6. CULTURAL RESOURCES

This chapter assesses the impacts that the proposed Northern Rail Extension (NRE) would have on cultural resources within the project area. A discussion of regulations is followed by a characterization of cultural resources in the project area. The subsequent section describes the direct and indirect impacts on cultural resources that would result from construction and operation of the rail line, followed by documentation of consultation with Alaska Native organizations. The analyses draw from three reports, which are incorporated here by reference: (1) a predictive model of cultural resources in the area (Potter, 2006), (2) 2006 survey results (Potter *et al.* 2007a), and (3) 2007 survey results (Potter *et al.*, 2007b).

6.1 Applicable Regulations

Section 106 of the National Historic Preservation Act (NHPA), as amended (16 U.S.C. 470), requires that Federal agencies consider the effects of their undertakings (including the issuance of permits, licenses, or authorizations) on historic properties and provide the Advisory Council on Historic Preservation (ACHP or the Council) an opportunity to comment. As the lead Federal agency for Alaska Railroad Corporation's (ARRC) proposed NRE, Section of Environmental Analysis (SEA) is responsible for consulting with the State Historic Preservation Office (SHPO), land managing agencies, Indian tribes, and other interested parties about the potential for this project to affect historic properties.

6.2 Affected Environment

This section summarizes the prehistoric and historic background of the project area as a baseline for evaluating the project's potential impacts on cultural resources. This cultural chronology of prehistoric and historic human activity in the project area draws from known archeological and historic resources, and illustrates the current extent of knowledge about prehistory and history of the Tanana River Basin.

6.2.1 Prehistoric Cultural Chronology

Archeological research in Interior Alaska indicates that humans have inhabited the middle Tanana River Basin for over 14,000 calendar years (12,000 radiocarbon years), making this region of Alaska the focus of some of the earliest dated sites in the Americas. This regional cultural history is divided into three broad archeological traditions: the American Paleoarctic Tradition (13,300 to 6,000 years ago), Northern Archaic Tradition (6,000 to 1,000 years ago), and Athabascan Tradition (1,000 years ago to 1880 AD), as well as two phases of the historic period, the historic Athabascan followed by Euroamerican. These periods represent major Alaskan cultural traditions and are based on differences in the material culture (artifacts), settlement type, and subsistence practices.

American Paleoarctic Tradition (13,300 to 6,000 years ago)

Paleoarctic inhabitants of the Tanana River Basin were hunters whose patterns of settlement reflect their strategies for hunting and processing of large and small game (Holmes, 1996; Bowers, 1999). They were nomadic and followed wapiti (elk) and other large herds on their seasonal cycles of migration across Alaska. They supplemented their diets with small game and fish. Previously identified archeological sites from this period in the Tanana River Basin include

residential areas, temporary hunting camps, hunting look-outs, tool production sites, meat and hide processing camps, and other small settlements. In their annual hunting cycles, sites near productive hunting grounds were often revisited, leading to stratified archeological deposits that represent reuse over many years.

Archeological features and material culture from the region reflect the hunting mode of subsistence. In general, sites are very ephemeral, and represented only by hearth features, faunal bones from hunted game, and stone tools and debitage (the byproduct of tool production). The lithic industry, or "stone tool kit," of hunters in the middle Tanana River Basin is characterized by a number of artifact forms, including "Chindadn" triangular projectile points, which have been found at a number of sites throughout the Basin and date to approximately 12,000 years ago. Bone implements, including worked mammoth ivory pieces, suggest bone points were in use during the 14,000 to 13,000 year time period. An eyed-bone needle was dated to 12,000 years and likely relates to processing of hides for clothing or shelters (Holmes, 1996:313). The variety of faunal remains includes ungulates (hoofed animals) like wapiti, bison, caribou, sheep, and moose, as well as small game like fox, wolf, hare, ground squirrel, and other small rodents. The remains of waterfowl such as duck, geese, and swan, as well as salmonid fish, indicate that river resources were exploited as well (Holmes, 1996; Yesner, 1996).

An example of the American Paleoarctic Tradition from the region is the Gerstle River site, east of Delta Junction, which reflects many of the components of settlement in the area. The site contained cultural materials dated between 12,000 and 9,000 years ago, comprising at least five separate periods of use at the site (Potter, 2005). The site had a wide variety of stone tools, ten hearth features, and multiple bones of wapiti and bison. The site functioned as a temporary field camp where large mammals killed nearby were processed (Potter, 2005). An extensive analysis of the faunal bones was conducted, indicating that lower and upper limbs were removed from the carcass and processed for marrow around hearths while meat and fat associated with ribs, cervical, and thoracic vertebrae were likely prepared for transport, removed from the site, and taken to a nearby residential base camp.

In general, sites of the American Paleoartic Tradition are ephemeral, in part because of the temporary nature of their use, but also as a result of their age and preservation. Many questions remain as to the nature of social organization as well as environmental interactions among these hunting populations. The work at Gerstle River (Potter, 2005) suggests stone tool technology in the area was related to site function, raising questions as to whether the artifacts can be associated with specific cultures or populations over time.

