

**SPRINGBANK OFF-STREAM RESERVOIR PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
VOLUME 3A: EFFECTS ASSESSMENT (CONSTRUCTION AND DRY OPERATIONS)**

Assessment of Potential Effects on Historical Resources
March 2018

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Abbreviations

ACO	Aboriginal Consultation Office
ACT	Alberta Culture and Tourism
A.D.	anno Domini
AEP	Alberta Environment and Parks
CEAA	Canadian Environmental Assessment Agency
HRA	<i>Historical Resources Act</i>
HRIA	Historical Resources Impact Assessment
HRMB	Historic Resources Management Branch
HRV	historic resource value
Hwy	highway
LAA	local assessment area
PDA	project development area
RCMP	Royal Canadian Mounted Police
SOJ	Statement of Justification
TOR	terms of reference
UTM	Universal Transverse Mercator
VC	valued component
W5M	West of the 5th Meridian

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13.0 ASSESSMENT OF POTENTIAL EFFECTS ON HISTORICAL RESOURCES

Historical resources is defined as including archaeological, historical and palaeontological sites and objects. Certain types of Aboriginal traditional use sites are also considered to be historical resources. More specifically, historical resources include:

- archaeological sites and artifacts dating to before European contact (known as precontact sites). These sites may occur on or beneath the ground surface and provide testament to the precontact occupation of the Province of Alberta, extending back to at least 13,000 years.
- historic sites and objects dating from the first European occupation until approximately 50 years ago. These sites may include below surface remains (such as buried foundations or dumps) as well as surface remains such as collapsed or standing historic buildings.
- palaeontological resources (also known as fossils) includes evidence of extinct multicellular beings and objects designated by regulations as palaeontological resources
- certain types of Aboriginal traditional use sites also may be considered as historical resources and are protected under the *Alberta Historical Resources Act* (for example burial sites, sacred sites, trails)

Historical resources are the product of unique processes of formation and preservation, and are considered non-renewable resources. They are increasingly susceptible to disturbance, damage or loss because of development projects. The value of historical resource sites is measured by the individual objects they contain and the information about the past that might be obtained from studying the sites, their contexts and their spatial relationships within the landscape. Of particular importance is the fragile relationship of artifacts and fossils to the soils and strata in which they are contained. Removing or mixing of historical resource sites and objects without scientific recording results in permanent loss of information. Scientific recording of historical resource sites prior to development projects can potentially increase understanding of the past and mitigate the effects of development projects.

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13.1 SCOPE OF THE ASSESSMENT

13.1.1 Regulatory and Policy Setting

Historical resources in Alberta are managed under the Alberta *Historical Resources Act* (HRA) and are administered by the Historical Resource Management Branch (HRMB) of Alberta Culture and Tourism (ACT). ACT reviews development project screenings, issues permits for assessments, reviews the resultant permit reports and determines whether additional work or mitigation measures are required. No project-related disturbance is permitted to occur to heritage resource sites without the prior approval of ACT. Final approval and additional requirements for historical resources mitigation are issued by the HRMB, based on their review of separate Historical Resources Impact Assessments (HRIAs) for archaeology and palaeontology, and any subsequent mitigation reports resulting from the assessments. ACT independently assesses the scientific value of historical resource sites, determines the need for, and scope of, avoidance or mitigation measures and issues approvals under the HRA once any required avoidance or mitigation has been implemented.

Historical resources are also identified as a concern under the Alberta Environment and Parks (AEP) terms of reference (TOR) for the Project and Canadian Environmental Assessment Agency (CEAA) guidelines for environmental assessments. The CEAA guidelines also identify historical resources as a concern relative to Aboriginal traditional use and cultural values. The Government of Alberta has released a *Policy on Consultation with First Nations on Land and Resource Management* and created the Aboriginal Consultation Office (ACO) in 2013 to coordinate and manage the consultation process.

13.1.2 Engagement and Key Concerns

The Project was submitted to ACT for review in the form of a summary regulatory screening document, known as a Statement of Justification, or SOJ (Boland et al. 2015a, 2015b). ACT reviewed the Project and indicated that HRA approval would be required and that HRIAs for archaeology and palaeontology were necessary as the first step in the approval process. No lands with designated historic resource values (HRVs) for known traditional use sites were noted within the ACT database (*Listing of Historic Resources*, ACT 2015) for the local assessment area (LAA). No Aboriginal consultation specific to historical resources under the HRA was required by ACT.

