

Department of Transportation and Public Facilities

Northern Region
Design and Engineering Services

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THE STATE
of **ALASKA**
GOVERNOR MIKE DUNLEAVY

January 14, 2022

Dear agencies, Alaska Native tribes, and Alaska Native corporations:

Re: Copper River Highway Planning and Environmental Linkage Study

The Alaska Department of Transportation and Public Facilities (DOT&PF) is requesting consultation with your respective agency, Alaska Native tribe, and native corporation to help assess and provide comments on the potential impacts that may occur from the actions to reconstruct, repair, and replace the damaged transportation infrastructure along a segment of the Copper River Highway (CRH), from approximately Milepost (MP) 27 through approximate MP 51 (Figure 1). This consultation request is primarily intended for Alaska Native tribes and for government agencies and Alaska Native corporations (collectively referred to as cooperating agencies) that will require a permit, concurrence, consistency statement, non-objection statement, etc. for the actions proposed under the preliminary alternatives to reconstruct, repair, or replace the damaged transportation infrastructure along the referenced segment of the CRH.

Due to the unique environmental setting of the study area and the complex challenges associated with the necessary repairs throughout this corridor (MP 27 through MP 51), the DOT&PF is using a Planning and Environmental Linkage (PEL) study to advance the planning analyses, which can later be adopted or cited by reference into the National Environmental Policy Act (NEPA) document.

The use of PEL studies are a relatively new process that the DOT&PF is utilizing. A PEL study is particularly useful when there is a large study area and it's unlikely that funding will be available to address all the issues or the entire area in a single project, as is the case with the CRH PEL study. In part, a PEL allows for comprehensive evaluations of the whole study area to identify and prioritize smaller independent projects within the study area that can then be addressed one at a time, sometimes referred to as "tiering". The development of mitigation needs or a programmatic mitigation plan to address the potential environmental impacts of future transportation projects can also be integrated into a PEL, in accordance with 23 CFR § 450.214.

If the study areas and circumstances remain the same from the PEL study (if-then statement) through the environmental review process (NEPA), the NEPA document can incorporate the findings from the PEL study, wherever possible. Furthermore, for a PEL study to be incorporated by reference into the NEPA document it must be in compliance with the ten statutory conditions listed in 23 U.S. Code §168 - Integration of planning and environmental review (Section 168). One of these conditions is to provide public notice that the resulting planning products may be adopted during a subsequent environmental review process in accordance with Section 168.¹ Accordingly, the DOT&PF is providing you notice that the CRH PEL may be adopted during the subsequent NEPA process in accordance with Section 168. This statement was also published in the Cordova

¹ <https://www.law.cornell.edu/uscode/text/23/168>

"Keep Alaska Moving through service and infrastructure."

Times on December 6, 2019, as part of DOT&PF's solicitation of public comments and invitation to attend a public meeting to discuss the draft CRH PEL.

Prior to this referenced public meeting and solicitation of public comments, the DOT&PF developed a wide range of alternatives for each of the potential project elements, including precursory assessments of potential impacts that could result from the respective alternatives. These preliminary alternatives, assessments, and draft Purpose and Need statement were included in the *Draft Copper River Highway Planning and Environmental Linkage Study; Alaska Department of Transportation and Public Facilities, December 17, 2019* (available upon request).

After which, the DOT&PF completed a screening process of the preliminary alternatives presented in the draft CRH PEL. The screening criteria gave substantial weight to the public comments and recommendations received. It also included review and acknowledgement of available scientific research, engineering reports, and consultation with in-house expertise.

The conclusion of this screening process identified additional alternatives that were not previously discerned and existing preliminary alternatives that the public would like to advance for further evaluation. Preliminary alternatives that received little or no public support or were perceived as unreasonable will not be carried forward for further evaluation at this time, nor are they included in this consultation request.

Additionally, the DOT&PF has contracted CRW Engineering Group, LLC (CRW) to complete a 25-Year Transportation Master Plan (TMP) for the CRH corridor, which will primarily focus on the highway's origin in the City of Cordova and extend to the terminus of the CRH PEL's northern boundary at the right bank of Abercrombie Creek (~ MP 51). The CRH TMP study is to be a broad level assessment to help identify the vision for the highway over the next 25 years, identify strategies to sustain the vision and prioritize any related transportation projects over the long term (25-years). The CRH 25-year TMP study is mentioned here because there will be a lot of overlap between these two studies and they will be undertaken concurrently. Both studies are intended to complement each other and the information obtained from these studies will be incorporated into both. However, this current consultation request is specific to the CRH PEL.

As mentioned, the damaged transportation infrastructure along this segment of the CRH highway is substantial, as are the challenges associated with each of their necessary repairs. As such, please bear with us because there is a lot of information presented below that we would like you to consider and comment on.

At this time, no money has been allocated by the State of Alaska or through the Federal-Aid Highway program to reconstruct, repair, or replace the damaged transportation infrastructure along this segment of the CRH, nor are any of the immediate actions identified to repair this infrastructure listed in the DOT&PF's 2020-2023 Alaska Statewide Transportation Improvement Program (STIP), as amended. Therefore, for the purpose of this consultation, the specific actions identified to address the damaged infrastructure are named "potential elements" rather than "project elements", this nomenclature deviates from what was used in the 2019 draft CRH PEL.

There are seven potential elements being evaluated in the CRH PEL, they are:

1. Reestablish public access across National Bridge Inventory (NBI) #339 and its associated washout, located at approximate MP 36.
2. Reestablish public access across a segment of the CRH that has been completely eroded away by the Copper River, between approximate MP 44 through MP 45.
3. Acquire right-of-way (ROW), dependent on the alternative selected to address the loss of the highway segment between approximate MP 44 through MP 45.

4. Repair or replace the icebreaker at Pier 1 of the Million Dollar Bridge and complete any necessary repairs to this bridge that might be identified through future engineering studies.
5. Replace culverts that are not in compliance with the Memorandum of Agreement (MOA) between the Alaska Department of Fish and Game (ADF&G) and the DOT&PF for the design, permitting, and construction of fish passage culverts. This includes removing or blocking culverts that provide connectivity to Clear Creek with the turbid waters of the Copper River.
6. Expand or develop new material sites, including consideration of a potential new quarry on land owned by The Eyak Corporation (surface estate) and the Chugach Alaska Corporation (subsurface).
7. Determine the logistics that will be required to get the heavy equipment needed to construct the potential elements to their respective sites, including development of staging area(s) for construction materials, fuel, support equipment, and possible work camp.

For each of the potential elements listed above there are a range of preliminary alternatives that were developed to address the problem(s). The preliminary alternatives listed under their respective heading below are the alternatives that the public would like to advance for further evaluation. The naming sequence of these alternatives (i.e. Alternative 1, Alternative 2, Alternative 3, etc.) have been retained from what was listed in the 2019 draft CRH PEL. This was done as an effort to minimize confusion as the PEL document advances. As such, there will be gaps in the sequencing name of these preliminary alternatives because the alternatives that received little or no public support, or were perceived as unreasonable will not be carried forward for further evaluation at this time and are not included in this consultation request.

CRH PEL Study Area

The boundary CRH PEL study area extends along the CRH from Flag Point, at approximate MP 26.5, and terminates at the right bank of Abercrombie Creek (aka Grinnell Creek), at approximate MP 51. The study area also encompasses the land between the river and base of the Chugach Mountains on each side of the active floodplain from Flag Point north to the Million Dollar Bridge. Figure 1 (enclosed) depicts the PEL study area. The southwestern termini at Flag Point (MP 26.5) was selected because in 2011 the Copper River Watershed Project (CRWP), along with partnering agencies, completed an evaluation to identify high priority fish improvement projects in the Copper River watershed. In the vicinity of Cordova, CRWP's assessments of culverts along the CRH ended at Flag Point. Because the status of culverts located east and north of Flag Point, were not included in CRWP's assessment, the DOT&PF will be evaluating them as part of CRH PEL study to assure there is adequate fish passage to upstream habitat. Flag Point is located within Section 32, Township 16 South, Range 2 East, Copper River Meridian, U.S. Geological Survey (USGS) Quad map Cordova B-3; or approximately 60.44564 North Latitude, -145.08718 West Longitude (NAD 83).

The study area's northern termini at Abercrombie Creek (MP 51) was selected because the highway is in good condition (comparatively) north of the Million Dollar Bridge until it reaches Abercrombie Creek, where the highway has been washed out by this stream. There are also two material sites near Abercrombie Creek that could potentially be utilized to produce barrow material (Figure 4). Abercrombie Creek is located within Section 32, Township 13 South, Range 4 East, Copper River Meridian, USGS Quad map Cordova C-2; or approximately 60.70626 North Latitude, -144.71945 West Longitude (NAD 83).

The western boundary of the PEL study area is selected because in-lieu of highway access across NBI #339 and its associated washout, an overland route around the washout would be needed if one or more of the other PEL elements receives project funding before construction of a new bridge across the NBI #339 washout can materialize. The DOT&PF believes there is potential for establishing a temporary overland route through this area during late fall and winter when the river is at its low water stage.

The eastern PEL boundary flanks the base of the Chugach Mountains, east and north from approximate MP 38.5, extending toward the southern margin of Miles Lake. This area is included because there is potential for new material sources in this area.

The PEL's southern boundary terminates at the Copper River Delta Critical Habitat Area's northern boundary, although there is slight overlap into the critical habitat area.

Potential Element:

Reestablish Access Across NBI #339 and its Associated Washout

Background: NBI # 339 is located at MP 36.2 and was built in 1977. It is 401 feet long and its driving surface width, including shoulders, is 28.5 feet wide. The bridge has 5 spans that are 80 feet in length. There are 6 supports spaced approximately 80 feet apart and each pier consists of 2 steel piles. The bridge has concrete pier caps, pre-stressed concrete double-tee girders, and concrete decking.

In August 2011, the DOT&PF was forced to close NBI # 339 for public safety reasons after DOT&PF bridge engineers determined that deep scour of the riverbed had undermined the bridge's support piers and greatly compromised its structural integrity. The deep scouring at this bridge, as much as 50 feet deep, is attributed to additional water from one of the channels of the Copper River being diverted westward through natural fluvial processes, which was accelerated during an October 2006 flood event. Then, during October 2012 and before the DOT&PF was able to make the necessary repairs to this bridge structure, the increased channel flow breached the highway at the bridge's east end. Over the following years this increased flow resulted in the land and segment of the roadway that had previously connected NBI #339 with NBI #340 to be completely eroded away and is now occupied by this active channel, a distance of approximately 1,110 feet. This bridge crossing still remains closed today.

The USGS has completed a study of the channel flow through NBI # 339 on behalf of the DOT&PF; their report is titled: *Hydrology and Modeling of Flow Conditions at Bridge 339 and Mile 38-43, Copper River Highway, Alaska*; U.S. Geological Survey Scientific Investigations Report 2012-5153. Beginning in early 2011, the USGS determined that about 40 percent (%) of the total flow of the Copper River passed through the channel at NBI # 339 but by mid-August 2011, 64 % of the Copper River's total flow passed through the NBI # 339 channel.² NBI # 339 was not designed to convey this amount of flow.³ The original bridge design used a 100-year flood flow of 21,300 cubic feet per second (ft³/s). On July 25, 2013, the flow at Bridge #339 was measured to be 92,600 ft³/s. Therefore, as part of the alternative screening criteria it was determined that because of the powerful dynamics of the Copper River's fluvial processes, which are constantly changing the river's braided stream channels, any bridge constructed within this delta should be designed for the maximum flow rate.

Preliminary Alternative 1

The DOT&PF considered this alternative in 2014, in conjunction with the National Constructors' Group (NCG), who was contracted by the DOT&PF to assist in analyzing bridge options and their constructability and costs. NCG's report is titled: *Constructability Analysis Report Copper River Highway NBI #339 Cordova Alaska AKSAS Project # 60555*, dated February 11, 2014. This report is on file at DOT&PF's Northern Region office and is available upon request.

² Brabets, T.P., 2012, *Hydrology and Modeling of Flow Conditions at Bridge 339 and Mile 38-43, Copper River Highway, Alaska*; U.S. Geological Survey Scientific Investigations Report 2012-5153, page 4.

³ Brabets, T.P., 2012, *Hydrology and Modeling of Flow Conditions at Bridge 339 and Mile 38-43, Copper River Highway, Alaska*; U.S. Geological Survey Scientific Investigations Report 2012-5153, page 1.

Under Preliminary Alternative 1, the DOT&PF proposes a new bridge that is 1,540 feet long and 31 feet wide. The design consists of 11 spans that are 140 feet and each span is founded upon a pier that is a single 8 feet diameter drilled shaft, which is 170 feet in length and having a hammer head substructure. The superstructure consists of 66 precast concrete “bulb-tee” girders, weighing 80 tons each.

After the new bridge is completed, NBI #339 and NBI #340 would be demolished because they would no longer be used and are within a navigable waterway, as defined by the U.S. Coast Guard (USCG) and the U.S. Army Corps of Engineers (USACE), and as such; the abandoned bridge structures would be unnecessary navigational hazards within this designated navigable waterway.