Northern Archaic Tradition (6,000 to 1,000 years ago)

At approximately 6,000 years ago, the characteristic stone tools of the region, which had been stable for thousands of years, began to change. In addition to the previously used tools, side-notched projectile points began to appear in Interior Alaska at this time (Potter, 2000, 2004). The reasons for why this happened are not clear (*e.g.*, Anderson, 1968; Workman, 1977), but some have argued that their occurrence throughout Interior Alaska and southwestern Yukon possibly is related to environmental transformations. The new tool kit may represent a new cultural tradition or new subsistence practices oriented towards exploitation of boreal forest resources, which were on the rise (Anderson, 1968; Dixon, 1985).

A number of sites in the Tanana River Basin provide examples where side-notched projectile points and narrow tapering lance-shaped points have been found, including the Swan Point site (Holmes *et al.*, 1996), the Tok Terrace site (Sheppard *et al.*, 1991), the Healy Lake Village site

(Cook, 1969), Dixthada (Shinkwin, 1979), the Chugwater site, and several other localities. The changes in tool type in the area are clear, but explanations for what they mean are not.

Athabascan Tradition (1,000 years ago to AD 1880)

The Athabascan Tradition is a prehistoric culture attributed to ancestors of northern Athabascan Indians of Alaska. Sites of the Athabascan Tradition in the Yukon Basin date from about 1,000 years ago to about AD 1880. Aspects of this tradition continued into the historic period of the late 19th century and up to the present time. Early prehistoric Athabascan Tradition sites are characterized by housepit and subsurface cache features. The artifacts that characterize this cultural group generally show less flaked stone tools than in previous periods and an increase in ground stone, bone, and antler artifacts.

Recent testing in an early historic house depression near Tok indicates a significant change in the Athabascan Tradition was an increased use of expedient tools, tools made as needed from readily available materials (Sheppard, 2001). Faunal materials found at Athabascan Tradition sites suggest a more broad spectrum use of natural resources, including bird fauna (Rainey, 1939), as well as black bear, Dall sheep, and marmot (Plaskett, 1977). Much of our understanding of sites from the Athabascan Tradition in Alaska results from excavations outside of the project area, including excavations at Lake Minchumina (Holmes, 1986) and sites near Eagle (Andrews, 1987), Tok (Sheppard, 2001), and Chitina (Rainey, 1939; Shinkwin, 1979). Athabascan Tradition sites in the project area include Swan Point, which contained pecked and ground stone artifacts as well as flaked artifacts, and where the flaked stone tools included lance-shaped projectile points and microblades (Holmes *et al.*, 1996).

The proto-historic Athabascan sites include those characterized by a mix of Native-made items and non-Native trade goods such as iron and glass beads, and copper tools. These artifacts on Athabascan sites reflect indirect contact with the Hudson's Bay Company and Russian American Company fur traders, as well as prospectors and missionary influences from the Yukon River (AD 1740–1850). Historic Athabascan sites (post-1850) generally have a mixture of log cabin and house pit dwellings affiliated with a larger percentage of Euroamerican artifacts, and were sometimes relocated away from traditional site location to areas that facilitated trading.

6.2.2 Historic Cultural Chronology

Historic Athabascans

At the time of direct Euroamerican contact, the project area was occupied by several bands of Tanana Athabascans (Andrews, 1977; McKennan, 1981). The Athabascan social group included a "band" of families whose subsistence activities centered on procurement of fish resources and terrestrial game animals. Athabascan settlement locations are tied to a yearly subsistence cycle. Traditional Athabascan land use includes fall hunting of moose, caribou, sheep, and small terrestrial animals, and also trapping (Andrews, 1975; McKennan, 1981). Hunting was associated with seasonal movements along trails and frozen rivers, particularly as bands moved between rivers and uplands.

Fishing was done near the village sites, and the fish were stored in large subsurface caches. In the early fall, the bands dispersed into small family units who then went on hunting ventures (Mishler, 1986). Seasonal procurement of caribou occurred at various times, focused on their fall and late-winter and early spring migrations. Sheep hunts occurred in the upland areas. Hares, ptarmigan, spruce grouse, and over-wintering waterfowl were also hunted. These subsistence patterns were similar to those practiced in the area for thousands of years.

Contact with Euroamericans brought about change. The establishment of trading posts as well as the movement of miners and missionaries coming into the country brought the Athabascans into the cash economy and systems of wage-labor for goods and services. Their former subsistence-based lifestyle was greatly disrupted (Simeone, 1995).

Noted geologist Alfred Brooks was the first non-native to record the Salcha River and place it on a map, during his 1898 expedition for the U.S. Geological Survey (USGS) (Andrews, 1975). Prior to the influx of Euroamericans into the Tanana River Basin just after 1900, Salchaket was a seasonally occupied site for the Salcha band of Athabaskan Indians. McKennan (1981:567) refers to Salchaket as "an old Salcha fish camp" (Figure 6-1). After the gold rush and the accompanying influx of Euroamerican settlers to the region, Salchaket became an important village for the Salcha band and was occupied year round (Andrews, 1975). In 1911, there were about 40 Salcha people living in the settlement of Salchaket (Grider, 1911) (Figure 6-2). The population steadily declined, and a church official noted in 1936 that the people in Salchaket had mostly moved away or died off and that "the few souls" remaining in that "old camp" were under the care of the reverend from St. Matthew's in Fairbanks (Bentley, 1936). By 1945, only two Salcha people were living in the village. These two people moved to Fairbanks during the early 1950s (Andrews, 1975).