Aboriginal consultation (TOR) and engagement (CEAA guidelines) relative to the Project is required. Consultation and engagement is ongoing with the Tsuut'ina Nation, Stoney Nakoda Nations (including Bearspaw First Nation, Chiniki First Nation, Wesley First Nation), Kainai First Nation, Piikani Nation, Siksika Nation, Ermineskin Cree Nation, Louis Bull Tribe, Samson Cree Nation, Montana First Nation, Foothills Ojibway First Nation, Métis Nation of Alberta, Region 3, Ktunaxa Nation and Métis Nation British Columbia. Available results from consultation and

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publicly available literature have been incorporated into the sections on existing conditions (Section 13.2) and project interactions (Section 13.3). While this information did not directly affect the significance definition it has been incorporated into the analysis of effects on which the significance determination was based.

The Tsuut'ina Nation expressed concern that burial sites that would be destroyed should the reservoir be filled. The Tsuut'ina noted: "There are also significant burial sites that would be destroyed should the reservoir ever be filled." Tsuut'ina Nation explained "in the past prior to the settlement of the SR1 area that the Tsuut'ina people practiced tree burials and recognizing that the tree burials would not remain intact forever, they would place rock cairns marking the spot where loved ones had been buried. In more recent times, after the signing of Treaty 7, the government established a medical station at Morley and while many of the Tsuut'ina people who travelled to Morley for treatment came home, many passed away during the journey and became tree burials with rock cairns to mark their final resting place...Tsuut'ina do not want to see those cairns to be impacted by SR1 project, however if it is found that these cairns still exist and are impacted by SR1, they will need to consider the appropriate way to deal with that would be. Tsuut'ina suggested that a ceremony may need to be undertaken to properly respect those Tsuut'ina Nation people who were part of the tree burials, but which sites cannot all be identified today."

The Tsuut'ina also requested the opportunity to review the historical resources section of the environmental impact assessment before it is submitted to the regulatory agencies.

The Siksika Nation expressed concerned about impacts to Blackfoot ceremonial locations and cultural sites from the Project during and after construction. The Siksika Nation also expressed concern about the lack of sharing of archaeological data. The Siksika Nation expressed a concern regarding potential impacts from the Project on Blackfoot artifacts, ceremonial and medicinal plants. The Siksika Nation noted: "The SR1 project lies in Siksika's Territory, and, the area where the project is proposed to be sited is in the middle of a prime transport corridor for our people along the Elbow River between the prairies and the mountains, and that the natural resources and heritage sites found there are central to our culture.". During their walk along project property #21, the Siksika team pointed out rocks along the east side of the unnamed creek near the outfall from the reservoir and sheltered adjacent hills on the west side of the creek, which indicated that was a wintering ground for the Blackfoot many years ago. Concerns were expressed about any disturbance that might occur in this area as a result of the Project.

Siksika Nation Elders and technicians, on inspection of Property #21 along the "unnamed Creek", identified what they believed to be tipi rings on the north side of the unnamed creek. Siksika Nation expressed concern that the tipi rings are potentially located adjacent to the reservoir outfall along an unnamed creek into Elbow River.

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During inspection of property #21 along the unnamed creek at the outflow, Siksika expressed concerns that the evidence of past use of this area for a winter camp could be destroyed by construction. Siksika Nation Elders and consultation technicians re-inspected the areas on properties #21 and #24. The area of most interest was near the off-stream reservoir in locations that they identified as a wintering ground with many tipi rings. Siksika Nation expressed concern that the evidence of these wintering grounds and tipi rings will be lost if this area is excavated for the outfall that would drain the off-stream reservoir after a flood. The Siksika consultation team expressed concerns that the excavation could have a serious impact on Blackfoot cultural items because the project area was part of Blackfoot Territory. The Siksika Nation consultation team expressed an interest in having monitors in place during the construction so that they could observe the work being undertaken and to protect Blackfoot artifacts.

Siksika Nation Elders and consultation technicians inspected the areas on project properties #6 and #9. Concerns were expressed that the excavations for the diversion channel could have a serious impact on Blackfoot cultural items that might exist in these areas.

Siksika Nation Elders and consultation technicians inspected the areas on project properties #86 and #4. Concerns were expressed that the landowner referenced an early trail that traversed her property #4 was the Stoney Trail. The Siksika Nation stated the: "North-South Trail that was used by the Blackfoot travelling from Montana into Northern Alberta within their territory." The Siksika Nation emphasized the "need to protect artifacts that exist on the SR1 site".

The Piikani Nation noted "The proponents of the project need to revise the language regarding mitigation and consider participation of Siksikaitsitapii (Keepers of our Language) in the official assessment by the experts utilized to confirm the authenticity of the historic and archeological sites discovered. If the project proceeds to the stage of construction another stage of consultation needs to proceed with Siksikaitsitapii prior to actual excavation and removal of material from the sites of the diversion". The Piikani Nation, while visiting on the referenced property inspected two possible tipi ring locations, an old campsite and the old north-south trails that runs through the referenced property. The Piikani Nation recorded possible tipi ring sites and other old campgrounds on either side of an unnamed creek at the low-level outlet channel.

