away from existing communities. Due to the general continuity of habitation locations during the historic period, existing towns, villages, and cities are located on the same sites where the original Euro-Canadian inhabitants established those communities. The vast majority of these communities within the proposed RoW are located along the banks of the Saint John River with a variety of more recently established outlying communities distributed throughout the area. In most cases these communities are several kilometers from the proposed TCH. It is also well documented that there is considerable overlap between the settlement locations of the early European settlers and the settlement areas of First Nation peoples living in this area, particularly during the later pre-contact periods (the last 3000 years). The reason for this is very simple. Areas that would have been good settlement locations for First Nation people, would also have been attractive areas for the early colonial people to settle, such as river confluence's, large flood plains, locations close to plentiful food resources, and cross-roads (portage sites). As discussed above, the Saint John River has tended to be a focus for habitation by all peoples living in this area for the last 10,000 years.

Unfortunately there tends to be very little historical information on the settlement of the specific area of the proposed TCH. This is due to the fact that as far as can be determined, very few people lived in the area of the proposed TCH, particularly during the historic period, the period to which most documentation refers. In addition to this, beyond general documentary sources which discuss the history of the area at large (being New Brunswick, or Central New Brunswick, etc.) no specific histories related to families and events in the area of the proposed RoW were found. With respect to Aboriginal settlement and use, there are no site-specific documentary sources either. For this reason, the vast



majority of the information on the presence of heritage resources within the proposed RoW comes from the archaeological survey.

Based on our current understanding of pre-contact settlement patterns by the Maliseet First Nation people and their ancestors, habitation and living sites tend to be concentrated along the shorelines of the navigable streams and rivers. For this reason, archaeological surveys for these sites are generally focussed on these areas and thus archaeological potential modeling usually results in such areas having higher archaeological potential than those areas away from watercourses.

There are 16 registered archaeological sites within five kilometres and 29 sites within 10 kilometres of the proposed RoW. The 29 archaeological sites are a mixture of pre-contact sites identified by the presence of scattered flaked stone fragments, find-spots of individual artifacts, and historic period sites identified by the presence of artifacts. The vast majority (27) of these sites are located along the banks of the Saint John River or close to the shoreline and well away from the proposed RoW. The other two sites are located on the shoreline areas of watercourses that flow into the Saint John River. Some of these sites are not located precisely as their presence was reported to archaeologists during mid-20th-century archaeological surveys, but their exact location was not determined. Very few of these sites have been thoroughly investigated through archaeological testing and thus their exact nature, condition and chronological sequence is not known.

Only two of these sites are located within the proposed RoW. These are site CbDv 9, on the Little Presque Isle Stream, and CdDw 1, on the Lower Guisiguit Brook. Both of these sites were discovered during the archaeological survey of the proposed TCH, and thus prior to the survey, there were no known heritage resources in the proposed RoW.

During the summer of 2002, NBDOT divided the 70.7 km RoW into three sections and hired three consultants to collect the appropriate archaeological and heritage data from these sections. Additional survey and archaeological testing was required in 2003 due to realignments and the finalizing of new access road locations. The results of all the archaeological surveys are summarized in this section of the CSR. Detailed descriptions of the findings of the surveys, including such information as testpit stratigraphy, not reported here, are available in the license reports of the professional archaeologists who undertook the work. These reports are on file with the provincial government at Archaeological Services Unit, and are available to the public (Dignam and Associates Consulting 2003; Heritage Technologies Inc. 2003; JWEL 2003f).

During the various surveys six watercourses were determined to warrant testing by the archaeological teams. This determination was largely based on navigability by watercraft, during at least most of the year. The other factor considered was the topographical conditions. As can be readily observed on topographical maps of the area, many of the watercourses crossed by the proposed TCH have very steep



topographies and thus it would have been impossible for anyone to have camped along these shores. In such areas of steep topography, no subsurface testing was initiated. The watercourses tested were: Big Presque Isle Stream, Little Presque Isle Stream, Upper Guisiguit Brook, Lower Guisiguit Brook, River de Chute and Graham Brook.

The testing intervals at these watercourses ranged from 5 m to 10 m based on the ground conditions and the refinement of the archaeological potential of the area during the site visit. Areas where the ground conditions were rough, the soil depths inconsistent, and the availability of good quality camp sites was limited, were not tested as intensively as those areas which exhibited high-quality topographical attributes related to archaeological potential, such as flood-plains. As previously discussed, floodplains appear to be one of the most desirable habitation areas, given our current understanding of settlement patterns in this region. Therefore a floodplain would rate as higher archaeological potential than a narrow terrace, 10 m in elevation above the channel of a watercourse. Constraints such as ease of access and camp lay-out options may be contributing factors to this phenomenon.

### **Graham Brook**

Due to the change in the watercourse crossing structure at River de Chute (Section 2.2.2.4) and need to make minor adjustments to the approach portions of the highway for this crossing, the proposed crossing location at Graham Brook also changed between 2002 and 2003. When the new crossing location was evaluated it was determined that the swampy nature of the valley bottom and steep slopes at the boundaries of that valley meant that there was no location where a camp-site could have been established. Thus no testing was warranted at this location, even though the previous crossing site had been tested (with negative results).

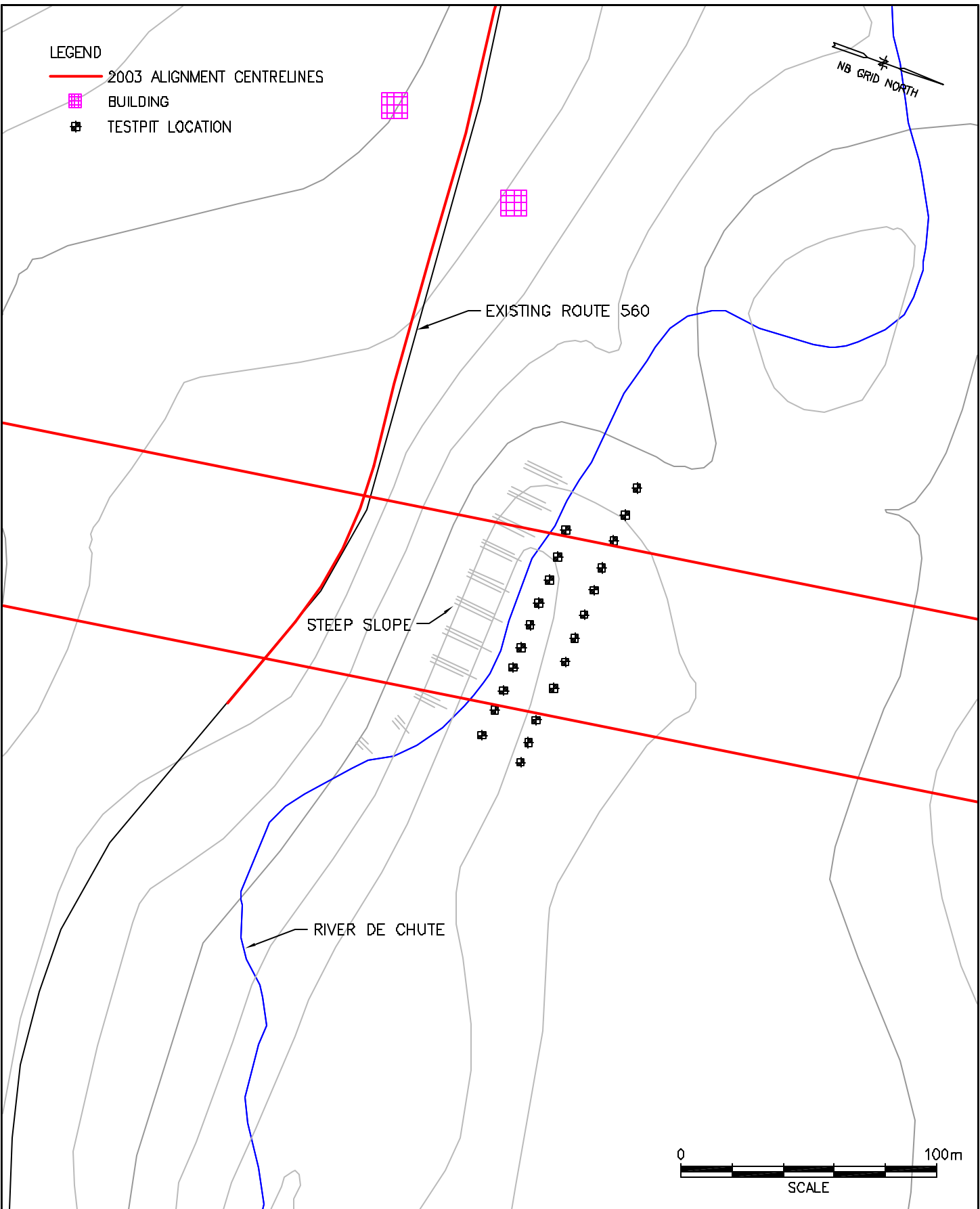
### **River de Chute**


Due to the change in the watercourse crossing structure at River de Chute (Section 2.2.2.4), the crossing location at River de Chute changed between the 2002 and 2003 field seasons. Thus an additional assessment and further testing was warranted at this watercourse. The extremely steep and unstable slope on the south side of River de Chute right to the water's edge eliminated this shoreline from the usefulness of testing. There was only a narrow terrace area located approximately in the middle of the RoW that warranted testing on the northern shoreline of the River. No artifacts or cultural features were located along this area. Additional testing was undertaken at another terrace further north of the river shoreline that may have been formed when the water levels were higher in this valley, some time since the melting of the glaciers. It could not be determined if this terrace was old shoreline or glacial outwash, and thus testing was initiated as a precaution (Figure 5.10.1). No artifacts or cultural features were encountered during this testing.









