Road to Tanana Project

Section 10/404 Permit Application

Application Block 23: Mitigation (Revision 1.0)

Prepared for

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Acronyms and Abbreviations

Term	Definition
3PPI	Three Parameters Plus, Inc.
DOT&PF	Alaska Department of Transportation and Public Facilities
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
BMP	Best Management Practice
CGP	Construction General Permit
DOF	ADNR Division of Forestry
EPA	U.S. Environmental Protection Agency
ESCP	Erosion and Sediment Control Plan
HGM	Hydrogeomorphic
LEDPA	Least Environmentally Damaging Practicable Alternative
MP	Milepost
PJD	Preliminary Jurisdictional Determination
ROW	Right-of-way
RGL	Regulatory Guidance Letter
SWPPP	Strom Water Pollution Prevention Plan
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

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Application Block 23: Description of Avoidance, Minimization and Compensation Activities, both Undertaken & Proposed (Revision 1.0)

23.1 AVOIDANCE & MINIMIZATION DURING DESIGN

During the preliminary and final design process, the Applicant evaluated major and minor alignment changes, and additional, potential material site locations, to identify the least environmentally damaging practicable alternative (LEDPA). During this process, the Applicant made significant efforts to reduce and avoid impacts to important wetland functions, wildlife habitats, areas of important cultural significance, and the most frequently used subsistence areas in the study area. One potential material site was dismissed for its likelihood to yield materials containing naturally-occurring asbestos, a potential human health hazard. These avoidance and minimization measures were incorporated into the Applicant"s preferred alternative presented in this application. Alternatives considered, but dismissed in favor of the less damaging alternative submitted, are addressed in detail below.

Figures included in the text below are also available as full-size drawings as Sheets 111-122. The figures show mapped wetlands, and areas including both wetlands and uplands are shaded in magenta, while areas where no wetlands were identified remain unshaded. The Applicant"s proposed road centerline is always shown in blue. Where alternative routes were evaluated, the impacted wetlands from the alternative are shown in orange, whereas the wetlands that would be impacted from the Applicant"s proposal are also shown in blue.

23.1.1 Road Alignment Alternatives Considered

Overview of Alternatives Considered

The purpose of the Road to Tanana project is to extend the existing highway system that currently terminates near Manley Hot Springs to the Yukon River near Tanana The logical beginning point of the proposed project is from the furthest west point of the Tofty Road, an existing, developed road with an established public Right of Way. When evaluating the logical western terminus of the proposed road, design criteria included avoiding wetlands; avoiding unfavorable geotechnical conditions; avoiding the crossing of Native Allotments; siting the staging area proximate to a Yukon River location suitable for accommodating barges during ice free conditions; and likewise siting the staging area in terrain suitable for a wintertime ice road approach. The output of these analyses was siting a project terminus on the Yukon River, above its ordinary high water level, approximately 6 miles upriver from the community of Tanana.

In evaluating the range of project alternatives considered within the identified project termini, the following engineering design criteria were utilized: Development of a roadway minimizing construction and maintenance costs; constructing a transportation facility that is safe for public use; geometrically designing the facility to AASHTO"s "Guidelines for Geometric Design of Very Low Volume Local Roads"; utilizing previously developed mining roads and trails to the extent possible; minimizing drainage crossings, and locating necessary crossings at hydrologically

prudent locations. In addition, material sites were located to be as close to the proposed project as possible to minimize road construction cost and associated impacts of material site access roads. Based on these engineering and material site criteria, a general project area was initially defined with an additional major alternative corridor identified and developed based on information provided by the public at meetings and during various community discussions. The following overviews of alternatives, and avoidance and minimization measures, are based on refinement of the initial, general project area and the additional, alternative corridor.

After defining an initial project area, the Department considered one additional major alternative, and five minor alternative variants, as part of the wetland avoidance and minimization measures undertaken for the Road to Tanana. These are shown in Figure 23.1.1-1 and described in more detail below. See also Sheet 111 for a larger format version of this figure.

