32 HERITAGE RESOURCES

32.1 Approach

Palaeontological, archaeological, and historical sites, objects, and features are the key indicators that comprise the heritage resources VC. These key indicators contain physical evidence of ancient flora and fauna or cultural materials including, but not limited to, remains of ancient campsites, subsistence procurement sites, historic structures, and locations containing burials. The heritage resources VC was selected for the following reasons:

- Interaction with Project components and activities
- Aboriginal concerns
- Public and stakeholder issues
- Federal and provincial regulations and guidelines

The selection of the heritage resources VC and the scope of the heritage program were developed using information obtained through discussion with various external sources including Aboriginal communities, research institutions, local citizens or associations, and government agencies.

Palaeontological, archaeological, and historical sites were identified through a review of pre-existing information and through an extensive field inventory program. The potential for the Project to adversely affect the VC, heritage resources, was assessed through a comprehensive heritage resources inventory and assessment program, recognizing that undetected heritage resources may be also encountered during the life of the Project. Such resources will be managed in a manner consistent with applicable legislation and policies (see Section 32.1.1).

Palaeontological sites are locations where ancient organisms, or traces of their existence, have been preserved in the geological record as fossils (Fossil Management Review Technical Working Group 2004). Fossils usually comprise the remnants of more resilient structural elements such as bones, teeth, shells, and woody parts, but can also be expressed as imprints of soft body parts, tracks, and traces of an organism's interaction with the environment. In northeast British Columbia, a wide variety of fossils occur in bedrock associated with Palaeozoic, Mesozoic, and Cenozoic times, and in unconsolidated Quaternary sediments. Known fossils from the region consist of mammals, birds, dinosaurs, reptiles, fish, shellfish, sea jellies (jellyfish), insects, worms, trees, ferns, flowering plants, mosses, algae, and micro-organisms, along with traces of their locomotion, feeding, and lodging.

Archaeological sites are locations that contain physical evidence of past human activities for which scientific methods of inquiry (i.e., survey, excavation, data analysis) provide the main sources of information. Archaeological sites can be associated with pre-contact (commonly referred to as prehistoric) and post-contact periods – that is, the time before or after the arrivals of Europeans.

Historical sites are any structure, site, or thing that is of historical or architectural significance as defined by the *British Columbia Archaeological Impact Assessment*

Guidelines (B.C. Archaeology Branch 1998) and heritage values as identified in interviews with local and regional historical societies, museums, and other organizations, as well as local residents. Historical sites and locations in B.C. are primarily attributable to post-contact Euro-Canadian settlement and land use, but also include habitations and other evidence left by Aboriginal peoples in that time period.

Heritage resources are non-renewable resources that may be susceptible to damage from land-altering activities. Many heritage resources have value to Aboriginal peoples, the public, and other stakeholders. Heritage resources may have regional, provincial, national, or international significance.

32.1.1 Regulatory and Policy Setting

As specified in the EIS Guidelines, the following statutes and guidance documents informed the effects assessment for the heritage resources VC:

- *Canadian Environmental Assessment Act* (CEAA), 2012
- *British Columbia Environmental Assessment Act*
- British Columbia Fossil Management Framework
- *British Columbia Heritage Conservation Act*

Following finalization of the EIS Guidelines, it was determined that the B.C. *Cremation, Interment and Funeral Services Act* and the B.C. *Coroners Act* are also relevant to the heritage resources VC.

32.1.1.1 *Canadian Environmental Assessment Act*, 2012

CEA Agency policies and procedures for heritage resources are described in A Reference Guide for the Canadian Environmental Assessment Act: Assessing Environmental Effects on Physical and Cultural Heritage Resources (CEA Agency 1996). This guide recommends that heritage resources should be assessed in relation to the mandates, objectives, and intents of existing legislation and policies on heritage found at various government levels (federal, provincial, municipal, or territorial). Consequently, for the assessment of heritage resources in British Columbia under CEAA 2012, to meet the guidance issued by the CEA Agency, the requirements of provincial legislation need to be met.

32.1.1.2 *British Columbia Environmental Assessment Act*

Under the B.C. *Environmental Assessment Act*, the BCEAO has issued guidance with respect to the assessment of adverse effects on heritage resources. That guidance states that an assessment should be conducted in accordance with B.C. Archaeology Branch (B.C. Ministry of Forests, Lands, and Natural Resource Operations) standards.

32.1.1.3 British Columbia Fossil Management Framework

The Province of British Columbia recognizes that palaeontological resources have heritage, scientific, and educational value as “fossils represent the historical record of the evolution and development of life on earth” (Fossil Management Review Technical Working Group 2004). As such, the Province recognizes the need to protect important fossil finds and the interests of stakeholders. Currently, fossil collecting in British

Columbia is unregulated and there is no clear policy for fossil management (Fossil Management Review Technical Working Group 2004). There are no explicit administrative controls or legal instruments that provide automatic protection and management of such resources, although protection can be provided under certain conditions, as explained below.

Regulatory protection for palaeontological sites was limited until 1997, when they were included under the B.C. *Mineral Tenure Act*. In 2005, a new regulation took effect that identifies fossils as “not a mineral” under the B.C. *Mineral Tenure Act*, effectively preventing the rights to mine, extract, and sell fossils being obtained through new mineral claims.

Although palaeontological sites are not currently protected by explicit provincial legislation, the Governor General-in-Council has the ability to protect specific palaeontological finds through designation as a Provincial heritage site or heritage object by issuing an Order-in-Council under Section 9 of the B.C. *Heritage Conservation Act* (see Section 32.1.1.4 below). In addition, the B.C. Land Tenures Branch (formerly the B.C. Strategic Land Policy and Legislation Branch) has established a set of guidelines for fossil management and is currently working with a Fossil Management Review Technical Working Group to establish operational and administrative processes for fossil management in B.C. The B.C. Land Tenures Branch (2012) guidelines state:

- Fossils and fossil sites are important to British Columbia as heritage resources
- The order of priority for fossil management is science, natural heritage, education and, where appropriate, commercial use
- The order of priority for extraction or excavation of fossils is science, natural heritage, education and, where appropriate, commercial use. Non-extractive commercial use has precedence over extractive commercial use
- A fossil management framework that recognizes the heritage value of fossils, the need to protect significant fossil sites, and the interests of stakeholders is necessary

In the absence of clear legislative protection and resource management guidelines, ethical guidelines found in Ludvigsen and Beard’s (1994) *West Coast Fossils: A Guide to the Ancient Life of Vancouver Island* and the British Columbia Palaeontological Alliance’s (2012) Policy on Fossil Collecting and Regulation have been adopted for this assessment.

32.1.1.4 *British Columbia Heritage Conservation Act*

Heritage sites on non-federal lands in British Columbia are administered by the B.C. Archaeology Branch and the B.C. Heritage Branch, in accordance with the B.C. *Heritage Conservation Act*. The B.C. Archaeology Branch is the agency responsible for administering the B.C. *Heritage Conservation Act* (HCA) and maintaining the Provincial Heritage Site Register. The B.C. Heritage Branch exercises regulatory authority under the HCA regarding the protection and alteration of designated (i.e., protected) historical heritage sites. Section 13 of the HCA specifies that an individual (or corporation) must not “damage, excavate, dig in or alter, or remove any heritage object” from a heritage site, except in accordance with a permit issued by the Minister pursuant to Sections 12 and 14. The HCA confers automatic protection upon heritage sites that predate 1846, or undated sites that could predate 1846, regardless of whether they are recorded in the

Provincial Heritage Register, whether they are located on Crown land or private property, and whether they are in a disturbed or intact context. Section 9 (2)(c) of the HCA allows protection of historical heritage sites under the B.C. *Local Government Act* or the *Vancouver Charter*. Post-1846 historical heritage sites can be protected by Ministerial Order, Designation by an Order-in-Council, or a municipal bylaw, but most historical sites are not protected in B.C.

The requirements and procedures for heritage resource studies undertaken for development projects are described in the British Columbia Archaeological Impact Assessment Guidelines (B.C. Archaeology Branch 1998), and procedures for respectful handling of found human remains that are protected under the HCA are provided in the Found Human Remains policy (B.C. Archaeology Branch 1999).

32.1.1.5 *Cremation, Interment and Funeral Services Act and Coroners Act*

In the event that interred human remains are encountered in a context that is not addressed by the B.C. *Heritage Conservation Act*, the B.C. *Cremation, Interment and Funeral Services Act* or the B.C. *Coroners Act* may apply. An example of such a context might be a historical grave site that is not archaeological, but that is not located in a registered cemetery.

Section 19(2) of the CIFSA outlines the specific circumstances under which human remains can be moved, providing, in part, as follows:

> A person must not disinter or remove human remains, or any part of human remains, from the place they are interred unless the disinterment or removal is in accordance with
>
> a) this Act, the *Coroners Act* and the regulations under those Acts, or
>
> b) a permit or an order under the *Heritage Conservation Act*.

32.1.1.6 Aboriginal Groups' Heritage Policies and Memoranda of Understanding

There are no Aboriginal groups in northeastern B.C. that issue permits to conduct heritage research within their respective traditional lands. However, there is a Memorandum of Understanding (MOU) signed by three Treaty 8 First Nations and the Province of British Columbia for heritage conservation (B.C. Ministry of Tourism, Culture, and the Arts 2010). The MOU was signed on May 20, 2010, between the Province and the Doig River First Nation, Prophet River First Nation, and West Moberly First Nations. The purpose of the MOU is to highlight the importance of heritage protection and conservation during development and resource extraction, to establish effective processes to facilitate information sharing between the Province and Treaty 8 First Nations, and to enable participation by signatory First Nations in heritage conservation.

32.1.2 External Communications

In 2008, BC Hydro commenced development of a heritage program for the Project. Initial activities included consultation with the public, key government agencies, Aboriginal groups and archaeologists, and reviews of previous heritage fieldwork and studies. Based on inputs from these earlier activities, a heritage program was initiated in 2010 to:

- Acquire baseline data through literature reviews, interviews, and discussions with key stakeholders and Aboriginal groups
- Undertake a field inventory program
- Assess potential effects of the Project on heritage resources

Throughout the heritage program, information was obtained from various external sources including Aboriginal groups, research institutions, local citizens or associations, and government agencies. These discussions were used to select the VC and guide the scope of the heritage program.

Discussions were held with national, provincial, and local government agencies, as well as local and regional museums, to obtain their input on all aspects of the heritage resources program, subsequent mitigation planning, and potential repositories for heritage objects recovered during fieldwork.

Prior to the commencement of archaeological fieldwork, Aboriginal groups with interests in the area were provided opportunities to review and comment upon the proposed assessment methods in the B.C. *Heritage Conservation Act* permit application and the 2011 and 2012 deep testing programs. In addition, the results of each year's heritage field programs were presented to Aboriginal groups upon request, and draft annual reports were submitted to Aboriginal groups, the Royal British Columbia Museum, the B.C. Ministry of Forests, Lands, and Natural Resource Operations (Land Tenures Branch), and the B.C. Archaeology Branch for review and comment. A copy of the final year one (2010) report (Golder and AMEC 2011) was provided to the same parties named above. At the request of representatives of the Treaty 8 Tribal Association, the B.C. Archaeology Branch conducted a quality audit of archaeological fieldwork (Spafford 2011).

Further information on interactions with Aboriginal groups, regulators, and stakeholders for the heritage program can be found in Volume 4 Appendix C Heritage Resources Assessment Report and Volume 1 Section 9 Information Distribution on Consultation.

32.1.3 Key Issues and Identification of Potential Effects

Heritage sites are non-renewable resources where the context and integrity of each heritage site location is of interpretative importance. As noted in Section 32.1.2, members of the heritage resources assessment team met with various Aboriginal groups, research institutions, local citizens or associations, and government agencies throughout the heritage program. During these meetings information was shared about the Project, proposed methodological approaches for the heritage program were reviewed, progress updates were presented, and the potential effects of the Project on the heritage resources VC were discussed. Topics raised about the heritage resources VC included the treatment of human burials, the excavation and housing of artifacts and palaeontological specimens, participation in the archaeological field program, the incorporation of traditional use information in the archaeological program, and the effects of the Project on heritage sites such as Rocky Mountain Fort.

Questions and comments from Aboriginal groups about the heritage resources VC were also generated through an information request process for the Draft Environmental Impact Statement Guidelines. This information request process included responses from BC Hydro.

The heritage resources VC has the potential to be affected by Project-related interactions that cause alteration to heritage sites, such as physical disturbance, compaction, and rendering them inaccessible or, alternatively, by making them more accessible and susceptible to vandalism and unauthorized collection. Any form of alteration to these sites can be permanent and irreversible. Project activities and physical works with the potential to interact with heritage resources would occur during the construction and operations phases. Construction-phase activities linked to direct effects include, but are not limited to, the following ground-altering activities that involve surface and subsurface disturbance:

- Vegetation clearing
- Surface stripping and excavation
- Temporary placement of stockpiled materials and fill (compaction)
- Inundation of the reservoir (loss of access or increase in access; erosion and siltation)

Potential effects during the operations phase would result from erosion, sedimentation, road maintenance, and increased public access or, conversely, restricted access to heritage resources.

The Site C Clean Energy Project Environmental Impact Statement Guidelines (BCEAO and CEA Agency 2012) list five key aspects, changes to which are to be taken into account in assessing the potential for the Project to adversely affect heritage resources. The five key aspects can be grouped into three basic types of potential effects to heritage resources:

(1) Changes to resource integrity:

- Disturbing heritage sites and features
- Disturbing elements essential to the heritage character of features
- Disturbing artifacts, features, human remains, and fossils

(2) Changes to resource accessibility:

- Hindering or increasing access to sites and destroying contextual information

(3) Other relevant considerations raised by Aboriginal groups

Potential Project interactions with heritage resources are summarized in Volume 2 Appendix A Project Interactions Matrix, Table 2. A “2” ranking in this table indicates that the effects of an interaction may not be fully avoided or mitigated through the application of standard mitigation measures, or are not well understood. Therefore, they require analysis and evaluation in the environmental assessment.

Project interactions with a ranking of “2” are summarized in Table 32.1 below.