<b>APPROXIMATE LOCATION OF ARCHAEOLOGICAL TESTPITS RIVER DE CHUTE</b>	Date: 2003 10 05	Scale: 1 : 2000	 <b>Jacques Whitford</b> Consulting Engineers Environmental Scientists
	Job No.: 14677	Fig. No.: 5.10.1	
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## **Upper Guisiguit Brook**

Due to the steep slope on the south side of the Upper Guisiguit Brook, testing was not warranted and only the north site of this watercourse was tested. The entire width of the RoW was tested and no cultural material was encountered (Figure 5.10.2) (Dignam and Associates Consulting 2003).

## **Lower Guisiguit Brook**

The proposed crossing location on the Lower Guisiguit was located on the floodplain at a confluence with this watercourse and an unnamed tributary. Floodplains and watercourse confluence are typically viewed as having very high archaeological potential. During the testpitting program initiated by the consultant archaeologist, one artifact, a bifacially (flakes removed from two directions) flaked stone tool was recovered at 24 cm below the surface. This find was registered as an archaeological site, and designated as registered site CdDw 1. The site was located on the south side of the Lower Guisiguit (Figure 5.10.3). Following the recovery, and the notification of the provincial regulator (who subsequently notified the Maliseet Advisory Committee on Archaeology) a more intensive investigation of the area of the find was initiated. The 50 cm by 50 cm square testpits in the immediate area of the find were expanded into 1 metre square units and additional 1 metre square units and 50 cm testpits were placed in the area as well. Two bones (one avian and one small mammal) were recovered during this testing, however, both were of recent origin and not archaeological. The only archaeologically relevant finding from this additional work was the recovery of one stone flake in the expanded testpit (Dignam and Associates Consulting 2003).

## **Big Presque Isle Stream**

As a result of a project design change, the crossing location for the Big Presque Isle stream was moved downstream between the summer of 2002 and 2003 and thus the new crossing required examination by an archaeologist. The walkover revealed that the stream is located at the bottom of a very steep gorge. The north side, in particular was steep right to the water's edge for approximately half of the width of the RoW. The eastern portion was tested where a narrow terrace area held some potential for archaeological resources. Nothing cultural was encountered. The slope on the south side was interrupted by the presence of a small terrace, which occupied only the middle portion of the RoW. This area was only about 5 to 10 m wide. In testpit (Tp) #3 on this side a collection of 39 square nails was encountered in the top layer of the testpit (Figure 5.10.4). Additional testing adjacent to Tp #3 located five more nails of the same style and condition. No other nails or artifacts were recovered in any of the other 19 testpits at this stream.



Following the completion of the testing at the stream, the nails were examined in the lab. All are square cut nails, from 7-10 cm in length, with the exception of one large round 15 cm spike. Although natural corrosion was evident on the nails, they do not show any sign of actually having been used. The fact that there is no surface evidence of a structure in the area, no obvious access to a structure, other than the stream, no other construction material encountered, and that the nails do not appear to have been used suggests that they may have been part of a barge or boat load of construction material being floated up or down the stream to another location. They were likely boxed together and fell off the barge and floated or ice brought them to this location. The box would have rotted eventually and a pile of nails would have remained. Although square cut nails were beginning to become widespread by the mid-19th century, the presence of a large round nail amongst them, suggests a late 19th century timeframe, possibly the 1880's.

### **Little Presque Isle Stream**

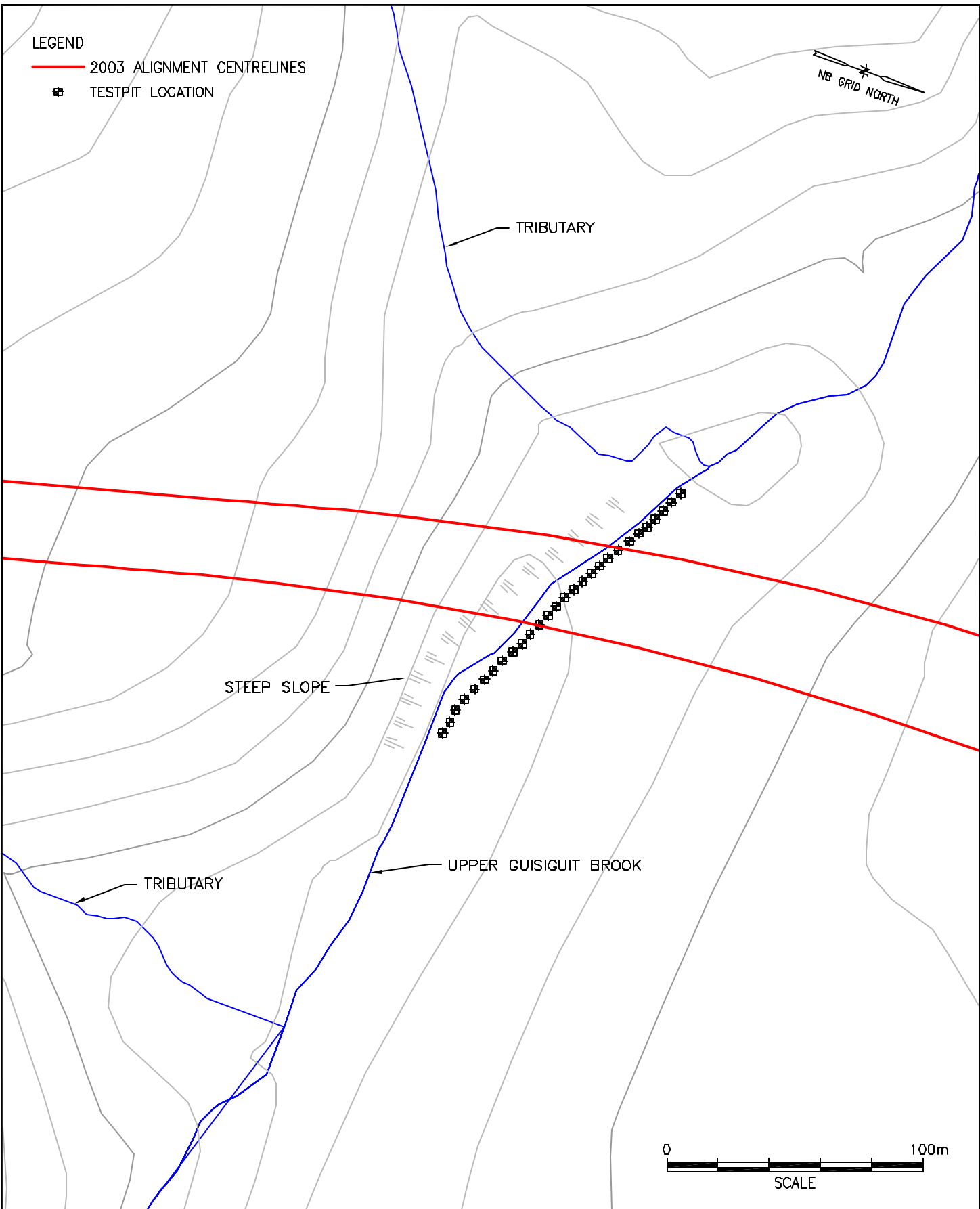
There are two crossings of this watercourse by the proposed Project. One crossing is for the main highway lanes, the other for a connector road for the Town of Hartland. Both sides to the crossing location were tested (Figure 5.10.5). No cultural material was encountered.


Due to the steep approach slope on the east side of the stream at the interchange access road location, no testing was warranted. One pre-contact period artifact was recovered from the western shoreline site at this crossing location of the Little Presque Isle Stream (Figure 5.10.6). The artifact, a ground-stone axe, was located during a routine examination of the erosional face of the watercourse. Subsequent testing (with a combination of regular and expanded testpits) of the bank area above the find location as well as along the stream's edge for the width of the RoW did not recover any additional artifacts, nor were any features encountered. This site has been registered as site CbDv 9 and will likely be classified as a find-spot; that is a location where an individual artifact has been recovered, yet no other artifacts nor features appear in the area in association with the artifact (Heritage Technologies Inc. 2003).