The Piikani Nation requested a copy of any archaeological information gathered during the project site investigations. The Piikani Nation raised concerns related to impacts on cultural sites by the Project during and after construction. The Piikani Nation expressed concern about the lack of sharing of archaeological data.

The Stoney Nakoda Nations noted "The elders said they do not camp in the river valleys." Stoney Nakoda Nations also "said that they used to listen to the bison moving. There are pockets of underground streams, and they listened to the vibration. The oral history told us about the water table and flood plain".

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The Kainai First Nation Elders and technicians, on inspection of Property #21 along the "unnamed creek", identified what they believed to be tipi rings on the north side of the unnamed creek. Kainai First Nation expressed concern that the tipi rings are potentially located adjacent to the off-stream reservoir outfall along an unnamed creek into Elbow River.

Kainai First Nation Elders and consultation technicians re-inspected the areas on project properties #4, #21, and #24. The area of most interest was near the off-stream reservoir in locations that they identified as a wintering ground, with many tipi rings. There was a concern that the evidence of these wintering grounds and tipi rings will be lost if this area is excavated for the low-level outfall to drain the off-stream reservoir after a flood. The Kainai First Nation noted they have cultural and historical resources in the project area. Kainai First Nation expressed concerns about impacts to Blackfoot ceremonial locations and cultural sites by the Project. Concerns were raised related to impacts on cultural sites by the Project during and after construction. The Kainai First Nation stated: "If tipi rings are disturbed by the SR1 they will have no meaning." The Kainai First Nation stated: "Construction of SR1 may disturb former Blackfoot campsites." The Kainai First Nation requested a copy of any archaeological information gathered during the project site investigations and expressed concern about the lack of sharing of archaeological data. Kainai First Nation expressed concerns about the loss of cultural sites such as tipi rings, effigies of different sorts and medicinal plants.

Métis Nation of Alberta (MNA) Region 3 stated that "there was a short-lived fort (Old "Bow Fort") in the area of SR1. It was also known as 'Peigan Post', built by the Hudson's Bay Company in 1832 to convince the Peigan [Piikani] of southern Alberta to travel to the post and trade. The post did not last long and closed after only one year (two seasons)". MNA, Region 3 noted the potential for Metis homesteads, cart trails, historical use areas and potential burial site to be affected within proximity of the Project. MNA Region 3 expressed concern that more research and information was needed to discover and document the past use of the area by the Métis. MNA Region 3 requested to review studies that were undertaken to see what rare plants, archaeological sites had been discovered, to ensure that no burial sites or medicinal plant sites would be affected.

The Ermineskin Cree Nation noted they have cultural and historical resources in the Project area.

The Samson Cree Nation noted they may have cultural and historical resources in the Project area.

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13.1.3 Potential Effects, Pathways and Measurable Parameters

Table 13-1 presents the potential effects and pathways for historical resources.

Table 13-1 Potential Effects, Effects Pathways and Measurable Parameters for Historical Resources

Potential Environmental Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Loss of or alteration to historical resource site contents or site contexts	Primary effects result from surface or subsurface disturbance due to project activities, including vegetation removal, topsoil removal, borrow activities, excavation, construction, roadwork and covering of sites, rendering them unavailable for future study.	Historical Resource sites are individually evaluated and ranked based on their heritage value.

13.1.4 Boundaries

The spatial boundaries used for the historical resources assessment vary slightly between archaeology and palaeontology. For archaeology, the assessment is restricted to the anticipated area of physical disturbance or project development area (PDA), including the reservoir and all project components. The local assessment area (LAA) corresponds to the PDA, since this is the maximum area within which project-related environmental effects can be characterized. No regional effects assessment area is defined because insufficient data exists to characterize regional effects. No cumulative effects assessment is undertaken for historical resources as a single VC, instead each historical resource site is individually ranked and assessed based on its heritage value.

For palaeontology, the PDA is also the assessment area. However, field data are collected from a broader area to examine any natural exposures outside the PDA. The data are extrapolated to characterize subsurface conditions within the PDA and help determine the palaeontological potential of the area. The LAA is a 1-km buffer zone around the PDA.

For historical resources temporal boundaries, project effects are mitigated prior to or during construction, since that is when the effects could occur. No additional effects are considered to occur within the PDA during dry dam operations.

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13.1.5 Residual Effects Characterization

The value of historical resource is not only measured in terms of the individual artifacts or fossils that the sites contain, but in terms of the information about the past that can be obtained by studying the materials and their spatial context within the sites and landscape. Of particular importance is the relationship of archaeological materials to the soils in which they are found, and fossils to their strata. Historical resource sites are the product of unique processes and conditions of preservation. As a result, removing or mixing of materials without adequate scientific study results in permanent loss of critical information. With proper scientific study, historical resource mitigation provides invaluable information about the past that cannot be otherwise obtained.