Table 32.1 Interactions of the Project with Heritage Resources

Project Activities and Physical Works	Heritage Resources – Key Aspects				
	Disturbing Heritage Sites and Features	Disturbing Elements Essential to the Heritage Character of Features	Disturbing Artifacts, Features, Human Remains, and Fossils	Hindering or Increasing Access to Sites and Destroying Contextual Information	Other Relevant Considerations Raised by Aboriginal Groups
Construction Phase					
Dam & Generating Station Construction					
Site clearing and preparation	✓	✓	✓	✓	✓
Temporary and permanent access roads	✓	✓	✓	✓	✓
Waste treatment and management facilities	✓	✓	✓	✓	✓
Relocation of surplus excavated material	✓	✓	✓	✓	✓
Temporary construction access bridge across the Peace River	✓	✓	✓	✓	✓
Sand and gravel source pits	✓	✓	✓	✓	✓
Stage 1 channelization and diversion works (north bank)	✓	✓	✓	✓	✓
Stage 1 channelization works (south bank)	✓	✓	✓	✓	✓
Stage 2 – diversion	✓	✓	✓	✓	✓
Stage 2 – Diversion | Earthfill dam and north bank excavation	✓	✓	✓	✓	✓
Stage 2 – Diversion | South bank structures	✓	✓	✓	✓	✓
Reservoir Preparation and Filling					
Existing infrastructure inventory, protection, and possible relocation	✓	✓	✓	✓	✓
Hudson's Hope Shoreline Protection	✓	✓	✓	✓	✓
Access: upgrades to existing licensee roads, winter road construction	✓	✓	✓	✓	✓
Clearing of vegetation and timber by manual or mechanical means	✓	✓	✓	✓	✓
Post-harvest terrestrial debris management	✓	✓	✓	✓	✓
Access road deactivation and reclamation of exposed cuts and fills, where required	✓	✓	✓	✓	✓

Project Activities and Physical Works	Heritage Resources – Key Aspects				
	Disturbing Heritage Sites and Features	Disturbing Elements Essential to the Heritage Character of Features	Disturbing Artifacts, Features, Human Remains, and Fossils	Hindering or Increasing Access to Sites and Destroying Contextual Information	Other Relevant Considerations Raised by Aboriginal Groups
Water management during confinement	✓	✓	✓	✓	✓
Water management during diversion	✓	✓	✓	✓	✓
Water management during reservoir filling	✓	✓	✓	✓	✓
Water management during commissioning period	✓	✓	✓	✓	✓
Transmission System					
Site – corridor clearing and preparation	✓	✓	✓	✓	✓
Access construction and improvement with right-of-way	✓	✓	✓	✓	✓
Tower installation	✓	✓	✓	✓	✓
Construction site decommissioning and restoration/reclamation	✓	✓	✓	✓	✓
Site C Substation installation	✓	✓	✓	✓	✓
Quarried and Excavated Material Source Development					
West Pine Siding extension	✓	✓	✓	✓	✓
85th Avenue Industrial Lands	✓	✓	✓	✓	✓
Wuthrich Quarry	✓	✓	✓	✓	✓
West Pine Quarry	✓	✓	✓	✓	✓
Portage Mountain Quarry	✓	✓	✓	✓	✓
Del Rio granular borrow	✓	✓	✓	✓	✓
Other Sources | Granular borrow (within inundation zone, along Hwy. 29)	✓	✓	✓	✓	✓
Other Sources | Area E	✓	✓	✓	✓	✓
Other Sources | On-site	✓	✓	✓	✓	✓
Highway 29 Realignment					
Highway 29 Realignment Construction	✓	✓	✓	✓	✓
Construction Access Road Development					
Transmission line access roads	✓	✓	✓	✓	✓

Project Activities and Physical Works	Heritage Resources – Key Aspects				
	Disturbing Heritage Sites and Features	Disturbing Elements Essential to the Heritage Character of Features	Disturbing Artifacts, Features, Human Remains, and Fossils	Hindering or Increasing Access to Sites and Destroying Contextual Information	Other Relevant Considerations Raised by Aboriginal Groups
Jackfish Lake Road works (includes improvement of existing Jackfish Lake Road and other existing roads on the Jackfish Plateau, and the Project access road leading to dam site)	✓	✓	✓	✓	✓
Old Fort Road realignment; extension of 240 and 269 roads.	✓	✓	✓	✓	✓
West Pine quarry access	✓	✓	✓	✓	✓
West Pine Siding Construction	✓	✓	✓	✓	✓
Septimus Rail Siding construction	✓	✓	✓	✓	✓
Worker Accommodation Construction and Operations					
Temporary Accommodation – Northern Regional Site (Halfway – Farrell)	✓	✓	✓	✓	✓
Temporary Accommodation – Southern Regional Site (Jackfish Lake Road)	✓	✓	✓	✓	✓
Commissioning and Operations					
Reservoir and Generating Station Operations					
Operation of the powerhouse, substation, and reservoir; includes downstream water management	✓	✓	✓	✓	✓
Maintenance of access roads	✓	✓	✓	✓	✓

NOTE:

Only Project interactions ranked as "2" in Volume 2 Appendix A Project Interactions Matrix Table 2 are carried forward to this table. A ✓ indicates that a project component or activity is likely to interact with the VC.

32.1.4 Standard Mitigation Measures and Effects Addressed

Project activities and works listed in Table 1 of Volume 2 Appendix A Project Interactions Matrix that scored a "0" were not carried through to the effects assessment. A "0" ranking is given where no interaction is predicted between a Project component and the VC.

The following activities would require ground disturbance, but they are ranked as "0" because their effects are already accounted for in the discussion of site clearing and preparation stages:

- Installation and operation of temporary facilities
- Hazardous materials storage and re-fuelling sites (includes explosives and petroleum fuels)
- Truck washing sites
- Aggregate and filter processing plants
- Concrete batch plants

Activities for which there is no interaction between the Project activity or component and heritage resources and, therefore, also ranked as "0", are not included in Table 32.1 and are not carried forward to the effects assessment. These activities include:

- Transport of construction materials and supplies (includes quarried materials and other materials needed for all Project components)
- Transport of merchantable timber away from the reservoir area by truck
- Aquatic debris management during inundation
- Conductor stringing
- Upgrades to Peace Canyon substation
- Operation of 85th Avenue till source conveyor belt
- Supply and transport of goods and services for worker camps
- Temporary accommodation – dam and generating station: installation of prefabricated units in the north and south bank camps; operation of both camps
- RV parks
- In-community accommodation – development of 40 new housing units
- Maintenance of the powerhouse and substation
- Debris management
- Hudson's Hope shoreline protection maintenance
- Operation of the 500 kV transmission line
- Maintenance of overhead structures

A "1" ranking in Volume 2 Appendix A Project Interactions Matrix, Table 2 means that an interaction with heritage resources will occur. However, the effects of these interactions are well understood, and can be avoided or mitigated through the application of standard mitigation measures. For example, a "1" ranking was assigned to right-of-way vegetation maintenance along the transmission line during operations, as the potential effects would have occurred and would have been adequately addressed during the earlier site clearing and preparation stages of the construction phase. In the event that heritage resources are identified during vegetation maintenance, the resources would be managed in accordance with applicable legislation (e.g., the B.C. *Heritage Conservation*

Act) and policy (see Section 32.6). Based on this rationale, no further analysis and evaluation is required in the environmental assessment for interactions assigned a value of "1".

32.1.5 Selection of Key Indicators

For the EIS, key indicators for the heritage resources VC consist of palaeontological, archaeological, and historical sites within the Project activity zone (see Section 32.1). Project-related activities that interact with heritage sites do so in definable and measurable ways. These sites form discrete spatial units that can be evaluated for size and complexity, but as a basic measure, their presence alone triggers consideration of requirements for varying forms of mitigation. Key indicators for heritage resources and their rationale for selection are listed in Table 32.2.

Table 32.2 Key Indicators for Heritage Resources

Key Aspects	Key Indicators	Rationale for Selection of the Key Indicators[a]
Changes to Palaeontological Resources		
Changes to Resource Integrity – Palaeontology		
Disturbing heritage sites and features	Detectable Project-induced disturbance of palaeontological sites and features	CEAA 2012 requirement; best practices in accordance with B.C.'s proposed fossil management framework (Fossil Management Review Technical Working Group 2004) and the British Columbia Palaeontological Alliance's (2012) Policy on Fossil Collecting and Regulation
Disturbing elements essential to the heritage character of features	Project-induced changes to context of palaeontological features	CEAA 2012 requirement; best practices in accordance with B.C.'s proposed fossil management framework (Fossil Management Review Technical Working Group 2004) and the British Columbia Palaeontological Alliance's (2012) Policy on Fossil Collecting and Regulation
Disturbing artifacts, features, human remains, and fossils	Project-induced disturbance of fossils and trace fossils	CEAA 2012 requirement; best practices in accordance with B.C.'s proposed fossil management framework (Fossil Management Review Technical Working Group 2004) and the British Columbia Palaeontological Alliance's (2012) Policy on Fossil Collecting and Regulation

Key Aspects	Key Indicators	Rationale for Selection of the Key Indicators[a]
Changes to Resource Accessibility – Palaeontology		
Hindering or increasing access to sites and destroying contextual information	Changes in level of accessibility to palaeontological sites	CEAA 2012 requirement; Aboriginal communities' interest; public interest; Research value; best practices in accordance with B.C.'s proposed fossil management framework management (Fossil Management Review Technical Working Group 2004) and the British Columbia Palaeontological Alliance's (2012) Policy on Fossil Collecting and Regulation
Other Relevant Considerations Raised by Aboriginal Groups – Palaeontology		
Other relevant considerations raised by Aboriginal groups	Changes to palaeontological sites that prompt relevant comment by Aboriginal groups Preservation of heritage resources for cultural uses by Aboriginal peoples	CEAA 2012 requirement; Aboriginal communities' interest
Changes to Archaeological Resources		
Changes to Resource Integrity – Archaeology		
Disturbing heritage sites and features	Detectable Project-induced disturbance of archaeological sites and features	B.C. *Heritage Conservation Act* requirement; CEAA 2012 requirement; Aboriginal concern for cultural heritage preservation (i.e., MOU signed by Doig River First Nation, Prophet River First Nation, and West Moberly First Nations and the Province of British Columbia); public interest
Disturbing elements essential to the heritage character of features	Project-induced changes to context of archaeological sites and features	B.C. *Heritage Conservation Act* requirement; CEAA 2012 requirement; Aboriginal concern for cultural heritage preservation (i.e., MOU signed by Doig River First Nation, Prophet River First Nation, and West Moberly First Nations and the Province of British Columbia); public interest
Disturbing artifacts, features, human remains, and fossils	Project-induced disturbance of archaeological features and artifacts	B.C. *Heritage Conservation Act* requirement; CEAA 2012 requirement; Aboriginal concern for cultural heritage preservation (i.e., MOU signed by Doig River First Nation, Prophet River First Nation, and West Moberly First Nations and the Province of British Columbia); public interest
Changes to Resource Accessibility – Archaeology		
Hindering or increasing access to sites and destroying contextual information	Changes in level of accessibility to archaeological sites	B.C. *Heritage Conservation Act* requirement; CEAA 2012 requirement; Aboriginal concern for cultural heritage preservation (i.e., MOU signed by Doig River First Nation, Prophet River First Nation, and West Moberly First Nations and the Province of British Columbia); public interest

Key Aspects	Key Indicators	Rationale for Selection of the Key Indicators[a]
Other Relevant Considerations Raised by Aboriginal groups – Archaeology		
Other relevant considerations raised by Aboriginal groups	Changes to archaeological sites that prompt relevant comment from Aboriginal groups Preservation of heritage resources for cultural uses by Aboriginal peoples	B.C. *Heritage Conservation Act* requirement; CEAA 2012 requirement; Aboriginal concern for cultural heritage preservation (i.e., MOU signed by Doig River First Nation, Prophet River First Nation, and West Moberly First Nations and the Province of British Columbia); public interest
Changes to Historical Resources		
Changes to Resource Integrity – Historical		
Disturbing heritage sites and features	Project-induced disturbance of historical sites	B.C. *Heritage Conservation Act* requirement (if protected); CEAA 2012 requirement; the B.C. *Cremation, Interment and Funeral Services Act* and the B.C. *Coroners Act* for burials; Aboriginal communities' interest; public interest
Disturbing elements essential to the heritage character of features	Project-induced changes to context of historical sites and features	B.C. *Heritage Conservation Act* requirement (if protected); CEAA 2012 requirement; the B.C. *Cremation, Interment and Funeral Services Act* and the B.C. *Coroners Act* for burials; Aboriginal communities' interest; public interest
Disturbing artifacts, features, human remains and fossils	Project-induced disturbance of historical sites, artifacts and burials	B.C. *Heritage Conservation Act* requirement (if protected); CEAA 2012 requirement; the B.C. *Cremation, Interment and Funeral Services Act* and the B.C. *Coroners Act* for burials; Aboriginal communities' interest; public interest
Changes to Resource Accessibility – Historical		
Hindering or increasing access to sites and destroying contextual information	Changes in level of accessibility to historical sites	B.C. *Heritage Conservation Act* requirement (if protected); CEAA 2012 requirement; the B.C. *Cremation, Interment and Funeral Services Act* and the B.C. *Coroners Act* for burials; Aboriginal communities' interest; public interest
Other Relevant Considerations Raised by Aboriginal Groups – Historical		
Other relevant considerations raised by Aboriginal groups	Changes to historical sites that prompt relevant comment from Aboriginal groups Preservation of heritage resources for cultural uses by Aboriginal peoples	B.C. *Heritage Conservation Act* requirement (if protected); CEAA 2012 requirement; the B.C. *Cremation, Interment and Funeral Services Act* and the B.C. *Coroners Act* for burials; Aboriginal communities' interest; public interest

NOTE:

[a] Includes input from regulators, Aboriginal groups, affected stakeholders, and the public, as well as regulatory guidelines, and policies

32.1.6 Spatial and Temporal Boundaries

32.1.6.1 Spatial Boundaries

The Local Assessment Area (LAA) for the heritage resources assessment is defined as the Project activity zone (Figure 32.1). Given the site-specific and stationary nature of heritage resources, this is the maximum area where potential direct and indirect Project effects on heritage resources are reasonably expected to occur.

The Regional Assessment Area (RAA) is also defined as the Project activity zone. Other projects are not expected to have residual effects on heritage sites within the LAA.

32.1.6.2 Temporal Boundaries

Activities that could affect heritage resources would occur during the construction and operations phases of the Project. Most direct effects would occur in the construction phase, during ground-altering activities that involve surface and subsurface disturbance, such as vegetation clearing, surface stripping and excavations, the placement of fill, and inundation of the reservoir. Potential effects during the operations phase would result from erosion, sedimentation, road maintenance, and increased public access or, conversely, would restrict access to heritage resources (see Table 32.2).

Construction activities are expected to affect heritage resources in years one through eight of the Project. Effects related to the operations phase would begin in year eight and may continue through the operating life of the Project.

32.2 Baseline Conditions

Baseline data were acquired from various external sources including Aboriginal groups, research institutions, local citizens or associations, and government agencies. Information on the location and nature of previously recorded heritage resources was obtained through a search of the Provincial Heritage Register and a review of existing palaeontological, archaeological, ethnographic, and historical literature relevant to the LAA. Field inventories to discover new heritage resources and confirm documentation of previously recorded heritage sites were completed between June 2010 and September 2012. Additional details are provided in Volume 4 Appendix C Heritage Resources Assessment Report.

It is important to note that heritage sites are commonly evaluated using criteria that describe heritage value in terms of the sites' significance. As a result, this baseline conditions section makes periodic reference to "site significance", which is distinct from the use of "significance" in the effects assessment. These concepts are discussed further in Section 32.4 Residual Effects.

Overviews of traditional land use (Kennedy 2011; Candler and The Firelight Group Research Cooperative with the Treaty 8 Tribal Association 2012), ethnohistory (Bouchard and Kennedy 2012a, 2012b), and culture and traditions (Nesoo Watchie Resource Management Ltd. 2011) were reviewed. Where site-specific information was available, it was used to aid in the interpretation of field results and the development of mitigation measures. Additional details are provided in Volume 4 Appendix C Heritage Resources Assessment Report.

32.2.1 Review of Existing Information

32.2.1.1 Palaeontological Resources

The review of existing information focused on the preparation of a palaeontological resources overview assessment to create a geologically based palaeontological sensitivity map for the dam, generating station and reservoir (Golder and AMEC 2011). The overview was subsequently expanded to include the remaining Project components (Golder and Branta 2012). The overviews included a detailed literature review, review of orthophotos, and communication with key scientific and regulatory personnel. Individuals from the Royal British Columbia Museum, the B.C. Ministry of Forests, Lands and Natural Resource Operations (Land Tenures Branch), the Royal Tyrell Museum, and the Geological Survey of Canada were consulted.

The review of existing information identified 899 potentially fossiliferous bedrock and sediment exposures within the LAA as palaeontologically sensitivity areas (Figure 32.2). Of these 899 locations, 41 palaeontologically sensitive areas contained documented palaeontological sites and were regarded as having the highest level of sensitivity (“extreme”). The remaining palaeontologically sensitive areas were ranked “high”, “medium”, and “moderate”, according to their likelihood of containing unique or *in situ* fossils. Areas with “low” palaeontological sensitivity were not identified. During fieldwork, some of the palaeontological sensitivity area rankings were revised as a result of field observations that created a “negligible” sensitivity category for locations that were observed during fieldwork that did not have potential to contain fossils.

32.2.1.2 Archaeological Resources

Previous archaeological research within and adjacent to the LAA principally involved a multi-year inventory study conducted by archaeologists from Simon Fraser University (SFU), directed successively by Knut Fladmark, Brian Spurling, and Diana Alexander.