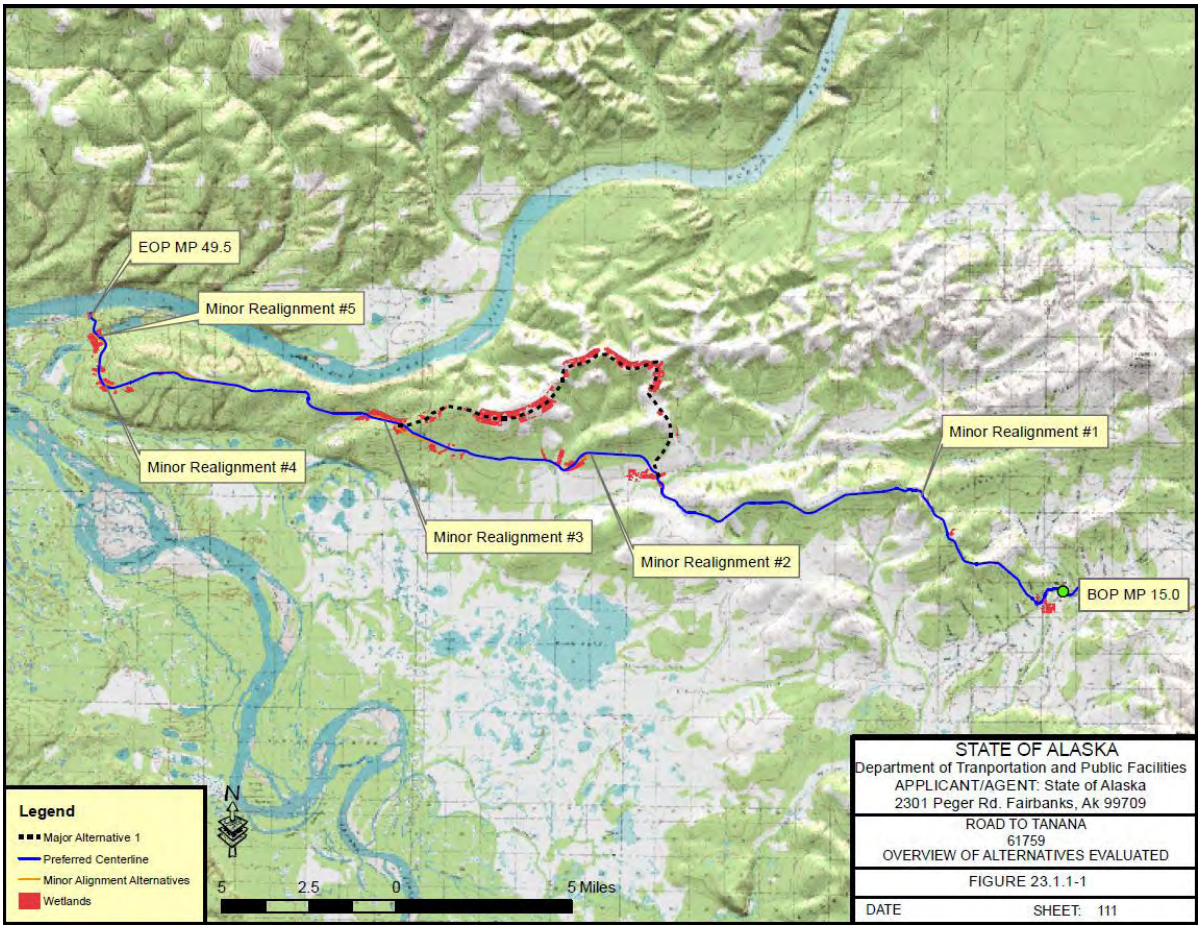

Figure 23.1.1-1: Overview of Alternatives Considered

Major Alternative 1: Figure 23.1.1-2 shows the alignment and wetland mapping in this region in more detail (see Sheet 112 for a larger format version of this figure). This alternative was proposed in the preliminary stage of the project, prior to detailed knowledge of wetlands, wildlife habitat, and topography being acquired. Beginning at MP 30.3, Major Alternative 1 (again shown by the black dashed line) diverges from the preferred centerline and bears due north, climbing to the top of the ridgeline nearly paralleling Moose Creek to the east. The proposed route then follows the ridgeline south-westerly, while gradually descending the ridge before tying back into the preferred centerline at MP 37.87.

Major Alternative 1 was originally thought to be an attractive alternative because it would avoid a number of drainage crossings and potentially minimize wetlands impacts by doing so. The decision to not pursue this route became obvious subsequent to receiving the draft wetlands mapping, which indicated a significant wetlands presence in the area. Also, detailed contour data revealed a highly variable topography, posing engineering and cost concerns associated with steep, dangerous grades and large cut/fill sections; and likewise generated high levels of concern about road geometry- and elevational/weather-related challenges to public travel safety from residents in Tanana and Manley.

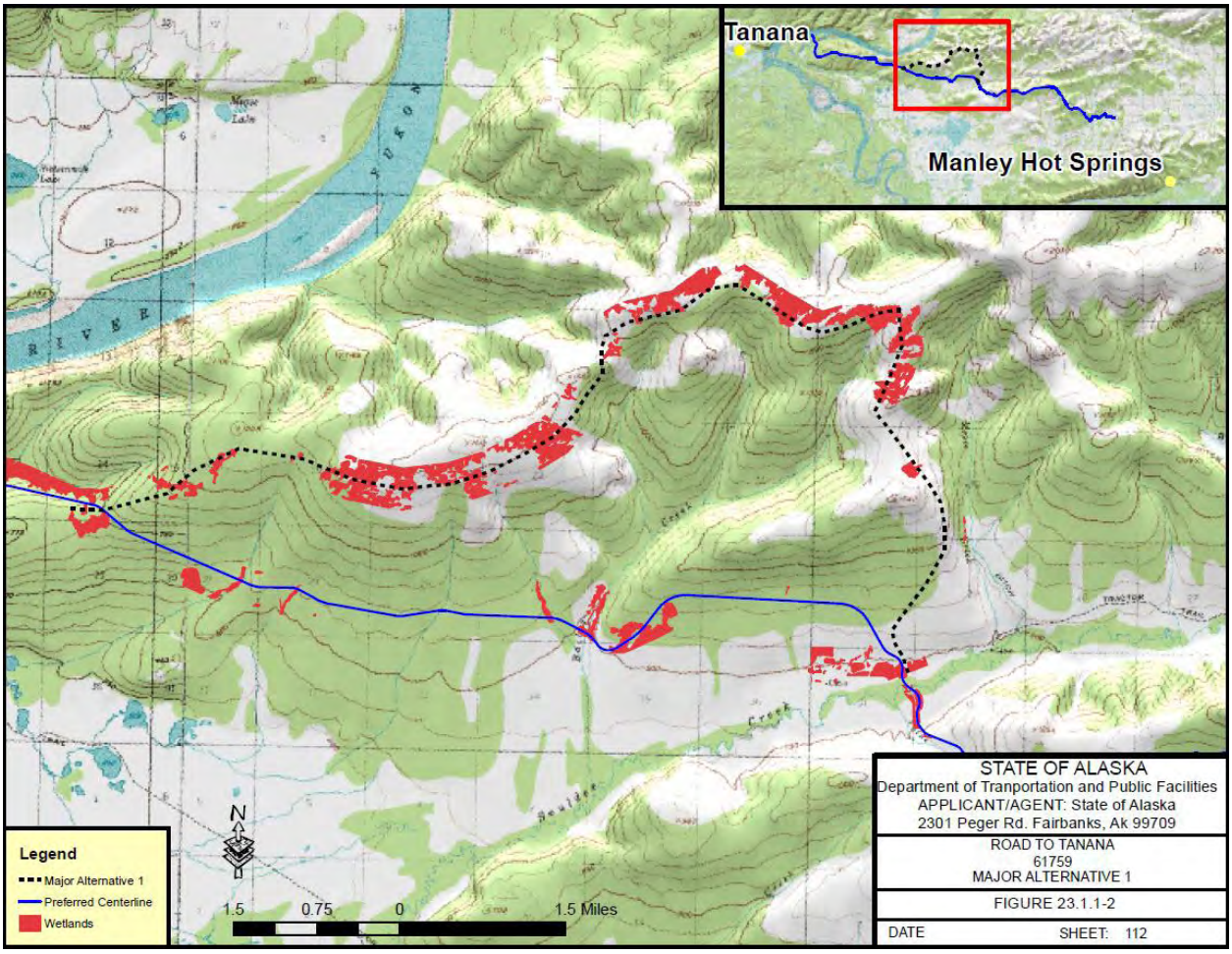

Figure 23.1.1-2: Major Alternative 1 (North Route)

A safe road design following the Major Alternative 1 alignment would require a significantly wider footprint and larger quantities of fill within wetlands than the preferred alignment. A number of cut sections within wetlands would also be required to achieve safe grades. Cut sections in wetlands are generally avoided by engineers due to high likelihood of intercepting permafrost and compromising the roadbed"s structural integrity (resulting in problems such as thawing and slumping).