This section considers residual effects on historical resources after the application of required mitigation. Site-specific mitigation of project effects on historical resources is provincially regulated. ACT independently assesses the heritage value of historical resource sites, determines the need for, and scope of, mitigation measures, and issues project approval under the *HRA*. Since project-specific environmental effects on historical resources are continually mitigated to the standards established by ACT, after implementation of the required mitigation measures, and Aboriginal consultation there are no residual environmental effects.

13.1.6 Significance Definition

A significant adverse residual environmental effect on historical resources is defined as one that results in an unauthorized project-related disturbance to, or destruction of, all or part of a historical resource considered by ACT to be of heritage value, and that is not mitigated or compensated as required by the regulators.

13.2 EXISTING CONDITIONS FOR HISTORICAL RESOURCES

13.2.1 Methods

The assessment was initiated with a desktop review. The *Listing of Historic Resources* (ACT 2015) was reviewed to identify listed lands with palaeontological and archaeological sensitivity and sites. A site file search of all known historical resource sites within the PDA was obtained from ACT and the search was extended to include a 1-km buffer of the PDA to identify sites of potential interest). All previous historical resource studies conducted within the PDA were reviewed. Aerial imagery, 1:50,000 scale topographic maps and geology maps were consulted. Historic period Dominion Land Survey Plans of Township (Dominion Lands Office 1884a, 1884b) were consulted to identify historic trails or named landscape features.

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The results of the desktop reviews were summarized in a regulatory screening document (SOJ), and submitted to ACT for regulatory review. Two SOJs were submitted for the Project, one for the reservoir and related components and one for a functional planning study of Hwy 22 (Boland et al. 2015a, 2015b). The purpose of the SOJ was to present the scope of the proposed development and the results of the desktop reviews to ACT in order for them to determine whether field assessments (HRIAs) would be required. ACT reviewed the SOJs and issued requirement letters to Alberta Transportation for HRIAs for archaeology and palaeontology (HRA Requirements 4825-15-004-001 and 4953-15-0007-001).

The HRIAs (field assessments) were undertaken in 2016. The archaeology assessment was conducted under permit 16-012 (Porter 2017) and consisted of surface inspection and shovel testing of areas of high and moderate archaeological potential. Sites were assessed, photographed, and documented according to provincial guidelines. Some areas were not examined due to lack of landowner access and field studies within these areas may be required by ACT in a supplemental HRIA. In addition, ACT required that a deep testing program, with a backhoe, be completed in areas of high potential for deeply buried sites. Because backhoe testing is an invasive technique, it would be scheduled. An additional HRIA will be required by ACT for areas where landowner access was not obtained or where deep testing is required.

The palaeontology assessment was conducted under permit 16-069 (Bohach 2017). Natural exposures were examined within the LAA along the Elbow River valley and in roadcuts. The geology and fossil content of the exposures were documented. Each palaeontological site was photographed and described and a UTM coordinate was recorded. Chance find fossil discoveries from other members of the project team (e.g., fisheries survey crew) were also documented.

Information from Aboriginal consultation has been incorporated into the assessment.

The HRIA reports were submitted to ACT in fulfillment of the permit requirements on June 14, 2017. ACT will review the reports and determine whether the assessment is complete and issue additional requirements for field assessment and avoidance or mitigation of any sites determined to be of high heritage value. Construction monitoring may also be required. Because ACT considers site information to be confidential, the reports are not included as part of this filing, and Alberta Transportation is not allowed under the *Act* to release the reports directly to any individual or group. Once the report is approved, it can only be released by ACT to individuals or groups who request it, not by Alberta Transportation.

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13.2.2 Overview

Existing conditions for historical resources were determined through desktop review and field assessments for archaeology and palaeontology and are described in detail in the HRIA reports. This overview provides a summary of results.

13.2.2.1 Archaeology

The Project is located within the Northern Plains Culture Area, and there is firm archaeological evidence that this area has been occupied since the end of the last glaciation, approximately 13,000 years ago. Evidence for any earlier occupation would have been obscured by glacial processes. The first people to occupy the northern plains hunted now-extinct ice-age animals, including mammoth, camel, muskox, horse and bison. These large animals became extinct or decreased in size after approximately 10,000 years ago, and the landscape of the northern plains became dominated by bison.

Human groups occupying the northern plains were focal hunter-gatherers, specializing on bison. In secondary sources reviewed for the Project, Siksika Nation related the importance of bison. "The Blackfoot bands were nomadic. The structure of their movements was dictated by the location of the bison herds, the weather and the season. Bison wintered in treed areas where snow is less deep. Brushing snow aside with winter's thick facial hair, grazing in shadow of forests, they did not move quickly in deep drifting snow and made easier targets for hunters. In spring the bison moved out onto the Plains where the new spring grasses provided forage." (Riversdale 2015).