In 1915 a meeting was held in Fairbanks with chiefs from the lower portions of the Tanana River Basin and U.S. government officials; the purpose of the meeting was to discuss the possibility of establishing reservations for the Natives. After hearing about the conditions of reservation life in other parts of the country, the chiefs decided against establishing reservations for their people in Alaska. At that time there were very few Euroamericans living outside the major settlements and the chiefs still felt that "there would be plenty of room for everyone" (Olson, 1981:706).

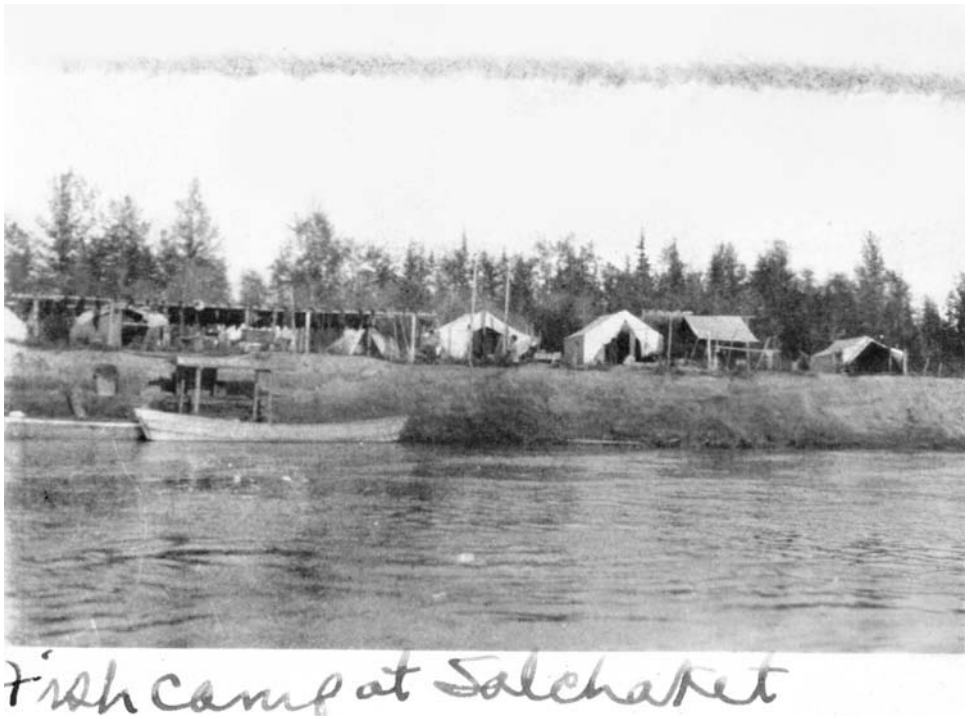

Figure 6-1 – Fish Camp at Salchaket (Frederick B. Drane Collection, UAF-1991-46-594, Archives, Alaska and Polar Regions Collections, Rasmuson Library, University of Alaska Fairbanks)

Figure 6-2 – St. Luke's Mission House, Salchaket, Alaska (Walter and Lilian Phillips Album, UAF-1985-72-118, Archives, Alaska and Polar Regions Collections, Rasmuson Library, University of Alaska Fairbanks)

Euroamericans

The Tanana River area has a documented Euroamerican history of less than 130 years, and like the Tanana Athabascan history, it has experienced significant changes since 1878. Tanana River Basin Euroamerican history is characterized by mineral exploration and construction of trading posts, roadhouses, and missions, followed by trade and commerce, and military buildup related to World War II and the Cold War.

Initial Euroamerican presence in the Tanana River Basin started with Yukon traders Harper and Mayo who began exploration of the greater Tanana River Basin in 1878 (Robe 1943). In 1898, Mendenhall's (1900) geological expedition reached the Tanana River Basin via the Copper and Delta rivers. His party ventured as far as Jarvis Creek, near present-day Delta Junction, but failed to reach the Tanana River before having to return to the Copper River.

The U.S. Army was responsible for the construction of the Washington-Alaska Military Cable and Telegraph System (WAMCATS), constructed during the first years of the 20th century. WAMCATS included a telegraph system spanning Interior Alaska, linking western Alaska with the rest of the state and crossing near the confluence of the Salcha and Tanana rivers. Portions of this 1903 telegraph system remain on the landscape (Quirk, 1974).

Perhaps the most notable event in the history of the Interior was the gold rush that occurred at the beginning of the 20th century. In 1902, Felix Pedro struck gold on a small stream 12 miles northeast of Fairbanks, and a rush began that brought settlers to the Tanana River Basin in force. The industry eventually became mechanized through the use of large dredges, in part due to the transportation advances that lowered the cost of shipping equipment to the mines and the opening of the Healy Coal Fields in the 1920s. Agriculture provided an additional viable occupation for people living in the region (Monahan, 1959). Fairbanks had been founded in 1901–1902, and its growth led to the development of the historic Valdez-Fairbanks Trail connecting Fairbanks to Alaska's southern coast. The trail later became Richardson Highway. This route would not have been feasible without roadhouses and other facilities constructed to

assist the freighters, mail contractors, miners, hunters, and other travelers that traversed the wilderness trail. In the 1920s the Alaska Road Commission began upgrading the Valdez Trail to automobile standards. Richardson Highway was first paved in 1957.