### **Walkover of the Proposed TCH**

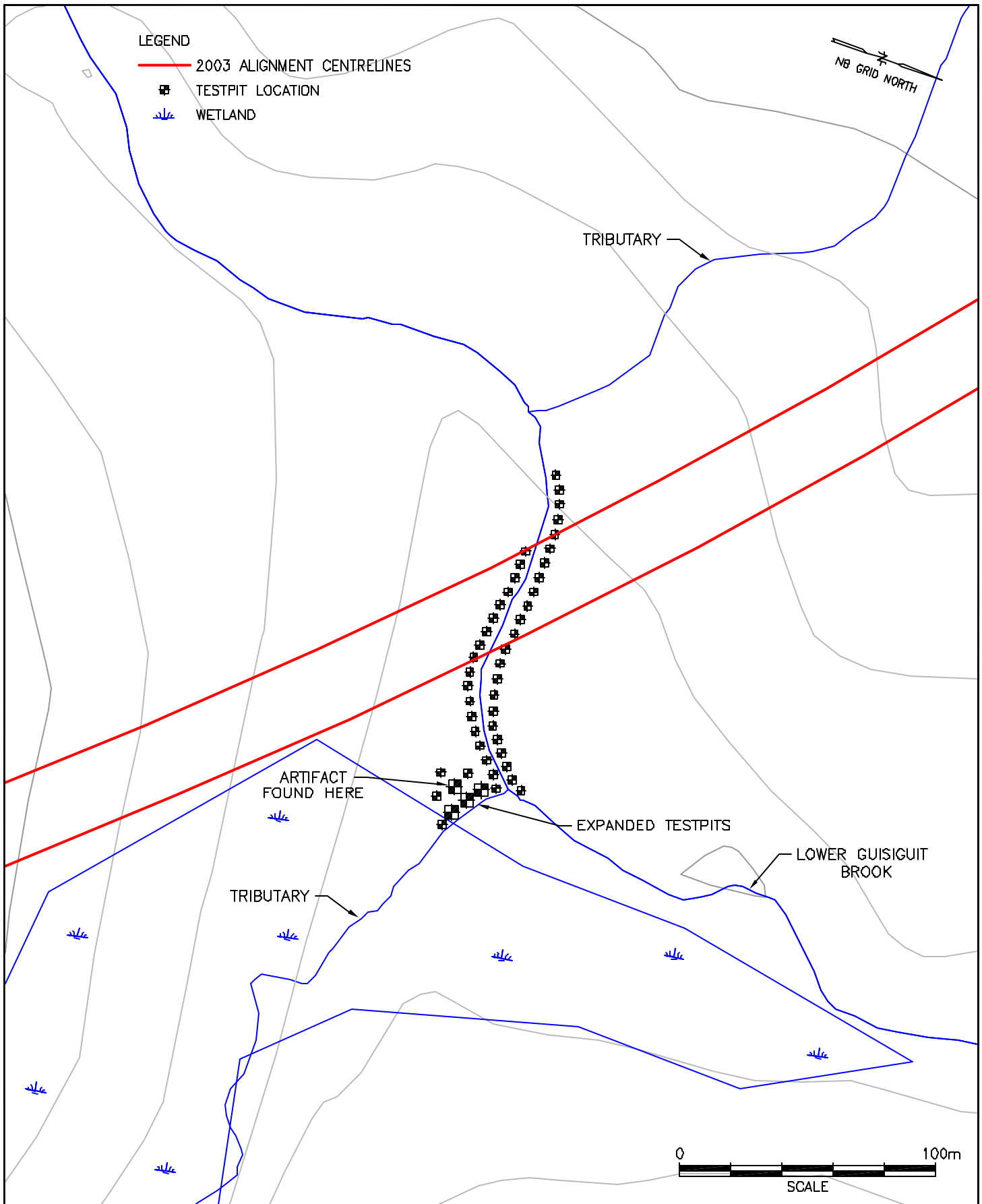
The proposed RoW, as determined at the time of the survey, was subject to a 100% walkover. The objective of this effort was to attempt to confirm the results of the archaeological modeling exercise by: 1) locate surface features (both cultural and/or naturally significant) not visible on mapping and aerial photographs; and 2) gather new information which, if conflicting with the data used in the model could be used to re-evaluate the model. During this exercise, the cut line of the RoW was walked by the archaeological teams with transects across the RoW examined at varying intervals, as ground conditions warranted. In addition, woods roads were examined and areas of abandoned farmland were inspected for surface features such as old structures, and family burial plots. In addition, topographical






<b>APPROXIMATE LOCATION OF ARCHAEOLOGICAL TESTPITS UPPER GUISIGUIT BROOK</b>	Date: 2003 10 03	Scale: 1 : 2000	 <b>Jacques Whitford</b> Consulting Engineers Environmental Scientists
	Job No.: 14677	Fig. No.: 5.10.2	
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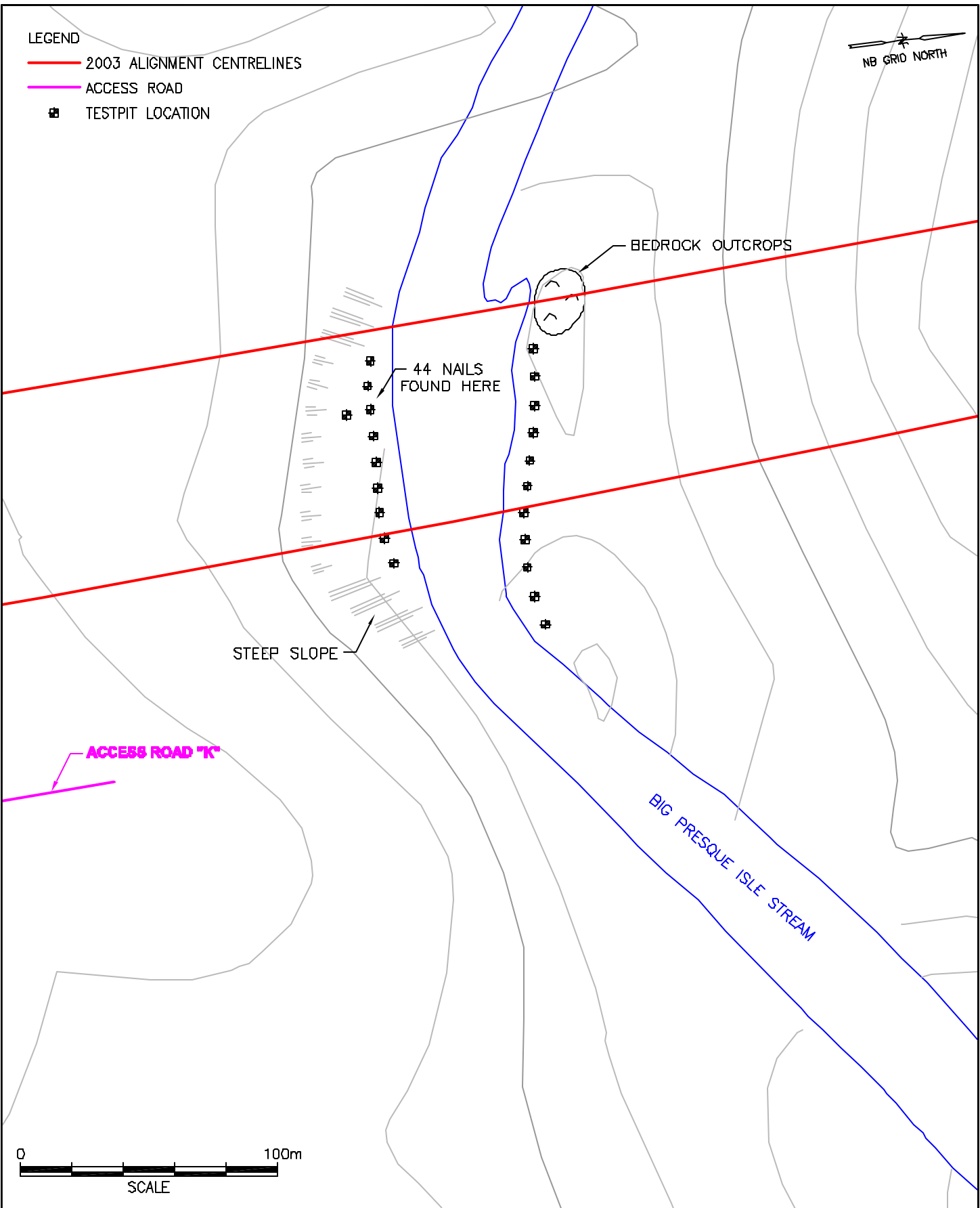