Without doing a complete design on this alternative, it is difficult to know the exact acres of wetlands avoided. However, by applying the same rough design parameters to both routes it was possible to obtain the relative difference. The centerlines of both routes were buffered to 75" wide to create an approximate road bed, and 25" buffers were added to each side of the 75" road bed to account for potential vegetation clearing impacts. The same parameters were applied to both road routes from beginning to end. Table 23.1-1 shows the results of this evaluation:

Table 23.1-1: Relative Comparison, Wetlands Impacts North vs. South Routes

Alternative	Impacts from Cut/Fill (acres)	Impacts from Vegetation Clearing (acres)	Total Relative Impacts to Wetlands (acres)
North Route (Alternative Dismissed By Applicant)	30.5	22.8	53.2
South Route (Applicant-Preferred Alternative)	13.2	11.0	24.2

Based on the above, we can conclude the wetland acres avoided from a similar width corridor would be 29 acres or approximately 54.5 percent.

Minor Alternative 1: Minor Alternative 1 (Figure 23.1.1-3) spans from station 1100+00 to 1115+00 (MP 20.8 to 21.1), following an existing trail that ranges from 6-12" in width (see Sheet 113 for a larger format version of this figure). The original design intent was to follow the existing trail as closely as possible in order to impact previously disturbed ground and minimize impacts to undisturbed ground and wetlands. However, the draft wetlands report and mapping revealed the presence of wetlands adjacent to both sides of the trail. The original design footprint through this section was anticipated to impact (0.66 acres) of wetlands. In order to reduce impacts to wetlands, the centerline was moved. The revised alignment adopted as part of the Applicant's proposal is anticipated to impact (0.33 acres) of wetlands, for a reduction of 0.33 acres.

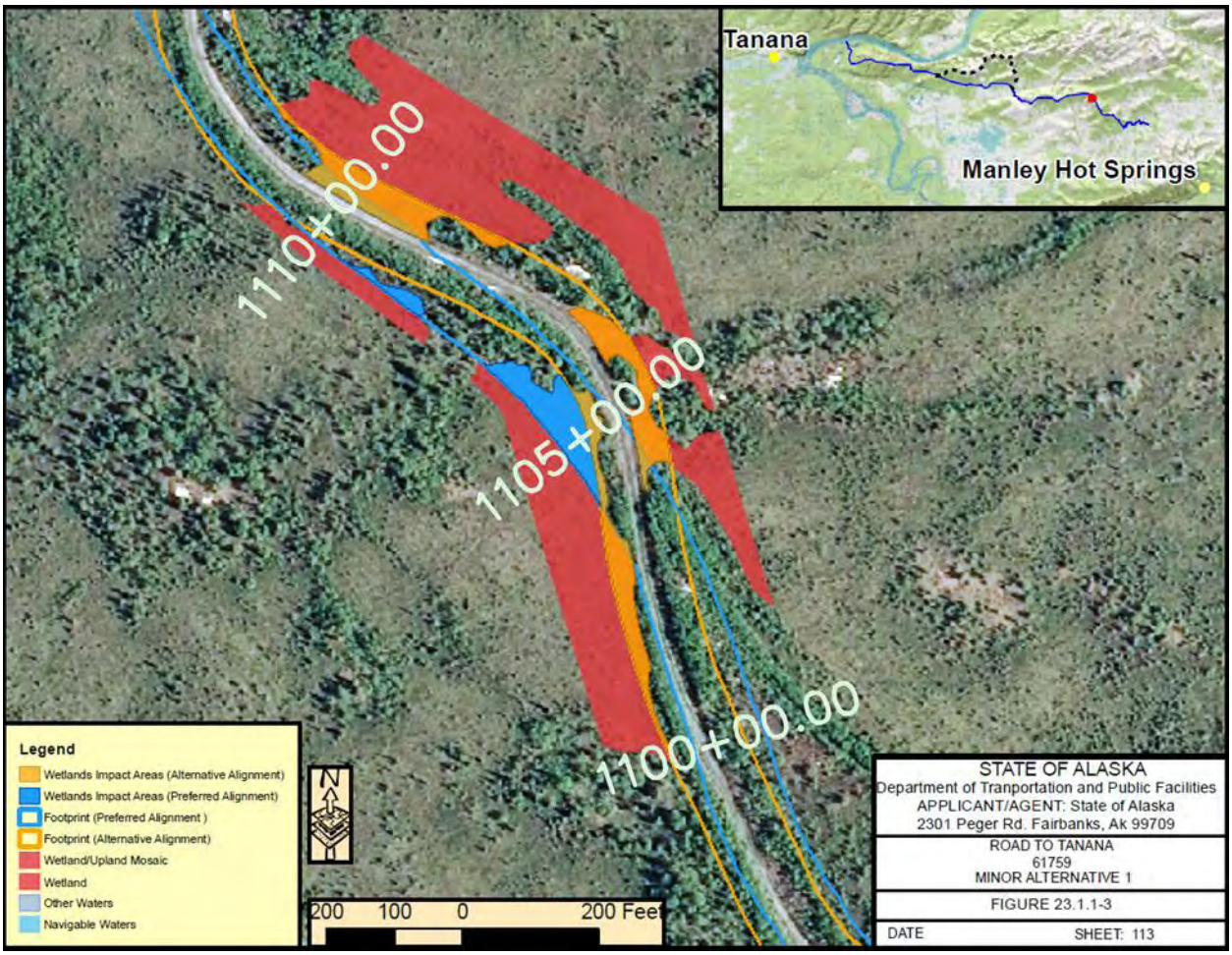

Figure 23.1.1-3: Minor Alternative 1

Minor Alternative 2: Minor Alternative 2 (Figure 23.1.1-4) spans from station 1680+00 to 1745+00 (MP 31.8 to 33.3). The wetlands mapping identified wetlands between stations 1705+00 to 1743+00 (MP 32.2 to 33.0). Minor Alternative 2 (see Sheet 114 for a larger format version of this figure) was anticipated to impact (5.15 acres) of wetlands. Due to the steep topography of the area, complete avoidance of wetlands was not feasible without compromising road design safety. The design centerline was altered where possible to reduce wetlands impacts. The preferred alignment proposed by the Applicant is anticipated to impact (3.07 acres) of wetlands, for a reduction of 2.08 acres.