In order to build Alternative 1, a temporary construction access trestle, approximately 1,400 long, will need to be constructed downstream of the proposed bridge. A large crane, similar in size to a Manitowoc model 2250, will be required to place each of the 66 precast concrete “bulb-tee” girders across the 140 feet long spans.

A large hydraulic casing oscillator would be used to install the drilled shaft piers. As such, an oscillator platform would need to be constructed at each pier and be adjacent to the access trestle for this purpose. Additionally, a service platform would be constructed between each pier for a second smaller crane, similar in size to a 70 ton Grove RT770E Rough Terrain Crane, needed as part of the hydraulic oscillator’s support equipment. The oscillator and crane service platforms are proposed, in part, because of the short construction season and the need to construct the main access trestle concurrently with the drilled shaft piers.

There are a few techniques that could be used to drill the shafts needed for the installation of the 8 feet diameter pier (thick walled steel casing) and it will be the decision of the awarded contractor to select their preferred technique. Regardless of the technique used, river bed alluvium will need to be removed from inside the casing and/or slightly ahead of it as the casing is advanced. The theoretical volume ($V = \pi r^2 h$) of alluvium produced from 8-foot diameter casing being installed 170-feet below the riverbed is 316.5 cubic yards (cy) for each pier; there are 11 piers proposed under Alternative 1’s design. Therefore, the theoretical volume of the 11 piers combined would produce 3,481.5 cy.

In regards to the installation of piles needed for the temporary access trestle, NCG concluded that thick walled steel casing would be the best option for the temporary piles needed to construct the access trestle because H-piles, mono piles, and concrete footing blocks were determined not feasible for use at this site. As such, it’s anticipated that these piles would be installed using a vibratory hammer in conjunction with an impact hammer, which would be needed to check the load capacity of the steel piles set.

The Copper River is an anadromous river, managed under the Magnuson-Stevens Fishery Conservation and Management Act, as amended. ADF&G’s *Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes* and its associated Atlas (AWC) number for the Copper River is 212-20-10080. The AWC lists the following anadromous fish to occur in the Copper River:

- Chinook [king] salmon, (*Oncorhynchus tshawytscha*);
- Sockeye [red] salmon, (*Oncorhynchus nerka*);
- Coho [silver] salmon, (*Oncorhynchus kisutch*);
- Pink [humpback] salmon, (*Oncorhynchus gorbuscha*);
- Steelhead salmon, (*Oncorhynchus mykiss*);
- Dolly Varden, (*Salvelinus malma*);
- Cutthroat trout, (*Oncorhynchus clarkii*);
- Eulachon [candle fish], (*Thaleichthys pacificus*)
- Pacific lamprey, (*Lampetra tridentata*).

Additionally, harbor seals (*Phoca vitulina*) are present in the Copper River and some of its tributaries during the summer. Harbor seals are opportunistic predators that take advantage of the abundance of salmon and eulachon that are migrating up the river. Harbor seals are protected under the authority of the Marine Mammal Protection Act of 1972, as amended.

The use of a vibratory hammer and impact hammer to set and test the piles, needed to construct the temporary access trestle, would produce loud noise and high underwater sound pressures that could potentially be lethal to fish and has potential to cause Level B harassment to the harbor seals in this area. To minimize the effects on fish and harbor seals, an air bubble curtain system could be installed to reduce underwater sound pressures from the pile driving activities, as air provides an effective barrier to sound propagating through water due to the difference in density between air and water. Underwater sound tests completed for air bubble curtain systems determined that the sound propagating through deep water was reduced by 20 to 30 decibels close to the pile, and in shallower waters, measurement reductions were 10 to 20 decibels.⁴

In concerns to sound propagating through air; on July 30, 2021, the ADF&G completed an eagle nest reconnaissance survey of the PEL study area. ADF&G's memorandum report is titled: *Completion of eagle nest survey on Copper River Highway repair/reconstruction study area*, dated October 12, 2021 (enclosed). As part of their eagle nest survey, ADF&G established a ½ mile radius around NBI # 339 in consideration of Level B harassment to nesting eagles from the noise produced during pile driving activities. ADF&G reported that no eagle nest were discovered within a ½ mile radius around NBI # 339.

Preliminary Alternative 1 has potential for use of a protected resource under Section 4(f) of the U.S. Department of Transportation Act of 1966, as amended (Section 4(f)). This is because construction of this alternative would encroach into the Copper River Delta Critical Habitat Area, a protected resource under Section 4(f). The reason is that the cumulative widths of the existing bridge (29 feet), the new replacement bridge (31 feet), the main work trestle (~ 37 feet), plus the hydraulic casing oscillator and smaller crane's work platforms (~ 50 feet), and the separation distances between these structures means that Preliminary Alternative 1 would exceed DOT&PF's ROW, which is defined at this location as 200 feet (100 feet on each side of centerline). Therefore, these work platforms and associated construction activities would temporarily extend beyond DOT&PF's ROW into the Copper River Delta Critical Habitat Area. The U.S. Forest Service (USFS) has regulatory authority over activities above ordinary high water (OHW) within the Copper River Delta Critical Habitat Area and the ADF&G has jurisdiction below OHW.

In 2014, NCG estimated the cost of Alternative 1 as \$49,000,000. However, the cost did not include the bridge abutment slopes protection, soil investigation, design and construction inspections, nor did it include a costs estimate for the demolitions of NBI #339 and NBI #340.

Three options were proposed for the protection of the bridge abutment slopes.

1. Install sheet pile walls; 2014 cost estimate was \$8,065,770.
2. Install riprap; 2014 cost estimate was \$2,433,390.
3. Install concrete blocks (dolos); 2014 cost estimate was \$4,800,000.

Given their relatively remote locations, the DOT&PF estimates the cost of the removing NBI #339 and NBI #340 would be approximately \$1,000,000/100 feet. NBI #339 is 401-feet long and NBI #340 is 241-feet long, thus \$6,420,000.

⁴ Reyff, James A.; *Reducing Underwater Sounds with Air Bubble Curtains Protecting Fish and Marine Mammals from Pile-Driving Noise*, The Transportation Research Board; National Academics of Sciences, Engineering, and Medicine; TR News 262 May-June 2009, page 32.

Preliminary Alternative 2

Preliminary Alternative 2 was also proposed in 2014 in conjunction with the NCG. This alternative's design proposes a new bridge that is 1,400 feet long. It consists of 14 spans having distances of 100 feet each. There are 15 piers, each pier consists of two 4-foot diameter driven thick walled steel casing piles that are 150' in length with a precast concrete pile cap. The superstructure consists of precast concrete box girders having dimensions of 3.5 feet wide by 5 feet deep. NBI #339 and NBI #340 would be demolished as part of this alternative because they would no longer be used and therefore would be an unnecessary navigational hazards within this designated navigable waterway.

In order to build Alternative 2, it's proposed that two construction access trestles be constructed along the same alignment as the proposed replacement bridge, one trestle on each side of the bridge. The trestles would include rails for the primary hoisting equipment to travel on, which would be a 225-ton straddle carrier gantry crane. As segments of the permanent bridge superstructure are completed those segments will provide the access road required for all material handling. Using this method of construction would allow the new bridge and its associated trestles to remain inside DOT&PF's ROW.

Similar to Preliminary Alternative 1 (above), alluvium will need to be removed from inside the casing (piling) as they are being driven into the riverbed. The theoretical volume of alluvium produced from the 4-foot diameter casing being installed 150-feet below the riverbed is 69.82 cy per pier; there are 15 piers consisting of two piles each. Therefore, the theoretical volume of the 15 piers having two piles each would produce 2,094.6 cy.

The use of a vibratory hammer and impact hammer to set and test the piles, could have their underwater sound levels reduced through the use of an air bubble curtain system.

In 2014, the cost of Alternative 2 was estimated at \$36,000,000. Similar to Alternative 1, the estimate did not include the costs for the bridge abutment slopes protection, soil investigation, design and construction inspections, nor did it include a costs estimate for the demolitions of NBI #339 and NBI #340.

Preliminary Alternative 8

Alternative 8 is the No-Build Alternative. The No-Build Alternative would retain the status quo, as no attempts to repair or reestablish access across NBI #339 and its associated washout would occur.

The combined aspects of the washout and leaving the bridge in its current condition means that routine maintenance and necessary repairs to the infrastructure beyond this point, including NBI #339, would not be made, resulting in the continued degradation of the CRH.

Potential Element:

Preliminary Alternatives to Reconstruct or Realign the CRH at the MP 44-45 Washout

Background: Over the past forty years, one of the main channels of the Copper River has been migrating eastward. Figure 2 (enclosed) depicts the chronology of this channel's eastward migration. As of September 11, 2021, the fluvial process from the eastward migration has completely eroded away about 3,867 linear feet (lf) of the highway between MP 44 and MP 45 and its limits have advanced at least 40 feet beyond DOT&PF's northeastern ROW boundary into property owned by The Eyak Corporation (TEC). DOT&PF's ROW at this location is defined as 300 feet (150 feet from each side of the road's centerline). In 2019, TEC posted No Trespassing signs along this area of ongoing erosion, largely due to public safety concerns and liability issues associated with the dangers of accessing this area. Erosion from this channel is also threatening a segment of the CRH between MP 43.5 through MP 44.

Furthermore, during high water events the CRH is often overtopped by the Copper River at various locations between MP 38 through MP 43.5. In fact, prior to the washout at MP 44 it was anticipated that this segment of highway, MP 38 through MP 43.5, would be the first to experience adverse impacts from erosion of the eastern channel migration. As such, the DOT&PF commissioned a hydraulics study, through a cooperative agreement, with the U.S. Geological Survey (USGS) to evaluate the river's hydraulics along this highway segment. The USGS report is titled: *Hydrology and Modeling of Flow Conditions at Bridge 339 and Mile 38-43, Copper River Highway, Alaska*. As part of this study, the USGS used their *Survey Flow and Sediment Transport with Morphologic Evolution of Channels* model to simulate water-surface elevation through this area for three flow scenarios, 116,000 ft³/s, 174,000 ft³/s, and 400,000 ft³/s. The USGS concluded, based on the results of their models, that the CRH would not be overtopped by the river if the road's elevation was raised 5 feet along the area of MP 38 through MP 43.⁵

As part of DOT&PF's engineering design and alternative screening criteria to address the erosional issues throughout these segments of highway, it was determined that regardless of the alternatives selected for the repairs, reconstructions, or realignments of the highway infrastructure it would need to last 20 years or more under normal routine maintenance.

It is also important to note that every alternative considered below, except the No-build, will require heavy equipment and construction materials to be transported to the project site. At this time, the site is inaccessible from the highway, as the highway is closed at MP 36.2 because NBI # 339 is condemned and the land that had previously connected to NBI # 340 has been lost to erosion.

Preliminary Alternative 1

Preliminary Alternative 1 proposes reconstruction of the CRH, between MP 44 and MP 45, back into its original alignment that existed before it was eroded away. As mentioned, DOT&PF's ROW at this location is defined as 300 feet (150 feet from each side of the road's centerline). In order to meet the design criteria of lasting 20 or more years under normal routine maintenance, the conceived design for this alternative would include installing Class IV riprap throughout the entirety of the ROW lost to erosion in this area in order to rebuild the road back into its original alignment and to provide a needed buffer to slow the erosional process between the river and newly reconstructed highway segment (20-year routine maintenance design criteria). DOT&PF's standard material specification for Class IV riprap includes the requirements that over 50% of the rocks need to weigh greater than (>) 2,000 pounds and up to 10% of rocks need to weigh > 5,400 pounds.

It's anticipated that riprap would need to be keyed-in along the reestablished bank to inhibit scour. Incorporating spur dikes (a.k.a. wing deflectors) into the design is also being considered in order to divert the channel's thalweg further westward away from the road. Based on the current geometry through this area lost to erosion, the DOT&PF has calculated that 843,333 cy of Class IV riprap would be required to reconstruct the road back into its original alignment. This calculation does not include the volume of riprap that would be needed to construct the spur dikes to divert the channel's thalweg westward.

It's anticipated that the in-water work needed to reconstruct this segment of highway back into its original alignment would occur during the summer when the river is free of ice. Therefore, given the large volume of earthen material that would need to be installed into this anadromous river, its DOT&PF's premise that Preliminary Alternative 1 is not the least environmentally damaging practical alternative (LEDPA) when compared to the other alternatives, presented below.

Furthermore, the estimated cost for this alternative is exorbitant. Using the price of \$85/cy for Class IV riprap equates to \$71,683,305 for just the riprap alone (\$85/cy X 843,333 cy).

⁵ Brabets, T.P., 2012, *Hydrology and Modeling of Flow Conditions at Bridge 339 and Mile 38-43, Copper River Highway, Alaska*; U.S. Geological Survey Scientific Investigations Report 2012-5153, page 25.

Preliminary Alternative 3

In lieu of reconstructing the highway back into its original alignment there was general consensus that if a new highway alignment was to be constructed then it should be as far away from the river as practicable. Preliminary Alternative 3 addresses that goal.