<p><b>APPROXIMATE LOCATION OF ARCHAEOLOGICAL TESTPITS LOWER GUISIGUIT BROOK</b></p>	Date: 2003 10 03	Scale: 1 : 2000	 <p><b>Jacques Whitford</b> Consulting Engineers Environmental Scientists</p>
	Job No.: 14677	Fig. No.: 5.10.3	
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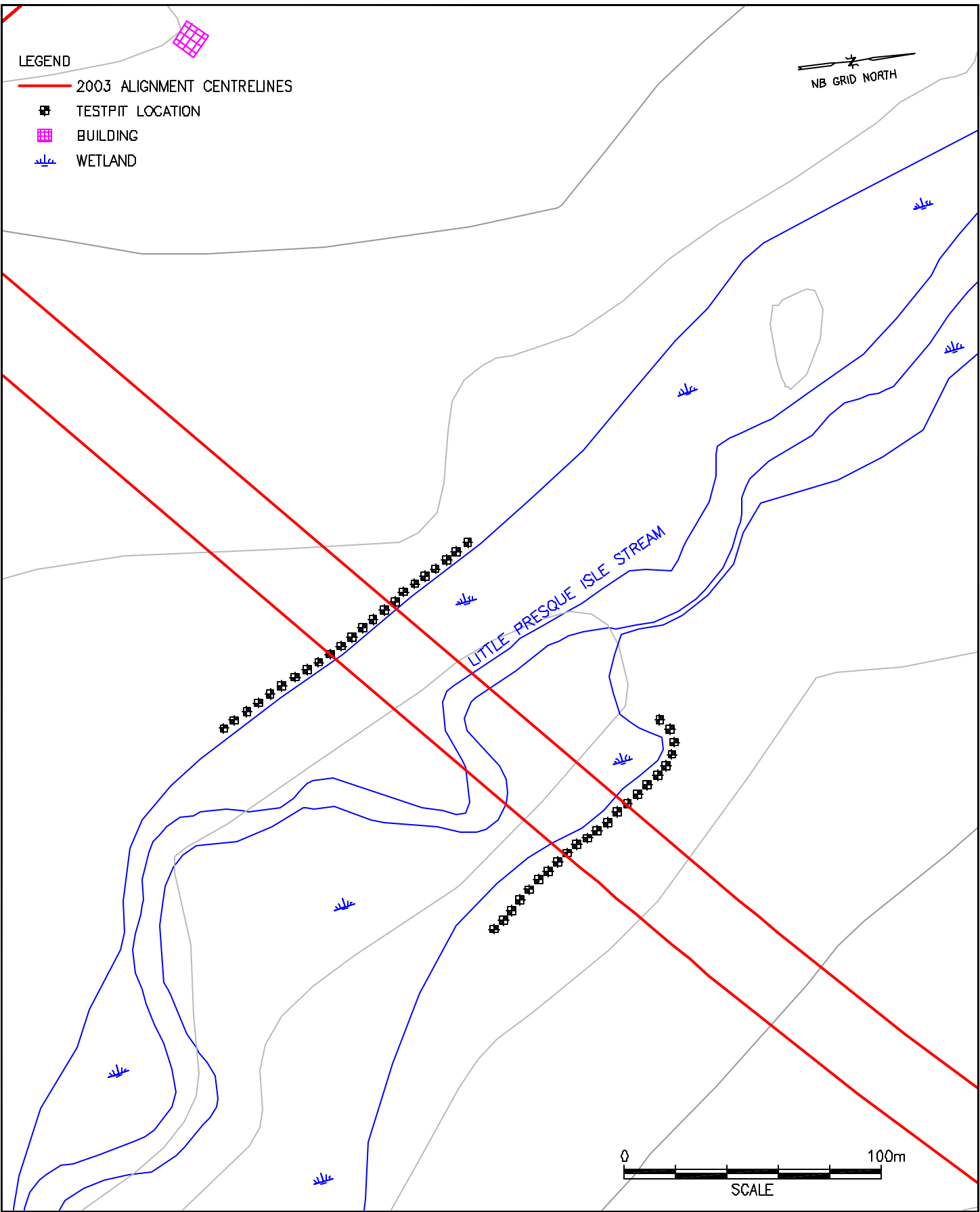






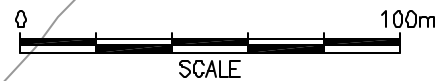
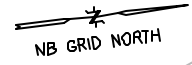
<b>APPROXIMATE LOCATION OF ARCHAEOLOGICAL TESTPITS BIG PRESQUE ISLE STREAM</b>	Date: 2003 10 03	Scale: 1 : 2000	 <b>Jacques Whitford</b> Consulting Engineers Environmental Scientists
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LEGEND

- 2003 ALIGNMENT CENTRELINES
- TESTPIT LOCATION
- BUILDING
- ▨ WETLAND




**APPROXIMATE LOCATION OF ARCHAEOLOGICAL TESTPITS**  
**LITTLE PRESQUE ISLE STREAM**  
**(FOUR-LANE HIGHWAY CROSSING)**

Date:  
2003 10 05

Job No.:  
14677

Scale:  
1 : 2000

Fig. No.:  
5.10.5



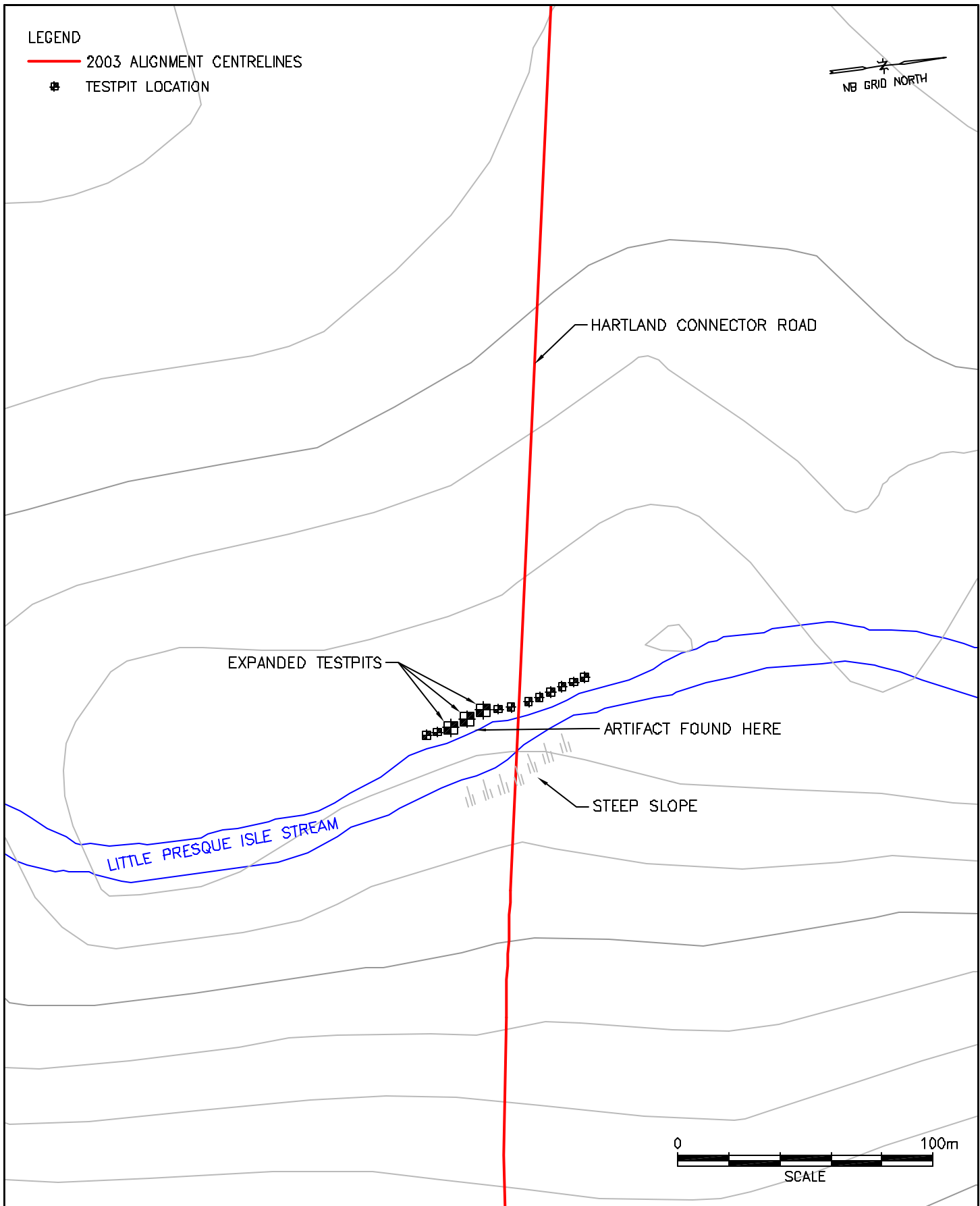
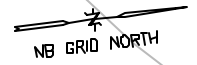
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LEGEND

- 2003 ALIGNMENT CENTRELINES
- ⊠ TESTPIT LOCATION




**APPROXIMATE LOCATION OF ARCHAEOLOGICAL TESTPITS**  
**LITTLE PRESQUE ISLE STREAM**  
**(HARTLAND CONNECTOR ROAD CROSSING)**

Date:  
2003 10 05

Job No.:  
14677

Scale:  
1 : 2000

Fig. No.:  
5.10.6



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information was evaluated for such natural features as old watercourse channels, glacial melt-water beaches and any other information that might be relevant to the heritage assessment of the proposed RoW, including new access roads.