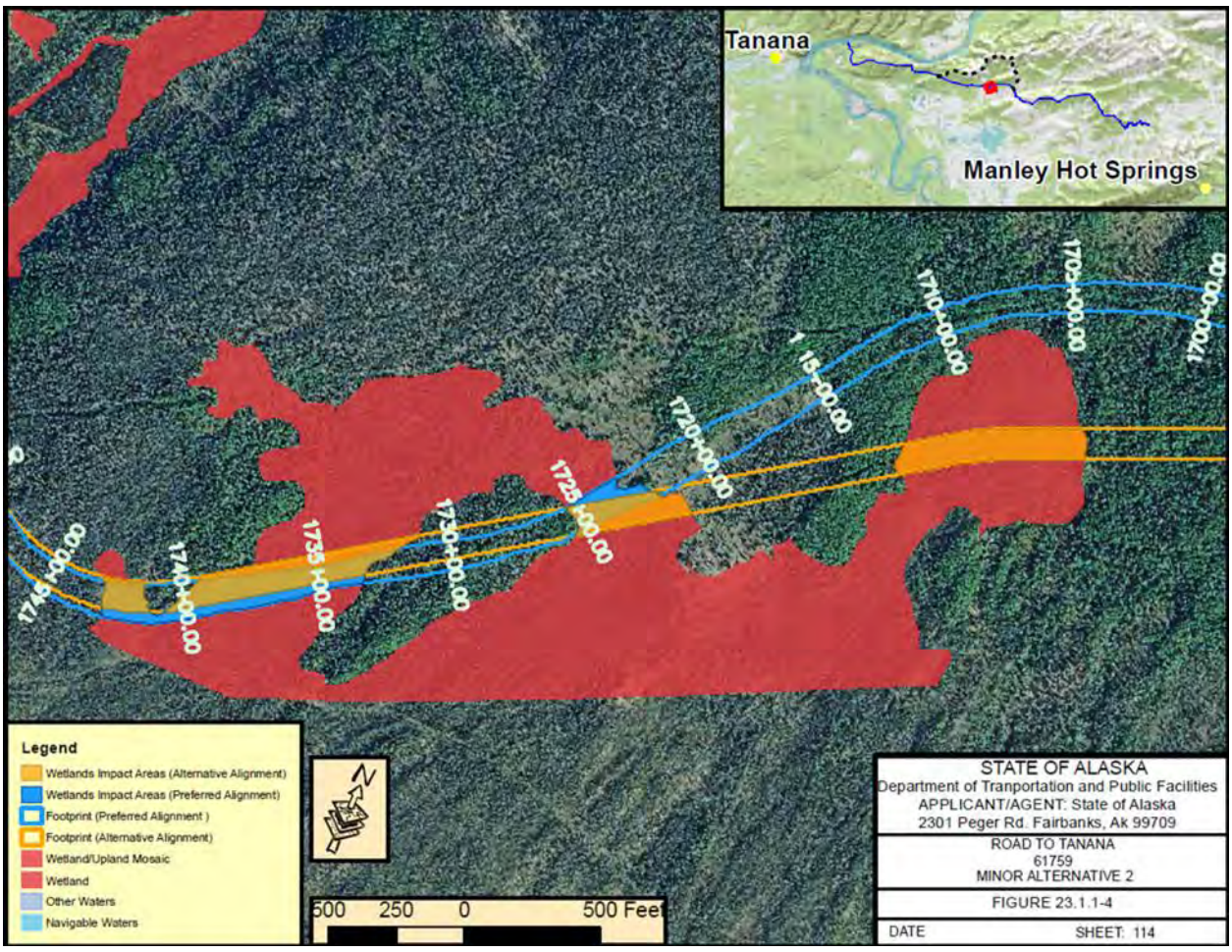

Figure 23.1.1-4: Minor Alternative 2

Minor Alternative 3: Minor Alternative 3 (Figure 23.1.1-5) spans from station 1930+00 to 2080+00 (MP 36.6 to 39.4). The wetlands report revealed the presence of wetlands between stations 1995+00 to 2065+00 (MP 37.8 to 39.1). Minor Alternative 3 (see Sheet 115 for a larger format version of this figure) was anticipated to impact (4.67 acres) of wetlands. The design centerline was shifted through this section to avoid wetlands. The preferred alignment is anticipated to impact (2.25 acres) of wetlands for a reduction of 2.42 acres.