Under this alternative a new segment of roadway is proposed to be constructed around the washout between MP 44 and MP 45 and around the area threatened by erosion between MP 43.5 and MP 44. The new alignment would start just before MP 43 and gently curve eastward toward the toe of the mountains, it would then curve back westward and tie back into the existing CRH past MP 45, a distance of approximately 3.1 miles (Figure 3). This proposed alignment would be constructed on land owned by TEC, therefore ROW acquisition would be required.

On June 22 through June 25, 2021, an aerial survey and an on-ground field reconnaissance of this proposed alignment was completed by DOT&PF personnel and staff from TEC. DOT&PF's staff consisted of an Archaeologist who meets the Secretary of the Interior's Professional Qualification Standards, a Hydraulics Engineer, and an Environmental Impact Analyst.

Additionally, ADF&G's eagle nest survey, completed on July 30, 2021, included Alternative 3's proposed highway alignment and the entire area between this alignment and the left bank of the river from MP 43 through MP 45 (ADF&G's report is enclosed).

The results of these referenced surveys were that:
No eagle nest were discovered by ADF&G in this area during their survey.

The archaeologist did not discover any historic or prehistoric cultural resources in this area and concluded that there was a low potential for uncovering previously undiscovered cultural and/or paleontological resources, report pending.

The hydraulics engineer determined that because all drainage crossings along this proposed alignment were dry, despite a late spring thaw and recent heavy rain events, only equalizing culverts would be needed at these crossing to prevent impoundment of intermittent surface waters by the new road embankment material (i.e. no fish passage culvert designs).

The Environmental Impact Analyst inferred that this new alignment would be sited on non-wetlands topography. This premise is because:

- It was observed that the strata positioned immediately below the vegetative mat is cobbles and coarse gravels with sand (i.e. not hydric soil).
- All the drainage crossings and areas of depression along this proposed alignment were dry, despite a late spring thaw and recent heavy rain events. Therefore, a well-drained strata, indicative of the cobbles and coarse gravels with sand.
- The entire area of the proposed new alignment is dominated by an extremely thick shrub complex consisting mostly of: Sitka alder (*Alnus viridis*); devils club (*Oplopanax horridus*); Sitka willow (*Salix sitchensis*); Barclay's willow (*Salix barclayi*). There are also a few trees growing within this shrub complex, they are: Black cottonwood (*Populus balsamifera*), Sitka spruce (*Picea sitchensis*), and; western hemlock (*Tsuga heterophylla*). With the exception Sitka willow and western hemlock all these species have the wetland designation of Facultative (FAC), meaning they are equally likely to occur in wetlands or non-wetlands. Sitka willow's wetland designation is Facultative Wetland (FACW), meaning it is usually found in wetland, but occasionally found on non-wetlands. Western hemlock's wetland designation is Facultative upland (FACU), meaning it usually occurs in non-wetlands.

The DOT&PF estimates the construction cost of Preliminary Alternative 3 would be approximately \$3,520,000.

Preliminary Alternative 4

Under this alternative the DOT&PF is proposing to raise the elevation of the road by 5 feet between MP 38 and MP 43. The development of this alternative is based on the conclusions of USGS's hydraulics study for this segment of the CRH. Additionally, Class III riprap would be installed on the highway's west embankment in select areas. DOT&PF's material specification for Class III riprap include the requirements that over 50% of the rocks weigh > 700 pounds and up to 10% of rocks need to weigh > 1,400 pounds. Preliminary Alternative 4 would then tie into the new highway alignment proposed under Preliminary Alternative 3, described above, as part of its design.

ADF&G's eagle nest survey, completed on July 30, 2021, discovered two bald eagle (*Haliaeetus leucocephalus*) nests within 330-feet of the highway segment between MP 38 and MP 41, one of which had two eaglets present. Further consultation with the USFWS and ADF&G will be required concerning these nests.

Raising the road grade 5 feet from MP 38 through MP 43 would protect the existing infrastructure from erosional damage during a high water event and meet the criteria of lasting 20 or more years.

Preliminary Alternative 4's estimated cost to raise the highway's elevation 5 feet between the MP 38 through MP 43 is \$15,000,000. Added to this is the cost of Preliminary Alternative 3 (estimated at \$3,520,000), which is part of alternative 4's proposed design, equals a total amount of \$18,520,000.

Alternative 5

Alternative 5 is the No-build Alternative. Under this alternative no money would be spent to reestablish access across the MP 44 through MP 45 washout. Any persons wanting to skirt around this washout area, via traverse over TEC land, will need prior authorization from TEC, otherwise it would be trespass. Additionally, there would be no attempts to address the potential loss of roadway near MP 43.5 from the channel's eastern migration in this area, nor would there be any attempts to address the overtopping of the highway between MP 38 through MP 43 during high water events.

Potential Element:

Preliminary Alternatives to Repair the Million Dollar Bridge

Background: The Million Dollar Bridge is located at MP 48 of the CRH and within Section 7, Township 14 South, Range 4 East, Copper River Meridian, USGS Quad Map Cordova C-2, or 60.67293 North Latitude and -144.74541 West Longitude (NAD 83). The history of the Million Dollar Bridge has been well documented by past scholars. As such, only a brief summary is provided in this background section below.

The construction of the Million Dollar Bridge started in 1909 and was completed in 1910 as part of the Copper River and Northwestern Railway (CR&NWR). The CR&NWR was a 196 miles long railroad built to haul processed copper ore from the Kennecott Copper Corporation's mining and milling facilities, located in the Wrangell Mountains about 66 miles east of Chitina, to the tidewater port facilities in Cordova. The Million Dollar Bridge is the longest bridge along the CR&NWR. The bridge is 1,550 feet long and rises 30 feet above the river's surface at ordinary high water (OHW). It has four spans of Pennsylvania through trusses mounted on three piers. Each pier is a massive six-sided concrete structure that is 55 feet tall and having dimensions of 64 feet long by 21 feet wide at its base and 13 feet wide at its coping.⁶ The lower portions of the piers have steel rail track embedded into their outer surfaces to help protect them from being damaged by icebergs that have

⁶ United States Department of Interior-National Parks Service, Form 10-900, National Register of Historic Places Registration Form, OMB No. 1024-0018, February 16, 2000, page 5.

calved off from Miles Glacier and then floated downriver. However, the main structures protecting the bridge piers from iceberg collisions are two detached concrete icebreakers located slightly upstream from Pier 1 and Pier 2, constructed as part of the original bridge design. These icebreakers are somewhat pyramidal in shape and each are 58 feet long by 33 feet wide and 28 feet high.⁷ They also have steel rail track embedded into their outer surfaces to help protect them from iceberg damage.

In 1938, the Kennecott Copper Corporation shut down their mining operations in the Wrangell Mountains and abandoned the CR&NWR. Circa 1950, the Alaska Road Commission started removing the rail tracks from the CR&NWR and slowly began converting the former railroad bed and its associated bridges into the CRH. However, it wasn't until 1961 that the then named Alaska Department of Highways converted the Million Dollar Bridge into a highway bridge by removing the old railroad tracks and installing reinforced concrete slab bridge decking and guardrails.⁸

On March 27, 1964, the Million Dollar Bridge sustained substantial damage during the devastating 9.2 magnitude Good Friday Earthquake. As part of its earthquake damage, Span 3 was shifted 12.5 feet north and 4.5 feet east, damaging its bottom chord. The upper portion of Pier 3 was offset 3 feet from its bottom portion. Span 4, which is the northern most span, was sheared off from Pier 3 and its southern end fell into the river. The rivets on bridge's north abutment, Abutment 2, were sheared and the abutment's concrete was broken. Numerous cracks were also identified throughout the bridge's super and substructure.⁹

In 1973, the Alaska Department of Highways made repairs to the bridge that included construction of a ramp that connected Span 3 with the downed Span 4, and; removal of several bridge members, sway bearings, and two panels on the top laterals in order to provide overhead clearance for vehicles. Additionally, two temporary false bents were erected to support the super-structure should Pier 3 fail. In the fall of 1995, a high water event destroyed the eastern false bent at Pier 3, which was repaired the following year.¹⁰

In 2000, the Million Dollar Bridge was listed on the National Register of Historic Places (NRHP) for its significance under Criterion A and Criterion C. The Million Dollar Bridge is also listed on the Historic American Engineering Record for landmark American bridges.

Beginning in October 2003 and completed in the spring of 2005, the DOT&PF constructed a new bridge pier to replace Pier 3, which had been damaged beyond repair during the Good Friday Earthquake. After its completion, the DOT&PF raised the fallen span, Span 4, back onto the new Pier 3. The DOT&PF also replaced the damaged and missing bridge members with newly fabricated parts, which resembled, to extent practicable, the original bridge materials and installation methods (workmanship) in order to maintain historic integrity.

In August 2016, a large iceberg struck and damaged the icebreaker protecting Pier 1 on the Million Dollar Bridge. Then, during July 2019, a high water event moved this icebreaker further downstream. At its current location it no longer provides adequate protection to Pier 1. As previously stated, without the protection of the icebreaker the bridge pier is exposed to the full energy of impacts from icebergs, creating a scenario for structural damage to the Million Dollar Bridge.

Every alternative considered below, with the exception the No-build Alternative, will require heavy equipment and construction materials to be transported to the project site, at this time, the site is inaccessible from the highway.

⁷ ibid

⁸ ibid

⁹ ibid

¹⁰ ibid

Preliminary Alternative 1

Under Preliminary Alternative 1, the DOT&PF proposes to construct a new icebreaker in front of Pier 1. This alternative consists of installing flat, precast, reinforced concrete slabs that would be stacked or “pancaked” on top of each other to create a new icebreaker.

It’s anticipated that construction of Alternative 1 would be achieved by first installing three 4-inch diameter steel piling deep into the riverbed alluvium around the icebreaker’s original caisson. Each precast concrete slab will have guide holes in them to keep them aligned as they are lowered through the steel piles. Additionally, as a potential mitigation effort to retain aspects of integrity to this listed NRHP resource, the outside surfaces of the concrete slabs could be shaped to mimic the geometry of the original icebreaker once they are assembled, at least to the extent practicable. After all the concrete slabs are stacked, the steel piles would be cut flush with the surface of the new icebreaker and then both the guide holes in the slabs and the inside of steel piles would be grouted with concrete, via a tremie tube. A temporary work trestle will need to be constructed within the river in order to install the steel pilings for aligning the concrete slabs. This temporary work trestle will also need to be large enough to support a crane that is capable of installing these precast concrete slabs.

The current lack of highway access to this site presents many challenges. One of which is that Pier 1 is located toward the south side of the bridge. There is a potential overland route that might be able to provide access to the bridge’s north side during the late fall and winter; this route is discussed under the heading of Logistics. However, if this overland route is used and the construction activities are to take place on the bridge’s south end, it means that all materials and equipment must be transported across the bridge. One of the limiting factors of this scenario is that the deck of the Million Dollar Bridge is only 20-foot wide. Since the existing icebreakers are 33 feet wide, the precast concrete slabs might have to be reduced in size in order for them to fit through the bridge opening if the site is accessed from the bridge’s north side. Furthermore, it’s advantageous for the precast concrete slabs to be as large as possible to increase their structural integrity and to decrease the amount of time it would take to construct the new icebreaker. As such, a large crane would be needed to place the concrete slabs, a wide track Manitowoc 2250 crane is 27 feet wide and as mentioned, the bridge deck is only 20 feet wide.

ADF&G’s eagle nest survey discovered one bald eagle nest within a ½ mile radius of the Million Dollar Bridge, located near the south end of the bridge. ADF&G reported this nest had one eaglet present at the time of their survey, July 30, 2021. Further consultation with the USFWS and ADF&G will be required concerning this nest.

As previously mentioned, the Copper River is an anadromous river, AWC number 212-20-10080. Additionally, the Native Village of Eyak and the ADF&G conduct ecological research at Miles Lake, located immediately upstream from the Million Dollar Bridge. The Native Village of Eyak’s research includes the operation of a fish wheel to collect biological samples from salmon. ADF&G research includes the operation of a sonar station to estimate salmon escapement in the Copper River, typically beginning in May and ending in July annually. The combined research from the Native Village of Eyak and the ADF&G is vital to the management of commercial, subsistence, and personal use salmon fisheries throughout the entire Copper River Watershed.

The DOT&PF anticipates Preliminary Alternative 1 would cost approximately \$25,000,000.

Preliminary Alternative 6

DOT&PF’s October 4, 2019 under water inspection report for the Million Dollar Bridge included the recommendation to repair or replace Pier 2’s icebreaker. It is also acknowledged that the same types of events that dislodged the icebreaker at Pier 1 could also occur at Pier 2. Therefore, to prevent the loss of the icebreaker at Pier 2, the DOT&PF proposes the following actions:

Advance three diamond core borings through the icebreaker at Pier 2 using PQ drill pipe, which has an outside pipe diameter of 4.8 inches. The drill pattern would place two borings on each end of the downstream side of the icebreaker, they would be drilled at a 45° angle towards the upstream direction. The third boring would be placed on the upstream end of the icebreaker, it will be drilled at a 45° angle towards the downstream direction. All three borings will be advanced to depths of 150 to 200 feet. After each boring is completed the entire drill string will be unscrewed from the drill head and left in their respective boring, effectively nailing or pinning the icebreaker in place. The drill pipe would be cut flush with the outside surface of the icebreaker once the boring is completed and each drill string would be filled with cement grout.