SFU conducted a number of archaeological surveys, spanning eight years, for the Project as part of preliminary design works prior to a 1981 British Columbia Utilities Commission review of the previous Site C hydro-electric project (Spurling 1980a, 1980b; Alexander 1982). The principal SFU investigations within and adjacent to the LAA during that period include:

- Field studies for the proposed Site 1, Site C, Site E, and Dunvegan Dam projects in 1974 (Fladmark 1975)
- Field studies for the proposed Site C reservoir in 1976 that were focused on the south side of the Peace River (Spurling et al. 1976)
- Two seasons of site inventory and impact assessment fieldwork in 1977 and 1978, using probabilistic sampling (Spurling 1978, 1980a, 1980b)
- An inventory and impact assessment of the Site C to Peace Canyon transmission line corridor in 1977 (Fedje 1977)
- An archaeological field school in the Peace River valley that involved site excavation and historical research (Fladmark 1979); this project investigated a number of sites potentially affected by the Project, but was not part of the studies conducted for the Project

- A site inventory and impact assessment of the dam site in 1981, using a mixed probabilistic and judgmental survey approach (Alexander 1982)

In addition to the SFU work, Wilson (1979) undertook an inventory and impact assessment of seven sections of the transmission line not inspected as part of Fedje 1977.

The research undertaken by SFU identified and recorded over 300 archaeological and historical heritage sites within and near the Project activity zone. Of these, detailed excavations were undertaken at two pre-contact sites, small-scale excavations were undertaken at nine sites, and systematic surface collections were conducted at eight sites (Spurling 1980a; Alexander 1982), as detailed below:

- Detailed excavations at sites HaRk-1 and HaRk-14
- Small-scale excavations at GlRj-1, HaRj-14, HaRj-19, HbRf-62, HbRg-5, HbRh-8, HbRh-33, HbRh-44, and HbRh-66
- Systematic surface collection at HaRk-40, HaRk-41, HaRk-42, HbRh-17, HbRg-15, HbRi-9, HbRi-33, and HbRi-34 (Arcas 2009)

Work also took place at the fur-trade era Rocky Mountain Fort and Rocky Mountain Portage House. Archaeological excavations in the 1970s and 1980s at Rocky Mountain Fort near the mouth of the Moberly River included site mapping and test excavations, preparation of a detailed contour map and proton magnetometer survey, and intensive excavations of 130 m² of site matrix (Spurling et al. 1976; Burley and Hamilton 1991; Burley et al. 1996; Arcas 2009). To date, approximately 22% of the site has been excavated, with a majority of the excavations focusing specifically on structural remains (Burley 1990:8).

In 1974, the site of Rocky Mountain Portage House was relocated opposite Hudson's Hope by Knut Fladmark "as a complex of low mounds and shallow depressions enclosing a rough quadrangular area" (Fladmark 1975:53). In 1974, the site had been affected by "modern construction" including log cabins as well as a road and ferry landing area (Fladmark 1975:53). In 1977, the site was mapped and surveyed in greater detail (Burley 1990:12). In 1987, a small number of shovel tests (i.e., half-metre square test units) were placed between the identified depressions and mounds. Few artifacts were recovered from the site and Burley et al. (1996:72) contend that the "Rocky Mountain Portage House we had been excavating was clearly that of the third incarnation [i.e., 1860s to1882–1899]".

After the early 1980s and prior to the onset of current investigative work for the Project, a number of office-and field-based studies were carried out, either for the Project or to address other regulatory requirements for BC Hydro. These studies include:

- A desktop review of documented and potential heritage resources within the footprint of the Project, to provide background information for BC Hydro and to identify changes in provincial cultural resource management standards implemented since the SFU studies were concluded in 1982 (Arcas 1991)
- An office-based assessment of the vulnerabilities of archaeological resources to fluctuating water flows on the Peace River downstream from the Peace Canyon Dam (Arcas 1994)

- An in-office review to summarize traditional Aboriginal land use and ecological knowledge for the Peace Water Use Plan Committee (Arcas 2002)
- Archaeological investigations at an archaeological site inadvertently disturbed by geotechnical investigations for the Project (Archer 2008a)
- An archaeological overview assessment of impervious aggregate material supply locations and potential slide zones within a 10 km radius of the dam site (Archer 2008b)
- A desktop study to reconcile conflicts between written records of heritage site locations within the Project footprint and their geospatial coordinates in the Provincial Heritage Register (I.R. Wilson Consultants 2009)
- A heritage resource data gap analysis for the Project (Arcas 2009)
- Archaeological impact assessments for geotechnical investigations and similar activities within the dam site and other Project components, beginning in 2009 and continuing concurrently with the Site C heritage program (Golder 2009a, 2009b, 2009c, 2009d, 2010a)
- An archaeological overview assessment of geotechnical investigations within the dam site (Golder 2010b)
- A study of erosional effects on archaeological resources by BC Hydro reservoir operations in the Peace basin; the study selected two sites on the Peace River as test locations, including one site (HbRh-8) within the reservoir and a historical site (HbRe-1) downstream from the dam site at Old Fort St. John (Millennia 2011)

Since 2010, a number of office-based studies have been carried out for the Project. These studies include:

- A predictive model of archaeological resource potential for the LAA (Millennia 2010a, 2010b), which was subsequently tested during the year one (2010) field program (Golder and AMEC 2011)
- An archaeological overview assessment of lands adjacent to the reservoir (Golder and AMEC 2011)
- Archaeological overview assessments for quarries and excavated construction material areas (Wuthrich Quarry, West Pine Quarry, Portage Mountain, Del Rio Pit, and Area E), access roads, and the as –yet-undefined construction activity areas near the dam site. Within these areas there are 10 previously recorded archaeological sites that are considered part of the existing baseline, but they are not included in mitigation planning or the effects assessment because they have not yet been assessed in the field (see Volume 4 Appendix C Heritage Resources Assessment Report).

A possible human burial has been recorded previously in the LAA, within archaeological site HbRh-2. The reported burial location has not yet been investigated, as the B.C. Archaeology Branch recommended avoiding disturbance to this feature until there is more certainty that the location cannot be avoided by the Project. The B.C. Archaeology Branch has also stated they wish to query B.C. Ministry of Transportation and Infrastructure records associated with the construction of Highway 29 and the existing Cache Creek bridge prior to further investigation (B.C. Archaeology Branch 2012, pers.

comm.). Currently, it is unknown whether a burial is, in fact, present and, if so, whether it is archaeological and protected under the B.C. *Heritage Conservation Act* or historic and protected under the B.C. *Cremation, Interment and Funeral Services Act* or the B.C. *Coroners Act*. Prior to construction, the reported burial site will be assessed and mitigation recommendations will be made in accordance with the relevant legislation if the location cannot be avoided by the Project (see Section 32.6).

32.2.1.3 Historical Resources

The review of historical background data included information concerning local and regional history as it relates to historical sites in the LAA, including written, cartographic, and photographic documents from published and unpublished sources. Sources include local histories, regional histories, community heritage site inventories and registers, the Provincial Heritage Register, and archival materials. Such data were accessed through:

- Local government records (City of Fort St. John, District of Hudson's Hope, Peace River Regional District, City of Vancouver)
- Provincial government records (B.C. Archaeology Branch, B.C. Archives, B.C. Heritage Branch, SFU, B.C. Surveyor General, University of British Columbia)
- Federal government records (Transport Canada 1973–1975, 1975, 1976–1983, 1977, 1979, 1983; Transportation Safety Board of Canada 2010)
- Corporate libraries (AMEC, BC Hydro, and Golder Associates)
- Online resources (Calverley 2010; Mills 2010; Peace River Museum 2010; Leonard 2012) and private resources (Northern Maritime Research 2002)

The review of historical information focused on areas identified as gaps in the historical data for the LAA (Arcas 2009). Particular attention was paid to the following themes: transportation methods and routes, aspects of settlement and interactions with the environment, developing economies (e.g., extraction and production, trade and commerce, communication, technology, and engineering), and building social and community life. These broad themes and subthemes are representative of those included in Parks Canada's (2009) National Historic Sites of Canada System Plan.

32.2.2 Field Summary

The goal of the heritage field program was to describe the location and characterize the nature of heritage resources within the LAA, such that potential Project effects on those resources could be assessed. Building upon existing baseline information, an additional heritage resources field inventory was undertaken during 2010, 2011, and 2012. The additional heritage baseline included inventories of palaeontological and historical sites, which had not been specifically assessed in previous work, as well as additional archaeological inventory.

The heritage field inventory focused on the following locations within the LAA:

- Dam and generating station
- Reservoir (land to be inundated behind the new dam), including the land between the reservoir and the five-year beach line, as defined in Volume 2 Appendix B, Part 2 Preliminary Reservoir Impact Lines

- Portions of the transmission line that have not been previously cleared, between the dam site and generating station and the Peace Canyon Dam
- Highway 29 realignment
- 85th Avenue Industrial Lands, conveyor corridor, and access roads to the dam and generating station
- Hudson's Hope shoreline protection

The heritage field inventory data are considered adequate for current assessment purposes, although additional field assessment remains outstanding for several Project components. The heritage assessment would continue as detailed design proceeds. Field inventory and assessment of heritage resources are still required for:

- Construction of access roads
- Off-site quarry and excavation construction materials areas
- A transmission line tie-in at Peace Canyon Dam Generating Station
- One on-site construction material source that is under consideration
- Existing infrastructure that may require relocation, such as buried services and pipelines
- A possible human burial site (HbRh-2), if the location cannot be avoided by the Project (see Section 32.2.1.2)

In addition, private land parcels for which access is currently restricted have yet to be inventoried. Undefined construction activity areas near the dam site, should they be required, will also be inventoried.

Fieldwork would be completed in a manner consistent with the current heritage assessment prior to the start of construction in these areas, with the following additions (see Volume 4 Appendix C Heritage Resources Assessment Report):

- Fieldwork proposed for the Del Rio Pit and Wuthrich Quarry would include mapping of observed subsurface test locations conducted during previous archaeological assessments by other consultants. The test locations would be added to the Project's database of subsurface test locations.

Reports on future heritage assessment work would be submitted to relevant Provincial agencies and Aboriginal groups in accordance with legislative and permit requirements.

32.2.2.1 Palaeontological Resources

In 2011 and 2012, palaeontological fieldwork included surface inspection to ground-truth palaeontological sensitivity areas identified during background research that resulted in revisions and additions to the original palaeontological sensitivity model (Golder and AMEC 2011; Golder and Branta 2012). Fieldwork involved pedestrian, helicopter, truck, and boat-based surveys to confirm fossil presence or absence and abundance at 287 identified palaeontological sensitivity areas. Limited fossil specimen samples were acquired from 104 palaeontological sensitivity areas within the LAA from 190 individual waypoint locations. The assemblage includes 285 fossil specimens representing a variety of taxa (Volume 4 Appendix C Heritage Resources Assessment Report).

Palaeontological analysis followed standard industry practices for the identification and description of fossils, drawing upon reference collections, published scientific articles, and external expertise, as required. Further analysis and discussion with scientific experts, including the Geological Survey of Canada, Royal British Columbia Museum, and local specialists from the Peace Region Palaeontological Research Centre will be undertaken to assist with refined species identification. Fossil specimen collection adhered to guidelines proposed in the Fossil Management Framework Consultation Summary Report (B.C. Land Tenures Branch 2010).

Prior to the assessment, 41 palaeontological sites had been recorded in the LAA, including previously recorded sites on lands that could not be accessed during the field inventory. Post-field analysis resulted in some palaeontological sensitivity areas being merged together in recognition of their observed fossil content, proximity, and similarity. Following this analysis, 173 positive palaeontological sensitivity areas have been documented within the LAA (Figure 32.4). Each positive palaeontological sensitivity area was assessed using a standardized checklist of criteria by indicating ‘yes’, ‘no’, or ‘insufficient data’ to answer questions posed under four categories: scientific, heritage, educational, and commercial (Volume 4 Appendix C Heritage Resources Assessment Report). Questions were weighted toward the assessment of scientific importance, and the overall positive answers in all assessment categories were used to rank the positive palaeontological sensitivity areas as Class I (n = 26), Class II (n = 113), or Class III (n = 34). In addition to ranking the positive palaeontological sensitivity areas against one another, an assessment confidence value was assigned to each location. The confidence value was determined by comparing the amount of ‘insufficient data’ answers to the total absolute answers (i.e., ‘yes’ or ‘no’). The resulting confidence assessment percentage was then factored into the overall significance assessment. Class III palaeontological sensitivity areas with relatively high ‘yes’ scores but with low confidence percentages were added to the Class II locations. These palaeontological sensitivity area site classes are linked to mitigation measures described in Section 32.3.2.

Class I palaeontological sensitivity areas are considered the most important locations and may contain unique fossils *in situ*, abundant and diverse specimens, and good specimen preservation, and have multiple time depths represented and potential educational opportunities or commercial opportunities. Class II palaeontological sensitivity areas are considered moderately important and may contain commonly known fossils *in situ*, moderate preservation, and moderate abundance, and may sometimes coincide with areas where amateur fossil collection has taken place. Class III positive palaeontological sensitivity areas are those locations that have low specimen abundance, poor preservation, and common specimens in *ex situ* context.

32.2.2.2 Archaeological Resources

Archaeological fieldwork followed the methods described in the application for Heritage Inspection Permit 2010-0378 (see Volume 4 Appendix C Heritage Resources Assessment Report), and the *British Columbia Archaeological Impact Assessment Guidelines* (B.C. Archaeology Branch 1998). At the direction of the B.C. Archaeology Branch, an archaeological predictive model created for the Project (Millennia 2010a, 2010b) was used to select locations for archaeological field testing.

In 2010 fieldwork focused on testing the archaeological predictive model (Golder and AMEC 2011). In 2011 and 2012, field inventory was undertaken within lands modelled as having high, moderate, and low archaeological site potential throughout the LAA, with

most effort focused on high potential areas. Field inspections included systematic visual surface inspection and over 50,000 subsurface tests, consisting of a combination of systematic, adaptive, and judgmental shovel tests, auger, or backhoe tests in locations with the potential for deeply buried archaeological deposits, and evaluative tests within select archaeological sites (Figure 32.3).

Specific archaeological methods were also designed to test for archaeological sites in the following contexts:

- Well-defined terrestrial margins of wetlands
- The saturated side of wetland margins
- Small (≤100 m^2), well-defined landforms
- Lands peripheral to the historic fur trade post of Rocky Mountain Fort

Archaeological analyses included standard quantitative and descriptive analyses of artifacts, radiocarbon dating, and X-ray fluorescence analysis to identify the geological sources of obsidian artifacts. Data from these analyses were used to assist in evaluating the heritage significance of individual archaeological sites, using the heritage significance criteria outlined in Appendix D of the British Columbia Archaeological Impact Assessment Guidelines (B.C. Archaeology Branch 1998).

Prior to the assessment, 111 archaeological sites had been recorded in the LAA, including previously recorded sites on lands that could not be accessed during the field inventory. During the assessment, 140 additional archaeological sites were identified.

A total of 251 assessed sites have been documented within the LAA (Figure 32.4), 184 of which are lithic scatters with less than 100 artifacts typically containing only artifacts made from black chert, including 57 sites where only a single artifact has been located. Thirty-one sites contain one or more of the following: a variety of artifact types, multiple raw materials, stratified deposits with multiple occupations, or faunal remains. Based on these characteristics, the 31 sites are considered to have higher scientific significance in accordance with Appendix D of the British Columbia Archaeological Impact Assessment Guidelines (B.C. Archaeology Branch 1998).

For the purposes of this assessment, these more complex sites have been labelled Class I sites while the low-density lithic scatters containing only artifacts made from black chert are considered Class II sites. These site classes are based on their assessed scientific significance, and they are linked to mitigation measures described in Section 32.3.2.

Ten sites could not be classified as either Class I or II based on existing information (see Volume 4 Appendix C Heritage Resources Assessment Report). These locations have been included in archaeological overview level assessments, but insufficient information is available to assign these locations to classes until such time as field level assessments occur. They include one site within the dam site, two sites on access roads, and seven sites within quarried and excavated construction materials areas.

32.2.2.3 Historical Resources

Following a review of existing information in 2010, field investigations at known and potential historical sites, as well as interviews with stakeholders were completed in 2011 and 2012. Interviews provided an understanding of valued historical resources within the

LAA, and why they are important. As well, participants were asked to identify sites, places, buildings, or other resources of historical or heritage importance in the LAA that reflect their personal values and ideas of heritage, or those of the group they represent.