Over time, successive groups developed different hunting techniques, such as communal methods for killing bison in large numbers using jumps and corrals (pounds). They also developed different weapon technologies, including the jabbing spear, the throwing spear (atlatl) and, approximately 2,000 years ago, the bow and arrow. Stone for tool manufacture was quarried from local sources but also obtained through trade. Plains peoples began to utilize innovative methods of mobile food storage, such as pemmican, and utilized the dog travois for transport. The tipi became the dominant form of dwelling, and northern plains groups began to produce ceramics and participate in trade for domesticated crops, such as corn. Eventually, some of these crops were grown in the northern plains by horticultural groups. Archaeological evidence for the spiritual life of people prior to European contact is seen in different types of sites—such as rock art sites, medicine wheels (arrangements of stone in meaningful patterns), ribstones (glacial erratics with incised lines representing bison ribs) and burial sites (Reeves 1991; Vickers 1986; Peck 2011).

Direct European contact in the northern plains was preceded by the acquisition of the horse through trade, and the influx of European diseases such as smallpox and measles, which devastated Indigenous groups. Trade goods, such as metal artifacts and glass beads, begin to

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appear in the archaeological record with increasing frequency after approximately 1750 A.D. and direct European contact related to the fur trade increased throughout the 19th century. The briefly occupied Peigan Post was built in the foothills west of the Project area in 1832 to further trade, but was soon abandoned (Smythe 1968). The Hudson's Bay Company maintained jurisdiction over southern Alberta until the transfer of Rupertsland to the Dominion of Canada in 1869. By this time, increasing European presence relating to the trade in buffalo hides was putting tremendous pressure on bison, which were extirpated in the project area by the late 1870s. The Our Lady of Peace Roman Catholic Mission was established immediately west of the PDA in 1872 and the RCMP established Fort Calgary to the east in 1875. Local Indigenous groups, including the Niitsitapii (Siksika, Kainai and Piikani), Tsuut'ina and the Stoney/Nakoda, signed Treaty 7 in 1877. Large scale cattle ranching began in the project area with the establishment of the Cochrane Ranche, but by the early 20th century the large ranching interests were replaced as the land in the Springbank area was subdivided and homesteaded (Foothills Historical Society 1976). Roads, bridges and schools were built in the following decades.

Desktop Review

The desktop review indicated that while the project area has generally good historical resource potential (all sections minimally have HRV-5 listings for archaeology, indicating high potential for unknown sites to be present), relatively few previously recorded archaeological sites are present in the PDA. Two sites (EgPo-67 and EgPo-68) were identified during pipeline HRIAs (McCullough and Kenzle 1992; McCullough 1993) and two during studies related to Highway 22 (EgPo-69, EgPo-71; Wickham 2011). The four previously recorded sites have all been assigned HRV-0 status in the provincial listing, indicating that they are of no further concern. Of interest was the presence of the Our Lady Peace Mission cairn, in immediate proximity to the PDA. This historic site has a provincial designation of HRV-2, indicating that it would likely require avoidance in the event of potential development. The cairn is approximately 100 m from the PDA and would not be affected by the Project. ACT requested that no shovel testing be completed in the HRV-2 listed area of the Mission site.

In addition to the Mission, a total of 13 other historic structure sites potentially occur within or partially within the PDA. These include farm and ranch buildings dating from the late 1800s to the 1960s, a garage, and the Jumpingpound School. Portions of the Calgary to Morleyville Trail were noted on historic plans for Township 24, Ranges 3 and 4, W5M (Dominion Lands Office 1884a, 1884b); however, the trail is no longer visible on current air photos. Much of the project area is cultivated, which has obscured or destroyed the potential for recovering intact sites on or near the ground surface.

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Field Visits

During the HRIA, 262 shovel tests were completed in areas of high archaeological potential and 698 surface exposures were inspected. A total of 11 precontact period sites and 11 historic period sites were assessed within the PDA. The precontact period sites include five isolated finds of single lithic (stone) artifacts (EgPo-132, EgPo-133, EgPo-137, EgPo-140 and EgPo-145). These isolated finds are of limited heritage value and, in most cases, documentation of the site, photography and collection of the artifact is believed to have sufficiently mitigated project effects. Additional investigation has been recommended at one of these sites of higher heritage value based on the recovery of a stone tool (biface) (EgPo-132); however, confirmation of requirements is pending from ACT based upon their review of the findings and recommendations submitted in the HRIA report. Through the Project-specific Aboriginal engagement program, Piikani Nation, Siksika Nation and Blood Tribe (Kainai First Nation) noted that the biface was found at a Blackfoot wintering camp.