A temporary work trestle, positioned over the icebreaker, would need to be constructed to support the drill rig, its tooling, and other necessary equipment. It is anticipated that each boring could be completed within two to three 12-hour shifts, provided that no steel rails are encountered when coring through the icebreaker or its caisson. A diamond core bit is capable of drilling through steel rails, but the penetration rate will be slow and it's expected that more than one drill bit would be required to complete the boring.

The DOT&PF has not developed this alternative in sufficient detail to provide a cost estimate.

Preliminary Alternative 8

Based on the public comments received, Alternative 8 is being carried forward for further evaluation. The actions proposed under Alternative 8 have already been determined by the FHWA to have no significant impacts on the human environment; FHWA's Finding of No Significant Impact (FONSI) for the *Copper River Highway Million Dollar Bridge Project No. BH-0851(62)/60803*, issued February 28, 2002, is on file at the DOT&PF Northern Region office and is available upon request. The actions proposed under Alternative 8 are to finish repairs to the damaged bridge structure that occurred during the 1964 earthquake. The DOT&PF is also proposing to install seismic retrofits on Pier 1 and Pier 2, and to rehabilitate deteriorated bridge components that have occurred over time, as the bridge is over 100 years old and has not received any maintenance, routine or otherwise, since 2005.

Specifically, the DOT&PF is proposing to drill vertical holes down through the entire length of Pier 1 and Pier 2 and through their respective caissons. The borings would be drilled from the bridge deck using diamond core or air rotary drilling techniques. High-strength post-tensioning anchor rods, having dimensions of 110 feet long by 1-3/8" diameter, would then be installed inside these borings. The anchor rods would increase the piers' external overturning resistance as well as its internal flexural and shear strength. After the rods are installed, pressurized grouting techniques would be used to inject cement grout, through tremie pipe, to fill any voids within the caissons' cofferdam cribs and any voids within the gravel of the caissons' working chambers, as well as filling the annulus of the borings within the piers. Provided that sufficient strength could be achieved with the steel bars alone and that this alternative could be completed from the bridge deck without the need for a temporary work trestle, the DOT&PF estimates it would cost approximately \$15,000,000 per pier.

Additional actions proposed under Alternative 8 are to install frictional pendulum bearings on Pier 1 and Pier 2 for seismic isolation of the bridge's superstructure; Pier 3 has already had this type bearing installed during its 2003-2005 repairs. The frictional pendulum bearings assembly consists of a concave dish and an articulated slider surface. During an earthquake, the slider moves back and forth on the concave dish, in a motion similar to that of a pendulum, hence its name. In order to install this bearing assemblage, the bridge spans will need to be lifted and the existing bearings removed, at that time a bracket system will be used to support the lifting mechanism and the spans will be realigned back to their pre-earthquake position.

The seismic retrofitting and realignment of the bridge's superstructure will require the back wall of the south abutment (Abutment 1) to be adjusted to allow room for the superstructure to move during an earthquake. At that time, repairs of cracks and spalls on this abutment would be completed.

Other actions proposed to restore the bridge's structural integrity would include repairs or replacements, as needed, of the bridge's bottom chords, bottom laterals, missing bolts, tie-rods, and concrete corbels.

Furthermore, the Million Dollar Bridge is in need of a new application of paint to protect its steel from rusting any further. On September 4, 2019, DOT&PF personnel collected three composite samples of paint chips from the bridge to determine the presence or absence of lead in the bridge paint. These samples were submitted to SGS North America, Inc. (SGS) laboratory for analysis of lead in paint. The sampling area consisted of roughly dividing the bridge into three equal segments, the north end, the middle, and the south end. Paint chips were scraped off the bridge structure along their respective sample segment with the sampler being conscious that the composite sample is to be representative of the entire segment length, i.e. not over or under sampling a particular area.

SGS reported the following analytical results for these referenced samples:

Sample Name: *Sample #1 N. end MDB*; SGS reported the lead concentration is 110,000 mg/Kg.

Sample Name: *Sample #2 Middle MDB*; SGS reported the lead concentration is 210,000 mg/Kg.

Sample Name: *Sample #3 S. end MDB*; SGS reported the lead concentration is 164,000 mg/Kg.

Therefore, before the old paint can be removed, in preparation for the new paint, the entire work area will need to be enclosed and a negative pressure system with a filter bag at its exhaust will need to be installed. The action of painting the Million Dollar Bridge was not included in the original EA or its subsequent FONSI.

Preliminary Alternative 9

Alternative 9 is the No-build Alternative. Under this alternative no attempts to repair or rehabilitate the Million Dollar Bridge would occur.

Based on public comments received, the No-build Alternative is not an acceptable alternative to the community because of the potential for significant impacts to the human and natural environment that could occur if the bridge was to collapse into the river. For any other alternative, except the No-build Alternative, the rationale for dismissing this alternative could be justified. However, as part of an Environmental Assessment (EA) or Environmental Impact Statement (EIS) NEPA requirements, a No-build Alternative is to be included as part of the environmental document. Therefore, the No-build Alternative is retained in this PEL document.

Under the No-build Alternative the bridge would continue to deteriorate, icebergs would continue to strike Pier 1, there would be no attempt to address Pier 1 and Pier 2's structural vulnerabilities, and there would be no attempt to help protect the bridge from being damaged by future large magnitude earthquakes.

Preliminary Alternative 10

Preliminary Alternative 10 is a new alternative that was not included in the Draft PEL study that was provided in the public involvement process, initiated on December 17, 2019. Preliminary Alternative 10 proposes that the Million Dollar Bridge be demolished. This alternative was added in response to public comments received, including their position that the No-build Alternative is an unacceptable alternative because over time, the risks of structural failure increases due to lack of necessary repairs and could have significant and adverse impacts if the bridge was to collapse into the river.

On February 10, 2020, DOT&PF's bridge section was contacted to provide details of what the actions associated with the demolition the Million Dollar Bridge would entail and to provide a preliminary cost estimate for the demolition. DOT&PF's bridge section stated they contract demolition of large bridges out to engineering firms that specialize in those activities, as their focus is on designing and building bridges, not demolition of them. Therefore, they were unable to provide the means and methods that the contractor would

use for demolition of the Million Dollar Bridge. They also searched their records to see if there were previous studies that may have addressed the demolition of this bridge and what the preliminary costs estimates were at the time. Unfortunately, there were no records in their files that specifically addressed the demolition of the Million Dollar Bridge, or preliminary cost estimates. However, they did state that provided the necessary equipment was able to access the site from the highway they estimated that the cost of demolition would be around 20-25 million dollars.

The demolition of the Million Dollar Bridge would be an adverse effect to this listed NRHP resource, and as such, it would also be a use under Section 4(f).

Potential Element:

Preliminary Alternatives to Replace or Remove Culverts

Background: There are approximately 25 culverts within the PEL study area, from Flag Point (MP 27) through Abercrombie Creek (MP 51); the majority of which have been damaged from various factors, including age. DOT&PF consulted with ADF&G about these culverts on February 26, 2020. As part of this consultation, ADF&G stated it's a priority to keep the turbid water of the Copper River from entering Clear Creek, an anadromous stream; AWC 212-20-10080-2010, it was also agreed that new assessments of the PEL study area culverts are warranted. Due to scheduling conflicts, the DOT&PF and ADF&G were unable to complete this reconnaissance survey during the 2021 field season; no field studies were conducted during 2020 because of the Covid-19 pandemic.

Every alternative considered below, with the exception the No-build Alternative, will require heavy equipment and construction materials to be transported to the project site, at this time the site is inaccessible from the highway.

Preliminary Alternative 1

Under Preliminary Alternative 1, the DOT&PF proposes to replace all culverts within the CRH's PEL study area that need replacements. The new replacement culverts will meet current design standards for conveyance of water during a 50-year flood event (2% probability of occurring in any given year). Culverts that require fish passage will be designed in coordination with the ADF&G and in accordance with the *Memorandum of Agreement between Alaska Department of Fish and Game and Alaska Department of Transportation and Public Facilities for the Design, Permitting, and Construction of Culverts for Fish Passage*, August 3, 2001.

Additionally, any culverts that provides connectivity with the Copper River and Clear Creek, or its tributaries, will be blocked or removed and no new culverts will be installed in these areas as replacements. Although many of these drainage channels are intermittent, they still have well established channels with large diameter culverts installed at their highway crossings (most of which have failed) in order to accommodate the large flow rates during high water events. Therefore, Class IV riprap will be installed within the areas of highway where the culverts have been removed, needed to fill the highway excavations and provide structural resistant against the force of the flowing water after the culverts are removed. Additionally, it's anticipated that backfilling upstream portions of these channels with Class IV riprap might be required to force the flow of water out of their previously defined channels and away from the highway. It is also conceived that revetment structures might need to be constructed across deeper, well established channels to redirect water away from the highway.

The DOT&PF estimates that non-fish pass culverts would cost approximately \$300 per lf and the fish pass culverts would cost about \$600 per lf. At this time, the DOT&PF has not evaluated the hydraulics of the river channels having connectivity to Clear Creek in enough detail to have an engineering design or cost estimate.

Preliminary Alternative 2

Preliminary Alternative 2 is the No-build Alternative. Under this alternative no attempts will be made to replace or remove existing culverts along the CRH PEL study area. The existing undersized and damaged culverts could result in water overtopping and washing out segments of roadway during high water events. The culverts that are inadequate for fish passage will continue to prevent anadromous species from migrating upstream to essential fish habitat (EFH), defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity, and; culverts providing connectivity to Clear Creek would continue to allow turbid water from the Copper River to enter this anadromous stream (AWC 212-20-10080-2010).

However, the DOT&PF is not able to simply abandon the culverts providing connectivity to Clear Creek or the culverts that prevent migration of anadromous species to valuable upstream habitat, as it would be inconsistent with the MOA between the ADF&G and the DOT&PF, as well as being construed as a potential adverse effect on EFH of an anadromous fishery resource, under the authority of the Magnuson-Stevens Fishery Conservation and Management Act, as amended. Therefore, the DOT&PF would either have to completely remove the culverts which are impeding fish passage, rendering those segments of the CRH impassible or, if they are left in place the DOT&PF would be subjected to fines for not meeting the requirements of the MOA between the ADF&G and the DOT&PF, as well as not being in compliance with Alaska Statute 16.05.841. Additionally, turbid water from the Copper River will continue entering Clear Creek through the highway culverts, resulting in the continued sedimentation to this anadromous stream.

Potential Element:

Preliminary Alternatives to Expand or Develop New Materials Sites

Background: Earthen material will be required to construct the majority of the PEL's proposed actions. The DOT&PF has researched the status of existing material sites along the CRH from approximately MP 9 through MP 52. Twenty-three material sites were identified between MP 9 and MP 52. However, most of these sites are unavailable for various reasons, which include: the sites have been mined out; existing material sales agreements with the Alaska Department of Natural Resources (DNR) or the USFS have expired and are unlikely to be renewed; shallow groundwater table constrains further extraction of gravel material, as mining below the water table is generally discouraged by resource agencies, and; the material at some sites consist mostly of sand and silt which is unsuitable for construction purposes. Both the Chugach Alaska Corporation and TEC have reviewed DOT&PF's material site research and have concurred with its accuracy and conclusions.

As part of selecting a viable material site, the material being extracted needs to meet DOT&PF's standard material specifications for its intended purpose. It's also advantageous to have a material site located as close to the project site as possible, as it not only reduces project costs but reduces the amount of emissions produced by the haul trucks, reduces fugitive dust produced along the roadway by the trucks, reduces noise impacts, and increases public safety by reducing the chance of encountering a haul truck along its route.

The unconsolidated sediments along the lower Copper River Delta is colluvium, comprised of a mixture of reworked glacier till, alluvium and, eolian sand and silt. DOT&PF's material site reports for the former quarries in this area indicates, in general, that the upper 6 foot stratigraphic horizon is eolian deposits of sand, silt, and clay, which were carried and deposited over time by the strong winds that occur throughout this delta. Below this horizon, the stratigraphy generally consists of sandy coarse gravels with boulders. This coarser material is more permeable and its upper horizon closely corresponds to the elevation of the groundwater table. Every alternative considered below will require heavy equipment to be able to access the project sites. At this time the sites are inaccessible from the highway.

Preliminary Alternative 1

Under Preliminary Alternative 1, the DOT&PF proposes to expand existing material sites that are currently permitted for material extraction. Under this criteria, the DOT&PF has identified two material sites that have potential, although they both have limiting factors.

The material site with the most potential is named 851-015-5, it is located north of the Million Dollar Bridge between approximate MP 50 through MP 51 and within Section 5, Township 14 South, Range 4 East, Copper River Meridian, USGS Quad map Cordova C-2. The north end of this site encompasses a portion of Abercrombie Creek, an anadromous stream (AWC 212-20-10080-2055) identified as rearing habitat for chinook, sockeye, and coho salmon. The enclosed Figure 4 depicts the location of material site 851-015-5.