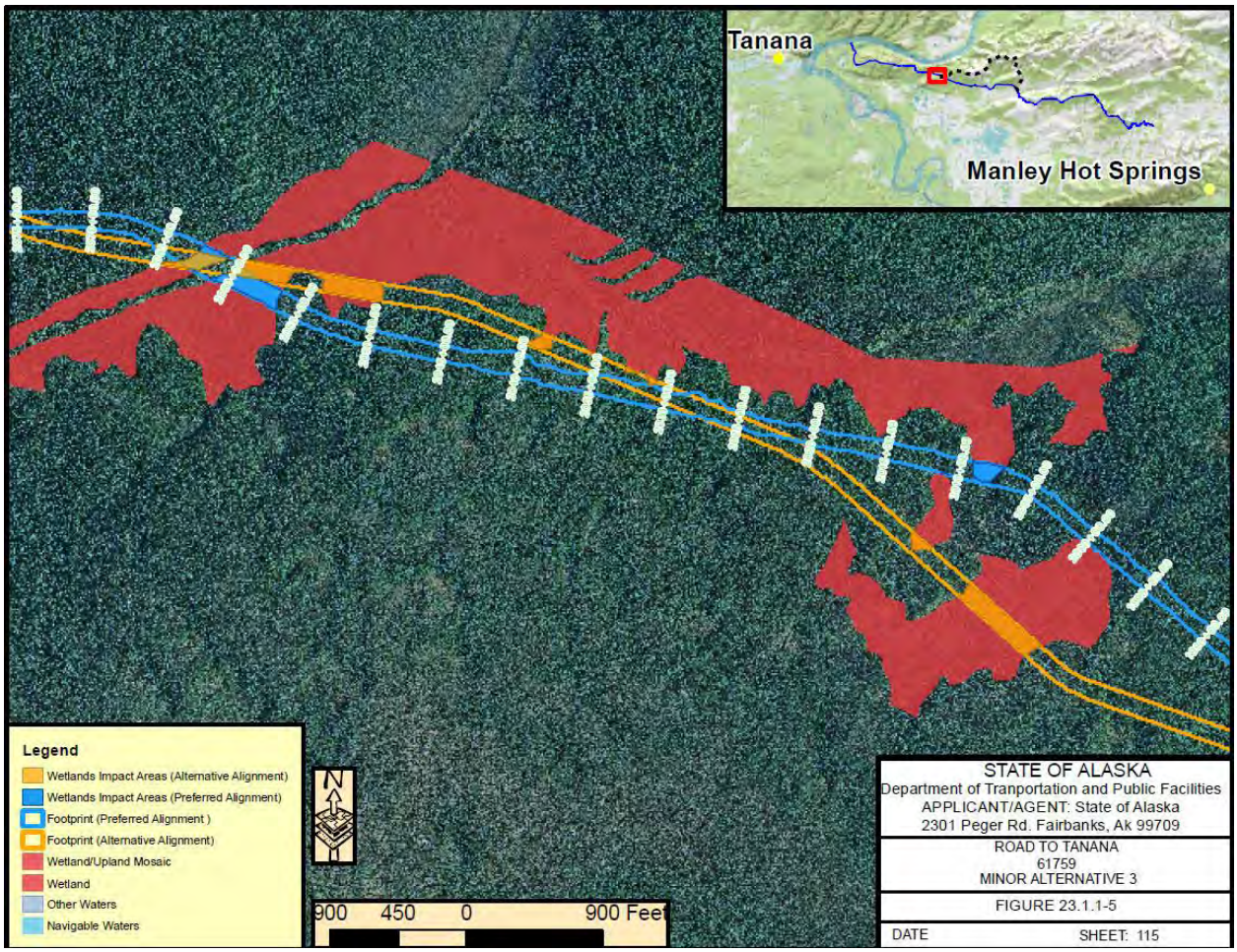

Figure 23.1.1-5: Minor Alternative 3

Minor Alternative 4: Minor Alternative 4 (Figure 23.1.1-6) spans from station 2455+00 to 2525+00 (MP 46.5 to 47.8). The wetlands report revealed the presence of wetlands between stations 2473+00 to 2520+00 (MP 46.8 to 47.7). Minor Alternative 4 (see Sheet 116 for a larger format version of this figure) was anticipated to impact 6.22 acres of wetlands. In an effort to reduce impacts to wetlands, the alignment was shifted south where possible and the footprint of the preferred alignment was narrowed by reducing the grade elevation by one to two feet. The preferred alignment is anticipated to impact 3.16 acres of wetlands in this area for a reduction of 3.06 acres.

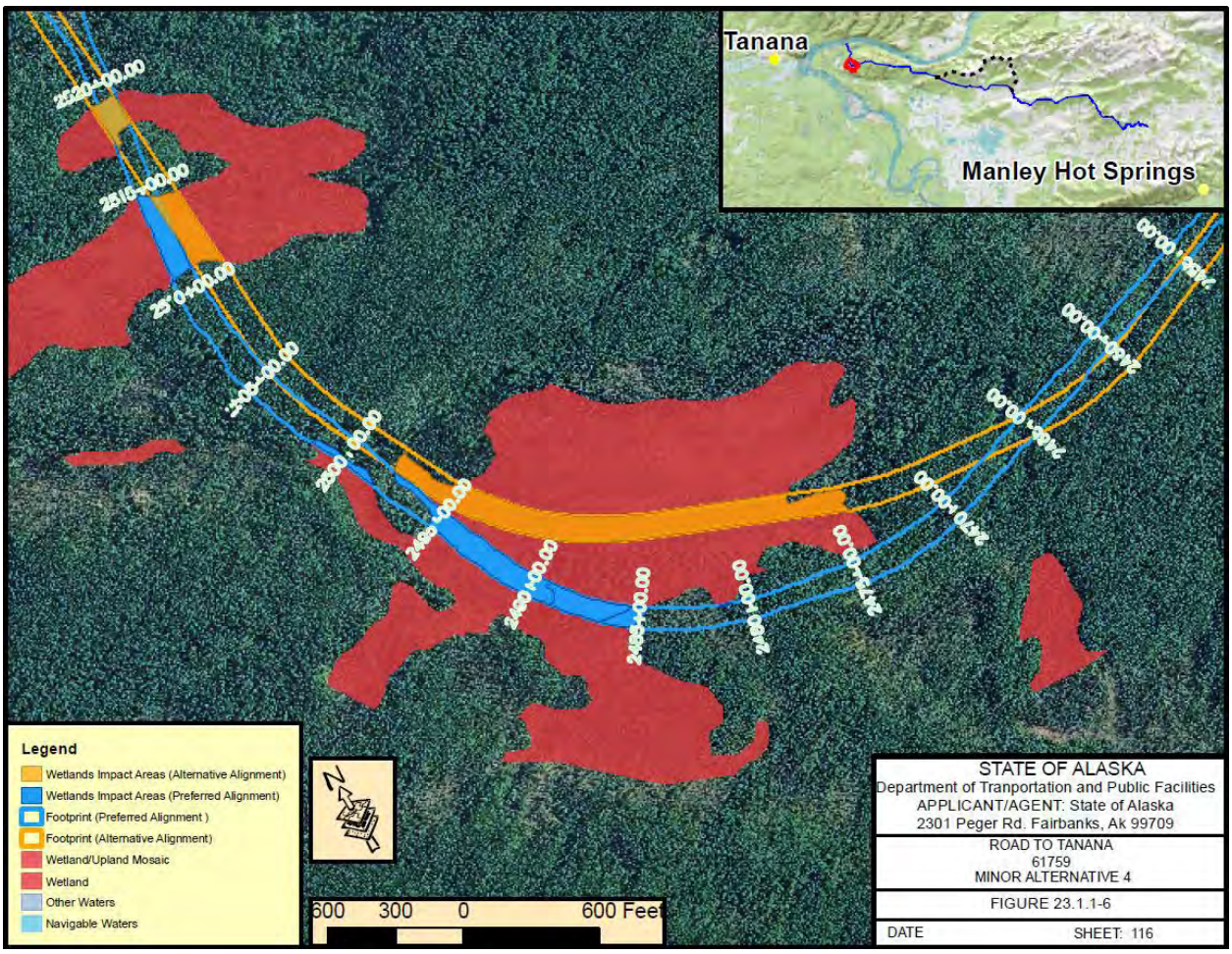

Figure 23.1.1-6: Minor Alternative 4

Minor Alternative 5: Minor Alternative 5 (Figure 23.1.1-7) spans from station 2540+00 to 2590+00 (MP 48.1 to 49.05). The wetlands report located wetlands between stations 2553+00 to 2580+00 (MP 48.35 to 48.86). Minor Alternative 5 (see Sheet 117 for a larger format version of this figure) was anticipated to impact (2.72 acres) of wetlands. In an effort to reduce impacts to wetlands, the alignment was shifted north where possible. Realigning the centerline to completely avoid wetlands was not possible due to the high concentration of wetlands in the vicinity, as well as steep topography limiting safe realignment options. The preferred alignment is anticipated to impact (1.16 acres) of wetlands for a reduction of 1.56 acres.