Six precontact period campsites were assessed. These sites are larger, with evidence of stone tool making and use, firebroken rocks from hearths or stone boiling, and occasional fragments of animal bone (EgPo-67, EgPo-69, EgPo-134, EgPo-139, EgPo-141 and EgPo-142). While these sites provide evidence of more extended use of the PDA, most have been previously disturbed by the effects of development (cultivation, roads). For these disturbed sites, documentation, photography and collection of the artifacts are deemed sufficient mitigation. However, one of the campsites, located in a treed remnant on a high terrace above the Elbow River, is undisturbed except by natural erosion along the terrace edge, giving this site higher heritage value. Additional systematic shovel testing and controlled excavation have been recommended in the HRIA report and this additional work may be required by ACT.

It was reported to the archaeology team that the Siksika and Kainai First Nations indicated that the LAA was likely used for winter camping in the past (Seamus Skelly, pers. comm. 2016). In one location, they noted the presence of surface cobbles that could be the remains of stone features, such as tipi rings or cairns. However, a later field visit by the senior archaeologist, accompanied by a member of the Piikani First Nation, did not confirm that the patterning of rock represented a definitive archaeological site. Examination of erosional exposures did not yield any artifacts although the shallow nature of the soils in this area resulted in considerable erosion and surface exposure of till. Although parts of the LAA were almost certainly used for winter camping in the past, this particular location is not believed to be of concern under the HRA. However, if any traditional use sites or additional locations of potential historical resource concern are identified during ongoing consultation and engagement activities, they would be investigated to determine whether they require additional consultation, assessment, avoidance, or mitigation.

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The eleven historic period sites examined include five historic artifact scatters (EgPo-135, EgPo-136, EgPo-138, EgPo-143, EgPo-144), a granary (HS-1), a cabin (EgPo-71) and four homestead sites (EgPo-146, EgPo-147, EgPo-148 and EgPo-149). Additional mitigation has been recommended at six of the historic sites. Mitigation at historic sites that may be required by ACT includes mapping, detailed recording of structures, excavation, and collection of oral history on the sites and buildings. Several additional historic homesteads or ranches were not recorded due to landowner concerns. If the Project is approved, ACT may require recording and possibly mitigation at some of these sites.

In summary, the results of the HRIA indicate that the project area does contain some sites of moderate to high heritage value that would require mitigation. However, in general terms, much of the area has been affected previously by cultivation and none of the identified sites have sufficient heritage value to mandate complete avoidance, with the exception of the Our Lady Peace Mission site, but that is outside the PDA. Through the Project-specific Aboriginal engagement program, Piikani Nation, Siksika Nation and Blood Tribe (Kainai First Nation) expressed an interest in the church (= mission) and related cairn and recommended further investigation for these sites.

13.2.2.2 Palaeontology

Desktop Review

The Project area is within the eastern limit of the disturbed belt for Cordilleran deformation, where strata have been uplifted and tilted. The geological formations extend diagonally in bands with the older Cretaceous units in the southwest and younger Paleocene units in the northeast. The units include the Brazeau, Coalspur and Porcupine Hills/ Paskapoo formation (Hamilton et al. 1999). All units are fossiliferous. Paleocene strata contain numerous early mammal fossil sites in the Calgary and Cochrane areas and there are Cretaceous shellbeds south of Cochrane. These sites also contain the remains of ancient fish, amphibians, lizards, crocodiles and molluscs. The closest fossil localities are the Nordic Ski Quarry, Bearpaw Dam sites (Scott et al. 2013), Cochrane 1 and 2 sites (Fox 1990; Scott et al. 2002), Radnor dinosaur locality (Bohach 2008), Jumpingpound Creek sites (Bohach 2016) and an unnamed site in Fish Creek Provincial Park. There are no previously recorded fossil localities within the PDA and no lands with HRVs for palaeontology (ACT 2015).

In secondary sources reviewed for the Project, Piikani Nation related that rock formations hold great historical and cultural significance. They represent a variety of meanings: "some of them tell battles that took place of massacres or of tribes winning a battle or great chiefs being buried on the hilltops and the markings of their stories." Others represent areas where people met or gathered together for ceremonies. (PN 2015b)

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The surficial geology of the LAA is complex (Moran 1986). The Elbow River valley is mapped as thin fluvial overbank sediments overlying fluvial channel sand. There are two bedrock ridges draped in till of the Spy Hill Formation, which was deposited by a glacier that flowed out of the Rocky Mountains to merge with the continental ice sheet. Lowlands are covered by lacustrine silt and clay, deposited following the last glaciation. Till underlies the thin lacustrine sediments. The greatest potential for palaeontological resources in the surficial sediments is in the fluvial and lacustrine deposits, which elsewhere in the Calgary area have yielded a Holocene invertebrate fauna (Bohach 2012; Frampton and Bohach 2014). Harris and Pip (1973) also documented late Quaternary mollusc localities in fluvial and lacustrine sediments within the foothills region, including a site near Cochrane.