Stakeholders included local and regional historical societies, museums, an archives committee, and a committee dedicated to documenting locations of local cemeteries, as well as local residents. Thirty-eight stakeholders were invited to participate in interviews, and 22 accepted. Six of the interviews included subsequent visits to historical site locations.

A field inventory of known (i.e., previously recorded) historical sites and potential (i.e., reported but not recorded) historical site locations was undertaken within the LAA. Known and potential historical site locations were selected for inventory based on the review of existing information and data obtained during reconnaissance surveys and the archaeological field program, as well as information provided by stakeholders. The field inventory included surface and subsurface inspections, and assessment of historical sites. A total of 50 locations were examined, and 184 subsurface tests were excavated during the historical field assessment.

Historical sites were recorded following recognized industry recording standards for post-1846 sites (e.g., Gotthardt and Thomas 2007; Alberta Culture 2008; Parks Canada 2010; National Park Service 2011; Washington State 2011). The evaluation of heritage significance of historical sites followed the significance criteria outlined in Appendix E of the British Columbia Archaeological Impact Assessment Guidelines (B.C. Archaeology Branch 1998) and input received through interviews with stakeholders.

Based on the field inventory and stakeholder interviews, 42 historical sites have been identified within the LAA (Figure 32.5). The 42 identified sites consist of Rocky Mountain Fort, Rocky Mountain Portage House, Rocky Mountain Portage Trail, former homesteads or other habitation sites (including collapsed or partially standing structures), industrial or agricultural sites, a wagon road, two trails, two unregistered cemeteries, a ferry landing, a canoe skid (a location on the shoreline used as a canoe landing, in which cobbles have been cleared away and a linear feature remains), a wagon wheel, and physiographic landscape features.

Site HbRf-31 (Rocky Mountain Fort) was revisited and general site observations were made, but no assessment work was conducted as part of this program, as extensive excavations have been previously completed at the site. Permission to access six other sites on private property, including HaRl-4 (Rocky Mountain Portage House) was not granted for the field program. These locations will be assessed in a manner consistent with the current heritage assessment prior to construction in those areas (see Section 32.6).

Also of note, in 1998, the Peace River was recognized as a provincial heritage river by British Columbia's Heritage River Program (Province of British Columbia 1998; B.C. Ministry of Environment 2010). Specifically, it has been recognized as a working river that "integrates economic activities with natural heritage, recreational, historic, and traditional cultural values" (B.C. Ministry of Environment 1998). The Province's vision statement seeks to manage resource-based uses of the river while maintaining representative natural heritage qualities and recognizing the historical heritage values of the river corridor to Aboriginal groups and non-Aboriginal people (Province of British Columbia 1998).

In the broader context, the cultural landscape of the Peace River region, comprising the river valley and its associated uplands, is also noted. Parks Canada (2010:253) defines cultural landscapes as “any geographical area that has been modified, influenced, or given special cultural meaning by people”. In this context, the Peace River region is both a cultural landscape and a rural historical landscape.

For the purposes of this assessment, those historical sites identified as having heritage significance (see B.C. Archaeology Branch 1998) and with good integrity and condition are considered Class I historical sites. Those sites evaluated as having heritage significance but poor integrity and condition are identified as Class II sites. Class III sites are those with low heritage significance and poor integrity and condition. These site classes are linked to the mitigation measures described in Section 32.3.3.

32.3 Effects Assessment

The effects assessment for heritage resources addresses Project components and activities capable of directly changing heritage resources as outlined above in Sections 32.1 and 32.2, as well as indirect effects associated with increased public access. While the activities that cause the effects vary, the effects are categorized as follows:

- Changes to resource integrity:
  - Disturbing heritage sites and features
  - Disturbing elements essential to the heritage character of features
  - Disturbing artifacts, features, human remains, and fossils
- Changes to resource accessibility:
  - Hindering or increasing access to sites and destroying contextual information
- Other relevant considerations raised by Aboriginal groups

Potential effects associated with construction activities are linked to discrete, planned, and measurable amounts of surface and subsurface disturbance, compaction, increased and decreased access to heritage resources, and to inundation and subsequent erosion or siltation, the rates of which are less predictable and may occur many years into the operational phase. Assessment of potential effects associated with construction, clearing, and preparation activities was accomplished on a case-by-case basis through review of known heritage site information and proposed construction activities.

Potential effects on archaeological and historical sites associated with inundation and operation of the reservoir were assessed using a heritage site erosion potential assessment scoring technique (E-PAST) that was developed specifically for the Project (see Volume 4 Appendix C Heritage Resources Assessment Report). The E-PAST tool uses a series of measurable units for specific site locations within and immediately adjacent to, the reservoir to create scores that indicate which sites are most and least susceptible to erosion.

Indirect effects to heritage resources associated with public or livestock access have the potential to occur along access roads and other areas of disturbance (U.S. Army Corps of Engineers 1989, 1990, 1992; Dunn 1996; Uphus et al. 2006).

Other relevant considerations raised by Aboriginal groups regarding effects to heritage resources will be evaluated by BC Hydro in consultation with the concerned group and the appropriate regulatory body on a case-by-case basis as such considerations are raised.

32.3.1 Effects Assessment – Construction – Heritage Resources

For the purposes of this assessment, the physical effects of construction activities on heritage resources (i.e., surface and subsurface disturbance-causing activities, compaction, and increased or restricted access to resources) are considered the same for all heritage resources (i.e., palaeontological, archaeological, and historical), with few exceptions. In an effort to simplify the assessment process, potential effects that apply equally to all heritage resources are reported as such. In instances where the Project's potential effects vary between palaeontological, archaeological, and historical resources, those differences are indicated.

32.3.1.1 Primary Construction Activities

Site clearing and preparation activities have the potential to directly affect heritage resources through surface and subsurface disturbance, which may result in changes to heritage site context and integrity through displacement or destruction of heritage material or cause compaction of the location. Site preparation activities may also require that existing structures, such as historical cabins or other features, be demolished or moved. Activities with the potential to affect heritage resources during site clearing and preparation include, but may not be limited to, clearing, grubbing, stripping, grading, and trenching. Effects on heritage resources from these kinds of activities are most often adverse; however, some benefit can be realized through inclusion of chance find management procedures for unearthed discoveries in the Heritage Resources Management Plan, resulting in the recovery of scientific information (see Section 32.6).

Activities with the potential to affect heritage resources by compaction include, but are not limited to, the use of laydown areas, parking areas and equipment storage, temporary facilities placement, temporary and permanent access road construction, temporary bridge installation, and surplus material storage.

As part of site preparation activities during construction, BC Hydro has noted that work may need to address contaminated sites in the Project activity zone. Remediation work that involves the excavation and removal of contaminated materials has the potential to adversely affect heritage resources, if present. Similarly, the potential removal or relocation of existing infrastructure (e.g., public utilities, oil and gas structures) could adversely affect heritage resources, if present.

32.3.1.2 Dam, Generating Station, and Spillways

All clearing, stripping, and ground-disturbing activities have the potential to affect heritage resources, if present (see Section 32.3.1.1). As noted previously, the dam and generating station footprint is known to contain heritage resources on both the north and south sides of the Peace River. Therefore, clearing and ground-disturbing activities in these areas have the potential to directly affect heritage resources. Further, activities that result in increased loading on buried deposits have the potential to affect heritage resources through compaction.

Filling and commissioning for testing of spillways and generating facilities has the potential to affect heritage resources through increased erosion and sedimentation.

Remediation or reclamation activities have the potential to affect heritage resources if they involve additional clearing or ground disturbance, as discussed in Section 32.3.1.1.

32.3.1.3 Reservoir

Initial filling of the reservoir has the potential to affect heritage resources, if present, through erosion, sedimentation, and hindering access for scientific research. Ground disturbing activities associated with channelization and diversion have the potential to alter heritage resources, as indicated in Section 32.3.1.1.

Debris management during construction has the potential to alter heritage resources through ground disturbance and compaction, as described in Section 32.3.1.1.

32.3.1.4 Hudson's Hope Shoreline Protection

Activities associated with the construction of the Hudson's Hope shoreline protection have the potential to affect heritage resources, if present, through clearing, ground disturbance, or compaction, as discussed in Section 32.3.1.1.

32.3.1.5 Transmission Line to Peace Canyon

Clearing, stripping, grading, and use of laydown areas along the transmission line right-of-way have the potential to affect heritage resources, if present, through displacement and destruction of heritage materials and compaction, as discussed in Section 32.3.1.1.

Tower construction may alter buried archaeological or palaeontological resources or historical structures through ground disturbance. Conductor stringing is not expected to affect heritage resources.

32.3.1.6 Highway 29 Realignment

Highway 29 realignment construction has the potential to alter heritage resources through ground disturbance and compaction, as described in Section 32.3.1.1. Should avoidance through redesign not be possible, road construction and Peace River tributary crossings have the potential to affect heritage resources. Further, deactivation of existing roads and subsequent restoration activities may affect resources if activities extend beyond the original road disturbance.

32.3.1.7 Construction Access

Road bed and Peace River tributary crossing construction and the installation of culverts have the potential to affect heritage resources, if present, through clearing, stripping, grading, excavation, and compacting activities (see Section 32.3.1.1). Road surface finishing and signage will have minimal to no effect on heritage resources.

Rail construction has the potential to affect heritage resources, if present, through ground disturbance and compaction.

The use of existing infrastructure should have no effect on heritage resources unless upgrades are proposed.

Road maintenance on 'built' roads and traffic management should have no effect on heritage resources unless the road passes through a heritage site. Roadside vegetation removal for ongoing maintenance may have potential to affect heritage resources, should they exist on or near the ground surface.

32.3.1.8 Quarried and Excavated Construction Materials

All ground-disturbing activities associated with quarrying, such as drilling, blasting, and excavating have the potential to affect heritage resources, if present, through displacement, destruction, and compaction. While crushing of rock material has a limited potential to affect archaeological and historical sites, it may have greater potential to destroy palaeontological specimens. Stockpiling quarried and excavated materials may affect heritage resources, if present, through compaction. Loading and transport of quarried and excavated materials will not affect heritage resources.

32.3.1.9 Worker Accommodation

Ground-disturbing activities associated with erecting worker accommodation and infrastructure have the potential to affect heritage resources, if present. Increased loading from temporary facilities may cause compaction to buried heritage resources.

Waste management and utilities operation for temporary facilities are not expected to affect heritage resources, beyond those effects discussed in the primary construction activities section (Section 32.3.1.1).

32.3.2 Effects Assessment – Operations – Heritage Resources

Once construction is complete, potential operational Project effects on heritage resources linked to erosion, sedimentation, road maintenance, increased public access and restriction of access to heritage resources are expected.

32.3.2.1 Dam, Generating Station, and Spillways

The potential effects of operation of the dam, generating station, and spillways are addressed in the discussion of the construction effects (Section 32.3.1.2). Therefore, no additional effects on heritage resources are expected during their operation.

32.3.2.2 Reservoir

The British Columbia Archaeological Impact Assessment Guidelines (B.C. Archaeology Branch 1998) requires consideration of project effects on "the extent or degree to which future opportunities for scientific research, preservation, or public appreciation are foreclosed or otherwise adversely affected by a proposed action". For heritage sites in the proposed reservoir area, "opportunities for scientific study" and "public appreciation" may be considered foreclosed for the planned operational life of the Project. However, the degree of preservation of heritage resources within a reservoir context is yet to be determined, and is site-specific and dependent on the erosional forces at work. Erosion and sedimentation at site-specific locations has been modelled using E-PAST (see Volume 4 Appendix C Heritage Resources Assessment Report). Opportunity for scientific examination of heritage resource locations within the operating range of the reservoir may occur during periods of maximum drawdown for scheduled and unscheduled maintenance. In the event that low reservoir levels occur in the future and exposed heritage site locations can be safely accessed, emergency salvage and

systematic data collection of exposed resources would help to mitigate the potential effects of erosion and unauthorized collection of heritage materials.

Direct effects to heritage resources caused by Project operations are linked to physical changes in the resource as a result of erosion and sedimentation, and through reduction of access to resources for scientific study and other purposes. Indirect effects related to the Project operation include increased risk of unpermitted collection and inadvertent alteration of resources through increased human access.

32.3.2.3 Transmission Line to Peace Canyon

Maintenance of the transmission line right-of-way and access roads have the potential to affect heritage resources, if present, through surface and subsurface disturbance. However, such effects are previously accounted for in the assessment of potential effects of construction of the Project (Section 32.3.1.1).

32.3.2.4 Highway 29 Realignment

Operation of the Highway 29 realignment is expected to have low potential for additional effects on heritage resources, as effects would likely have occurred during construction. Some forms of highway maintenance, such as ditch clearing or signpost replacement have potential to affect buried resources.

32.3.3 Mitigation Measures – Heritage Resources

Within the heritage resources LAA, 173 positive palaeontologically sensitive areas, 251 archaeological sites, and 42 historical sites have been recorded (Volume 4 Appendix C Heritage Resources Assessment Report). Given that heritage sites are a non-renewable resource, site preservation and conservation are considered primary principles. The preferred means of minimizing effects to heritage sites is complete avoidance. Based on the nature of the Project, the option of avoidance may be available primarily for the transmission line, Highway 29 realignment, access roads, and possibly the off-site quarries and construction materials areas. In addition, the use of restricted activity areas at the dam and generating station may enable avoidance of some heritage sites. Given that detailed Project design is ongoing, heritage resource considerations will be incorporated into detailed design and will improve the likelihood that heritage sites will be avoided. Avoidance measures would have to be considered in final design, and would have to consider potential effects on other VCs.

In certain circumstances, constraints such as terrain or design tolerances may make complete avoidance of a heritage site impossible. However, it may be possible to redesign portions of the Project components to reduce effects to a heritage site (e.g., partial avoidance). Project components with the greatest opportunity for partially avoiding heritage sites include the transmission line, Highway 29 realignment, access roads, and possibly the off-site quarries and construction materials areas. Similar to above, heritage resource considerations will be incorporated into the detailed design process, improving the likelihood that some heritage resources can at least be partially avoided.

For Project components where avoidance or partial avoidance of effects to heritage sites is not possible, steps may be taken to reduce or minimize effects to these sites (see B.C. Archaeology Branch 1998). Such steps could include relocation (e.g., historical

structures) or capping (intentional site burial) of important heritage sites, or portions of heritage sites, that cannot be excavated or moved. Other options could include structural supports (e.g., elevated causeways, bridges) or in the case of sites within the reservoir, inundated structures (e.g., wave breaks and shore-normal and shore-parallel structures). For potential effects from proposed reservoir clearing, it may be possible to minimize effects to sites by working in winter ground conditions on stable, frozen, and snow-covered surfaces, if no other effects such as inundation are expected.

In some instances, the nature of the effect is such that a systematic data recovery program (e.g., additional site inventory, surface collection, or excavation) is appropriate. For example, it would not be possible to avoid sites in the reservoir. The scope of a systematic data recovery program is typically commensurate with the evaluated heritage significance of the resource and the magnitude of the effect.

Documentation as a mitigation strategy may include detailed geological strata mapping, the recording of palaeoecological environments, or architectural recording of historical structures or features. Methods may include photography, detailed measurements, plan and elevation drawings, or dendrochronology core samples. The goals are to offset adverse effects and generate positive effects by creating a record of the strata, feature, or structure, by supplementing and updating limited previous recording and, in the case of previously recorded historical structures and features, providing a basis for evaluating the amount of deterioration that has occurred since originally recorded.

Construction monitoring, also known as surveillance, is often undertaken during excavations or other development-related activities as a means of mitigating Project effects on heritage resources. Construction monitoring can be used as both a site discovery tool and as a means of monitoring the systematic removal of known heritage resources so that site information can be recorded and important objects collected. A less common but equally valid approach to mitigating adverse effects is compensation-in-kind, which could include replication (replacement) and funding for public programming, museums, or even for research in areas within or beyond the LAA.