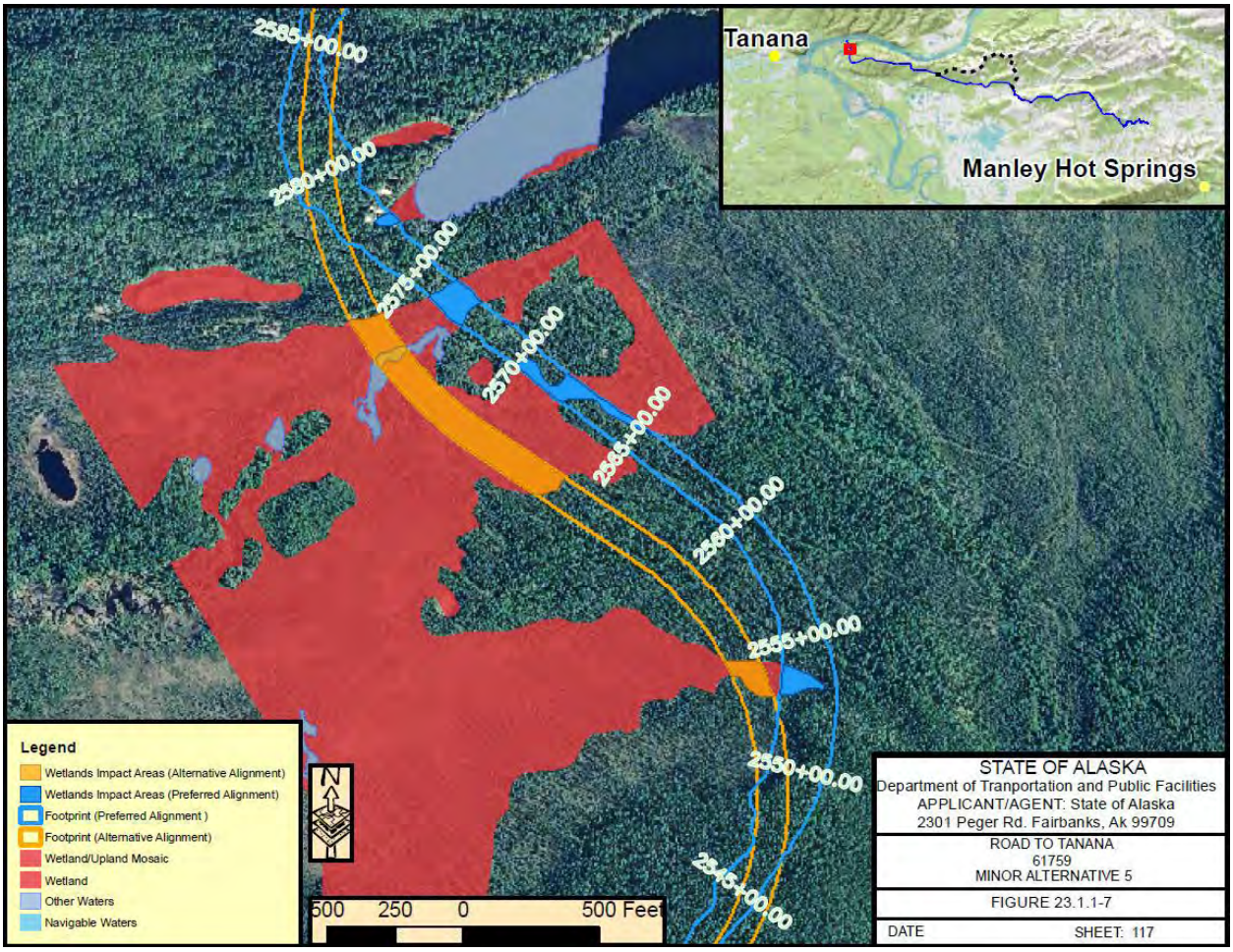

Figure 23.1.1-7: Minor Alternative 5

23.1.2 Material Site Avoidance Measures

Figure 23.1.2-1 provides an overview of all material sites evaluated for the project. See also Sheet 118 for a larger format version of this figure.

Two additional material sites were evaluated to support the project as proposed. Both were abandoned to reduce the project‟s overall impact to the biological and human environment.