In many areas within the proposed RoW where agricultural fields dominated the landscape, the proposed TCH was routed in an attempt to avoid as much cropland as reasonably possible. During the walkover of these areas, in particular in the southern portions of the RoW, the reason there were no fields in those areas became very obvious as the alignment tended to be in low areas of poor drainage and had very low potential for archaeological resources. Many of the forested areas in the northern sections of the RoW were located on areas well elevated above the navigable rivers and streams in the area, and also scored low for archaeological potential, particularly for pre-contact resources.

Several features related to abandoned farming activities during the 19th and early 20th centuries were encountered during the walkover. These mainly included such things as field-clearing rock piles, cedar rail fencing, and pagewire fencing. Based on the cut line chainages (westbound lane) marked on the survey stakes encountered, fieldstone piles/fence lines appeared at 239+175, 239+050, 231+400, 230+825, 228+725, 225+925, 209+250, 208+550, 208+400, 207+650, 207+550, and 206+900. The ground around these features was generally very flat and in various states of regeneration. The stone pile at 207+550, for example, was over 6 m in diameter and 2 m high in its middle. Considerable effort and/or time had obviously been spent preparing and maintaining that field for agricultural purposes. Some of the fields had clearly not been maintained for a long time, possibly as much as 100 years, based on the size of the trees growing within them. Others appeared to have been abandoned within the last 20 years. The ground around all of these abandoned fields was thoroughly examined for indications of surviving structures associated with agriculture and in particular for any evidence of family burial plots. The potential for such sites is low given the establishment of churches and burial grounds concurrently with the settlement of these areas, however, it was necessary to confirm this presumption.

Where plowed fields were encountered during the walkover, a transect system of walking was established to see if any archaeological sites had been encountered during this process and if any surface artifacts could be seen. This methodology of walking over plowed fields looking for artifact scatters has long been successfully practiced in areas such as southern Ontario and the eastern US. Although there is no tradition of this methodology in New Brunswick, it is a worthwhile approach when the opportunity presents itself. No significant archaeological resources were discovered during this procedure. The fieldstone piles and old fence lines that were encountered are not considered historically significant enough to warrant changes to the Project.

One potential palaeo-shoreline area was encountered during the walkover in 2002 in the area south of Demerchant Brook (Figure 5.10.7). This area was investigated in 2003 with the assistance of Quaternary geologist Allan Seaman of the NBDNR. During Mr. Seaman's examination of the area,



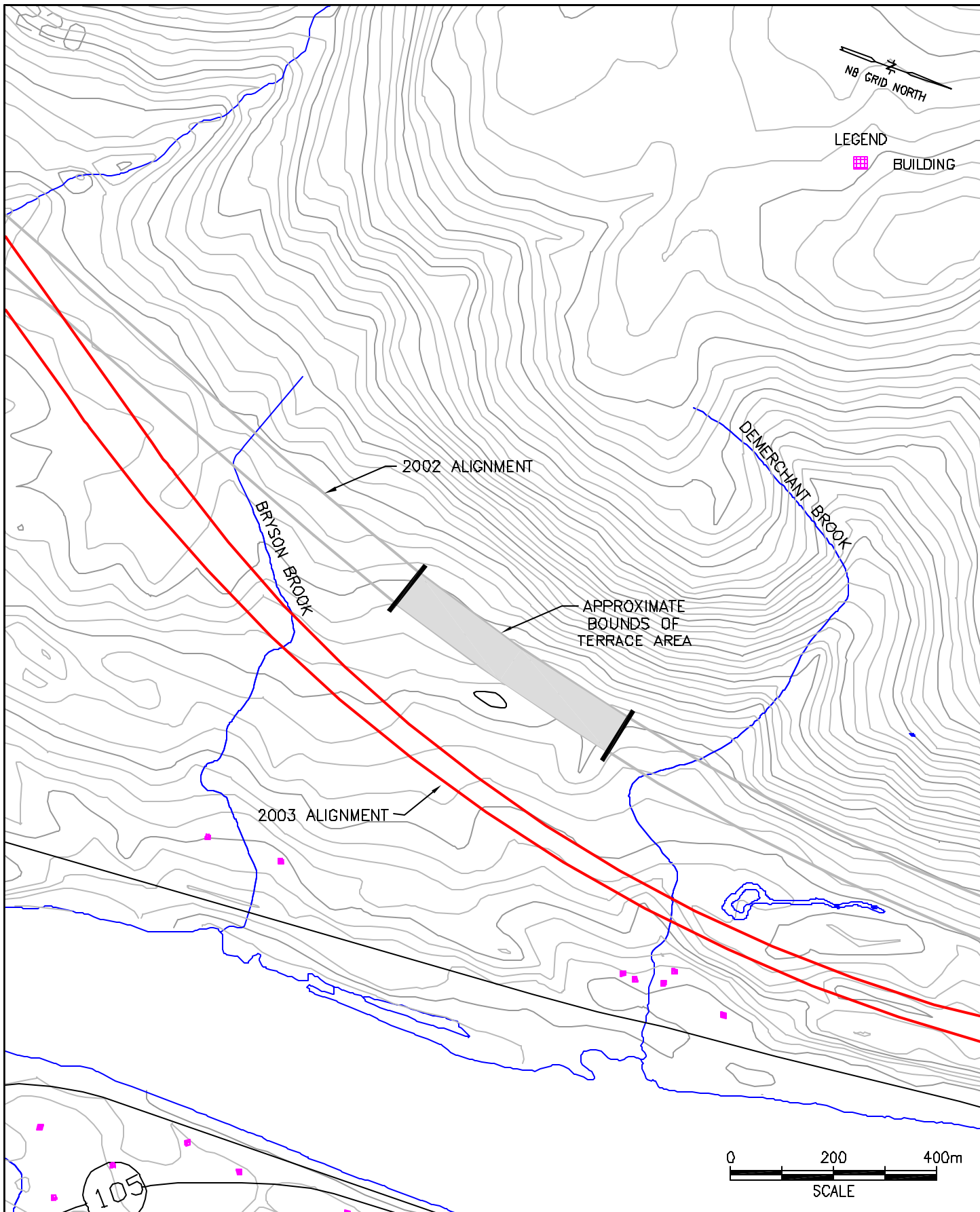
which included subsurface testing, he determined that the area consisted of basal lodgment till, material that was pushed to that location by a glacier and thus it would not have been part of a palaeo-shoreline. In addition to this, it was noted that the area had been plowed, likely in the 19th century based on the size of the trees in the area. Based on the fact that the area was not a paleo-shoreline, testpitting for cultural features or artifacts was not warranted along this area. In addition to this, the proposed alignment has moved approximately 250 m to the east at this location. The archaeological team inspected the proposed new RoW alignment, however, due to the steep slope in this area, no similar concerns were raised and no additional investigation is warranted.

A wooden structure described as a maple sugar camp was encountered at the Stairs Road (for location Figure 3.2B, Appendix C), however, it is not considered to be an important heritage resource. One informant stated that the remains of an old house (including a cellar) with various outbuildings was also located at the Stairs Road. A surface examination of this area failed to encounter these features and it is presumed that they likely lie outside of the proposed RoW. Various historic period artifacts were encountered during testing at the Sipprell Road crossing location, however, they all appeared to be 20th century in origin, and therefore no changes to the proposed alignment has been recommended at this location.

The remains of an old lumber mill were encountered within the RoW, approximately 4 km north of the Raymond Road (Figure 3.2C, Appendix C). The site is located next to an abandoned farm property upon which there was a house and outbuildings. A local informant stated that he was sure that no cellar feature existed for the house and that the house and other buildings were located away from the proposed RoW. Given that the potential to encounter surface features was minimal, no extensive surface examination for any remains of the house was initiated. The lumber mill site is visible on the surface in the form of a 3.8 by 6.8 stone foundation, with some metal fragments from various pieces of equipment in the area as well. According to a local resident, there was a water well in the area that was used to draw water, which in turn was boiled to produce steam to drive the saw in the mill. The archaeological team was unable to locate the well. Given the quality and “living memory” of the local lore on this site, it likely dates to the mid- to late 19th century. The site has been recorded, sketched, and photographed for archival purposes. Little remains of the structure and no change to the proposed alignment is recommended for this location.








**APPROXIMATE BOUNDS OF POTENTIAL  
TERRACE AREA, DEMERCHANT BROOK  
NEW ROUTE 2 TRANS-CANADA HIGHWAY  
PROJECT PERTH-ANDOVER TO WOODSTOCK**

Date:	2003 10 05	Scale:	1 : 10 000
Job No.:	14677	Fig. No.:	5.10.7


**Jacques Whitford**  
 Consulting Engineers  
 Environmental Scientists

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## **Access Roads**

There are 19 proposed new access roads associated with the proposed Project (Figures 3.2 A-D, Appendix C). All of these roads are to provide access to land where current access will be cut off as a result of the proposed TCH. Many of these roads parallel the existing RoW and thus many of the locations of the access roads were surveyed during the earlier field visits. Almost all of these new roads are located away from significant watercourses and are in areas considered to have low potential for archaeological resources. Access Road J did cross Hunter Brook (Figure 3.2C, Appendix C), however the watercourse could not be considered navigable at the crossing location. The west side of the watercourse crossing was very steep right to the waters edge and thus no testpitting was warranted. The north side consisted of a series of abandoned high water channels with small terraces in between. The water was very close to the surface in this area. Two testpits were placed on the eastern shoreline area. No cultural material was encountered.