Located at the northwestern end of the proposed project area, the military base eventually known as Eielson Air Force Base (AFB) came into existence in 1942–1943, when military planners desired an alternate satellite field for Ladd Field in Fairbanks. The facility was originally known as "Mile 26" due to its location 26 miles southeast of Fairbanks and was later renamed Eielson AFB. Ladd Field was then transferred to the U.S. Army. The U.S. Army formally took over the installation on January 1, 1961, and it was renamed Fort Wainwright (Price, 2001). The project area also includes two sites that were part of the Ballistic Missile Early Warning System (BMEWS) during the Cold War. BMEWS stations generally consisted of a radio relay building, a so-called POL (petroleum, oils, lubricants) tank, and a TD-2 communication tower. There was a BMEWS station at Harding Lake and one near Delta Junction (Reynolds, 1988). A military history of the project area is found in the U.S. Army Lands Environmental Impact Statement (CEMML, 1999) and the Fort Wainwright and Fort Greely Draft Integrated Cultural Resources Management Plan (Lewis, 1999).

6.2.3 Previously Known Cultural Resources in the Project Area

Previous surveys for cultural resources have been conducted only in the extreme northwestern and southeastern portions of the NRE. The Trans-Alaska Pipeline System (TAPS), Alaska Natural Gas Transportation System (ANGTS), and Alaska Gas Producers Pipeline Team (AGPPT) surveys were located on the east side of the Tanana River, but there has been some surveys west of the Tanana River. The Fort Greely surveys (Higgs *et al.*, 1999; Holmes, 1979) took place generally to the south of the project area. The various surveys in support of the U.S. Army units (Hedman *et al.*, 2003; Raymond-Yakoubian and Robertson, 2005; Robertson *et al.*, 2005) were conducted to the east of the Delta River. The Golden Valley Electric Association, Inc. and Fort Wainwright surveys (Bowers *et al.*, 1995; Dixon *et al.*, 1980; Potter, 1999) were conducted to the west of the project area, though the Fort Wainwright survey did cover a large portion of the project area northwest of Flag Hill, including the Blair Lakes area. These surveys were assessed with respect to survey methods, coverage, and results in developing the predictive model for the NRE surveys (Potter, 2006).

The main Fort Greely base in Delta Junction has had more comprehensive and wide-scale surveys over the past 30 years than any other region in the Tanana River Basin (Dixon *et al.*, 1980; Reynolds, 1986; Potter *et al.*, 2000). The current understanding of regional prehistory and history in the mid-Tanana River Basin is dominated by sites found east of the Tanana River and Richardson Highway. Given the lack of survey in the western areas, cultural resource surveys for this proposed action focused on those areas, which correspond with the vast majority of the NRE build alternatives (Potter, 2006; Potter *et al.*, 2007a; 2007b).

6.3 Environmental Consequences

6.3.1 Methodology

Section 106 regulations, (36 Code of Federal Regulations [CFR] Part 800) use "historic properties" as a general term to include the entire range of different cultural resources, such as archeological sites and historic structures. The National Environmental Policy Act of 1969 (NEPA) requires an assessment of impacts on historic properties. To assess the potential impacts

on historic properties in the project area, SEA used a combination of direct identification of sites in the project area, as well as computerized modeling of potential for the presence of buried archeological resources in different parts of the project area.

In general, the purpose of cultural resource surveys is to identify historic properties within the Area of Potential Effect (APE) that are eligible for listing on the *National Register of Historic Places*. For the purposes of the NRE cultural resources surveys, the limits of potential disturbance were considered to be 100 feet on either side of the track centerline. This would encompass the actual railbed. The overall APE for the project was established as 328 feet (100 meters) on either side of the rail centerline. This APE would account for the proposed mainline track, as well as ancillary support facilities and the potential indirect impacts that could result from construction and operation of the rail line. A complete field survey of the entire APE, including all alternative segments, was not feasible because of climate and field conditions. The survey was conducted as a systematic sampling survey, which included development of a predictive model for the project area, followed by strategic field sampling of certain moderate and high probability locations. This workplan was approved by the Alaska SHPO and Bureau of Land Management (BLM) prior to survey.

Discussions of the predictive model and the field survey results are presented below. Proposed mitigation for impacts to cultural resources is presented in Chapter 20 of the Environmental Impact Statement (EIS).

Site Location Model

To develop the predictive model for cultural resources in the project area (Potter, 2006), a range of values from low potential to high potential was assigned to the landscape. Factors considered important in predicting prehistoric archeological site locations in Interior Alaska include local microtopography and slope, geomorphology and sediments, distance to and type of water source, percentage of surface cover, exposed stratigraphy, mineral licks, spawning sites in clearwater tributaries of larger rivers, lake shores, the margins of swampy lowlands, caribou migration routes, habitats favorable to large mammals and waterfowl, and lithic (stone) resource localities.

The predictive model was applied to areas with proposed rail alternative segments and ancillary facilities, which were then surveyed by Type A or Type B surveys. Type A surveys consisted of low-altitude, low-speed helicopter fly-over supplemented by ground survey in sample locations. Type B surveys, conducted in high probability areas, consisted of pedestrian walkover in transects, combined with subsurface excavations. Testing was discretionary and based on overflights of the areas, review of aerial photographs, review of the archeological literature of the area, and previous experience conducting surveys, reviews, and excavations in Interior Alaska (Bowers *et al.*, 1995; Gerlach *et al.*, 1996; Higgs *et al.*, 1999; Potter *et al.*, 2000; Potter *et al.*, 2002). Areas determined to have high and moderate potential were more intensively tested and included riverbanks, alluvial terrace edges, lakeshores with positive relief, bedrock ridges and other elevated terrain features. The overall survey strategy was designed to meet Phase II survey requirements by the Alaska SHPO and intended to gather sufficient data for a determination of eligibility for listing on the National Register (Potter *et al.*, 2007a).