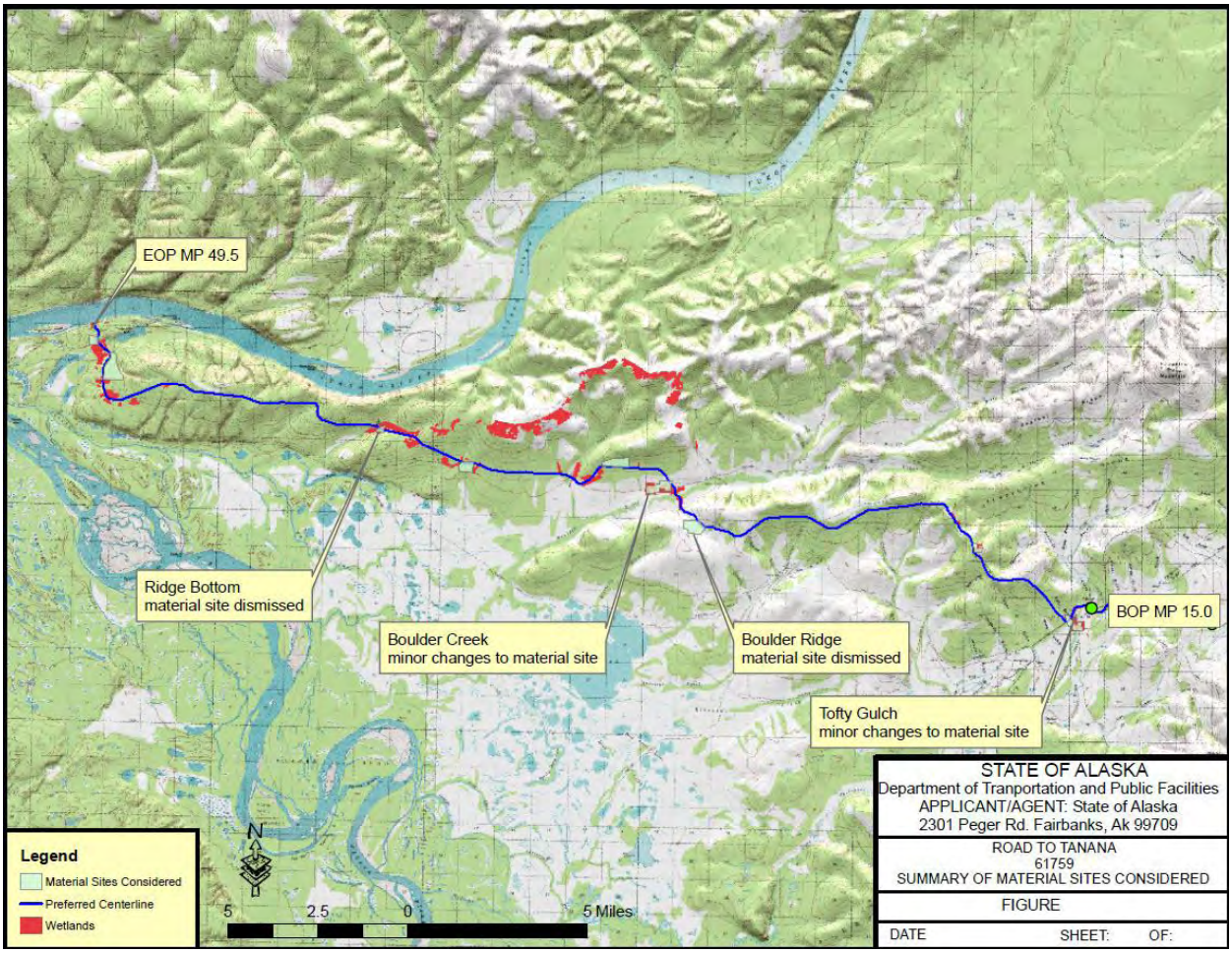

Figure 23.1.2-1: Material Sites Alternatives Evaluated for the Road to Tanana

Boulder Ridge Material Site: Boulder Ridge Material Site (Figure 23.1.2-2) spans approximately from station 1500+00 to 1515+50 (MP 28.41 to 28.70), and is situated south of the preferred road centerline (see Sheet 119 for a larger format version of this figure). Geotechnical field investigations initially revealed the proposed Boulder Ridge material site as a source of high quality material including riprap and crushable surfacing material. Further, no wetlands were located in this area during the preliminary mapping efforts.

However, analyses of material samples taken from the site showed a high percentage of naturally occurring asbestos. The decision to not develop Boulder Ridge material site was based on the presence of naturally occurring asbestos-containing material. Typically, material high in naturally occurring asbestos poses less detrimental effects on potential human receptors if the material is „capped" by covering it with non-asbestos-containing material, thus reducing the likelihood of inhalation, ingestion, or direct contact with asbestos fibers in the material. It is not recommended that material containing high levels of naturally occurring asbestos be used for surfacing or as exposed construction material. Because the primary purpose of this material site would have been for surfacing, plans to develop the site for the project were abandoned. Material needs were met by expanding other sites along this alternative route.