There was evidence of past and relatively recent forest harvesting activities observed throughout the forested portions of the RoW during the walkover. Obviously this activity is well documented throughout the province and it is not considered historically significant.

As with most archaeological surveys, there is an element of uncertainty regarding the field portions of the assessment and therefore despite the apparent lack of any remaining significant heritage resources along the proposed alignment, there remains a limited potential for encountering such resources during the groundbreaking phases of construction within the proposed RoW. In order to address this issue it is recommended that in the unlikely event archaeological materials are encountered during any groundbreaking phases of the construction work related to the Project, Section 7.6(f) of the EPP be followed by construction workers and supervisory personnel on the site. This section states that in the event of a discovery of an archaeological nature, work in the area of the discovery shall be halted and the provincial regulating agency contacted for assistance and guidance.

## **Architectural Heritage**

Despite NBDOT's efforts to avoid existing homesteads, structures (houses, garages, various outbuildings) were encountered on 34 of the properties crossed by the proposed RoW. These have to be removed as a result of the proposed Project. In all circumstances, these structures are located within the proposed RoW and realigning the proposed TCH at these locations was not feasible.

Nineteen houses on properties that were crossed by the alignment will be removed from the property and placed elsewhere. Only one house was torn down. This house was a Georgian-style home and is reported as being approximately 100 years old. Georgian style houses and various imitation styles have been constructed in New Brunswick since the arrival of the Loyalists in the late 18th century and are still very popular. The house that was torn down, located on Route 560 at Jacksonville, did not possess any



unique attributes that warranted preservation and the house was in relatively poor condition. There was an addition on the back of the house that was of an inconsistent style and the interior had been modified to accommodate its alteration into apartments. There are additional properties for which the sale of the property has not been completed at the time of this study.

None of the houses affected by the Project are on the Canadian Inventory of Historic Buildings. Based on the review of these building, most were of relatively recent construction (post-1945), were bungalows or similar design and are not of historical or architectural significance. Some of the homes were approximately 100 years old. At this time it has not been determined if any of the 19 sold properties with houses possess any features of architectural significance, however, since the houses were not destroyed, there is no loss to architectural heritage of the properties. For those properties where the sales have not been completed, none are on the Canadian Inventory of Historic Buildings, most are of relatively recent construction and some are mobile homes. None are believed to be of architectural significance.

## **Palaeontological Resources**

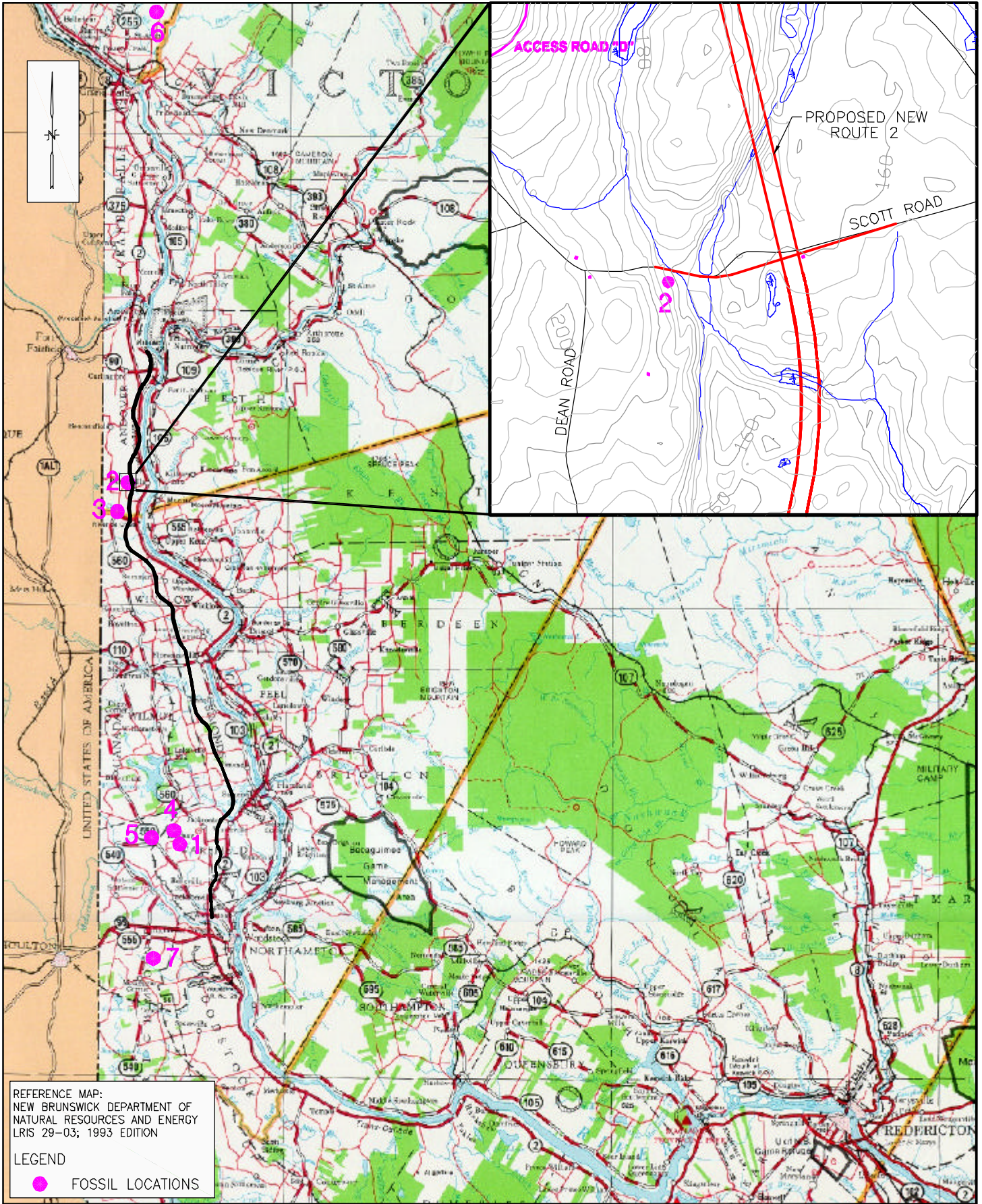
Five sites that are known to contain palaeontological resources have been recorded by provincial agencies within 10 km of the proposed TCH (Figure 5.10.8). The closest known fossil site is located approximately 420 m west of the proposed new underpass at Scott Road. This site produces fossils of corals and crinoids from the Silurian and Devonian periods. It is very unlikely that this site will be affected by the proposed Project. Given that similar rock formations will be exposed in the area during the blasting of the required grade cuts in areas where bedrock is close to the surface, there is the potential for new fossil producing rock to be exposed here and throughout the length of the proposed TCH. Rock cuts exposed as a result of blasting activities associated with construction are often sought out by geologists studying the area, since there tend to be few natural phenomenon in this area that expose these sedimentary layers for scientists to study. While some individual fossils will potentially be destroyed during blasting, the rock formations that contain these fossils are extensive and spread throughout this area.

### **5.10.5 Environmental Effects Analysis**

#### **5.10.5.1 Project-VEC Interactions**

This section evaluates the significance of potential residual environmental effects resulting from Project interactions with the Archaeological and Heritage Resources VEC. The proposed mitigation, consisting of the pre-construction survey and the implementation of the archaeological protocol presented in Sections 7.6 and 8.3 of the EPP, are included within the analysis.





REFERENCE MAP:  
 NEW BRUNSWICK DEPARTMENT OF  
 NATURAL RESOURCES AND ENERGY  
 LRIS 29-03; 1993 EDITION

LEGEND  
 ● FOSSIL LOCATIONS

**PALAEONTOLOGICAL RESOURCES IN AREA  
 NEW ROUTE 2 TRANS-CANADA HIGHWAY  
 PROJECT PERTH-ANDOVER TO WOODSTOCK**

Date:  
 2003 10 05  
 Job No.:  
 14677

Scale:  
 N.T.S.  
 Fig. No.:  
 5.10.8



**Jacques Whitford**

Consulting Engineers  
 Environmental Scientists

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Table 5.10.1 illustrates that only groundbreaking activities have the potential for interaction with the Archaeological and Heritage Resources VEC during construction and for accidents, malfunctions and unplanned event only.