6.3.2 Field Results

Survey of the alternative segments totaled 239.3 miles (385.1 kilometers), which included 149.9 miles (241.2 kilometers) of Type A survey and 89.4 miles (143.9 kilometers) of Type B survey. About 70 percent of the build alternative segments have been surveyed. The 2006-2007 surveys

identified and tested 198 high potential areas for subsurface cultural remains, resulting in the excavation of 949 test pits and the discovery of 61 historic properties including archeological sites and standing structures. Of those, 51 were prehistoric archaeological sites, representing the full range of occupation in the region from American Paleoartic to Athabascan settlements (Potter *et al.*, 2007b: see Appendix C). Ten sites were historic or recent sites associated with Athabascans or Euroamericans.

Summary data on all 61 historic properties discovered during the 2006-2007 surveys are provided in Table 6-1. Of the 61 historic properties evaluated for this project, 7 were considered not eligible for listing on the National Register because they are less than 50 years old. A total of 51 were considered eligible under Criterion D of the Department of Interior's guidelines for assessing site significance. Historic properties eligible for listing on the National Register under Criterion D are those that have the potential to yield important information about prehistory or history. Criterion D is generally used to describe the research potential of archeological resources whose full extent and integrity are unknown. Of the 61 properties, 3 historic properties need more information before eligibility can be adequately determined: XBD-293, 294, and 295, comprised of historic archeological deposits associated with Salchaket Village. These sites are likely eligible for listing on the National Register, but more research is needed to fully determine their significance.

Table 6-1
Archaeological Site Summary Data

Site[a]	Nearest Alternative	Description	Age[b]	Eligibility for National Register Listing
FAI-1750	North Common Segment	Cabin	Recent	Not Eligible
FAI-1751	Salcha 2	Buried lithic site	250±40 BP	Eligible (D)
FAI-1607	Salcha 1	Cabin	Recent	Not Eligible
XBD-281	Delta 2, MT5*	Buried lithic site	2760±40 BP	Eligible (D)
XBD-282	Delta 2, MT5*	Buried lithic site	5920±50 BP	Eligible (D)
XBD-283	Delta 1	Buried lithic site	5000±50 BP	Eligible (D)
XBD-284	Delta 2	Cabin and land use area	Recent	Not Eligible
XBD-285	Delta 1	Cabin	Recent	Not Eligible
XBD-286	Donnelly 2	Buried lithic site	1860±50 BP	Eligible (D)
XBD-287	Donnelly 2	Buried lithic site	4490±50 BP	Eligible (D)
XBD-288	Donnelly 2	Buried lithic site	6060±60 BP	Eligible (D)
XBD-289	Donnelly 2	Buried lithic site	7960±70 BP	Eligible (D)
XBD-290	Donnelly 2	Buried lithic site	1170±40 BP	Eligible (D)
XBD-291	Donnelly 2	Buried lithic site	7350±60 BP	Eligible (D)
XBD-292	Salcha 2	Axe-cut stumps	Recent	Not Eligible
XBD-293	Salcha 2	Associated with Salchaket	19th-20th cent.	Data needed
XBD-294	Salcha 2	Associated with Salchaket	19th-20th cent.	Data needed
XBD-295	Salcha 2	Associated with Salchaket?	AD 1940s	Data needed
XBD-296	Salcha 2	Buried lithic site	2010±40 BP	Eligible (D)
XBD-297	Donnelly 1	Buried lithic site	3620±50 BP	Eligible (D)

Table 6-1
Archaeological Site Summary Data (continued)