Should the Project proceed, a detailed heritage site mitigation strategy would be required based on the results of the heritage resources assessment and upon completion of detailed design. Applying the principles outlined above, an opportunity exists to incorporate heritage resource considerations into Project planning and detailed design. The goal of the proposed mitigation strategy would be to reduce adverse Project effects on heritage sites and to provide a positive Project effect by recovering data which adds to the knowledge base of palaeontology, local prehistory, and human use of the LAA over time. While the effects of Project activities on palaeontological, archaeological, and historical resources will be similar, the measures used to mitigate the effects on each resource type will differ. Potential mitigation strategies for each resource type are presented below, based on existing information.

32.3.3.1 Palaeontological Resources

The review of existing information and field investigations identified 139 positive palaeontological sensitivity areas that warrant some form of mitigation (Table 32.3). An additional 34 palaeontological sensitivity areas require no further palaeontological work (see Volume 4 Appendix C Heritage Resources Assessment Report). Class I palaeontological sensitivity areas would require some form of mitigation, possibly a combination of avoidance, effect reduction or minimization, documentation, systematic

data recovery, monitoring, or compensation-in-kind. Class II palaeontological sensitivity areas would also require that mitigation measures be implemented, possibly including avoidance, effect reduction or minimization, and compensation-in-kind; this would be further supplemented by a representative sample (approximately 20%) being identified for documentation, systematic data recovery and monitoring, where Project effects are unavoidable. Class III palaeontological sensitivity areas would not require further work beyond adherence to established chance find management procedures (see Section 32.6). In the absence of statutory guidance, a positive palaeontological sensitivity area-specific strategy of mitigation measures would be developed using guidance from best practices for palaeontological mitigation in jurisdictions with legislation that address palaeontological resources. Mitigation measures for palaeontological resources would be developed with input from the Royal British Columbia Museum, the B.C. Ministry of Forests, Mines, and Lands (Land Tenures Branch), and local stakeholders.

Table 32.3 summarizes the results of the palaeontological resources baseline investigation and potential mitigation approaches for the heritage resources in the LAA.

Table 32.3 Summary of Palaeontological Baseline and Mitigation Approaches

Project Activities and Physical Works	Palaeontological Resources – Mitigation					
	Class I Sites	Class I Sites Potential Mitigation Approaches	Class II Sites	Class II Sites Potential Mitigation Approaches	Class III	Class III Sites Potential Mitigation Approaches
Construction Phase						
Dam & Generating Station Construction		Systematic data recovery (site inventory, surface collection, excavation); Documentation; Monitoring; Compensation-in-kind	PS001A, PS001C, PS114E, PS114G, PS124D1-2, PSND01I	Systematic data recovery (site inventory, surface collection, excavation); Documentation; Monitoring; Compensation-in-kind	PS002B, PS002C	Chance find management procedure (see Section 32.6); No further palaeontological work
Reservoir Preparation and Filling	PS013E1-3, PS013F, PS025E, PS026C, PS026D, PS027J, PS027K, PS028B, PS029E, PS040D, PS042A, PS046B-C, PS048B, PS049B, PS049C, PS051B-C, PS053A-D, PS056A-B, PS093A-C, PS099A-C, PS119D, PS120D, PS121D, PS122B, PS123C, PSX07A	Systematic data recovery (site inventory, surface collection, excavation); Documentation ; Monitoring; Compensation-in-kind	PS001A, PS001C, PS003B-D, PS004A, PS004D, PS005B, PS005C, PS005D, PS005E-F, PS006A, PS006C, PS012A, PS012C, PS012C/A, PS012D, PS012E, PS012H, PS013C, PS013D, PS013G1-2, PS015A, PS017D, PS018A, PS021E, PS021F, PS023A, PS023B, PS025B, PS026A, PS026F, PS026G, PS027A, PS027F, PS027G, PS027H, PS027I/J, PS028A, PS029A, PS029B, PS029C, PS029D1, PS029D2, PS029E/F, PS037B, PS043C,	Systematic data recovery (site inventory, surface collection, excavation); Documentation ; Monitoring; Compensation-in-kind	PS002B, PS002C, PS012F, PS024B, PS029G, PS037A, PS038F, PS038G, PS043D, PS047B, PS061B, PS062C, PS062E, PS062F, PS062G, PS062L, PS062M/N, PS062N, PS064D, PS066E, PS067B, PS067C, PS068C, PS073B, PS073C, PS076E, PS077F, PS079H, PS080A, PS083B/C, PS098E	Chance find management procedure (see Section 32.6); No further palaeontological work

Project Activities and Physical Works	Palaeontological Resources – Mitigation					
	Class I Sites	Class I Sites Potential Mitigation Approaches	Class II Sites	Class II Sites Potential Mitigation Approaches	Class III	Class III Sites Potential Mitigation Approaches
			PS045A-E, PS047A, PS048A, PS050A, PS052A-D, PS057D, PS062A, PS062B, PS062D, PS063A, PS064A, PS064B, PS064C, PS065A, PS067A, PS069A-C, PS069D, PS069E, PS070A, PS070B, PS070C, PS070D, PS072B, PS072C, PS073D, PS073F, PS073I, PS078G, PS079A, PS079E, PS079G, PS084A, PS086A, PS090A, PS100A-C, PS101A-G, PS110B, PS110E-F, PS111A, PS111B, PS114D, PS114E, PS114G, PS115A, PS115E, PS115F, PS116C/D, PS116E, PS116F, PS116G, PS117A, PS117E, PS117F, PS117G, PS117H, PS117I, PS118C, PS119B, PS119C, PS122A, PS124D1-2,			

Project Activities and Physical Works	Palaeontological Resources – Mitigation					
	Class I Sites	Class I Sites Potential Mitigation Approaches	Class II Sites	Class II Sites Potential Mitigation Approaches	Class III	Class III Sites Potential Mitigation Approaches
			PSR05H, PSX07B			
Transmission System		Avoidance or partial avoidance; Effect reduction/minimization (winter ground conditions); Systematic data recovery (site inventory, surface collection, excavation); Documentation; Monitoring; Compensation-in-kind	PST01B, PST02E, PST03B	Avoidance or partial avoidance; Effect reduction/minimization (winter ground conditions); Systematic data recovery (site inventory, surface collection, excavation); Documentation; Monitoring; Compensation-in-kind	PST01E, PST04F, PST05G	Chance find management procedure (see Section 32.6); No further palaeontological work
Quarried and Excavated Material Source Development	PS025E, PS040D, PS042A, PS053A-D	Avoidance or partial avoidance; Effect reduction/minimization (winter ground conditions); Systematic data recovery (site inventory, surface collection, excavation); Documentation; Monitoring; Compensation-in-kind	PS026F, PS037B, PS062A, PS062D, PS063A, PS065A, PS067A, PS069A-C	Avoidance or partial avoidance; Effect reduction/minimization (winter ground conditions); Systematic data recovery (site inventory, surface collection, excavation); Documentation; Monitoring; Compensation-in-kind	PS024B, PS037A, PS062E, PS062N, PS064D, PS067B, PS067C, PS068C, PS076E	Chance find management procedure (see Section 32.6); No further palaeontological work

Project Activities and Physical Works	Palaeontological Resources – Mitigation					
	Class I Sites	Class I Sites Potential Mitigation Approaches	Class II Sites	Class II Sites Potential Mitigation Approaches	Class III	Class III Sites Potential Mitigation Approaches
Highway 29 Realignment	PS025E, PS040D, PS053A-D	Avoidance or partial avoidance; Effect reduction/minimization (winter ground conditions); Systematic data recovery (site inventory, surface collection, excavation); Documentation; Monitoring; Compensation-in-kind	PS025B, PS062B, PS063A, PS064A, PS064B, PS064C, PS067A, PSQ02A, PSR01H2, PSR05H	Avoidance or partial avoidance; Effect reduction/minimization (winter ground conditions); Systematic data recovery (site inventory, surface collection, excavation); Documentation; Monitoring; Compensation-in-kind	PS061B, PS062C, PS062N, PS064D, PS067B	Chance find management procedure (see Section 32.6); No further palaeontological work
Construction Access Road Development	PS026C, PS026D	Avoidance or partial avoidance; Effect reduction/minimization (winter ground conditions); Systematic data recovery (site inventory, surface collection, excavation); Documentation; Monitoring; Compensation-in-kind	PS001A, PS001C, PS004A, PS021F, PS026G, PS052A-D, PS062B, PS064A, PS064B, PS064C, PS067A, PS069A-C, PS078G, PS079A, PS084A, PS114G, PS115E, PS116G, PS117F, PS117I, PSR01H2	Avoidance or partial avoidance; Effect reduction/minimization (winter ground conditions); Systematic data recovery (site inventory, surface collection, excavation); Documentation; Monitoring; Compensation-in-kind	PS002B, PS024B, PS043D, PS062C, PS062F, PS062G, PS062L, PS062M/N, PS062N, PS064D, PS067B, PS067C, PS083B/C	Chance find management procedure (see Section 32.6); No further palaeontological work
Worker Accommodation Construction and Operations	NA	Avoidance or partial avoidance; Effect reduction/minimization (winter ground conditions); Systematic data recovery (site inventory, surface collection, excavation); Documentation; Monitoring; Compensation-in-kind	NA	Avoidance or partial avoidance; Effect reduction/minimization (winter ground conditions); Systematic data recovery (site inventory, surface collection, excavation); Documentation; Monitoring; Compensation-in-kind	NA	Chance find management procedure (see Section 32.6); No further work

Project Activities and Physical Works	Palaeontological Resources – Mitigation					
	Class I Sites	Class I Sites Potential Mitigation Approaches	Class II Sites	Class II Sites Potential Mitigation Approaches	Class III	Class III Sites Potential Mitigation Approaches
Commissioning and Operations						
Reservoir and Generating Station Operations	PS013E1-3, PS013F, PS025E, PS026C, PS026D, PS027J, PS027K, PS028B, PS029E, PS040D, PS042A, PS046B-C, PS048B, PS049B, PS049C, PS051B-C, PS053A-D, PS056A-B, PS093A-C, PS099A-C, PS119D, PS120D, PS121D, PS122B, PS123C, PSX07A	Systematic data recovery (site inventory, surface collection, excavation); Documentation; Monitoring	PS001A, PS001C, PS003B-D, PS004A, PS004D, PS005B, PS005C, PS005D, PS005E-F, PS006A, PS006C, PS012A, PS012C, PS012C/A, PS012D, PS012E, PS012H, PS013C, PS013D, PS013G1-2, PS015A, PS017D, PS018A, PS021E, PS021F, PS023A, PS023B, PS025B, PS026A, PS026F, PS026G, PS027A, PS027F, PS027G, PS027H, PS027I/J, PS028A, PS029A, PS029B, PS029C, PS029D1, PS029D2, PS029E/F, PS037B, PS043C, PS045A-E, PS047A, PS048A, PS050A, PS052A-D, PS057D, PS062A, PS062B, PS062D, PS063A, PS064A, PS064B, PS064C, PS065A,	Systematic data recovery (site inventory, surface collection, excavation); Documentation; Monitoring	PS002B, PS002C, PS012F, PS024B, PS029G, PS037A, PS038F, PS038G, PS043D, PS047B, PS061B, PS062C, PS062E, PS062F, PS062G, PS062L, PS062M/N, PS062N, PS064D, PS066E, PS067B, PS067C, PS068C, PS073B, PS073C, PS076E, PS077F, PS079H, PS080A, PS083B/C, PS098E	Chance find management procedure (see Section 32.6); No further palaeontological work

Project Activities and Physical Works	Palaeontological Resources – Mitigation					
	Class I Sites	Class I Sites Potential Mitigation Approaches	Class II Sites	Class II Sites Potential Mitigation Approaches	Class III	Class III Sites Potential Mitigation Approaches
			PS067A, PS069A-C, PS069D, PS069E, PS070A, PS070B, PS070C, PS070D, PS072B, PS072C, PS073D, PS073F, PS073I, PS078G, PS079A, PS079E, PS079G, PS084A, PS086A, PS090A, PS100A-C, PS101A-G, PS110B, PS110E-F, PS111A, PS111B, PS114D, PS114E, PS114G, PS115A, PS115E, PS115F, PS116C/D, PS116E, PS116F, PS116G, PS117A, PS117E, PS117F, PS117G, PS117H, PS117I, PS118C, PS119B, PS119C, PS122A, PS124D1-2, PSR05H, PSX07B, PSND01I			

32.3.3.2 Archaeological Resources

Both Class I and II sites that cannot be avoided through Project redesign would be considered for a systematic data recovery (excavation) program. Class I sites have the greatest potential to provide more archaeological information and larger artifact assemblages with time depth, whereas Class II sites collectively have the potential to

provide important information about Aboriginal land use associated with the most common type of archaeological site in the area.

As noted in Table 32.4, there are 31 Class I sites (approximately 13% of all archaeological sites, including historical sites with archaeological deposits) in the LAA. All Class I sites that cannot be avoided would be considered for systematic data recovery. The size of sample to be excavated at each site, the approach, and methods would be determined through permit discussions with the B.C. Archaeology Branch, and consultation with Aboriginal groups. The extent and nature of mitigation is ultimately determined by the B.C. Archaeology Branch as part of their B.C. *Heritage Conservation Act* permitting responsibilities.

For the 210 Class II sites (Table 32.4), a sample of up to 20% would be considered for further investigation. Stratified, random sampling would be used to determine which Class II sites should be selected for excavation, based on site content, size, and LAA setting (e.g., north bank and south bank of the Peace River Valley; plateau, low, mid, and high terraces; low, moderate, and high archaeological potential locations, based on the predictive model for archaeological potential; proximity to wetlands, terrace edges, or river and creek confluences). Similar to Class I sites, the number of sites, the size of sample to be excavated at each site, the approach, and methods would be determined through discussions with the B.C. Archaeology Branch and Aboriginal groups. The extent of mitigation is ultimately determined by the B.C. Archaeology Branch.

Tables 32.4 and 32.5 summarize the baseline conditions and potential mitigation approaches for archaeological resources. For sites that have not yet been assessed, the site class is rated as NA (data not available).