Material site 851-015-5 has a non-expiring permit issued to the State of Alaska by the Bureau of Land Management (BLM) on February 25, 1963 (administered through a transfer to the USFS) for a "Federal Aid material site", under exception 4(h). Upon depletion of the material resource, the surface estate within this site is conveyed to TEC, pursuant to the Alaska Native Claims Settlement Act (ANCSA); Interim Conveyance No. 943, September 28, 1984.

The DOT&PF's materials report for this site, completed in September 1994, noted the site is predominately silty sand with some coarse gravel and boulders that generally met standard material specifications. It was also noted that a June 1962 geotechnical exploration of this site encountered groundwater at 5.5 feet below the ground surface. However, the 1994 geotechnical program did not encounter groundwater at depths of 8 below the ground surface, although there were exceptions near surface waters.

ADF&G's July 30, 2021 eagle nest survey did not discover any eagle nests within a ½ mile radius of this material site. However, because the material site is located north of the Million Dollar Bridge the haul trucks will need to transport the material over the bridge to the damaged highway infrastructure located south of the bridge. As previously stated, the ADF&G discovered one bald eagle nest, with an eaglet present at the time of their survey, within a ½ mile radius of the Million Dollar Bridge; located near the south end of the bridge on its downstream side. Because the haul trucks would be crossing back and forth over the bridge there is potential to cause Level B Harassment from the traffic noise; further consultation with USFWS and the ADG&G will be required.

The DOT&PF completed an archaeological survey of this material site on June 22, 2021. The archaeologist did not discover any historic or prehistoric cultural resources in this area and concluded that there was a low potential for uncovering previously undiscovered cultural and/or paleontological resources, report pending.

Another existing material site, located north of the Million Dollar Bridge and south of material site 851-015-5 has limited potential. This site also has a non-expiring permit issued to the State of Alaska. Although this site has been previously mined, the DOT&PF's materials report for this site noted that there is undetermined quantity of large boulders still present at this site, which could potentially produce riprap material. The report also noted a shallow groundwater table.

ADF&G's July 30, 2021 eagle nest survey did not discover any eagle nests within a ½ mile radius of this material site. Similar to material site 851-015-5, discussed above, the haul trucks will need to travel north over the bridge to the material site then back south over the bridge to the construction site. The noise from haul truck traffic has potential to cause Level B Harassment to the eagles nesting within a ½ radius of the bridge.

The archaeologist also completed a cultural resource survey of this material site on June 22, 2021. The archaeologist did not discover any historic or prehistoric cultural resources in this area and concluded that there was a low potential for uncovering previously undiscovered cultural and/or paleontological resources.

Preliminary Alternative 2

Preliminary Alternative 2 is to develop a new material site that is capable of producing both the quantity of material needed to construct any of the potential elements and be able to produce Class IV riprap or smaller.

The Draft CRH PEL provided to the public in December 2019 expressed interest in granitic body located in the upper reaches of Sheep Creek, an anadromous stream, AWC 212-20-10040-2011-3023. However, after detailed review of DOT&PF's recent LIDAR survey of this potential site it was determined that due to the engineering and environmental challenges required to utilize this site, which included realigning Sheep Creek, constructing a bridge over this stream, and constructing a haul road up a near vertical cliff in order to access the granitic body, the DOT&PF determined that developing this material site was not the LEDPA.

Through a review of the same LIDAR imagery, the DOT&PF identified an anomalous geomorphic feature at the toe of the glacial valley that cuts through Goat Mountain that warranted investigations into whether it's a viable material site. This glacial valley is also the headwaters of Clear Creek (AWC 212-20-1008-2010). The anomalous geomorphic feature is located within the SW 1/4 of Section 5, SE 1/4 of Section 6, NE 1/4 of Section 7, and NW 1/4 of Section 8; Township 15 South, Range 4 East, Copper River Meridian, USGS Quad map Cordova C-2. TEC owns the surface estate of this potential material site and Chugach Alaska Corporation owns the subsurface estate. The enclosed Figure 5 shows a plan view of this potential material site and its proximity to a proposed road alignment around the MP 44 washout.

In concerns to the referenced LIDAR survey, the DOT&PF will provide the Alaska Division of Geological and Geophysical Survey (DDGS) the LIDAR survey data so they can upload it into their database, which will then be available to the public through DDGS' Elevation Portal, link provided: <https://elevation.alaska.gov/>.

On May 20, 2021, TEC issued the DOT&PF a Land Use Permit so that we could investigate this potential material site. On June 22, 2021 an archaeologist, a hydraulics engineer, and Environmental Impact Analyst (whose background is geology) accessed this site, via a Robinson R66 helicopter. Additionally, this potential material site was included in ADF&G's July 30, 2021 eagle nest survey. The ADF&G established a ½ mile radius around the site as part of their survey.

The results of these referenced surveys were that:

The ADF&G did not discover any bald or golden eagle (*Aquila chrysaetos*) nests within a ½ mile radius of this site.

The archaeologist did not discover any historic or prehistoric cultural resources in this area and concluded that there was a low potential for uncovering previously undiscovered cultural and/or paleontological resources, report pending.

In order to ascertain whether fish are present, the hydraulics engineer installed fish traps in waterbodies near the west facing base of the material site, which are tributaries to Clear Creek. Fish traps were also installed in waterbodies located near the proposed new road alignment around the MP 44 washout and between the material site and the Copper River Highway, as a haul road would need to be constructed to access the material site. The enclosed Figure 6 depicts the location of the fish traps. The Copper River Highway PEL Fish Study is summarized below:

Six fish traps were installed on June 22, 2021 and retrieved approximately 24-hours later on June 23rd.

- Fish Trap #1: Total of 136 fish caught. 133 were sticklebacks (*Gasterosteus aculeatus*); one was a juvenile coho salmon about 3 ½" long, one was a sculpin (order *Scorpaeniformes*) about 3" long, and; one was an unidentified fish believed to be a juvenile Dolly Varden (*Salvelinus malma*). This trap was set in a large, long pool with weeds along the edges. Water flows to the main channel of Clear Creek from northwest to southeast.

- Fish Trap #2: Total of 82 fish caught. All 82 fish were sticklebacks. This trap was located about 30' north of Fish Trap #1 in the long large pool.
- Fish Trap #3: Total of 1 fish caught, it was a stickleback approximately 2" long. This trap was located about 320 yards northwest of fish traps 1 and 2. It was installed in a small ponded area that had connectivity to downstream water through a small channel running through the brush.
- Fish Trap #4: No fish were caught and no fish were observed. This trap was located about 100' from Fish Trap #3 at the confluence of the incoming stream and the small pond.
- Fish Trap #5: No fish were caught and no fish were observed. This trap was installed in a pond of standing water that occupies what appears geomorphically to be an old stream channel that had been abandoned a very long time ago. No discernable stream channels exist into or out of the area.
- Fish trap #6: No fish were caught and no fish were observed. This trap was located approximately 150' from Fish Trap #5 in a separate pool. No visible stream flows.

The Environmental Impact Analyst was only able to collect two rock samples (each weighing >80 pounds) from this site because of limitations on our time and the extremely steep, heavily vegetated terrain. The samples were submitted to DOT&PF's materials laboratory for the following analysis:

- Degradation Value;
- L.A. Abrasion;
- Sodium Sulfate Loss;
- Specific Gravity, and;
- NORDIC

No petrology studies were requested to determine the rock type but field examinations indicated the rock samples are Tholeiitic basalt.

The analytical results for both of these referenced samples exceed the most stringent thresholds for the Standard Highway Material Specifications and the Standard Airport Material Specifications.

Therefore, given the above data, this potential material site, in which Chugach Alaska Corporation owns the subsurface estate and TEC owns the surface estate, is a viable material site and one that the DOT&PF is interested in potentially developing in order to reconstruct, repair, and replace the damaged transportation infrastructure along segments of the Copper River Highway.

Preliminary Alternative 3

Preliminary Alternative 3 is the No-build Alternative. Under this alternative no attempts will be made to utilize existing material sites or develop new ones. Since that vast majority of the potential elements require earthen material for their construction this means that without access across NBI #339 and its associated washout no earthen material will be available for construction and thus, no construction.

Potential Element:

Preliminary Alternatives for the Logistics Required to Get Heavy Equipment, Fuel, Construction Materials, and Personnel to the Respective Sites

Background: The preliminary alternatives presented below are premised on the idea that access across NBI #339 and its associated washout has not been reestablished nor has funding been allocated for its construction. Because of the large expense that would be required to construct a new bridge across this washout it's conceivable that other potential elements covered in this PEL could receive funding for their respective construction before a new bridge is built over the NBI #339 washout; such as, realigning the highway around the MP 44 washout or addressing the culverts that are not in compliance with the MOA between the ADF&G and the DOT&PF.

Preliminary Alternative 2

Under this alternative, the DOT&PF proposes to access the potential project site(s) east of the MP #339 washout by traveling along the exposed gravels of the riverbed during the late fall and winter when the river is at its lowest levels. The route would start near NBI #339 and head north along the right bank of the Copper River to the Childs Glacier Lodge, where the equipment would then be able to access the CRH north of the Million Dollar Bridge. However, as mentioned, the Million Dollar Bridge is only 20 feet wide so that is a limiting factor for large equipment.

It's anticipated that a suitable temporary trail could be quickly constructed by using a dozer, possibly aided by a grader and front-loader. It is DOT&PF's premise that the temporary trail would be reclaimed by the river's fluvial processes during the high water events of spring breakup and high summer discharge rates.

DOT&PF anticipates that the following permits will be required to utilize this proposed temporary trail:

- ADF&G permits for all stream crossings along the temporary trail;
- TEC Land Use Permit for access across their land;
- USFS Land Use Permit for access across their land (jurisdiction is the vegetated areas);
- DNR permit will be required for anything weighing 10,000 lbs. or greater, and;
- An approved Alaska Department of Environmental Conservation (ADEC) Spill Prevention, Control, and Countermeasures (SPCC) plan for storage and transport of 10,000 gallons or greater of petroleum products.

In concerns to fuel storage, TEC has stated in prior conversation with DOT&PF about this subject that they would not permit the DOT&PF to store fuel on their land. Therefore, the bulk fuel storage would need to be sited within DOT&PF ROW and maintain a 200 feet separation distance from any waterbody.

Preliminary Alternative 3

Alternative 3 is the No-build Alternative. Under this alternative no attempts to access the east side of the NBI #339 washout would occur. Without the ability to have the required equipment, fuel, construction materials, and necessary personnel able to access the sites no reconstruction, repairs, or replacement of the damaged transportation infrastructure along this segment of the CRH would occur.

Preliminary Alternative 4

Preliminary Alternative 4 is a new alternative that was not included in the Draft PEL study that was provided in the public involvement process, initiated on December 17, 2019. Preliminary Alternative 4 proposes that a temporary access route through the Copper River Delta Critical Habitat Area be established and utilized. Downstream from the CRH the Copper River Delta widens out, the river loses flow velocity, and it is considerably shallower. Because of the river's shallower depth and slower velocity it generally freezes over during the winter months. Thus, the river at lower portion of the delta has potential for an ice road to be constructed over it. This would allow the larger pieces heavy equipment, which are too wide to fit through the Million Dollar Bridge, to access the site(s) and provide a safer route for equipment operators.

The DOT&PF has not determined a potential trail route at this time and as such, is not informed of what, if any, river bank modification or vegetative clearing would be needed for the equipment to access the CRH from this route.

As mentioned, the Copper River Delta Critical Habitat Area is a Section 4(f) resource. Therefore, the DOT&PF's Statewide Environment Office (SEO) will need to determine whether this route would constitute a use of a Section 4(f) resource. Further consultations with the officials with jurisdiction over this resource will be required before the SEO can make this determination. The USFS has regulatory authority over activities above OHW within the Copper River Delta Critical Habitat Area and the ADF&G has jurisdiction below OHW.

The DOT&PF anticipates similar permits as those listed under the above Preliminary Alternative 2 would be required.

If you have any questions or need additional information, please contact me at the address or telephone number above, or by email at jeff.stutzke@alaska.gov. You may also contact Bill Kulash at telephone number (907) 451-5291 or by email at william.kulash@alaska.gov.