**Table 5.10.1 Project Activity – Environmental Effects Interaction Matrix for Archaeological and Heritage Resources**

<b>Potential Interactions Between Project Activities and Environmental Effects</b> <b>Valued Environmental Component: <u>ARCHAEOLOGICAL AND HERITAGE RESOURCES</u></b>	
<b>Project Activities and Physical Works</b> (see Table 4.1.1 for list of specific activities and works)	<b>Potential Environmental Effect</b> <b>Project Related Change in</b> <b>Archaeological and Heritage</b> <b>Resources</b>
<b>Construction</b>	
Site Preparation	✓
Roadbed Preparation	
Surfacing and Finishing	
Watercourse Crossing Structures	✓
Ancillary Structures and Facilities Construction	✓
<b>Operation</b>	
Winter Safety	
Proposed TCH Presence	
<b>Maintenance</b>	
Proposed TCH Maintenance	
Vegetation and Wildlife Management	
<b>Accidents, Malfunctions and Unplanned Events</b>	
Hazardous Material Spills	✓
Disturbance of Archaeological or Heritage Resources	✓

#### 5.10.5.1.1 Construction

A substantial amount of the construction associated with the proposed Project involves groundbreaking. Clearing has the potential to disturb subsurface soils due to soft ground conditions in wet soils and along watercourse shorelines, although measures in place as described in the EPP to prevent erosion and sediment problems, will often address the issues related to soil disturbance in these areas. The potentially most destructive phase of construction is the establishment of grade. This work involves the movement of large amounts of soil and rock within the footprint to achieve the ground elevation levels required by the design of the proposed TCH. By far most archaeological sites are located in the upper portions of the soil stratigraphy, in those layers of soil deposited since the retreat of the glaciers, 11,000 years ago. The blasting of rock encountered below the covering soils is typically not a concern, as subsurface rock will not contain any archaeological evidence. Therefore, following the removal and disruption of the upper soil layers, there is no further concern for any interactions between the Project and this VEC.



As discussed previously, shorelines often have high archaeological potential given that watercourses were the main transportation routes during pre-contact and the early historic period throughout the region. All watercourses that are to be crossed by the proposed Project will require a structure of some type to be installed within or over the channel. These structures usually require relatively complicated installation procedure with a lot of construction equipment. Therefore there is the potential for an interaction with heritage resources at the watercourse shoreline.

There are various facilities associated with the proposed Project such as marshalling yards, weigh scales, aggregate sources, and new access roads. Most of these areas will be located within the RoW and were therefore included within the modeling and archaeological surveys undertaken. Any facilities, such as the aggregate extraction areas, which have not been identified, will be reviewed once their location has been determined. If, during a preliminary archaeological survey, any significant heritage resources are encountered at the proposed location, then appropriate mitigation will be implemented or another aggregate site will be chosen.

#### **5.10.5.1.2 Operation**

The activities associated with the later phases of the project such as the surfacing and finishing of the proposed TCH and those associated with the operation and maintenance of the proposed TCH are not anticipated to affect archaeological and heritage resources since no new groundbreaking activities will take place during this construction phase. Therefore there is no interaction between the operational phase of the project and the VEC and thus there is virtually no potential for environmental effects to archaeological and heritage resources during normal activities associated with this activity.

#### **5.10.5.1.3 Maintenance**

Within the normal activities associated with highway maintenance, there will be no interaction between this phase of the Project and the VEC.

#### **5.10.5.1.4 Accidents, Malfunctions and Unplanned Events**

Table 5.10.1 demonstrates that there is a pathway between the preliminary groundbreaking activities associated with construction and the Archaeological and Heritage Resources VEC in the case of an accident or unplanned event. Examples of Accidents and Malfunctions include the spill of a material that requires a clean-up (*e.g.*, Petroleum Oil Lubricant (POL)) or the potential for off-RoW vehicle movement. An unplanned event that could have the potential to affect this VEC is the disturbance of an unknown archaeological resource during the groundbreaking phases of construction.





### 5.10.5.2 Environmental Effects Analysis and Mitigation

The following tables in this section provide the environmental effects matrix for the Project activities that could potentially interact with the Archaeological and Heritage Resources VECs. The sections have been divided into the interaction activities: Construction, Accident and Unplanned Events. The text following each table provides a discussion of the environmental effects and mitigation outlined in the matrix.

#### 5.10.5.2.1 Construction

**Table 5.10.2 Environmental Effects Assessment Matrix for Archaeological and Heritage Resources (Construction)**

<b>Environmental Effects Assessment Matrix</b> <b>Valued Environmental Component: <u>Archaeological and Heritage Resources</u></b> <b>Phase: <u>Construction</u></b>							
<b>Project Activity</b> (See Table 4.1.1 for list of specific activities and works)	<b>Potential Environmental Effects</b>	<b>Mitigation</b>	<b>Magnitude</b>	<b>Geographic Extent</b>	<b>Duration/Frequency</b>	<b>Reversibility</b>	<b>Ecological/Socio-Cultural and Economic Context</b>
Site Preparation	Disturbance or destruction of a significant archaeological or heritage resource (A)	<ul style="list-style-type: none"> <li>Pre-construction archaeological survey</li> <li>Archaeological monitoring at Little Presque Isle and Lower Guisquit Stream</li> <li>All construction activities will be carried out in accordance with Sections 7.6 and 8.3 of the EPP</li> </ul>	1	1	1/1	I	2
Watercourse Crossing Structures	Disturbance or destruction of a significant archaeological or heritage resource (A)	<ul style="list-style-type: none"> <li>Pre-construction archaeological survey</li> <li>Archaeological monitoring at Little Presque Isle and Lower Guisquit Stream</li> <li>All construction activities will be carried out in accordance with Sections 7.6 and 8.3 of the EPP</li> </ul>	1	1	1/1	I	2
Ancillary Structures and Facilities Construction	Disturbance or destruction of a significant archaeological or heritage resource (A)	<ul style="list-style-type: none"> <li>Pre-construction archaeological survey</li> <li>All construction activities will be carried out in accordance with Sections 7.6 and 8.3 of the EPP</li> </ul>	1	1	1/1	I	2



**Table 5.10.2 Environmental Effects Assessment Matrix for Archaeological and Heritage Resources (Construction)**

<b>Environmental Effects Assessment Matrix</b> <b>Valued Environmental Component: <u>Archaeological and Heritage Resources</u></b> <b>Phase: <u>Construction</u></b>							
Project Activity (See Table 4.1.1 for list of specific activities and works)	Potential Environmental Effects	Mitigation	Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context
<b>Key:</b> Magnitude: 1 = Low: e.g., minor impairments to cultural resources appreciation or affects to non-significant historic period heritage feature, e.g., stone fence line, field stone pile; loss of individual artifact. 2 = Medium: e.g., loss of historic or cultural resources not of major importance or pre-disturbed heritage site, artifacts present, however, no or little chance of intact features. 3 = High: e.g., intact "significant" heritage site, pre-contact and/or contact period, features present, portion or all of site will be destroyed or lost. Geographic Extent: 1 = <1 km <sup>2</sup> 2 = 1-10 km <sup>2</sup> 3 = 11-100 km <sup>2</sup> 4 = 101 - 1,000 km <sup>2</sup> 5 = 1,001 - 10,000 km <sup>2</sup> 6 = >10,000 km <sup>2</sup> Duration: 1 = <1 month 2 = 1 - 12 months 3 = 13 - 36 months 4 = 37 - 72 months 5 = >72 months Frequency: 1 = <11 events/year 2 = 11 - 50 events/year 3 = 51 - 100 events/year 4 = 101 - 200 events/year 5 = >200 events/year 6 = continuous Reversibility: R = Reversible I = Irreversible Ecological/Socio-cultural and Economic Context: 1 = Relatively pristine area or area not adversely affected by human activity. 2 = Evidence of adverse environmental effects. N/A = Not Applicable (A) = adverse (P) = positive							

Site preparation and construction will require clearing, grading, soil removal and deposition, and structure construction at watercourses. Clearing and grading will disturb the integrity of the subsurface soils which may result in the disturbance or loss of archaeological and heritage resources. The archaeological survey completed by the three consulting companies reviewed the entire RoW and included a comprehensive testpitting survey of the areas of high archaeological potential (Dignam and Associates Consulting 2003; Heritage Technologies Inc. 2003; JWEL 2003f). No significant archaeological or heritage resources were identified during the study survey along the RoW. Therefore it is not anticipated that there will be any adverse environmental effects to the Archaeological and Heritage Resources VEC during the construction phase of the Project.

Navigable watercourses tend to score high on archaeological modeling exercises, pending verification of ground conditions during a field visit. These areas were thoroughly examined by the various archaeological teams. Shoreline areas were tested, where appropriate, and all soils screened through ¼ inch mesh to ensure that no artifacts were missed. The artifact and the flake recovered from the Lower Guisiguit Brook crossing location appear to be isolated finds and not representative of a larger archaeological site. Based on the findings of the consultant archaeologist, there is no recommendation to change the proposed alignment at this watercourse (Dignam and Associates Consulting 2003). However it is recommended that an archaeologist monitor the initial groundbreaking phases of construction at this location. Based on the results of the pre-construction survey and the monitoring



recommendation, no adverse environmental effects to this VEC are anticipated at this watercourse crossing location as a result of the Project.