Table 32.4 Summary of Archaeological Baseline and Mitigation Approaches for Assessed Project Components

Project Activities and Physical Works	Archaeological Resources – Mitigation					
	Class I Sites	Class I Sites Potential Mitigation Approaches	Class II Sites	Class II Sites Potential Mitigation Approaches	Class NA Sites	Class NA Site Potential Mitigation Approaches
Construction Phase						
Dam & Generating Station Construction	HbRf-102, HbRf-40, HbRf-61, HbRf-62	systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation -in-kind	HaRf-24, HaRf-25, HaRf-26, HaRf-27, HaRf-28, HaRf-29, HaRf-30, HbRf-100, HbRf-103, HbRf-104, HbRf-105, HbRf-106, HbRf-107, HbRf-108, HbRf-109, HbRf-110, HbRf-30, HbRf-59, HbRf-60, HbRf-63, HbRf-64,	systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation-in-kind	HbRf-32, HbRf-66	systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation-in-kind

Project Activities and Physical Works	Archaeological Resources – Mitigation					
	Class I Sites	Class I Sites Potential Mitigation Approaches	Class II Sites	Class II Sites Potential Mitigation Approaches	Class NA Sites	Class NA Site Potential Mitigation Approaches
			HbRf-65, HbRf-67, HbRf-82, HbRf-88, HbRf-93, HbRf-94, HbRf-95, HbRf-96, HbRf-97, HbRf-98, HbRf-99			

Project Activities and Physical Works	Archaeological Resources – Mitigation					
	Class I Sites	Class I Sites Potential Mitigation Approaches	Class II Sites	Class II Sites Potential Mitigation Approaches	Class NA Sites	Class NA Site Potential Mitigation Approaches
Reservoir Preparation and Filling	HaRj-14, HaRj-19, HaRk-1, HaRk-23, HaRk-38, HaRk-46, HaRk-49, HbRf-61, HbRf-62, HbRg-47, HbRg-5, HbRg-6, HbRh-122, HbRh-131, HbRh-36, HbRh-66, HbRh-8, HbRi-43	Capping, inundated structures, winter ground conditions, systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation -in-kind	HaRj-16, HaRj-21, HaRj-22, HaRj-24, HaRj-27, HaRj-28, HaRj-29, HaRj-30, HaRj-31, HaRj-7, HaRk-12, HaRk-13, HaRk-15, HaRk-16, HaRk-2, HaRk-35, HaRk-43, HaRk-44, HaRk-47, HaRk-48, HaRk-5, HaRk-50, HaRk-51, HaRk-52, HaRk-53, HaRk-55, HaRl-10, HaRl-18, HaRl-19, HaRl-29, HaRl-30, HaRl-34, HaRl-37, HbRf-100, HbRf-42, HbRf-59, HbRg-11, HbRg-15, HbRg-17, HbRg-18, HbRg-46, HbRg-48, HbRg-49, HbRg-50, HbRg-51, HbRg-52, HbRg-53, HbRg-54, HbRg-55, HbRg-56, HbRg-57, HbRg-61, HbRh-104, HbRh-107, HbRh-112, HbRh-113, HbRh-114, HbRh-115, HbRh-116, HbRh-117, HbRh-120,	Capping, inundated structures, winter ground conditions, systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation-in-kind	HaRk-18, HaRk-25, HaRk-26, HaRk-36, HaRl-20, HaRl-21, HaRl-22, HaRl-23, HaRl-24, HaRl-3, HaRl-4, HbRh-18, HbRh-19	Capping, inundated structures, winter ground conditions, systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation-in-kind

Project Activities and Physical Works	Archaeological Resources – Mitigation					
	Class I Sites	Class I Sites Potential Mitigation Approaches	Class II Sites	Class II Sites Potential Mitigation Approaches	Class NA Sites	Class NA Site Potential Mitigation Approaches
			HbRh-121, HbRh-123, HbRh-124, HbRh-125, HbRh-126, HbRh-127, HbRh-128, HbRh-129, HbRh-130, HbRh-132, HbRh-133, HbRh-134, HbRh-135, HbRh-136, HbRh-137, HbRh-138, HbRh-139, HbRh-140, HbRh-141, HbRh-142, HbRh-2, HbRh-20, HbRh-29, HbRh-32, HbRh-34, HbRh-37, HbRh-38, HbRh-46, HbRh-52, HbRh-53, HbRh-56, HbRh-58, HbRh-6, HbRh-65, HbRh-67, HbRi-10, HbRi-11, HbRi-12, HbRi-24, HbRi-25, HbRi-42, HbRi-50, HbRi-56, HbRi-57, HbRi-58, HbRi-59, HbRi-60, HbRi-61, HbRj-6			
Transmission System	GlRj-2, HaRf-32, HaRf-34, HaRj-32, HbRf-61	Avoidance, partial avoidance, capping, winter ground conditions, systematic data recovery (site inventory, surface	GlRk-5, HaRf-13, HaRf-31, HaRf-33, HaRf-35, HaRf-36, HaRf-37, HaRf-38, HaRf-39, HaRf-40, HaRf-41,	Avoidance, partial avoidance, capping, winter ground conditions, systematic data recovery (site inventory, surface collection, or		Avoidance, partial avoidance, capping, winter ground conditions, systematic data recovery (site inventory, surface collection, or

Project Activities and Physical Works	Archaeological Resources – Mitigation					
	Class I Sites	Class I Sites Potential Mitigation Approaches	Class II Sites	Class II Sites Potential Mitigation Approaches	Class NA Sites	Class NA Site Potential Mitigation Approaches
		collection, or excavation), monitoring, compensation -in-kind	HaRg-3, HaRg-37, HaRg-38, HaRg-39, HaRg-40, HaRg-42, HaRh-15, HaRj-34, HbRf-103, HbRf-113, HbRf-114, HbRf-95	excavation), monitoring, compensation-in-kind		excavation), monitoring, compensation-in-kind
Quarried and Excavated Material Source Development	HaRk-23, HaRk-38, HaRk-46, HaRk-49, HbRf-115, HbRh-122, HbRh-131, HbRh-16, HbRh-36, HbRh-8, HbRi-43, HbRi-6	Avoidance, partial avoidance, systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation -in-kind	HaRj-17, HaRj-26, HaRj-35, HaRk-15, HaRk-16, HaRk-2, HaRk-35, HaRk-43, HaRk-44, HaRk-53, HaRl-18, HaRl-19, HaRl-29, HaRl-31, HaRl-32, HaRl-36, HbRf-111, HbRf-112, HbRh-104, HbRh-107, HbRh-112, HbRh-113, HbRh-114, HbRh-115, HbRh-116, HbRh-120, HbRh-121, HbRh-123, HbRh-124, HbRh-125, HbRh-127, HbRh-128, HbRh-129, HbRh-130, HbRh-132, HbRh-133, HbRh-136, HbRh-137, HbRh-138, HbRh-139, HbRh-140, HbRh-2, HbRh-29, HbRh-32, HbRh-34, HbRh-37, HbRh-38, HbRh-46,	Avoidance, partial avoidance, systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation-in-kind	HaRk-18, HaRk-25, HaRk-26, HaRk-36, HbRh-18	Avoidance, partial avoidance, systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation-in-kind

Project Activities and Physical Works	Archaeological Resources – Mitigation					
	Class I Sites	Class I Sites Potential Mitigation Approaches	Class II Sites	Class II Sites Potential Mitigation Approaches	Class NA Sites	Class NA Site Potential Mitigation Approaches
			HbRh-52, HbRh-56, HbRh-58, HbRh-6, HbRh-65, HbRh-67, HbRi-10, HbRi-12, HbRi-24, HbRi-25, HbRi-42, HbRi-50, HbRi-56, HbRi-57, HbRi-58, HbRi-59, HbRi-60, HbRi-61			

Project Activities and Physical Works	Archaeological Resources – Mitigation					
	Class I Sites	Class I Sites Potential Mitigation Approaches	Class II Sites	Class II Sites Potential Mitigation Approaches	Class NA Sites	Class NA Site Potential Mitigation Approaches
Highway 29 Realignment	HaRk-1, HbRh-12, HbRh-16, HbRh-54, HbRh-55, HbRi-41, HbRi-6	Avoidance, partial avoidance, capping, structural supports, winter ground conditions, systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation -in-kind	HaRj-15, HaRj-16, HaRj-17, HaRj-18, HaRj-21, HaRj-23, HaRj-26, HaRj-30, HaRj-33, HaRj-35, HaRk-12, HaRk-13, HaRk-17, HaRk-48, HaRk-5, HaRk-54, HaRk-6, HaRl-10, HaRl-14, HaRl-30, HaRl-31, HaRl-32, HaRl-33, HaRl-35, HbRh-143, HbRh-144, HbRh-145, HbRh-146, HbRh-147, HbRh-148, HbRh-33, HbRh-42, HbRh-57, HbRh-63, HbRh-64, HbRi-46	Avoidance, partial avoidance, capping, structural supports, winter ground conditions, systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation-in-kind	HaRk-8, HbRh-10, HbRh-68, HbRh-69	Avoidance, partial avoidance, capping, structural supports, winter ground conditions, systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation-in-kind
Construction Access Road Development	HaRf-32, HaRf-34, HaRj-14, HaRk-1, HbRf-62, HbRh-36	Avoidance, partial avoidance, capping, structural supports, winter ground conditions, systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation -in-kind	HaRk-13, HaRk-15, HbRf-100, HbRg-11, HbRg-46, HbRh-132, HbRi-10	Avoidance, partial avoidance, capping, structural supports, winter ground conditions, systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation-in-kind	HaRl-23, HaRl-4	Avoidance, partial avoidance, capping, structural supports, winter ground conditions, systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation-in-kind
Worker Accommodation Construction and Operations	NA	Avoidance, partial avoidance, capping, winter ground conditions,	NA	Avoidance, partial avoidance, capping, winter ground conditions,	NA	Avoidance, partial avoidance, capping, winter ground conditions,

Project Activities and Physical Works	Archaeological Resources – Mitigation					
	Class I Sites	Class I Sites Potential Mitigation Approaches	Class II Sites	Class II Sites Potential Mitigation Approaches	Class NA Sites	Class NA Site Potential Mitigation Approaches
		systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation -in-kind		systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation-in-kind		systematic data recovery (site inventory, surface collection, or excavation), monitoring, compensation-in-kind
Commissioning and Operations						
Reservoir and Generating Station Operations	HaRj-14, HaRj-19, HaRk-1, HaRk-23, HaRk-38, HaRk-46, HaRk-49, HbRf-61, HbRf-62, HbRg-47, HbRg-5, HbRg-6, HbRh-122, HbRh-131, HbRh-36, HbRh-66, HbRh-8, HbRi-43	systematic data recovery (site inventory, surface collection, or excavation), monitoring	HaRj-16, HaRj-21, HaRj-22, HaRj-24, HaRj-27, HaRj-28, HaRj-29, HaRj-30, HaRj-31, HaRj-7, HaRk-12, HaRk-13, HaRk-15, HaRk-16, HaRk-2, HaRk-35, HaRk-43, HaRk-44, HaRk-47, HaRk-48, HaRk-5, HaRk-50, HaRk-51, HaRk-52, HaRk-53, HaRk-55, HaRl-10,	systematic data recovery (site inventory, surface collection, or excavation), monitoring	HaRk-18, HaRk-25, HaRk-26, HaRk-36, HaRl-20, HaRl-21, HaRl-22, HaRl-23, HaRl-24, HaRl-3, HaRl-4, HbRh-18, HbRh-19	systematic data recovery (site inventory, surface collection, or excavation), monitoring
Reservoir and Generating Station Operations			HaRl-18, HaRl-19, HaRl-29, HaRl-30, HaRl-34, HaRl-37, HbRf-100, HbRf-42, HbRf-59, HbRg-11, HbRg-15, HbRg-17, HbRg-18, HbRg-46, HbRg-48, HbRg-49, HbRg-50, HbRg-51, HbRg-52, HbRg-53, HbRg-54, HbRg-55,			

Project Activities and Physical Works	Archaeological Resources – Mitigation					
	Class I Sites	Class I Sites Potential Mitigation Approaches	Class II Sites	Class II Sites Potential Mitigation Approaches	Class NA Sites	Class NA Site Potential Mitigation Approaches
			HbRg-56, HbRg-57, HbRg-61, HbRh-104, HbRh-107, HbRh-112, HbRh-113, HbRh-114, HbRh-115, HbRh-116, HbRh-117, HbRh-120, HbRh-121, HbRh-123, HbRh-124, HbRh-125, HbRh-126, HbRh-127, HbRh-128, HbRh-129, HbRh-130, HbRh-132, HbRh-133, HbRh-134, HbRh-135, HbRh-136, HbRh-137, HbRh-138, HbRh-139, HbRh-140, HbRh-141, HbRh-142, HbRh-2, HbRh-20, HbRh-29, HbRh-32, HbRh-34, HbRh-37, HbRh-38, HbRh-46, HbRh-52, HbRh-53, HbRh-56, HbRh-58, HbRh-6, HbRh-65, HbRh-67, HbRi-10, HbRi-11, HbRi-12, HbRi-24, HbRi-25, HbRi-42, HbRi-50, HbRi-56, HbRi-57, HbRi-58, HbRi-59, HbRi-60, HbRi-61, HbRj-6			

Wide area excavations at three identified archaeological site complexes (i.e., localities with high densities of both Class I and II archaeological sites associated with particular landforms or environmental features) would also be considered for systematic data recovery. The three site complexes are:

- Wilder Creek–Jim Rose Prairie, a high intermediate terrace complex on the north side of the Peace River that extends on either side of Wilder Creek, known locally as Jim Rose Prairie (Table 32.5)
- Cache Creek–Bear Flat, a high intermediate terrace on the north side of the Peace River and west of Cache Creek, known locally as Bear Flat (Table 32.5)
- Cache Creek–Watson Slough, situated immediately below the Bear Flat Complex, surrounding a wetland known locally as Watson Slough; sites are concentrated either near the slough or at the terrace edge (Table 32.5)

Mitigation work in these areas would be used to understand the use of several environmental settings that appear to have been more intensively utilized by people in the past. The approach, size of sample to be excavated, and methods to be used at each site complex would be determined in discussion with the B.C. Archaeology Branch and Aboriginal groups. The extent of mitigation would ultimately be determined by the B.C. Archaeology Branch. The sites that comprise the three site complexes are listed in Table 32.5. These sites are also included in Table 32.4, but they are shown separately here because they may be sampled in a different way during mitigation (subject to discussions with the B.C. Archaeology Branch and Aboriginal groups).

Table 32.5 Archaeological Site Complexes within the Heritage Resource LAA

Wilder Creek–Jim Rose Prairie	Cache Creek–Bear Flat	Cache Creek–Watson Slough	
		Near Slough	Near Terrace Edge
HbRg-5	HbRh-10	HbRh-18	HbRh-2
HbRg-6	HbRh-12	HbRh-36	HbRh-6
HbRg-11	HbRh-16	HbRh-38	HbRh-8
HbRg-15	HbRh-33	HbRh-53	HbRh-34
HbRg-17	HbRh-54	HbRh-56	HbRh-37
HbRg-18	HbRh-55	HbRh-65	HbRh-58
HbRg-46	HbRh-57	HbRh-66	HbRh-67
HbRg-47	HbRh-63	HbRh-107	HbRh-104
HbRg-48	HbRh-64	HbRh-112	HbRh-113
HbRg-49	HbRh-68	HbRh-117	HbRh-114
HbRg-50	HbRh-69	HbRh-126	HbRh-115
HbRg-51	HbRh-112	HbRh-128	HbRh-116
HbRg-52	HbRh-143	HbRh-130	HbRh-121
HbRg-53	HbRh-144	HbRh-132	HbRh-122
HbRg-54	HbRh-145	HbRh-133	HbRh-123
HbRg-55	HbRh-146	HbRh-134	HbRh-125
HbRg-56	HbRh-147	HbRh-135	HbRh-126
HbRg-57	HbRh-148	HbRh-136	HbRh-127
HbRg-61	-	HbRh-137	HbRh-131
-	-	HbRh-140	-

Archaeological site mitigation would also include systematic data recovery at locations identified as having deeply buried archaeological materials (e.g., HaRk-1, HaRk-23, HaRk-16, and HaRk-46), provided avoidance of adverse Project effects is not possible at these locations.

Further mitigation measures would include ongoing scheduled monitoring along the edge of the reservoir (see Section 32.6). Newly exposed sites would be assessed for potential effects due to wind and water erosion, and recommendations would be made for mitigation of those effects, if any. An initial monitoring period of five years would be implemented during which most shoreline erosion is expected to occur. The need for additional monitoring would be evaluated after the fifth year.

Additional mitigation measures related to archaeological resources could include compensation-in-kind for museums, public displays, and public education – including academic research, publications, a website, videos, and signage – and for research in areas outside the LAA.

32.3.3.3 Historical Resources

Within the heritage resources LAA, 42 historical sites have been recorded. Of these, nine sites are Class I sites, 21 are Class II sites, and eight are Class III sites (Table 32.6). No data were collected at the remaining four sites, which could not be accessed during the field inventory. Defining criteria for Class I, II, and III sites are provided in Section 32.2.2.3. For historical sites protected by the B.C. *Heritage Conservation Act*, the nature and extent of mitigation will be determined in discussion with the B.C. Archaeology Branch, the Business Practices and Consumer Protection Authority of B.C., Aboriginal groups, museums, and stakeholders. For historical sites not protected by the B.C. *Heritage Conservation Act*, the extent and nature of mitigation will be determined through discussions with the Business Practices and Consumer Protection Authority of B.C., Aboriginal groups, museums, and stakeholders.

Mitigation of historical sites in the LAA would include nine Class I sites, including four HCA-protected historical sites. The potential mitigation approaches for these Class I sites are avoidance, systematic data recovery, capping, relocation, documentation, monitoring, and compensation-in-kind.

Site HbRf-31 (Rocky Mountain Fort) and HaRl-4 (Rocky Mountain Portage House) are Class I historical sites protected by the B.C. *Heritage Conservation Act*, and have been identified as candidates for systematic data recovery (excavation) to expose and identify additional architectural details and to gather a sample of historical artifacts. At site Rocky Mountain Fort (HbRf-31), previous excavations conducted were undertaken within a research-oriented design, rather than one oriented toward salvage recovery of data. Mitigation measures for HbRf-31 would be proposed (Table 32.6), including relocation, systematic data recovery, capping, monitoring, and compensation-in-kind (replication).