Sincerely,



Jeff Stutzke, P.E.
DOT&PF Northern Region Hydraulics Engineer and CRH PEL Engineering Manager

Enclosures:

- Figure 1: Copper River Highway PEL Study Area
- Figure 2: Chronology of Channel Migration Near MP 44, Copper River Highway
- Figure 3: Proposed Realignment Around MP 44 Washout, Copper River Highway
- Figure 4: Locations of Proposed Material Sites North of the Million Dollar Bridge
- Figure 5: Location of Proposed Material Site at Toe of Goat Mountain's Glacial Valley
- Figure 6: Fish Trap Locations
- ADF&G's Memorandum Letter Report: *Completion of Eagle Nest Survey on Copper River Highway Repair/Reconstruction Study Area*, dated October 12, 2021

cc w/enclosures:

- Bert Adams, Executive Director, Native Village of Eyak
- Nancy Barnes, President, The Eyak Corporation
- Judith Bittner, AK SHPO, Office of History and Archaeology Review Compliance, DNR
- Brennan Cain, Vice President and General Counsel, The Eyak Corporation
- Judy Chapman, Planning Chief, DOT&PF NR
- Robert Dunning, M&O Superintendent, DOT&PF NR-Valdez District
- Daniel Fenza, President and CEO, Chugach Alaska Corporation
- Nina Horne, Environmental Impact Analyst Manager I, DOT&PF SEO
- Joe Kemp, P.E., Acting Director, DOT&PF NR
- Honorable Clay Koplín, P.E., Mayor, City of Cordova
- Bill Kulash, Environmental Impact Analyst III, DOT&PF NR
- Jon Kurland, Director, NOAA-National Marine Fisheries Service
- Brooke Mallory, Deputy Director, Native Village of Eyak
- Megan Marie, Regional Supervisor, ADF&G-Habitat Division
- Elmer Marx, Senior Bridge Engineer, DOT&PF Statewide Bridge Design
- Robert Mattson, M&O & Airport Manager, DOT&PF NR-Cordova
- Holley McKinney, Cultural Resource Specialist-PQI, DOT&PF NR
- Brett Nelson, Regional Environmental Manager, DOT&PF NR
- Sean O'Brien, Capital Projects Director, Native Village of Eyak
- David Phillips, Land and Resources Manager, Chugach Alaska Corporation
- James Rypkema, Division of Water, Storm Water and Wetlands, ADEC
- Sarah Schacher, P.E., Preconstruction Engineer, DOT&PF NR
- Jeff Schramm, Chugach National Forest Supervisor

Clint Scott, Bridge Program Administer, U.S. Coast Guard District 17
Honorable Gary Stevens, State Senator, District P
Honorable Louise Stutes, State Representative, District 32
Jeff Stutzke, P.E., Hydraulic Engineering Manager, DOT&PF NR
U.S. Army Corps of Engineers
U.S. Fish & Wildlife Service
Janice Wiegers, Environmental Program Manager, ADEC
April Woolery, Transportation Planner III, DOT&PF NR
Rod Worl, Chief Executive Officer, The Eyak Corporation
Dave Zastrow, Public Services Staff Officer, U.S. Forest Service

Enclosures

Figures:

Figure 1: Copper River Highway PEL Study Area

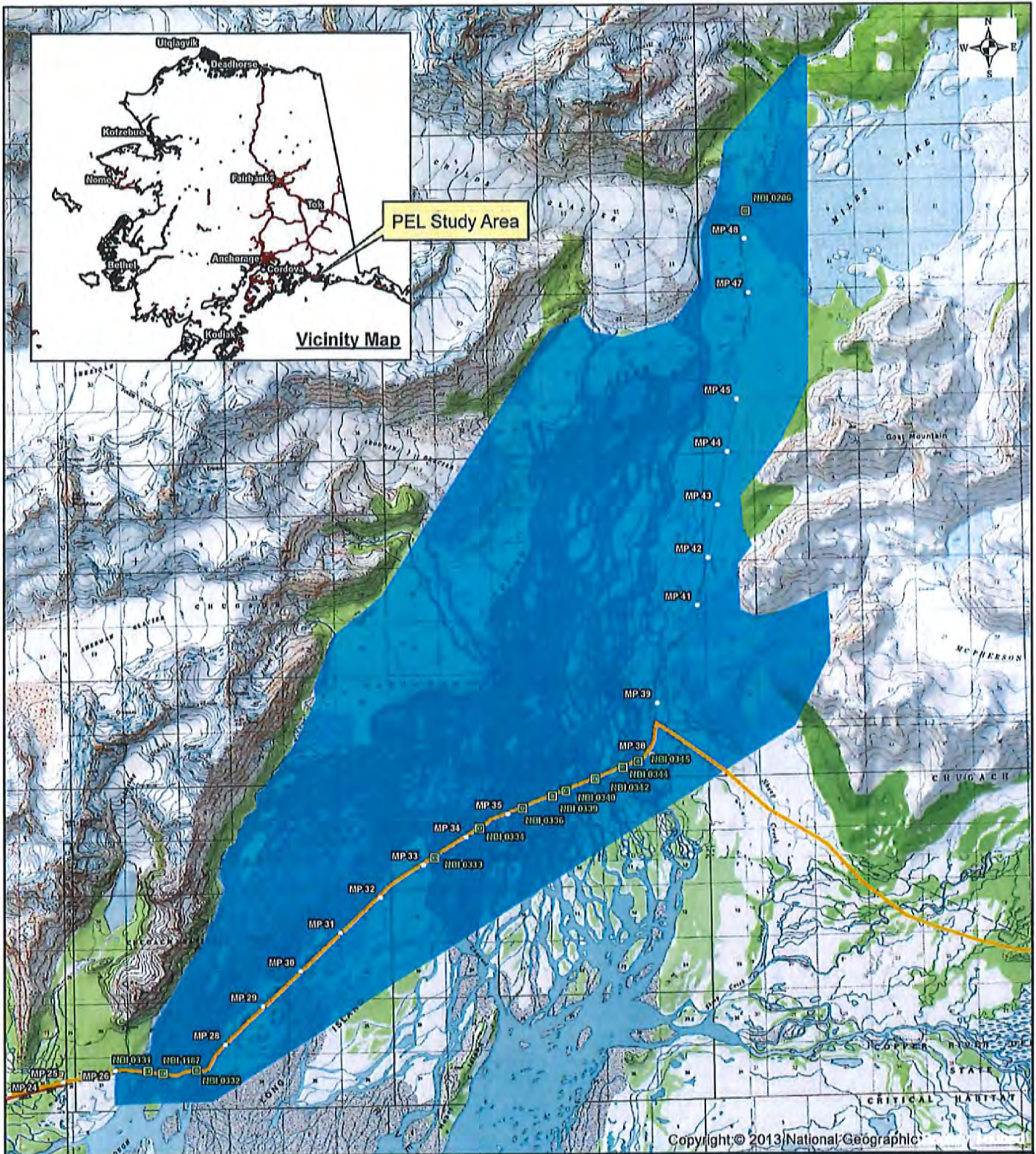
Figure 2: Chronology of Channel Migration Near MP 44, Copper River Highway

Figure 3: Proposed Realignment Around MP 44 Washout, Copper River Highway

Figure 4: Locations of Proposed Material Sites North of the Million Dollar Bridge

Figure 5: Location of Proposed Material Site at Toe of Goat Mountain's Glacial Valley

Figure 6: Fish Trap Locations






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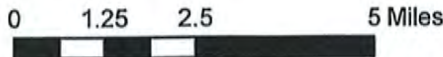


Legend

-  Alaska DOT&PF Bridges
-  Copper River Delta CHA
-  PEL Study Area

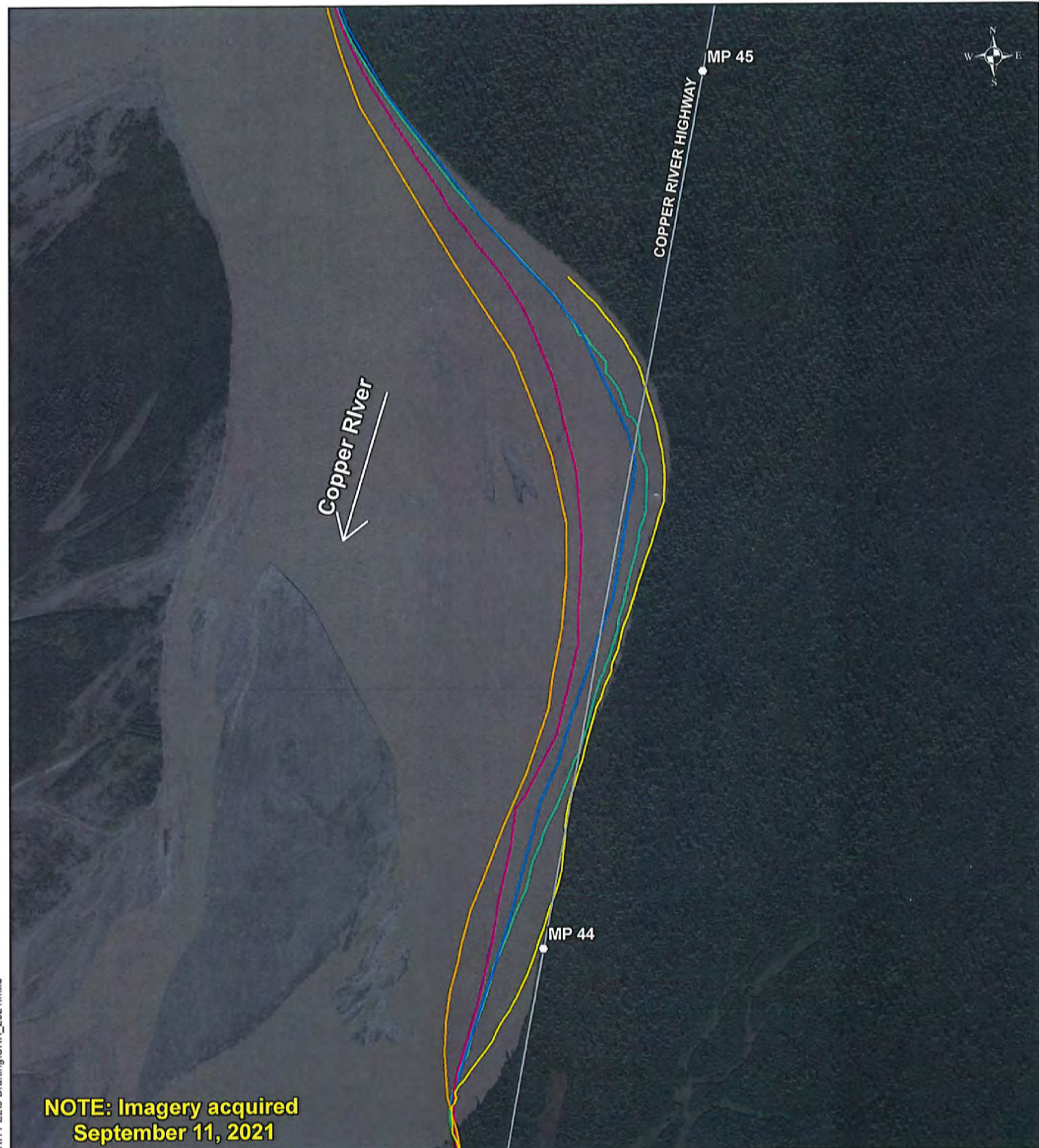
STATE OF ALASKA
 Department of Transportation and Public Facilities
 2301 Peger Road Fairbanks, AK 99709

**Copper River Highway
 PEL Study Area**

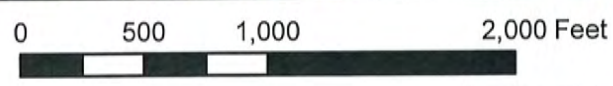


DATE: November 2019

FIGURE 1



NOTE: Imagery acquired September 11, 2021



Legend	
—	July 21, 2011 River Edge
—	September 30, 2016 River Edge
—	September 30, 2018 River Edge
—	June 29, 2019 River Edge
—	October 2020 River Edge



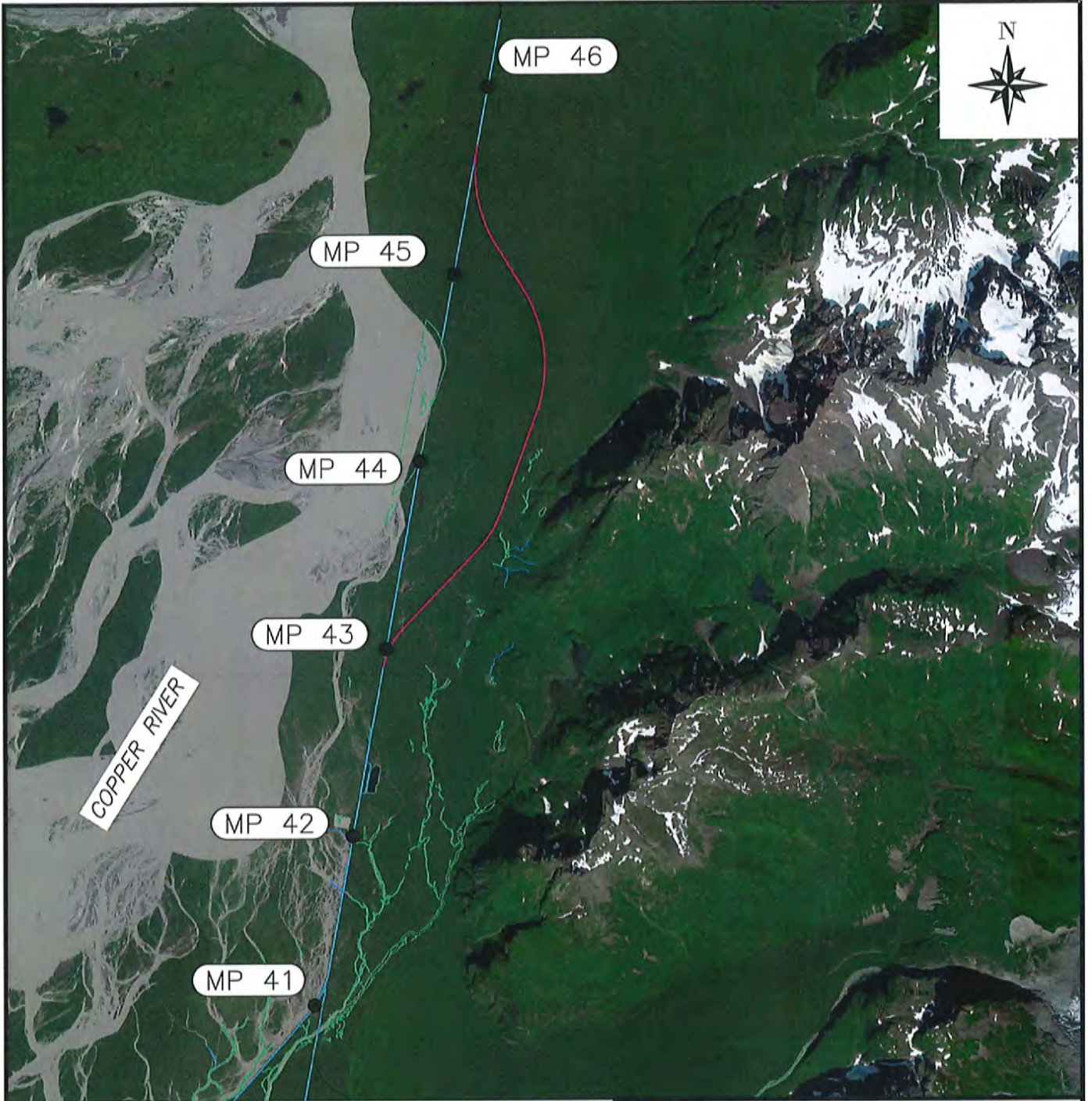
STATE OF ALASKA
 Department of Transportation and Public Facilities
 2301 Peger Road Fairbanks, AK 99709