Site[a]	Nearest Alternative	Description	Age[b]	Eligibility for National Register Listing
XBD-298	Donnelly 1	Buried lithic site	Component 1: 11,300±40 BP Component 2: 9670±40 BP Component 3: 9650±60 BP Component 4: 8880±40 BP	Eligible (D)
XBD-299	Donnelly 1	Buried lithic site	4500-8900 BP	Eligible (D)
XBD-300	Donnelly 1	Buried lithic site	4500-8900 BP	Eligible (D)
XBD-301	Donnelly 1	Buried lithic site	4360±50 BP	Eligible (D)
XBD-302	Donnelly 1	Buried lithic site	4500-8900 BP	Eligible (D)
XBD-303	Donnelly 1	Buried lithic site	9340±80 BP	Eligible (D)
XBD-304	Donnelly 1	Buried lithic site	4500-8900 BP	Eligible (D)
XBD-305	Donnelly 1	Buried lithic site	9300-10000 BP	Eligible (D)
XBD-306	Donnelly 1	Buried lithic site	8930±90 BP	Eligible (D)
XBD-307	Donnelly 1	Buried lithic site	8070±60 BP	Eligible (D)
XBD-308	Donnelly 1	Buried lithic site	10050±70 BP	Eligible (D)
XBD-309	Donnelly 1	Buried lithic site	9300-10000 BP	Eligible (D)
XBD-311	Donnelly 1	Buried lithic site	6490±50 BP	Eligible (D)
XBD-312	Donnelly 1	Buried lithic site	9290±50 BP	Eligible (D)
XBD-313	Donnelly 2	Buried lithic site	6750±60 BP	Eligible (D)
XBD-314	Donnelly 2	Buried lithic site	1000-4000 BP	Eligible (D)
XBD-315	Donnelly 2	Buried lithic site	4100-6800 BP	Eligible (D)
XBD-316	Donnelly 2	Buried lithic site	4050±50 BP	Eligible (D)
XBD-317	Donnelly 2	Buried lithic site	5610±50 BP	Eligible (D)
XBD-318	Donnelly 2	Buried lithic site	4100-6800 BP	Eligible (D)
XBD-319	Donnelly 2	Buried lithic site	4100-6800 BP	Eligible (D)
XBD-320	Donnelly 2	Buried lithic site	4100-6800 BP	Eligible (D)
XBD-321	Donnelly 2	Buried lithic site	4100-6800 BP	Eligible (D)
XBD-322	South Common Segment	Buried lithic site	1000-2700 BP	Eligible (D)
XBD-323	MT3*	Buried lithic site	1000-2700 BP	Eligible (D)
XBD-324	MT3*	Buried lithic site	2070±50 BP	Eligible (D)
XBD-325	DCMPS*	Buried lithic site	7360±40 BP	Eligible (D)
XBD-326	DCMPS*	Buried lithic site	7740±60 BP	Eligible (D)
XBD-327	DCMPS*	Buried lithic site	5200-7700 BP	Eligible (D)
XBD-328	DCMPS*	Buried lithic site	5170±50 BP	Eligible (D)
XBD-329	Donnelly 2	Cabin	Recent	Not Eligible
XBD-330	Donnelly 1	Cabin	Recent	Not Eligible
XBD-335	Donnelly 1	Buried lithic site	Component 1: 5400±40 BP Component 2: 1000-2700 BP	Eligible (D)
XBD-336	Donnelly 1	Buried lithic site	3040±40 BP	Eligible (D)
XBD-337	Donnelly 1	Buried lithic site	2180±40 BP	Eligible (D)

Table 6-1
Archaeological Site Summary Data (continued)

Site[a]	Nearest Alternative	Description	Age[b]	Eligibility for National Register Listing
XBD-338	Donnelly 1	Buried lithic site	Component 1: 12,000-11,000 BP Component 2: 10,000±80 BP	Eligible (D)
XBD-339	Donnelly 1	Buried lithic site	8000-3600 BP estimated	Eligible (D)
XBD-340	Donnelly 1	Buried lithic site	8000±50 BP	Eligible (D)
XBD-341	Donnelly 1	Buried lithic site	10000-8000 BP estimated	Eligible (D)
XBD-342	Donnelly 1	Buried lithic site	4670±40 BP	Eligible (D)
XBD-343	Donnelly 1	Buried lithic site	4160±40 BP	Eligible (D)

[a] The sites listed in this table are identified by their site identifier codes.
[b] Age is the uncalibrated radiocarbon date associated with the site or site component.
* DCMPS = Delta Creek Material Processing Site Location, MT = Microwave Tower Location. These are possible sites identified by ARRC for ancillary facilities associated with the proposed NRE.

6.3.3 Common Impacts

This section describes the possible types of impacts that construction and operation of the proposed NRE could have on cultural resources. Direct impacts include surface and subsurface disturbances resulting from construction, operation, and maintenance activities associated with the proposed rail line. Ground disturbance would directly and adversely impact the integrity of archeological sites through removal of surface artifacts, disturbance of site contexts, soil compaction, watershed modification, and contamination of organic residues of a site. Where vegetation is cleared, erosion could increase and expose archaeological resources. For historic properties eligible for the NRHP, construction of the project could have impacts to the aesthetics and visual site setting, depending on proximity.

Indirect project impacts would include increased erosion and site degradation. The project would likely alter the watershed in the area. Changes to the surface flow of water, from removal of vegetation or cutting and filling, can cause changes in soil deposition across the area. New erosion patterns could expose buried archeological sites. There could also be changes to groundwater, which affects soil pH levels and has an overall effect on the preservation of buried artifacts and features at sites.

6.3.4 Impacts by Alternative Segment

This section compares the impacts of each alternative segment on known historic properties as well as the potential to affect buried archeological sites. This section also provides a summary and description of potential impacts on historic properties by the build alternatives. The limits of disturbance for the mainline track extend 100 feet on either side of the track centerline. These are areas subject to direct impacts. The overall project APE is considered 328 feet (100 meters) from the centerline. These areas, outside the limits of direct disturbance, are subject to indirect impacts from the build alternatives.

All known historic properties associated with NRE alternative segments, both previously known and newly discovered, are listed in Table 6-2. There are a total of 16 sites within 328 feet of

Table 6-2
Summary of Site Proximity to Main Track Alternative Segments

Segment	Historic Properties[a] (within the Area of Potential Effect)	Historic Properties[a] (within 1,312 feet of Area of Potential Effect)
North Common Segment	0	0
Eielson 1	0	1 (FAI-071*)
Eielson 2	0	0
Eielson 3	0	0
Salcha 1	0	0
Salcha 2	2 (FAI-1751, XBD-293**)	4 (FAI-156*, XBD-027, XBD-294**, 296)
Central alternative segments	0	0
Donnelly 1	8 (XBD-335-336, 338-343)	17 (XBD-188*, 189*, 297-309, 312, 337)
Donnelly 2	4 (XBD-291, 313, 320-321)	11 (XBD-287-289, 314-319, 325-326)
South Common Segment	0	1 (XBD-322)
Delta 1	1 (XBD-091)*	0
Delta 2	1 (XBD-281)	2 (XBD-282, XBD-129))