Field Visits

Field surveys were conducted throughout all areas with existing exposure in the LAA.

In bedrock, the HRIA field surveys documented three palaeontological sites and recorded fossil occurrences of plant remains (impressions and carbonized remains of wood). The three sites consist of shellbeds in Cretaceous to Paleocene strata exposed along the Elbow River. These shellbeds contain molluscs (snails and clams) and one contains rare microvertebrate material (i.e., teeth, scales and small bones of fish, amphibians, reptiles and mammals). Vertebrate sites also occur in these strata outside of the LAA. The presence of these sites indicates that the local palaeontological potential of the strata in the LAA is high. The likelihood of encountering palaeontological sites of high heritage value during excavation through bedrock is therefore considered high.

Through the Project-specific Aboriginal engagement program, Piikani Nation, Siksika Nation and Blood Tribe (Kainai First Nation) indicated the importance of fossils to the Blackfoot culture. They consider fossils to be *Iniskim* (also known as buffalo stones, these are generally pieces of ammonite but can be any rock or fossil that is attributed a spiritual value [Peck 2002]). *Iniskim* are considered culturally significant and are incorporated into bundles.

No Quaternary localities were documented during the HRIA field surveys. One chance find of a bison skull on the Elbow River floodplain was documented. Quaternary sediments along the low banks of the Elbow River are frequently obscured. These banks were affected by the 2013 flood and subsequently have slumped, with softer sediments eroded away and the overlying root mat obscuring the bank. The palaeontological potential of the Quaternary sediments is therefore difficult to evaluate. In general, the palaeontological potential for Quaternary sites along watercourses is considered high, as has been previously documented in flood impact assessment studies along Jumpingpound Creek, the Kananaskis River, Tongue Creek and the Highwood River (Bohach 2016; Bohach and Frampton 2015). The palaeontological potential of Quaternary sediments along the Elbow River valley and its tributaries is likely also high and would

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be investigated further in a future deep backhoe testing program, to be conducted in conjunction with archaeology post approval.

13.3 PROJECT INTERACTIONS WITH HISTORICAL RESOURCES

Table 13-2 identifies the project components and physical activities that might interact with historical resources during construction and dry operations. A justification for no effect is provided following the table.

Table 13-2 Project-Environment Interactions with Historical Resources during Construction and Dry Operations

Project Components and Physical Activities	Environmental Effect
	Loss of or alteration to historical resource site contents or site contexts
Construction	
Clearing	✓
Channel excavation	✓
Water diversion construction	✓
Dam and berm construction	✓
Low-level outlet works construction	✓
Road construction	✓
Bridge construction	✓
Lay down areas	✓
Borrow extraction	✓
Reclamation	✓
Dry Operations	
Maintenance	-
NOTES: ✓ = Potential interaction - = No interaction	

Maintenance activities would not affect historical resources as there would be no ground disturbance outside of areas previously disturbed during construction.

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13.3.1 Project Interactions with Archaeology and Mitigation Measures

Project activities within the PDA would disturb 11 precontact period and 11 historic period archaeological sites. No traditional land use sites of very high heritage value, such as spiritual sites or human burials have been identified within the PDA. Identified sites include isolated finds, artifact scatters, campsites and historic remains such as homesteads and a school. The Our Lady Peace Mission Site, a provincially protected historical resource of high heritage value, is located outside of the PDA. Through the Project-specific Aboriginal engagement program, Piikani Nation, Siksika Nation and Kainai First Nation have requested that archaeologists verify their scientific information with the Elders, who should be involved with HRIA studies on Blackfoot history. They have also requested that knowledge holders participate in all field studies, not only the archaeological studies. Two meetings took place, one on October 26, 2016 with Tsuut'ina Nation and the other on January 18, 2017, with the Piikani Nation, Siksika Nation and Blood Tribe (Kainai First Nation). The archaeological permit holder shared the results of the HRIA and received feedback at these meetings.

ACT considers documentation of the site locations, photography, and collection of a sample of artifacts as sufficient mitigation for sites of low to moderate heritage value. For sites of moderate to high heritage value, avoidance or additional mitigation, such as detailed recording and mitigative excavation to retrieve a larger sample of artifacts and obtain an improved understanding of the cultural affiliation may be required by ACT. Construction monitoring could also be required, depending upon the results of mitigative excavations. Through the Project-specific Aboriginal engagement program, Piikani Nation, Siksika Nation and Blood Tribe (Kainai First Nation) have recommended that all collected artifacts be returned to the land. They have also requested that GPS coordinates or archaeological findings be shared so that they can discover those areas with their Elders. HRIA permit requirements state that all artifacts be curated at the Royal Alberta Museum. ACT is the repository for all HRIA data and only they can share locality information.