**Chronology of Channel Migration
 Near MP 44 Copper River Highway**

DATE: October 2021

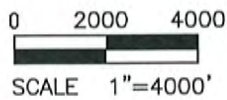
FIGURE 2

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LEGEND

- COPPER RIVER HIGHWAY
- PROPOSED REALIGNMENT



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**COPPER RIVER HIGHWAY
 PROPOSED REALIGNMENT**

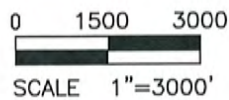
DATE: MARCH 2021

FIGURE 3



LEGEND

- PRIMARY MATERIAL SITE
- ALTERNATE MATERIAL SITE

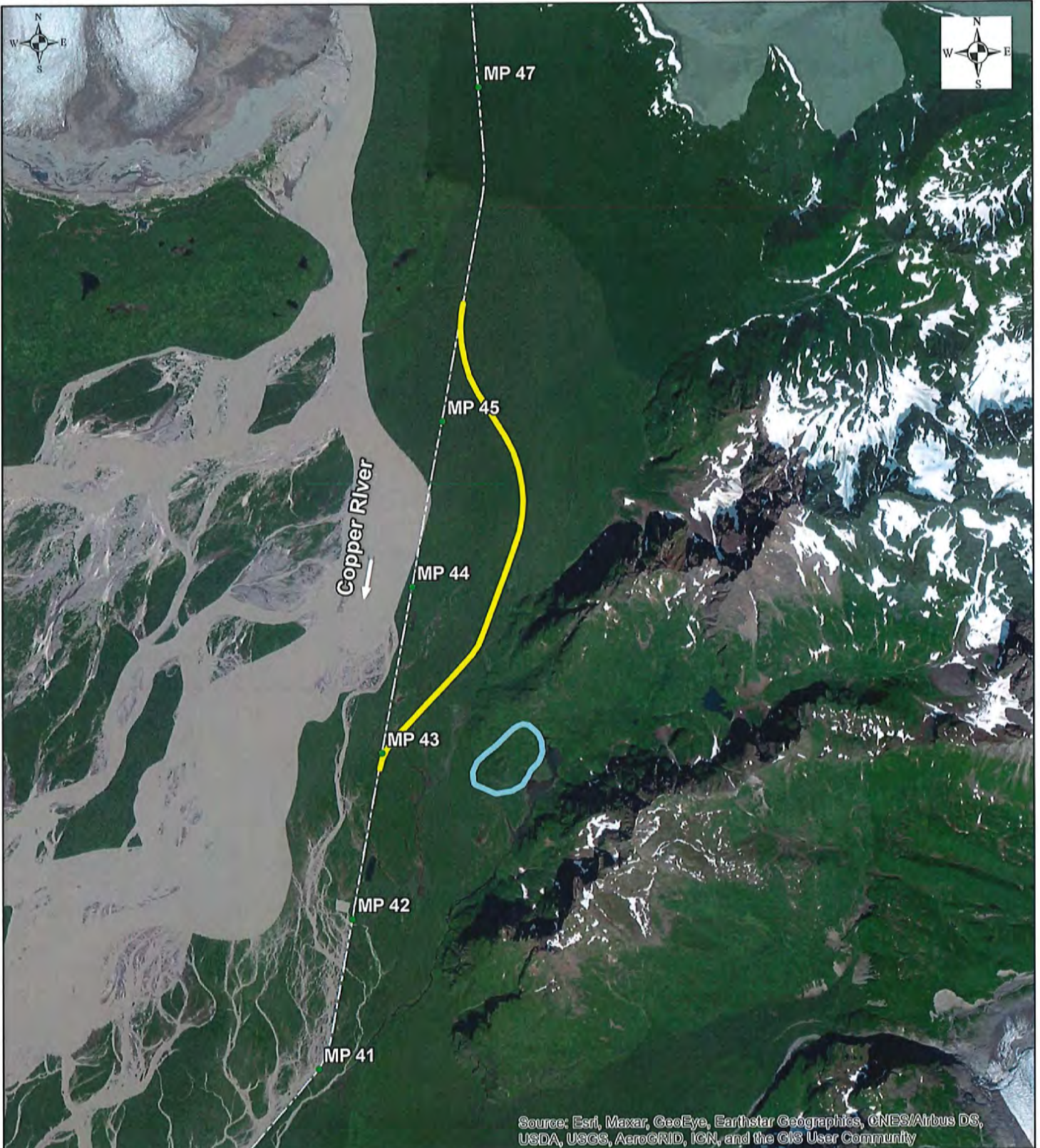


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**COPPER RIVER HIGHWAY
 POTENTIAL MATERIAL SITES**

DATE: MARCH 2021



FIGURE 4

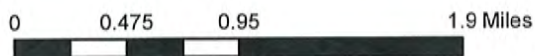


Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Legend

-  Proposed Material Site
-  Proposed Realignment

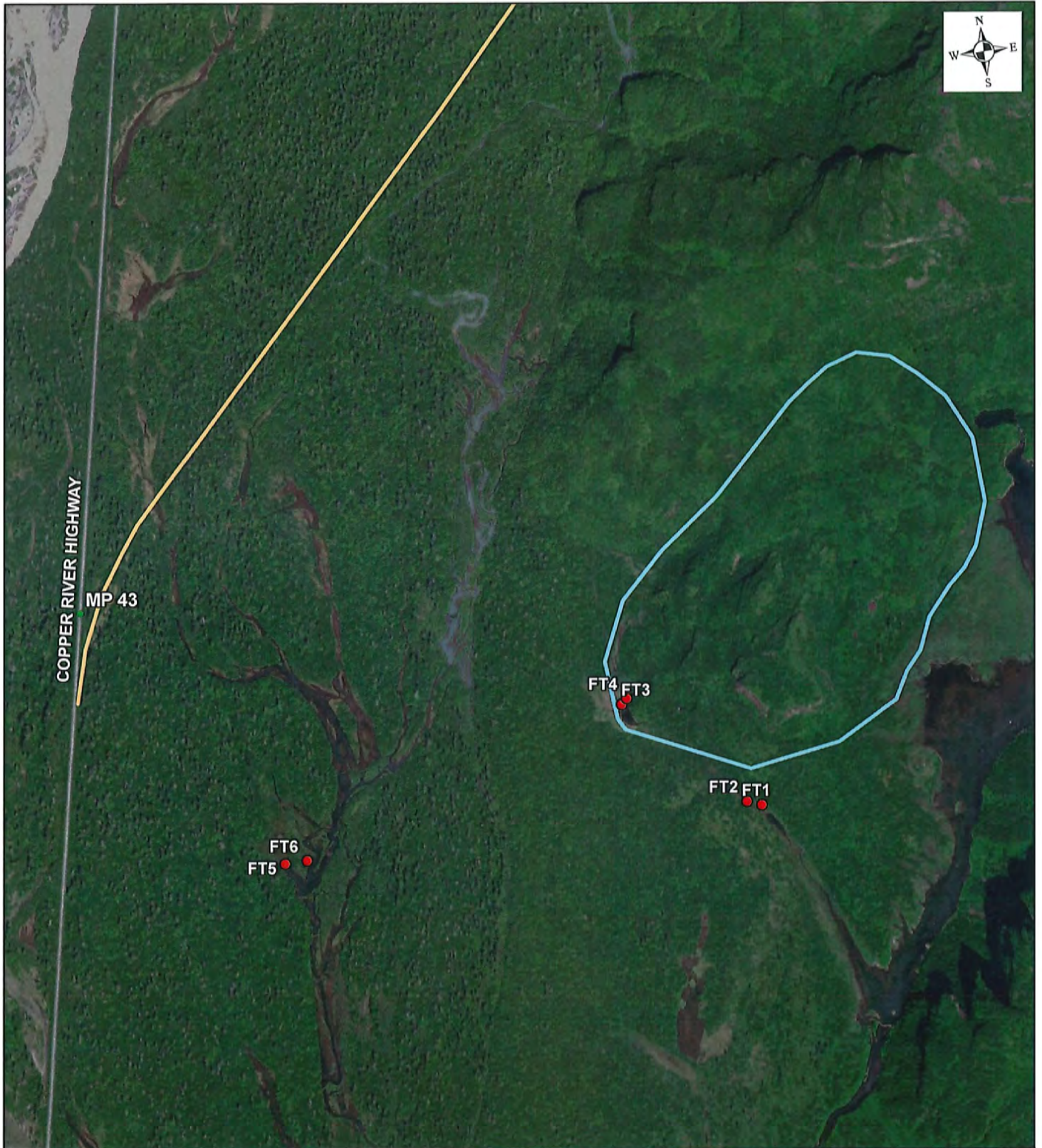


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Copper River Highway

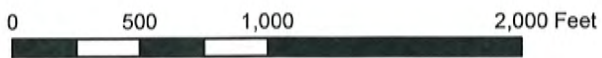
Date: April 2021

Figure 5



Legend

- Fish Trap Points
- Proposed Material Site
- Proposed Realignment



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 Department of Transportation and Public Facilities
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Copper River Highway
 Fish Trap Locations

Date: August 2021

Figure 6

ADF&G's Memorandum Letter Report:

*Completion of Eagle Nest Survey on Copper River Highway
Repair/Reconstruction Study Area, dated October 12, 2021*



THE STATE
of ALASKA
GOVERNOR MIKE DUNLEAVY

**Department of
Fish and Game**

DIVISION OF WILDLIFE CONSERVATION
Cordova Office

401 Railroad Avenue
Cordova, Alaska 99574-0669
Main: 907.424.3215
Fax: 907.424.3235

August 12, 2021

MEMORANDUM

To: William Kulash
Jeff Stutzke
Alaska Department of Transportation and Public Facilities
Fairbanks

From: Charlotte Westing
Wildlife Conservation Division
Alaska Department of Fish and Game
Cordova

Subject: *Completion of eagle nest survey on Copper River Highway repair/reconstruction study area.*

INTRODUCTION

Identifying and documenting bald eagle (*Haliaeetus leucocephalus*) nests is necessary when planning road repair, blasting quarry sites, or redirecting roadways. Alaska Department of Fish and Game (ADF&G) staff conducted these surveys on behalf of Alaska Department of Transportation and Public Facilities (DOT&PF.) The area of interest follows the existing road corridor of the Copper River Highway starting at the first washout near milepost (MP) 36. An icebreaker supporting the Million Dollar Bridge is in disrepair. Both areas would also require a near-site materials quarry. The road redirect would also require a diversion east of the existing corridor and a corresponding materials site.

Much of the area is dominated by shrub willow and alder complexes (Figure 1). Trees are predominately cottonwood with some spruce and hemlock with increasing elevation. With distance from the river, the terrain becomes increasingly rugged and roosting trees are completely absent (Figure 2 and 3).

METHODS

Areas of interest were delineated by DOT&PF staff using GIS shapefiles (Figure 4). A survey grid of 1 km² units was superimposed over polygon features outside of the existing road corridor to standardize search intensity (Figure 5). Each unit of the survey grid was assigned a number for data recording purposes. Forty-three units were assigned but six were eliminated because they did not overlap with any polygon features. Therefore, 37 units were identified for survey.

The survey was conducted using a helicopter (Robinson 44) with one observer in addition to the pilot. Observations of eagles and nests and their corresponding GPS coordinates were recorded. Nests were circled to determine occupancy. Pictures were taken of all active nests observed.