There are five recorded historic period human graves at two locations in the LAA (not including the potential burial at site HbRh-2 as discussed above in Section 32.3.2.2). These two locations are identified as Class I historical sites protected by the B.C. *Heritage Conservation Act*, having heritage significance, good integrity, and good condition. Prior to construction in these areas, mitigation recommendations would be made for these five burials in accordance with legislation and in consultation with relevant stakeholders (e.g., confirmed descendants of the deceased).

The Class II sites include nine sites in which mitigation approaches of systematic data recovery, documentation, and relocation would be undertaken (Table 32.6). No further historical work would be undertaken at 12 Class II historical sites with heritage significance but poor integrity and condition, including the three Class II historical sites which also have archaeological components protected by the B.C. *Heritage Conservation Act* (see Section 32.3.2.2).

No further historical work would be undertaken at seven Class III historical sites with low heritage significance and poor integrity and condition. No further historical work would be undertaken on the historical component at one Class III site that also has an archaeological component protected by the B.C. *Heritage Conservation Act*. Mitigation of the archaeological component of this site is addressed in Section 32.3.2.2.

Additional mitigation measures related to historical resources could include compensation-in-kind for museums, public displays, and public education – including academic research, publications, a website, videos, and signage – and for research in areas outside the heritage resources LAA.

Table 32.6 summarizes the baseline conditions and potential mitigation approaches for historical resources.

Table 32.6 Summary of Historical Resources Baseline and Mitigation Approaches

Project Activities and Physical Works	Class I Site	Class II Site	Class III Site	Class NA Site	HCA-protected	Potential Mitigation Approach
Construction Phase						
Dam & Generating Station Construction	N/A	N/A	AMB-T5	N/A	No	no further historical work
	N/A	N/A	AMB-T6	N/A	No	no further historical work
Reservoir Preparation and Filling	HaRl-4	N/A	N/A	N/A	Yes	systematic data recovery, monitoring, compensation-in-kind
	H-12-G4	N/A	N/A	N/A	Yes	relocation, capping
	H-12-G9	N/A	N/A	N/A	No	documentation, compensation-in-kind
	H-12-G13-1	N/A	N/A	N/A	No	documentation; compensation-in-kind (replication)
	H-12-G13-2	N/A	N/A	N/A	No	documentation
	N/A	HaRk-13	N/A	N/A	Yes (archaeological component)	no further historical work
	N/A	HaRk-16	N/A	N/A	Yes (archaeological component)	no further historical work
	N/A	HaRk-32	N/A	N/A	No	no further historical work

Project Activities and Physical Works	Class I Site	Class II Site	Class III Site	Class NA Site	HCA-protected	Potential Mitigation Approach
	N/A	HaRk-33	N/A	N/A	No	no further historical work
	N/A	HbRf-8	N/A	N/A	No	no further historical work
	N/A	HbRf-37	N/A	N/A	No	no further historical work
	N/A	HbRh-35	N/A	N/A	No	no further historical work
	N/A	HbRh-45	N/A	N/A	No	no further historical work
	N/A	AMB-T3	N/A	N/A	No	documentation
	N/A	AMB-12-1	N/A	N/A	No	systematic data recovery
	N/A	H-12-G13-3	N/A	N/A	No	documentation
	N/A	H-12-P1	N/A	N/A	No	systematic data recovery, documentation
	N/A	GMY-12-1	N/A	N/A	No	no further historical work
	N/A	N/A	HbRj-6	N/A	Yes (archaeological component)	no further historical work
	N/A	N/A	HbRj-10	N/A	No	no further historical work
	N/A	N/A	AMB-T1	N/A	No	no further historical work
	N/A	N/A	AMB-T4	N/A	No	no further historical work
	N/A	N/A	N/A	HaRl-5	No	systematic data recovery (inventory)
	N/A	N/A	N/A	HaRl-28	No	systematic data recovery (inventory)
Reservoir Preparation and Filling, Dam and Generating Station	HbRf-31	N/A	N/A	N/A	Yes	relocation, capping, systematic data recovery, monitoring, compensation in-kind (replication)
	N/A	N/A	HbRf-29	N/A	No	no further historical work
Reservoir (5 Year Beach Line)	H-12-G13-4	N/A	N/A	N/A	No	documentation, compensation-in-kind
	N/A	HbRg-28	N/A	N/A	No	documentation
	N/A	HaRk-29	N/A	N/A	No	no further historical work
	N/A	HaRk-9	N/A	N/A	No	Documentation

Project Activities and Physical Works	Class I Site	Class II Site	Class III Site	Class NA Site	HCA-protected	Potential Mitigation Approach
	N/A	HaRk-38	N/A	N/A	Yes (archaeological component)	no further historical work
	N/A	HbRi-10	N/A	N/A	Yes (archaeological component)	systematic data recovery (historical component)
	N/A	N/A	N/A	HaRk-10	No	systematic data recovery (inventory)
Transmission System	N/A	N/A	N/A	N/A	N/A	N/A
Quarried and Excavated Material Source Development	N/A	N/A	N/A	N/A	N/A	N/A
Highway 29 Realignment	H-12-G10D	N/A	N/A	N/A	Yes	avoidance, capping, relocation
	N/A	HaRj-23	N/A	N/A	Yes (archaeological component)	systematic data recovery, documentation, relocation (historical component)
	N/A	N/A	AMB-12-2	N/A	No	no further historical work
	N/A	N/A	N/A	HbRh-60	No	systematic data recovery (inventory)
Reservoir Preparation and Filling, Highway 29 Realignment	H-12-G10A	N/A	N/A	N/A	No	documentation, compensation-in-kind
	N/A	HaRk-34	N/A	N/A	No	systematic data recovery, documentation, relocation
	N/A	HbRh-61	N/A	N/A	No	no further historical work
Construction Access Road Development	NA	NA	NA	NA	NA	NA
Worker Accommodation Construction and Operations	NA	NA	NA	NA	NA	NA
Commissioning and Operations						
Reservoir and Generating Station Operations	HaRl-4	N/A	N/A	N/A	Yes	monitoring (primary mitigation requirements addressed in Construction Phase)
	H-12-G4	N/A	N/A	N/A	Yes	no further historical work (mitigation requirements

Project Activities and Physical Works	Class I Site	Class II Site	Class III Site	Class NA Site	HCA-protected	Potential Mitigation Approach
						addressed in Construction Phase)
	H-12-G9	N/A	N/A	N/A	No	no further historical work (mitigation requirements addressed in Construction Phase)
	H-12-G13-1	N/A	N/A	N/A	No	no further historical work (mitigation requirements addressed in Construction Phase)
	H-12-G13-2	N/A	N/A	N/A	No	no further historical work (mitigation requirements addressed in Construction Phase)
	N/A	HaRk-13	N/A	N/A	Yes (archaeological component)	no further historical work
	N/A	HaRk-16	N/A	N/A	Yes (archaeological component)	no further historical work
	N/A	HaRk-32	N/A	N/A	No	no further historical work
	N/A	HaRk-33	N/A	N/A	No	no further historical work
	N/A	HbRf-8	N/A	N/A	No	no further historical work
	N/A	HbRf-37	N/A	N/A	No	no further historical work
	N/A	HbRh-35	N/A	N/A	No	no further historical work
	N/A	HbRh-45	N/A	N/A	No	no further historical work
	N/A	AMB-T3	N/A	N/A	No	no further historical work (mitigation requirements addressed in Construction Phase)
	N/A	AMB-12-1	N/A	N/A	No	no further historical work (mitigation requirements addressed in Construction Phase)
	N/A	H-12-G13-3	N/A	N/A	No	no further historical work (mitigation

Project Activities and Physical Works	Class I Site	Class II Site	Class III Site	Class NA Site	HCA-protected	Potential Mitigation Approach
						requirements addressed in Construction Phase)
	N/A	H-12-P1	N/A	N/A	No	no further historical work (mitigation requirements addressed in Construction Phase)
	N/A	GMY-12-1	N/A	N/A	No	no further historical work
	N/A	N/A	HbRj-6	N/A	Yes (archaeological component)	no further historical work
	N/A	N/A	HbRj-10	N/A	No	no further historical work
	N/A	N/A	AMB-T1	N/A	No	no further historical work
	N/A	N/A	AMB-T4	N/A	No	no further historical work
	N/A	N/A	N/A	HaRl-5	No	no further historical work (mitigation requirements addressed in Construction Phase)
	N/A	N/A	N/A	HaRl-28	No	no further historical work (mitigation requirements addressed in Construction Phase)
	HbRf-31	N/A	N/A	N/A	Yes	monitoring (primary mitigation requirements addressed in Construction Phase)
	N/A	N/A	HbRf-29	N/A	No	no further historical work

NOTE:
N/A – not applicable

32.3.3.4 Summary of Proposed Heritage Resources Mitigation

Table 32.7 summarizes proposed mitigation measures to address potential adverse effects on heritage resources according to Project phase. The combination of identified mitigation strategies are assumed adequate to effectively offset adverse effects to levels consistent with regulatory requirements and recognized best practices. The responsibility for implementing and completing mitigation rests with BC Hydro.

Table 32.7 Summary of Effectiveness of Proposed Mitigation Measures

Valued Component	Project Phase	Potential Adverse Effects	Key Mitigation Measures	Mitigation Effectiveness	Responsibility
Heritage Resources	Construction	Effect Type 1 Changes to resource integrity: • Surface disturbance • Disturbance of structures • Subsurface disturbance • Compaction • Erosion Effect Type 2: Changes to resource accessibility: • Increased access • Unauthorized collection • Lack of access Effect Type 3: Other relevant considerations raised by Aboriginal groups	• Avoidance • Disinter or reinter burial • Move Historical structure • Class I Staged Scientific Excavation • Class II Stratified Sample Excavation • Detailed documentation (Historical) • Systematic surface collection • Resource capping • Construction monitoring • Reconnaissance • Erosion monitoring • Commemoration • Clear under winter conditions • Implementation of Chance Find Procedure • Implementation of Heritage Resources Management Plan	It is assumed that recommended key mitigation measures will reduce residual effects to levels consistent with regulatory requirements and recognized best practices, but that Project residual effects will still be encountered	BC Hydro

Valued Component	Project Phase	Potential Adverse Effects	Key Mitigation Measures	Mitigation Effectiveness	Responsibility
Heritage Resources	Operations	Effect Type 1 Changes to resource integrity: • Surface disturbance • Disturbance of structures • Subsurface disturbance • Compaction • Erosion Effect Type 2: Changes to resource accessibility: • Increased access • Unauthorized collection • Lack of access Effect Type 3: • Other relevant considerations raised by Aboriginal groups	• Systematic surface collection • Resource Capping • Resource monitoring • Reconnaissance • Erosion monitoring in conjunction with E-PAST • Implementation of Chance Find Procedure • Implementation of Heritage Resources Management Plan • Clear under winter conditions	It is assumed recommended key mitigation measures will reduce residual effects to levels consistent with regulatory requirements and recognized best practices, but that Project residual effects will still be encountered	BC Hydro

32.3.3.5 Other Mitigation Measures Considered

No other mitigation measures were considered. However, should additional or alternative mitigation measures be identified through discussions with Aboriginal groups, research institutions, local citizens or associations, and government agencies, these will be evaluated by BC Hydro in consultation with the group in question and the appropriate regulatory body on a case-by-case basis.

32.4 Residual Effects

Despite mitigation efforts for palaeontological, archaeological, and historical resources, Project-related residual effects could occur because these resources would still be susceptible to Project-induced changes.

32.4.1 Characterization of Residual Effects

Characterization of potential residual effects on heritage resources was achieved using criteria defined in Table 32.8. These criteria correspond, in meaning, to criteria from Appendix F: Indicators for Assessing Impacts in Archaeological Sites of the B.C. Archaeological Impact Assessment Guidelines (B.C. Archaeology Branch 1998), although several of the names differ slightly. Characterization of potential residual effects assumes that, where applicable, mitigation has occurred to a level that meets regulatory

expectations for adequacy, such as those established by the B.C. Archaeology Branch for individual archaeological sites.

Table 32.8 Characterization Criteria for Residual Heritage Resources Effects

Criterion	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	This refers to the ultimate long-term trend of the heritage effect	**Adverse:** loss of resources or contextual information
		Beneficial: increase in knowledge through investigation
		Neutral: condition of the heritage resource is unchanged in comparison to baseline conditions and trends
Magnitude	This refers to the amount of change in a key indicator or variable relative to baseline case. Consideration is given to factors such as the uniqueness of the effect, and the comparison to natural or background variation.	**Negligible:** no physical effects occur or no heritage sites are expected to be present
		Low: minimal effects to resources of low, moderate, or high heritage value resources are few and of low heritage value
		Moderate: moderate to high effects to resources of low or moderate heritage value
		High: moderate to high effects to resources of high heritage value
Geographic Extent	This refers to the geographic areas in which a heritage effect of a defined magnitude occurs	**Site-specific:** the expected measurable effects are within the specific heritage resource boundary
		Component-specific: the expected measurable effects are within a single component of the Project activity zone
		Multiple Components: the expected measurable changes occur in more than one Project component
		Project activity zone: the expected measurable changes occur throughout the entire Project activity zone
Duration	The period of time required until the valued component returns to baseline condition, or the effect can no longer be measured or otherwise perceived	**Short-term**: effect lasts during construction phase
		Medium-term: effect does not extend beyond the life of the Project
		Permanent: effect results in permanent change
Frequency	The number of times during a project or a specific project phase that a heritage effect may occur.	**Once:** occurs once
		Continuous: occurs on a regular basis and at regular intervals
		Sporadic: occurs rarely and at irregular intervals
Reversibility	This refers to the degree or likelihood to which existing baseline conditions can be regained after the factors causing the effect are removed.	**Reversible:** Effect is reversible with reclamation or over time
		Irreversible: Effect is permanent and cannot be reversed with reclamation or over time
		Unknown: Effect reversibility is poorly understood and requires follow-up monitoring.

Criterion	Description	Quantitative Measure or Definition of Qualitative Categories
Context	This refers to the extent to which the area within which an effect may occur has already been adversely affected by human activities; and is ecologically fragile and has little resilience and resistance to imposed stresses.	**Disturbed:** Area has been substantially previously disturbed by human development or human development is still present
		Undisturbed: Area relatively pristine or not adversely affected by human activity
Level of Confidence	This is an evaluation of scientific certainty one has in the review of project specific data, relevant literature, and professional opinion	**Low:** uncertain if heritage resources will be affected by activity or knowledge of resource is incomplete or effect of mitigation measures is poorly understood
		Moderate: effect of activity moderately well understood and knowledge of resource is mostly complete and effect of mitigation measures is moderately well understood
		High: effect of activity well understood and knowledge of resource is complete and effect of mitigation measures is well understood
Probability	The likelihood that an adverse effect will occur.	**Low:** activity is unlikely to affect heritage resources
		High: activity probably will affect heritage resources
		Unknown: unable to determine if activity will affect heritage resources

Table 32.9 characterizes the potential residual adverse effects on heritage resources in the LAA. Residual effects significance is evaluated on the basis of the nature of the anticipated adverse effects, recognizing that some beneficial residual effects will have occurred through mitigation.