Standard mitigation measures will be determined by ACT based on their review of the HRIA (Porter 2017). Through the Project-specific Aboriginal engagement program, Piikani Nation, Siksika Nation and Kainai First Nation have recommended further investigation of the church (= mission) and related cairn. This site (The Our Lady of Peace Mission) is located outside of the PDA. ACT will also issue requirements for any additional assessment such as a deep backhoe testing program or assessment for areas where landowner approval of access was not obtained. Because deep testing with a backhoe is an invasive discovery technique, its application has been delayed until the Project has received approval. However, any sites discovered during this additional assessment phase or reported because of traditional land use studies will also require the application of standard mitigation measures prior to project approval by ACT.

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As required under provincial legislation, should an unexpected find of a significant historical resource occur during construction, ACT will be notified and will determine the appropriate mitigation.

Should any chance find of human remains be made during construction, all construction will immediately cease in the area, the site will be secured and all provincial regulations regarding the chance find of human remains will be followed. If the remains are determined to be of Aboriginal origin the Provincial Government would engage Indigenous groups according to Government of Alberta protocol and guidelines developed in consultation with Indigenous groups.

13.3.2 Project Interactions with Palaeontology and Mitigation Measures

Construction activities for some components of the Project would disturb bedrock, including:

- construction of the diversion inlet
- excavation of the diversion channel (nearly 30 m deep in some areas)
- realignment of Highway 22
- open trenching to re-locate three existing pipelines under the diversion channel

The bedrock in these areas consists of the Brazeau, Coalspur and Porcupine Hills/Paskapoo formations. These are fossiliferous units that produce dinosaurs, fish, early mammals and other fossils, meaning that they have high palaeontological potential. Any buried palaeontological sites could be lost to construction activities. Therefore, the likelihood of impacts to palaeontological resources is considered high. ACT will review the palaeontology HRIA report prepared for the Project (Bohach 2017). To mitigate any potential effects, ACT may require construction monitoring by a professional palaeontologist. The palaeontologist would salvage any fossils unearthed by construction and record the location and stratigraphic context.

The Project could also potentially interact with buried Quaternary palaeontological resources. There are areas within the PDA where potentially fossiliferous Holocene sequences may have accumulated in low catchment areas set back from the river. There are no exposures in these areas and they would be investigated further in a planned deep testing program in conjunction with the archaeology studies. This program would only be completed after Project approval.

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13.4 ASSESSMENT OF RESIDUAL ENVIRONMENTAL EFFECTS ON HISTORICAL RESOURCES

Project-specific environmental effects on historical resources are mitigated to the standards established by ACT. After implementation of the required mitigation measures, and Aboriginal consultation, there are no residual effects on historical resources.

13.5 DETERMINATION OF SIGNIFICANCE

As defined in Section 13.1.6, a significant adverse environmental effect on historical resources may occur when there is a disturbance to or destruction of a historical resource site that has not been previously authorized by ACT. Alberta Transportation would implement all mitigation required by ACT and would obtain all required project approvals under the HRA. A chance find protocol would be enacted if unexpected discoveries of historical resources are made during construction. With the application of regulatory standards (including application of chance find protocols required by ACT during construction), the Project effects on historical resources are assessed as being not significant.

13.6 PREDICTION CONFIDENCE

Alberta Culture and Tourism will not provide approval for the Project until they have completed their review of the HRIAs and are satisfied that all assessment is complete, including follow up backhoe testing and examination of areas for which landowner access was not obtained. ACT will issue subsequent regulatory requirements for avoidance or site-specific mitigation based on their assessment of the heritage value of all identified sites in the PDA. Alberta Transportation is aware of its responsibilities under the HRA and will undertake the required avoidance or mitigation. With this commitment, prediction confidence is high for an expectation of effects as being not significant.

13.7 CONCLUSIONS

The HRIA field studies required by ACT for archaeology and palaeontology have been completed, except for deep testing, which would be completed prior to construction, and HRIA studies for archaeology in some areas for which landowner access could not be obtained. Mitigation and/or construction monitoring required by ACT, based on the HRIAs, will be completed. After implementation of the required mitigation measures, and Aboriginal consultation, there are no residual effects.

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13.8 REFERENCES

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13.8.2 Personal Communication

Seamus Skelly, pers. comm. 2016

Skelly, S., Senior Water Projects Technologist, Alberta Transportation Alberta communication to Meaghan Porter, Stantec, August 18, 2016.