[a] The historic sites listed in this table are identified by their site identifier codes.
* Sites have not undergone determinations of eligibility for listing on the National Register.
** Sites related to Salchaket Village require more data for a determination of eligibility for listing on the National Register, and would likely be eligible.

proposed project alternative segments, 15 prehistoric and 1 historic. Testing to date has involved a limited sample and the full spatial boundaries of these 15 sites have not been determined. It is assumed here that historic properties within 328 feet of proposed alternative segments have the potential to receive direct and indirect impacts from construction and operation of the rail line. Historic properties up to 1,312 feet (400 meters) from the APE would not likely be affected by the right-of-way, but could be affected by the final design of ancillary features and their access roads.

In addition to sites affected by the right-of-way, some ancillary facility locations have associated historic properties (Table 6-3). The list in Table 6-3 includes only those ancillary feature locations that have been proposed by ARRC and which have historic properties within 1,312 feet (400 meters) of the APE.

Table 6-3
Survey Results of Ancillary Facilities

Ancillary Facility	Historic Properties[a] (within the Area of Potential Effect)	Historic Properties[a] (within 1,312 feet of Area of Potential Effect)
Delta Creek Material Processing Site	4 (XBD-327-330)	0
Material Site 7	1 (XBD-293)	1 (XBD-294)
Microwave tower 1	0	1 (FAI-1750)
Microwave tower 2	0	2 (XBD-128, 296)
Microwave tower 3	2 (XBD-323-324)	0

Table 6-3
Survey Results of Ancillary Facilities (continued)

Ancillary Facility	Historic Properties[a] (within the Area of Potential Effect)	Historic Properties[a] (within 1,312 feet of Area of Potential Effect)
Microwave tower 5	1 (XBD-282)	1 (XBD-281)
Southern Terminus Depot	0	1 (XBD-129)

Note: Sites located in the vicinity of both rail line alternatives and ancillary facilities are noted in Tables 6-2 and 6-3.
[a] The historic sites listed in this table are identified by their site identifier codes.

Historic properties within the APE can be divided into two groups with respect to significance and impacts. The first group includes all buried prehistoric sites. The sites are all eligible for listing on the NRHP for their potential to yield information important in prehistory or history. These sites consist of buried cultural materials including features, artifacts, and faunal remains.

The second group is comprised of two historic sites near Salchaket Village (XBD-293 and 294). More data collection and research is necessary to determine National Register eligibility of these sites; however, they would almost certainly be considered eligible. Large portions of the Salchaket Village area were not surveyed because they are on private property, in some cases Native allotments. No alignments considered in the EIS affect Native Allotments, because the eastern alignment through Salcha was removed from consideration.

North Common Segment

The North Common Segment is located in an area of relatively low archeological sensitivity for prehistoric sites and moderate sensitivity for historic sites. No historic properties are known within the APE, though much of the area has not been surveyed. Given its proximity to Richardson Highway, no direct impacts on cultural resources are anticipated for this segment. Any indirect impacts to resources that have not been identified during survey would be minimal.

Eielson Alternative Segments

Eielson Alternative Segments 1, 2, and 3 are also located in an area of relatively low archeological sensitivity for prehistoric sites and moderate sensitivity for historic sites. Most of Eielson Alternative Segment 2, about half of Eielson Alternative Segment 1, and less than a fourth of Eielson Alternative Segment 3 have been surveyed, but all lie within similar surface geology and vegetation. No historic properties are known within the APE. No direct impacts on cultural resources are anticipated for these segments. Any indirect impacts to resources that have not been identified during survey would be minimal.

Salcha Alternative Segments

The two Salcha alternative segments are very different in their potential to affect archeological remains. Salcha Alternative Segment 1 lies west of the Tanana River in floodplain alluvium with little topographic relief. Salcha Alternative Segment 1 has not been surveyed, but lies just southwest of a surveyed area and is considered to have relatively low potential for historic or prehistoric sites. No historic properties are known in or near the APE. No direct impacts and minimal indirect impacts on cultural resources are anticipated for Salcha Alternative Segment 1.

Salcha Alternative Segment 2 lies in areas having high potential for both prehistoric and historic sites. Two historic properties lie in or very near the APE, prehistoric site FAI-1751, and historic site XBD-293, which is associated with Salchaket Village. Four other prehistoric and historic

sites are known within 1,312 feet of the APE. One of these, XBD-294, is related to Salchaket Village and features associated with the site may extend into the APE. Three testing areas were identified and surveyed within the APE of Salcha Alternative Segment 2. Numerous archeological resources were encountered. A comprehensive survey of the Salchaket area has yet to be completed. In sum, there are considerable direct and indirect impacts on historic properties anticipated for Salcha Alternative Segment 2.

Connectors A, B, C, and D

The Connector alternative segments A, B, C, and D lie in an area of relatively low potential for prehistoric and historic sites. The area is low, flat, and boggy forest with creek channels and sloughs running through it. Connectors A, B, and C were surveyed by type A survey methods. Four testpits were excavated along Connector A and eight testpits excavated along Connector C. No cultural resources were identified in any of the surveys. A trapper's cabin, first constructed in 1959, was located along Connector B. No historic properties are known in or near the Connector alternative segments. No direct impacts and minimal indirect impacts to historic properties are anticipated for the Connector alternative segments.