The groundstone axe recovered in the riverbank at the connector road to Hartland, which crosses the Little Presque Isle Stream, appears to be an isolated find and not representative of a larger archaeological site. When individual pre-contact period artifacts are encountered in this manner, they are presumed to have been lost or discarded by their original users. In this case, since no other evidence of use or occupation of the area was found during the additional testing regime, it appears that there is no further evidence to be gathered from the location. Therefore, no changes to the proposed alignment have been recommended at this watercourse crossing location (Heritage Technologies Inc. 2003). The provincial regulating agency for archaeology has accepted all the recommendation of the consultants' archaeological license reports. However it is recommended that an archaeologist monitor the initial groundbreaking phases of construction at this location. Based on the results of the pre-construction survey and the monitoring recommendation, no adverse environmental effects to this VEC are anticipated at this watercourse crossing location as a result of the Project.

### **Architectural Heritage**

To date only one house was demolished as a result of the Project and it was of a style common throughout New Brunswick. None of the remaining structures to be removed are considered to be architecturally significant. Thus, no significant adverse environmental effects to architectural heritage are anticipated as a result of the Project.

### **Palaeontological Resources**

Based on the abundant nature of the bedrock formations, within which these resources exist in the area of the Project, it is not anticipated that any significant palaeo-environmental information will be lost as a result of the Project.

Based on the results of the archaeological assessment and fieldwork, the potential for the construction of any Project ancillary facilities to result in Project-related environmental effects to this VEC is low. Although the proposed alignment does cross several areas determined to have medium to high potential for archaeological resources, these areas were thoroughly examined by professional archaeologists and no significant resources were encountered. Any ancillary resources related to the project that have not been determined at this time will be subject to an environmental review prior to any groundbreaking construction activities. Therefore it is not anticipated that there will be adverse environmental effects to the archaeological and heritage resources as a result of the Project.



Based on this analysis, the residual environmental effects of the Project on the Archaeological and Heritage Resources VEC are considered as not significant

### 5.10.5.2.2 Accidents, Malfunctions and Unplanned Events

**Table 5.10.3 Environmental Effects Assessment Matrix for Archaeological and Heritage Resources (Accidents, Malfunctions and Unplanned Events)**

<b>Environmental Effects Assessment Matrix</b> <b>Valued Environmental Component: <u>Archaeological and Heritage Resources</u></b> <b>Phase: <u>Accidents, Malfunctions and Unplanned Events</u></b>							
Project Activity (See Table 4.1.1 for list of specific activities and works)	Potential Environmental Effects	Mitigation	Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context
Hazardous Material Spills	Disturbance or destruction of a significant archaeological or heritage resource (A)	<ul style="list-style-type: none"> <li>Pre-construction archaeological survey</li> <li>All construction activities will be carried out in accordance with Sections 7.6 and 8.3 of the EPP</li> </ul>	1	1	1/1	I	2
Disturbance of Archaeological or Heritage Resources	Disturbance or destruction of a significant archaeological or heritage resource (A)	<ul style="list-style-type: none"> <li>Pre-construction archaeological survey</li> <li>Archaeological monitoring at Little Presque Isle and Lower Guisguet Stream</li> <li>Marking of RoW boundary during construction</li> <li>All construction activities will be carried out in accordance with Sections 7.6 and 8.3 of the EPP</li> </ul>	1	1	1/1	I	2

Key:

<b>Magnitude:</b> 1 = Low: e.g., minor impairments to cultural resources appreciation or affects to non-significant historic period heritage feature, e.g., stone fence line, field stone pile; loss of individual artifact. 2 = Medium: e.g., loss of historic or cultural resources not of major importance or pre-disturbed heritage site, artifacts present, however, no or little chance of intact features. 3 = High: e.g., intact "significant" heritage site, pre-contact and/or contact period, features present, portion or all of site will be destroyed or lost.	<b>Geographic Extent:</b> 1 = <1 km <sup>2</sup> 2 = 1-10 km <sup>2</sup> 3 = 11-100 km <sup>2</sup> 4 = 101 - 1,000 km <sup>2</sup> 5 = 1,001 - 10,000 km <sup>2</sup> 6 = >10,000 km <sup>2</sup>	<b>Frequency:</b> 1 = <11 events/year 2 = 11 - 50 events/year 3 = 51 - 100 events/year 4 = 101 - 200 events/year 5 = >200 events/year 6 = continuous	<b>Ecological/Socio-cultural and Economic Context:</b> 1 = Relatively pristine area or area not adversely affected by human activity. 2 = Evidence of adverse environmental effects.  N/A = Not Applicable (A) = adverse (P) = positive
	<b>Duration:</b> 1 = <1 month 2 = 1 - 12 months 3 = 13 - 36 months 4 = 37 - 72 months 5 = >72 months	<b>Reversibility:</b> R = Reversible I = Irreversible	

The archaeological resources that may be affected as a result of an unplanned event are individual artifacts as opposed to archaeological sites containing features (non-removable in-ground evidence of human use and occupation such as fire pits and living floors). While the potential exists for individual



artifacts to have been missed during the survey, the potential for encountering archaeological or heritage sites during these accidental or unplanned events is considered low due to the intensity of the subsurface testpitting in areas of high archaeological potential. A spill of a material that requires a clean-up, any groundbreaking work outside of the area surveyed, and the unplanned discovery of an archaeological site within the RoW are events that could adversely effect archaeological resources. Spills requiring clean-up are most likely to occur within the footprint of the RoW where vehicle and equipment will be used and parked. Due to the precautions taken by developers, spills tend to be infrequent and minor, and therefore only limited ground disturbance is required to mitigate these situations. Off RoW vehicle movement is not anticipated to have an adverse environmental effect on the VEC. The RoW limits in forested areas will be clearly staked and/or flagged and only those areas required for construction will be cleared. In areas adjacent to agricultural fields, the RoW boundary will be clearly indicated and personnel driving heavy equipment will be instructed to stay within the construction zone. Developer or NBDOT personnel who encounter a potential heritage resource are instructed to follow the protocols outlined in Section 8.3 of the EPP. Therefore, while disturbance to any important archaeological or heritage resources as a result of an accident, malfunction or unplanned event could be significant, it is very unlikely to occur, given the implementation of mitigation such as the pre-construction archaeological survey, the RoW boundary delineation, and the archaeological protocol described in Section 8.3 of the EPP.

Based on this analysis, the residual environmental effects of the Project on the Archaeological and Heritage Resources VEC are considered as not significant

### 5.10.5.3 Determination of Significance

The overall results of the environmental assessment for the archaeological and heritage resources are presented in a summary matrix, Table 5.10.4. The residual environmental effects of the Project are considered as unlikely and not significant.

**Table 5.10.4 Residual Environmental Effects Summary Matrix for Archaeological and Heritage Resources**

<b>Residual Environmental Effects Summary Matrix</b>				
<b>Valued Environmental Component: ARCHAEOLOGICAL AND HERITAGE RESOURCES</b>				
<b>Phase</b>	<b>Residual Environmental Effects Rating</b>	<b>Level of Confidence</b>	<b>Likelihood</b>	
			<b>Probability of Occurrence</b>	<b>Scientific Certainty</b>
Construction	NS	3	1	3
Operation	N/A	N/A	N/A	N/A
Maintenance	N/A	N/A	N/A	N/A
Accidents, Malfunctions and Unplanned Events	NS	3	3	3
Project Overall	NS	3	3	3



**Table 5.10.4 Residual Environmental Effects Summary Matrix for Archaeological and Heritage Resources**

Residual Environmental Effects Summary Matrix				
Valued Environmental Component: <b>ARCHAEOLOGICAL AND HERITAGE RESOURCES</b>				
Phase	Residual Environmental Effects Rating	Level of Confidence	Likelihood	
			Probability of Occurrence	Scientific Certainty
Key Residual Environmental Effect Rating: S = Significant Adverse Environmental Effect NS = Not-significant Adverse Environmental Effect P = Positive Environmental Effect  Level of Confidence 1 = Low Level of Confidence 2 = Medium Level of Confidence 3 = High Level of Confidence				
Probability of Occurrence: based on professional judgement 1 = Low Probability of Occurrence 2 = Medium Probability of Occurrence 3 = High Probability of Occurrence  Scientific Certainty: based on scientific information and statistical analysis or professional judgement 1 = Low Level of Confidence 2 = Medium Level of Confidence 3 = High Level of Confidence N/A = Not Applicable *As determined in consideration of established residual environmental effects rating criteria.				

**5.10.6 Monitoring and Follow-up**

During the study no features of archaeological or heritage significance were noted. The two locations where pre-contact archaeological artifacts were encountered have been mitigated to the satisfaction of the provincial archaeological regulating agency, and no further testing is recommended. However, it is recommended that an archaeologist monitor the initial groundbreaking phases of construction at these two watercourses, the Lower Guisguet and Little Presque Isle River (Hartland connector road). With the exception of the navigable watercourse crossing with habitable topography which were thoroughly examined and tested, most of the RoW appears to have low to moderate potential for the presence of significant archaeological and heritage resources.

If a suspected archaeological / heritage resource is encountered during construction, it is recommended that the procedures described in Section 8.3 of the EPP be followed, including the cessation of construction activities in the area of the discovery and contacting the provincial regulating agency of archaeological resources.