RESULTS AND DISCUSSION

The survey was conducted July 30 starting at approximately 12:00 and finishing at about 17:00 with 4.2 hours of total flying time. Search intensity was approximately 5 min/km² and was deemed appropriate for sparse forest cover. Eight bald eagles were observed through the course of the survey (Figure 6). Three nests were observed two of which were active (Figures 7 and 8), one was inactive. The two active nests contained eaglets (Table 1). No golden eagle (*Aquila chrysaetos*) nests were observed in the survey area.

Table 1: Observations of birds and nest in CRH area of interest during July 30, 2021 survey.

SU	Birds	Nests	Eaglet Count	Lat/Long ^a
3	1	0	0	N60.51892 W144.84524
Corridor East	1	0	0	N60.57135 W144.77197
5	1	0	0	N60.58433 W144.74743
17	1	0	0	N60.61200 W144.75735
22	2	1	1	N60.66861 W144.76167
Corridor West	1	1	2	N60.55905 W144.79375
32	0	1	0	N60.53831 W144.79923
31	1	0	0	N60.70816 W144.71463

^a Lat/Long collected in geographic coordinate system WGS84

ADF&G will continue to provide support on biological data collection for this and other potential projects whenever possible.

Figure 1: Area of road washout near MP 43 demonstrating predominant habitat and roosting trees.

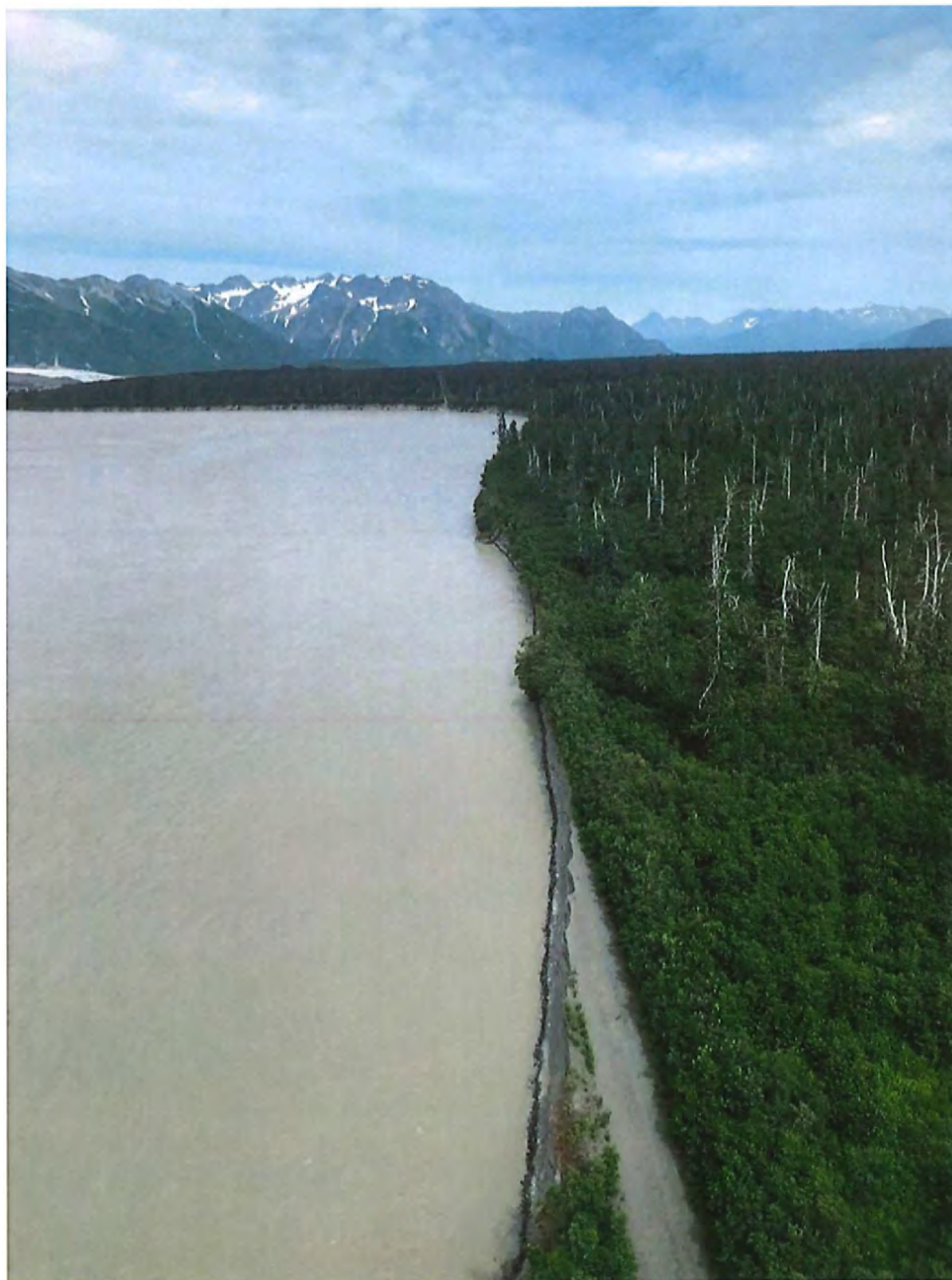


Figure 2: Area near redirect quarry in survey units 6 and 9. Dominated by shrubs with no roosting trees.

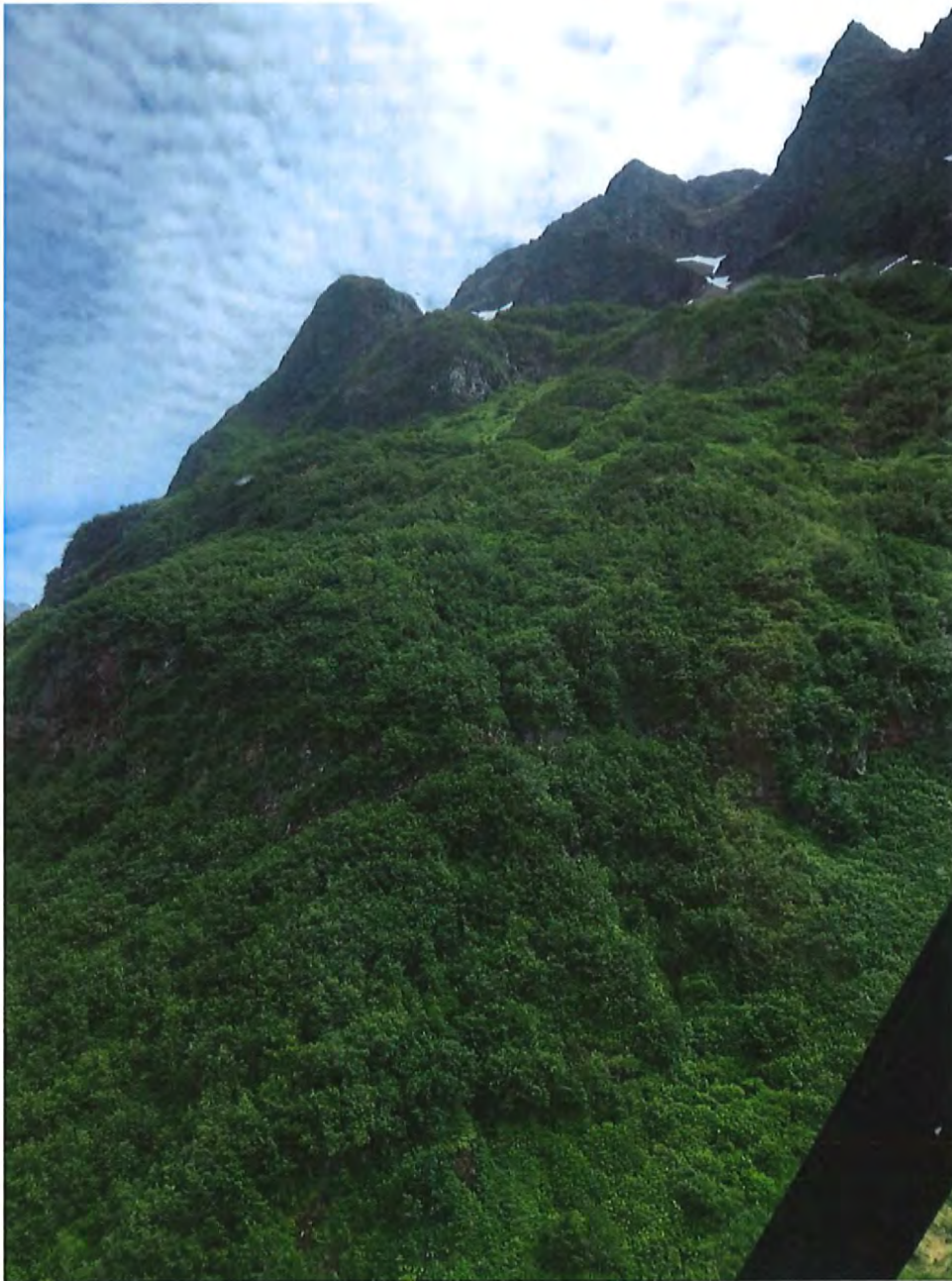


Figure 3: Area near redirect quarry in survey units 7 and 9. Dominated by shrubs with few roosting trees.



Figure 4: Copper River Highway with areas of interest identified.



Figure 6: Bald Eagles and Bald Eagle nests observed.

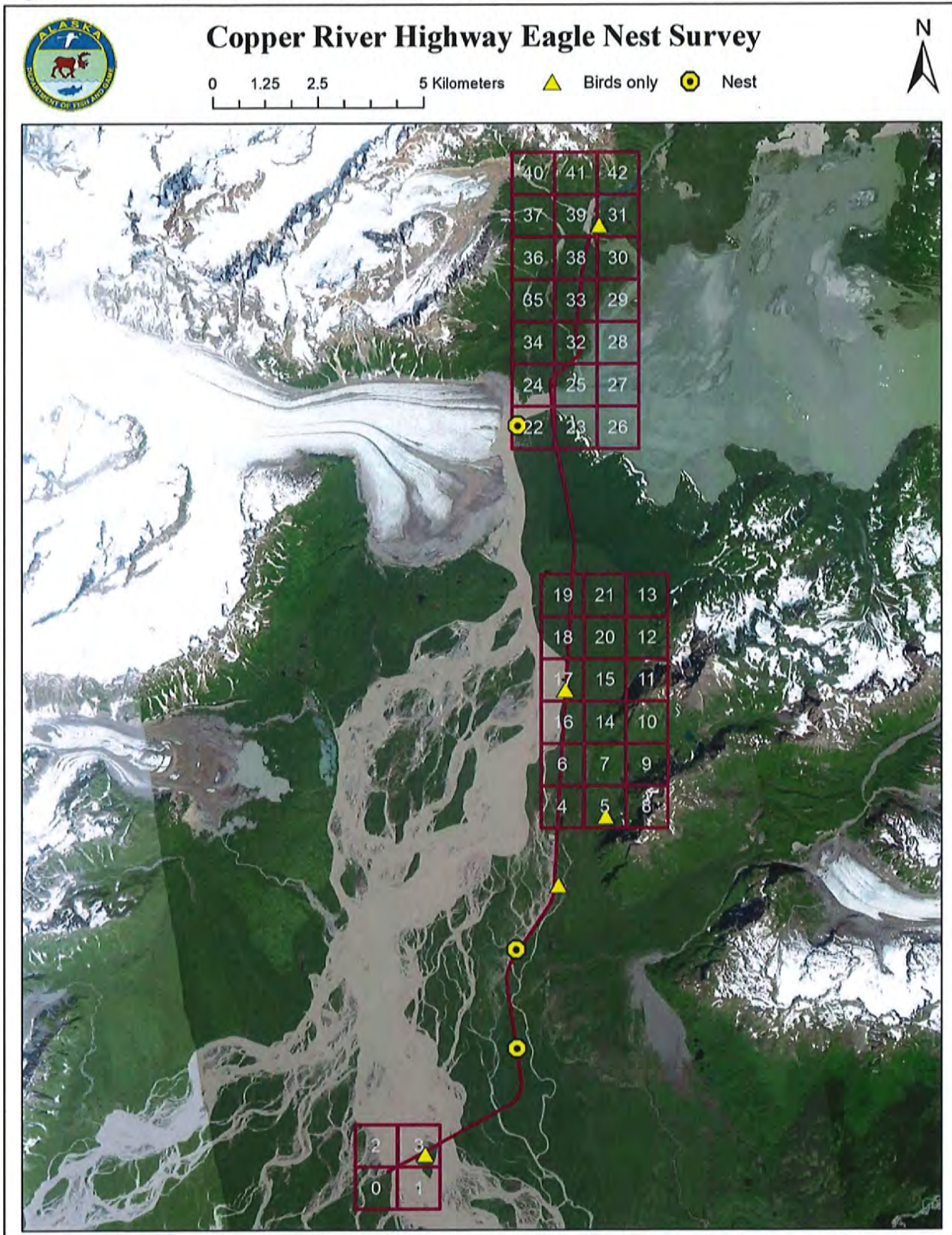


Figure 7: Active eagle nest in survey unit 22. One eaglet present.



Figure 8: Active eagle nest in road corridor. Two eaglets present.