Table 32.9 Characterization Criteria for Residual Heritage Resources Effects

Activity	Effect (bold font indicates main effect)	Residual Heritage Effect							
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Context	Probability	Level of Confidence
Construction									
Dam & Generating Station Construction									
Site clearing and preparation	**E1**, E2, E3	Adverse	Low	LAA	Permanent Once	Irreversible	Undisturbed	High	High
Temporary and permanent access roads	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Undisturbed Disturbed	High	High
Waste treatment and management facilities	**E1**, E2, E3	Adverse	Low	Component Specific	Short Term Continuous	Irreversible	Disturbed	Low	High
Relocation of surplus excavated material	**E1**, E2, E3	Adverse	Low	Component Specific	Short Term Once	Irreversible	Undisturbed	Low	High
Temporary construction access bridge across the Peace	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Undisturbed	Low	High
Sand and gravel source pits	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Undisturbed	Unknown	High
Stage 1 channelization and diversion works (north bank)	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Disturbed	Low	High
Stage 1 channelization works (south bank)	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Disturbed	Low	High
Stage 2 – diversion	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Disturbed	Low	High

Activity	Effect (bold font indicates main effect)	Residual Heritage Effect							
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Context	Probability	Level of Confidence
Stage 2 – diversion | earthfill dam and north bank excavation	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Disturbed	Low	High
Stage 2 – diversion | south bank structures	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Undisturbed	Low	High
Reservoir Preparation and Filling									
Existing infrastructure inventory, protection, and possible relocation	E1, E2, E3	-	-	-	-	-	-	-	-
Hudson's Hope Shoreline Protection	E1, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Undisturbed	High	High
Access: upgrades to existing licensee roads, winter road construction	E1, E2, E3	Adverse	Low	Multiple Components	Permanent Once	Irreversible	Disturbed	High	High
Clearing of vegetation and timber by manual or mechanical means	E1, E2, E3	Neutral to Adverse	Moderate	LAA	Permanent Once	Irreversible	Undisturbed	High	High
Post-harvest terrestrial debris management	E1, E2, E3	Neutral to Adverse	Low	Multiple Components	Permanent Once	Irreversible	Disturbed	Low	High
Access road deactivation and reclamation of exposed cuts and fills, where required	E1, E2, E3	Neutral to Adverse	Low	Multiple Components	Permanent Once	Irreversible	Disturbed	High	High
Water management during confinement	E1, E2, E3	Neutral to Adverse	Moderate	Component Specific	Short Term Once	Irreversible	Undisturbed	High	Moderate

Activity	Effect (bold font indicates main effect)	Residual Heritage Effect							
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Context	Probability	Level of Confidence
Water management during diversion	E1, E2, E3	Neutral to Adverse	Moderate	Component Specific	Short Term Once	Irreversible	Undisturbed	High	Moderate
Water management during reservoir filling	E1, E2, E3	Neutral to Adverse	Moderate	Component Specific	Short Term Once	Irreversible	Undisturbed	High	Moderate
Water management during commissioning period	E1, E2, E3	Neutral to Adverse	Moderate	Component Specific	Short Term Once	Irreversible	Undisturbed	High	Moderate
Transmission System									
Site – corridor clearing and preparation	E1, E2, E3	Adverse	Moderate	Component Specific	Permanent Once	Irreversible	Undisturbed	High	High
Access construction and improvement with right-of-way	E1, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Undisturbed	High	High
Tower installation	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Undisturbed	Low	High
Construction site decommissioning and restoration/reclamation	**E1**, E2, E3	Adverse	Low	Multiple Components	Permanent Once	Irreversible	Disturbed	High	High
Site C Substation installation	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Undisturbed	High	High
West Pine Siding extension	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Undisturbed	High	High
Quarried and Excavated Material Source Development									
85th Avenue Industrial Lands	E1, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Disturbed	High	High

Activity	Effect (bold font indicates main effect)	Residual Heritage Effect							
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Context	Probability	Level of Confidence
Wuthrich Quarry	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Disturbed	High	High
West Pine Quarry	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Undisturbed	High	High
Portage Mountain Quarry	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Undisturbed	High	High
Del Rio granular borrow	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Disturbed	High	High
Other Sources | Granular borrow (within inundation zone, along Hwy. 29)	**E1**, E2, E3	Adverse	Low	Multiple Components	Permanent Once	Irreversible	Undisturbed	High	High
Other Sources | Area E	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Disturbed	High	High
Other Sources | On-site	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Undisturbed	High	High
Highway 29 Realignment									
Highway 29 Realignment Construction	E1, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Disturbed Undisturbed	High	High
Construction Access Road Development									
Transmission line access roads	E1, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Undisturbed	Unknown	High

Activity	Effect (bold font indicates main effect)	Residual Heritage Effect							
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Context	Probability	Level of Confidence
Jackfish Lake Road works (includes improvement of existing Jackfish Lake Road and other existing roads on the Jackfish Plateau and the Project access road leading to dam site)	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Disturbed	High	High
Old Fort Road Realignment, extension of 240 and 269 roads.	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Disturbed	Unknown	High
West Pine quarry access	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Undisturbed	Unknown	High
West Pine Siding Construction	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Undisturbed	Unknown	High
Septimus Rail Siding Construction	**E1**, E2, E3	Adverse	Low	Component Specific	Permanent Once	Irreversible	Undisturbed	High	High
Worker Accommodation Construction and Operations									
Temporary Accommodation – Northern Regional Site (Halfway - Farrell)	E1, E2, E3	Adverse	Negligible	Component Specific	Short Term Once	Irreversible	Disturbed	Low	High
Temporary Accommodation – Southern Regional Site (Jackfish Lake Road)	E1, E2, E3	Adverse	Negligible	Component Specific	Short Term Once	Irreversible	Disturbed	Low	High

Activity	Effect (bold font indicates main effect)	Residual Heritage Effect							
		Direction	Magnitude	Geographic Extent	Duration and Frequency	Reversibility	Context	Probability	Level of Confidence
Commissioning and Operations									
Reservoir and Generating Station Operations									
Operation of the powerhouse, substation, and reservoir, includes downstream water management	E1, E2, E3	Adverse	Moderate	Multiple Components	Medium Term Once	Unknown	Undisturbed	High	Moderate
Maintenance of access roads	E1, E2, E3	Adverse	Low	Multiple Components	Medium Term Continuous	Irreversible	Disturbed	High	High

32.4.2 Standards or Thresholds for Determining Significance

The process of determining the significance of effects to the heritage resources VC is through a combined evaluation of heritage site value, Project-related effects on those sites, the application of mitigation strategies to offset the effects, and evaluation of the success of follow-up mitigation on any residual effects. This process begins with individual site evaluation using methods prescribed by various guidelines and frameworks, as described in the sections below. The checks and balances established by this process should result in residual effects that are not significant. Significant residual effects should only occur when processes are not followed or when unforeseen effects occur to heritage resources of value which are not mitigated to applicable regulatory standards.

32.4.3 Assessing Significance of Residual Effects on Palaeontological Sites

Palaeontological site values are determined using a checklist that includes the following four categories of evaluative criteria: scientific, educational, heritage, and commercial (see Volume 4 Appendix C Heritage Resource Assessment Report). These criteria are described in the following documents: Fossil Management Framework Consultation Summary Report (B.C. Land Tenures Branch 2010), Fossil Management Plan for British Columbia (Fossil Management Review Technical Working Group 2004), and palaeontological resources of the Dawson Land Resource Management Plan (Haggart et al. 1997). Additional guidance was taken from criteria used in other North American jurisdictions for the protection of palaeontological resources.

The significance of the potential effect is first determined by evaluating the heritage value (typically referred to as the site significance) of the positive palaeontological sensitivity area in question, according to the criteria noted above. The second step is to evaluate the magnitude of the effect of the proposed alteration on the positive palaeontological sensitivity area. As a result, equal levels of alteration to positive palaeontological sensitivity areas with different heritage value ratings will result in a different significance determination for the potential effect. Using this approach, alterations to palaeontological sensitivity areas determined to be of high (Class I), moderate (Class II), and low (Class III) heritage value can occur, provided that acceptable, paleontological sensitivity area-specific mitigation is implemented to offset the adverse effect or to create a beneficial effect. In the absence of explicit palaeontological legislation in B.C., mitigation would be to a level equivalent to recognized ‘good practices’. As such, the residual effect might not be significant.

32.4.4 Assessing Significance of Residual Effects on Archaeological Sites

For archaeological sites, heritage value is determined by applying the Checklist for Criteria for Pre-Contact Site Evaluation (British Columbia Archaeological Impact Assessment Guidelines [B.C. Archaeology Branch 1998], Appendix D). The checklist includes four evaluative categories: scientific, public, ethnic, and economic significance, where the term ‘significance’ refers to values assigned to each category. This use of the term ‘significance’ in this context is distinct from its use in determining the significance of an effect. For archaeological site value assessment, scientific significance was used as the discriminating criteria, as the sites were considered to have low public and economic

significance and, based on discussions with Aboriginal groups, the ethnic significance of all sites is considered high.

The significance of the potential effect is first determined by evaluating the heritage value (typically referred to the site significance) of the archaeological site in question according to the criteria noted above. The second step is to evaluate the magnitude of the effect of the proposed alteration on the archaeological site. As a result, equal levels of alteration to archaeological sites with different heritage value ratings will result in a different significance determination for the potential effect. Using this approach, alterations to archaeological sites determined to be of high heritage value can occur, provided that acceptable, site-specific mitigation is implemented to offset the adverse effect. The degree to which planned alterations and mitigation strategies are acceptable is a decision that rests with the B.C. Archaeology Branch, based on information gathered by archaeologists, input from Aboriginal groups, and other sources. Once it is determined that the Project will affect an archaeological site, a mitigation plan must be developed and implemented that includes methods to reduce the adverse effects of the alteration to a level that is acceptable to the B.C. Archaeology Branch. As such, the residual effect would not be significant.

32.4.5 Assessing Significance of Residual Effects on Historical Sites

The heritage value of historical sites, including those protected under the B.C. *Heritage Conservation Act*, is evaluated by the application of the Checklist of Criteria for Post-Contact Site Evaluation (British Columbia Archaeological Impact Assessment Guidelines [B.C. Archaeology Branch 1998], Appendix E), which consist of five evaluative categories – scientific, historic, public, ethnic, and economic significance – as well as separate categories for integrity, condition, and “other”. In addition to application of the Checklist of Criteria for Post-Contact Evaluation for historic significance, heritage values associated with identified historical resources, as determined from interviews with local and regional historical societies, museums and other organizations, and local residents contributed to the evaluation of historic value.

The significance of the potential effect is first determined by evaluating the heritage value (typically referred to the site significance) of the historical site in question according to the criteria noted above. The second step is to evaluate the magnitude of the effect of the proposed alteration on the historical site. As a result, equal levels of alteration to historical sites with different heritage value ratings will result in a different significance determination for the potential effect. Using this approach, alterations to historical sites determined to be of high heritage value can occur, provided that acceptable, site-specific mitigation is implemented to offset the adverse effect. The degree, to which planned alterations and mitigation strategies are acceptable, is a decision that rests with the B.C. Archaeology Branch for sites protected by the B.C. *Heritage Conservation Act*. For those sites that are not protected by the *Heritage Conservation Act,* mitigation would be to a level equivalent to recognized best practices. As such, the residual effect would not be significant.

32.4.6 Determination of Significance of Residual Effects

The effects assessment indicates the mitigation plan for addressing palaeontological effects is considered adequate to render residual adverse effects as not significant.

The potential residual effects to archaeological and historical resources are not considered to be significant. The determination of a threshold for residual effects on archaeological and historical resources that are protected under the B.C. *Heritage Conservation Act* is the jurisdiction of the B.C. Archaeology Branch, with input from Aboriginal groups. It is therefore understood that residual effects would need to be mitigated to an acceptable level before the proposed Project activities could proceed.

Table 32.10 summarizes the assessment of potential significance of residual adverse effects for heritage resources.

Table 32.10 Summary of Assessment of Potentially Significant Residual Adverse Effects

Potential Effect	Proposed Mitigation	Potential Residual Effect (Y/N)	Significant (Y/N)
During construction: <u>Effect Type 1:</u> Changes to resource integrity: • Surface disturbance • Disturbance of structures • Subsurface disturbance • Compaction • Erosion <u>Effect Type 2:</u> Changes to resource accessibility: • Increased access • Unauthorized collection • Lack of access <u>Effect Type 3:</u> Other relevant considerations raised by Aboriginal groups	The following measures will be implemented: • Heritage Resources Management Plan • Avoidance • Disinter or reinter burial • Move historical structure • Class I Staged Scientific Excavation • Class II Stratified Sample Excavation • Detailed documentation (historical) • Systematic surface collection • Resource capping • Construction monitoring • Reconnaissance • Erosion monitoring • Commemoration • Clear under winter conditions • Implementation of Chance Find Procedure	Y – Residual effects would be classified similar to potential effects before mitigation, using the categories of Effect Types 1 to 3	N

Potential Effect	Proposed Mitigation	Potential Residual Effect (Y/N)	Significant (Y/N)
During operations: Effect Type 1: Changes to resource integrity: • Surface disturbance • Disturbance of structures • Subsurface disturbance • Compaction • Erosion Effect Type 2: Changes to resource accessibility: • Increased access • Unauthorized collection • Lack of access Effect Type 3: Other relevant considerations raised by Aboriginal groups	• Implement Heritage Resources Management Plan • Systematic surface collection • Resource Capping • Resource monitoring • Reconnaissance • Erosion monitoring in conjunction with E-PAST • Implementation of Chance Find Procedure • Clear under winter conditions	Y – Residual effects would be classified similar to potential effects before mitigation, using the categories of Effect Types 1 to 3.	N

32.5 Cumulative Effects Assessment

32.5.1 Screening of Cumulative Effects

The heritage effects assessment indicates the Project does have the potential to affect heritage resources. However, the magnitude of the effects would be reduced to a level that is acceptable to regulators through mitigation measures as described in Section 32.3.2.

No other foreseeable projects have been identified that temporally or spatially overlap with the heritage resources LAA. As such, no other projects contribute to potential effects on the heritage resources VC. Therefore, in conducting an assessment of cumulative future effects on heritage resources within the LAA, with and without the Project, it is concluded that predicted future effects on heritage resources in the LAA, without the Project, would remain consistent with their current state, should land use remain the same.

32.6 Monitoring and Follow-up

A Heritage Resources Management Plan would be implemented that addresses heritage site stewardship and protection relative to Project construction activities, as described in Volume 5 Section 35 Summary of Environmental Management Plans. The plan would include procedures for monitoring at known heritage site locations within the Project activity zone, as well as chance find procedures to be implemented in the event that

heritage resources are encountered during construction. The Heritage Resources Management Plan would be developed with guidance, where applicable, from the B.C. Archaeology Branch, the Fossil Management Framework, the Fossil Management Review Technical Working Group, and existing BC Hydro policies and procedures, and in consultation with Aboriginal groups.

Follow-up work on archaeological sites that are affected by the Project would be prescribed by the methods put forth in B.C. *Heritage Conservation Act* Section 12 (Site Alteration) and Section 14 (Site Investigation) Permit application(s) for the Project. The methods and scope must be acceptable to the B.C. Archaeology Branch before the application(s) can be approved.

Consistent with BC Hydro's reservoir monitoring program, shoreline erosion of heritage resources within the reservoir would be monitored for a period of not less than the first five years of operation. Predicted rates of sedimentation and erosion affecting shoreline heritage resources made using E-PAST would be confirmed through shoreline monitoring.

As noted in Section 32.3.2.2, heritage work could also include an opportunity for scientific examination of heritage resource locations within the operating range of the reservoir during periods of maximum drawdown for scheduled and unscheduled maintenance. In the event that low reservoir levels occur in the future and exposed heritage site locations can be safely accessed, emergency salvage and systematic data collection of exposed resources would help to mitigate the potential effects of erosion and unauthorized collection of heritage materials.

Table 32.11 summarizes the follow-up program for heritage resources.

1 **Table 32.11 Follow-up Program for Heritage Resources**

Follow-Up Program Objective	Follow-Up Monitoring Description	Monitoring Program Frequency	Monitoring Program Duration
To verify the anticipated effects of erosion on heritage sites due to reservoir operations in the first five years of service, and to evaluate the effectiveness of mitigation measures implemented on heritage sites along the reservoir shoreline	• Effects of shoreline erosion on heritage resources will be monitored for at least the first five years of operations, based on predicted rates of erosion and sedimentation from E-PAST.	Annual	First five years of operations
To evaluate the effectiveness of mitigation measures implemented on heritage sites, and to identify previously unknown heritage sites in the reservoir and mitigate potential effects of erosion on those sites.	• Follow-up work on archaeological sites will be prescribed by the methods put forth in B.C. Heritage Conservation Act Permits • Heritage work could include opportunity for scientific examination of heritage resources within the operating range of the reservoir during periods of maximum drawdown for maintenance. Activities may include emergency salvage and systematic data collection of exposed resources.	TBD, in consultation with regulators	TBD, in consultation with regulators

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