Central Alternative Segments

The Central alternative segments lie in an area of relatively low potential for prehistoric and historic sites. Central Alternative Segment 2 is situated on floodplain alluvium with little topographic relief and many areas of water saturation. No historic properties are known in or near the APE along this segment. Central Alternative Segment 1 is farther inland, but still lies in an area of abandoned floodplain with no terraces and is considered lowlands. Four areas of subsurface testing were identified along Central Alternative Segment 1 by computer model. Ten testpits were excavated, but no cultural remains were identified in any of the tests. No direct impacts and minimal indirect impacts on historic properties are anticipated for the Central alternative segments.

Donnelly Alternative Segments

Both Donnelly alternative segments are located in areas with high potential for prehistoric resources. Twenty-six areas of the APE along Donnelly Alternative Segment 1 were tested. There are eight sites within the APE; all are buried prehistoric sites (XBD-335-336, 338-343). Twenty-two areas between 328 and 1,640 feet of the APE were tested, and 17 historic properties were identified (XBD-297-307, 312, 337-341). Site XBD-298 returned a radiocarbon date indicating the site is one of the earliest human habitation sites in North America. Donnelly Alternative Segment 1 also contains the Donnelly-Washburn Trail (RS 2477 Trail No. 0064).

The entire extent of Donnelly Alternative Segment 2 has been surveyed. Four prehistoric archeological sites were recorded, XBD-291, 313, 320, 321. Eleven prehistoric sites were identified in 7 test areas within 1,312 feet of the APE.

The two Donnelly alternative segments would both have direct impacts on historic properties. Overall, Donnelly Alternative Segment 1 contains more archeological sites than Donnelly Alternative Segment 2, including some that have exceptional significance for understanding human migrations to North America. Consequently, Donnelly Alternative Segment 1 would have proportionally greater direct impacts on historic properties than Donnelly Alternative Segment 2. Both alternatives would have similar indirect impacts.

South Common Segment

The South Common Segment lies in an area of low to moderate potential for prehistoric and historic sites. Six areas were tested in the APE, but no cultural resources were identified. One prehistoric site, XBD-322, was identified, within 1,312 feet of the APE. Minimal direct and indirect impacts on historic properties would be anticipated for the South Common Segment.

Delta Alternative Segments

Both Delta alternative segments have moderate potential for prehistoric and historic archeological sites. Delta Alternative Segment 1 is located primarily west of Delta River in an area of moderate potential for prehistoric and historic sites. The segment is situated in abandoned and active floodplain alluvium. Four areas were identified for testing within the APE but no resources were identified. A previously recorded site in the vicinity, XBD-091, is presumed to have been eroded by Jarvis Creek.

Delta Alternative Segment 2 is located primarily east of the Delta River in an area of moderate potential for prehistoric sites and high potential for historic sites. Eight areas in the APE were tested, and one prehistoric site was identified, XBD-281. Two sites were identified within 1,312 feet of the APE, a prehistoric site, XBD-282, and historic site XBD-129, a Cold War-era BMEWS station.

The Delta alternative segments are relatively similar, with moderate potential to affect historic properties. From the known data, Delta Alternative Segment 2 would likely have greater direct impacts on historic properties.

6.3.5 No-Action Alternative

If this project is not constructed, there would be few potential impacts on cultural resources. More vehicle traffic, both commercial and private, on Richardson Highway is anticipated for the No-Action Alternative. Increased traffic raises the potential for erosion and road damage, and if the highway is widened there would be direct impacts to compensate for lack of rail transport. Tourism associated with recreational and other vehicles may have more direct and indirect impacts on cultural resources than tourism associated with the rail line.

6.4 Programmatic Agreement

SEA has developed a Programmatic Agreement (PA) for the NRE that will govern the completion of the Section 106 process. The regulations implementing Section 106 allow for the development of a PA when the effects on historic properties cannot be fully determined prior to approval of an undertaking (36 CFR 800.14.). The PA for the NRE provides for the completion of the Level 2 identification survey once an alignment has been chosen and the locations of ancillary facilities have been established. Additionally, the PA establishes responsibilities for the treatment of historic properties, the implementation of mitigation measures, and ongoing consultation efforts. The draft PA is Appendix H of the EIS.

6.5 Tribal Consultation

Consultation with Native American tribes in the project area vicinity, required under 36 CFR 800, is ongoing. Consultation was initiated as part of the government-to-government consultation and coordination for the EIS process, and is discussed in Section 1.4.2, Tribal and

Government-to-Government Consultation, and summarized in Table 1-2. A total of 23 federally-recognized tribes, tribal groups and Alaska Native Regional Corporations were contacted as part of the government-to-government consultation and coordination. Several agency meetings specifically addressing Section 106 consultation and cultural resources issues were held at the Alaska SHPO in Anchorage, and SEA's cultural resources subcontractor, Northern Land Use Research, Inc. (NLUR), met with Tanana Chiefs Conference (TCC) in Fairbanks to present the results of each season's fieldwork. These meetings occurred on November 20, 2006 and October 26, 2007 and were attended by cultural resource specialists from NLUR, TCC, BLM, and the U.S. Army. Additional consultation will take place throughout this project, as described in the government-to-government consultation and coordination plan, and as detailed in the draft PA (see Appendix H).