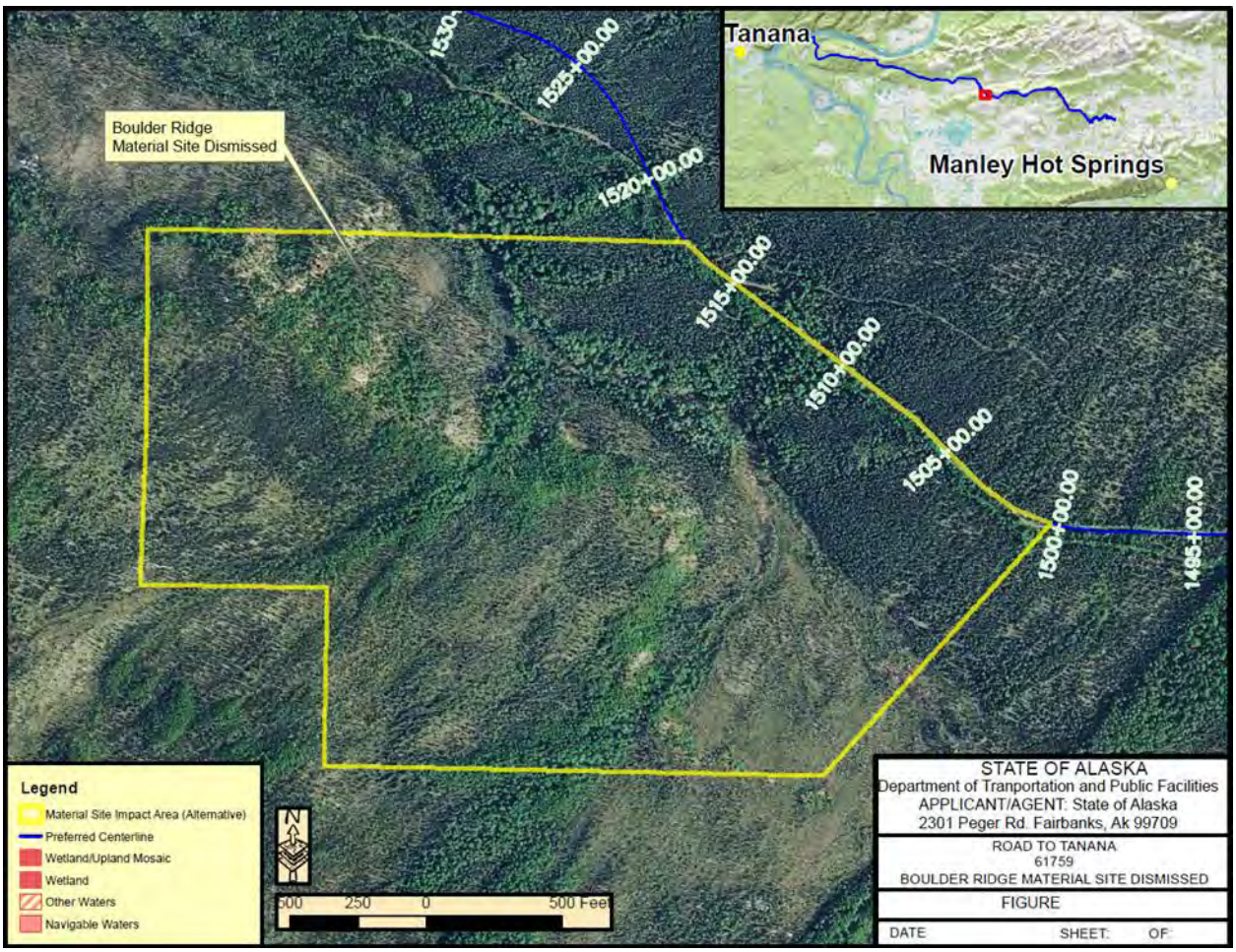

Figure 23.1.2-2: Boulder Ridge Material Site

Ridge Base Material Site: Ridge Base Material Site (see Figure 23.1.2-3) spans approximately from station 2050+00 to 2060+50 (MP 38.83 to 39.02) and is centered over the preferred road alternative centerline (see Sheet 120 for a larger format version of this figure). Prior to geotechnical field investigations, Ridge Base Material Site was believed to hold a potential to produce crushable surfacing material. This belief was based on an aerial survey and satellite imagery indicating the presence of quartzite boulders. Subsequent field investigations revealed the material site would produce material suitable only for embankment, rather than crushable surfacing material as expected. Further, wetland investigations revealed significant wetlands presence within the proposed material site boundary and also throughout surrounding area.

The decision to not develop Ridge Base material site was reached subsequent to receiving the wetlands report, which suggested site development would impact wetlands approximately 14.31 acres in extent. In addition, successful reclamation of the site after completion of material extraction would be difficult considering the steep topography of the area. The material quantity demands for the preferred project alternative can be adequately met without developing Ridge Base material site, thereby avoiding potential wetland impacts by 14.31 acres.

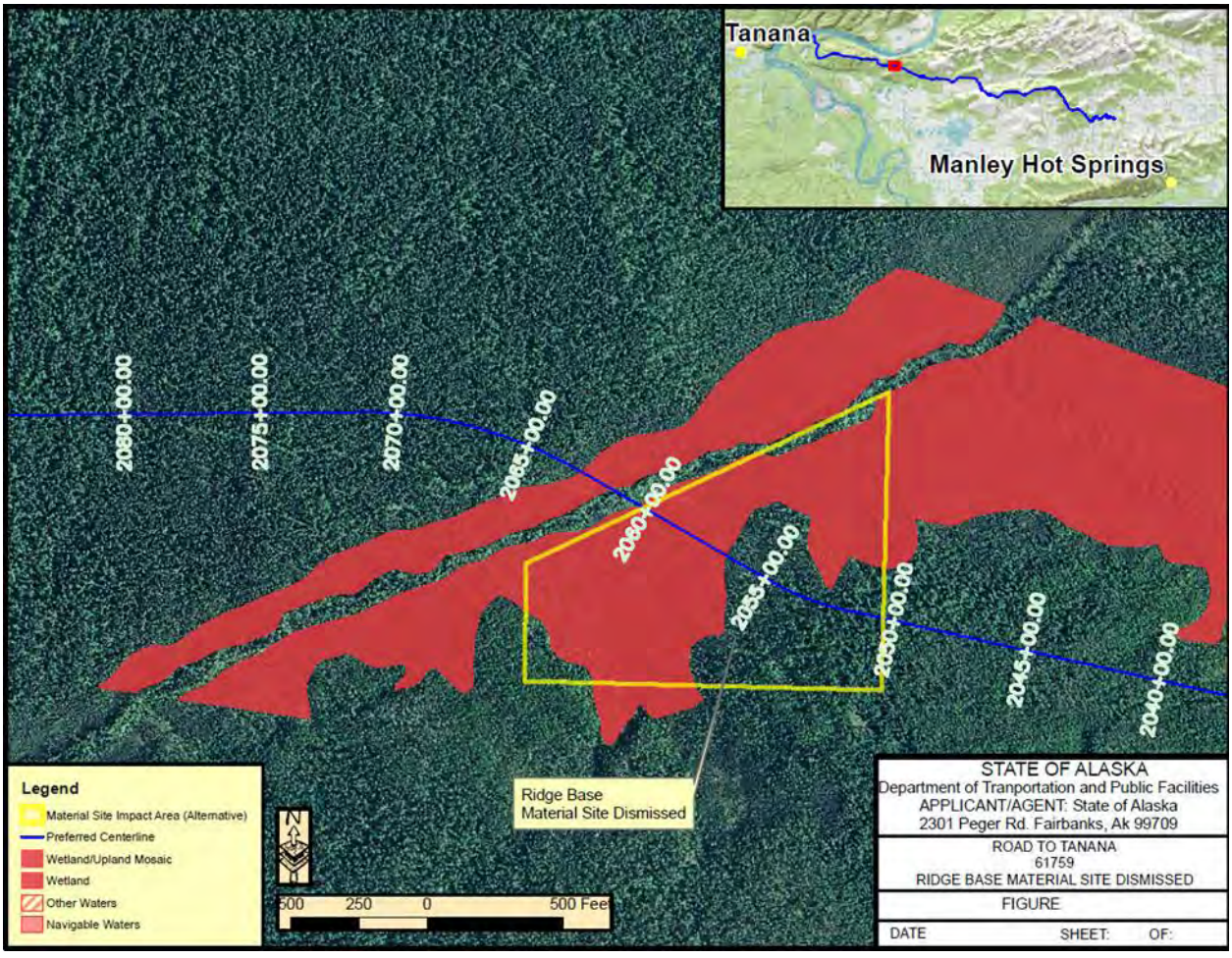

Figure 23.1.2-3: Ridge Base Material Site

23.1.3 Material Site Minimization Measures

Tofty Gulch Material Site: Tofty Gulch material site (Figure 23.1.3-1 below) spans from station 845+00 to 855+00 (MP 16 to 16.2) and is situated on either side of the preferred road alternative centerline (see Sheet 121 for a larger format version of this figure). Geotechnical field investigations confirmed the presence of large quantities of gravel tailings, produced from prior gold placer mining activity, that are suitable as surfacing material. The wetlands report indicated the original material site boundary (shown in yellow on Figure 23.1.3-1) would impact 16.62 acres of wetlands and other waters of the U.S. In an effort to minimize impacts to these areas, the material site boundary was adjusted and decreased in size, reducing the anticipated wetlands impacts to 2.13 acres and yielding a 14.5 acre avoidance. Tofty Gulch material site will also be reclaimed upon completion of mining activity.

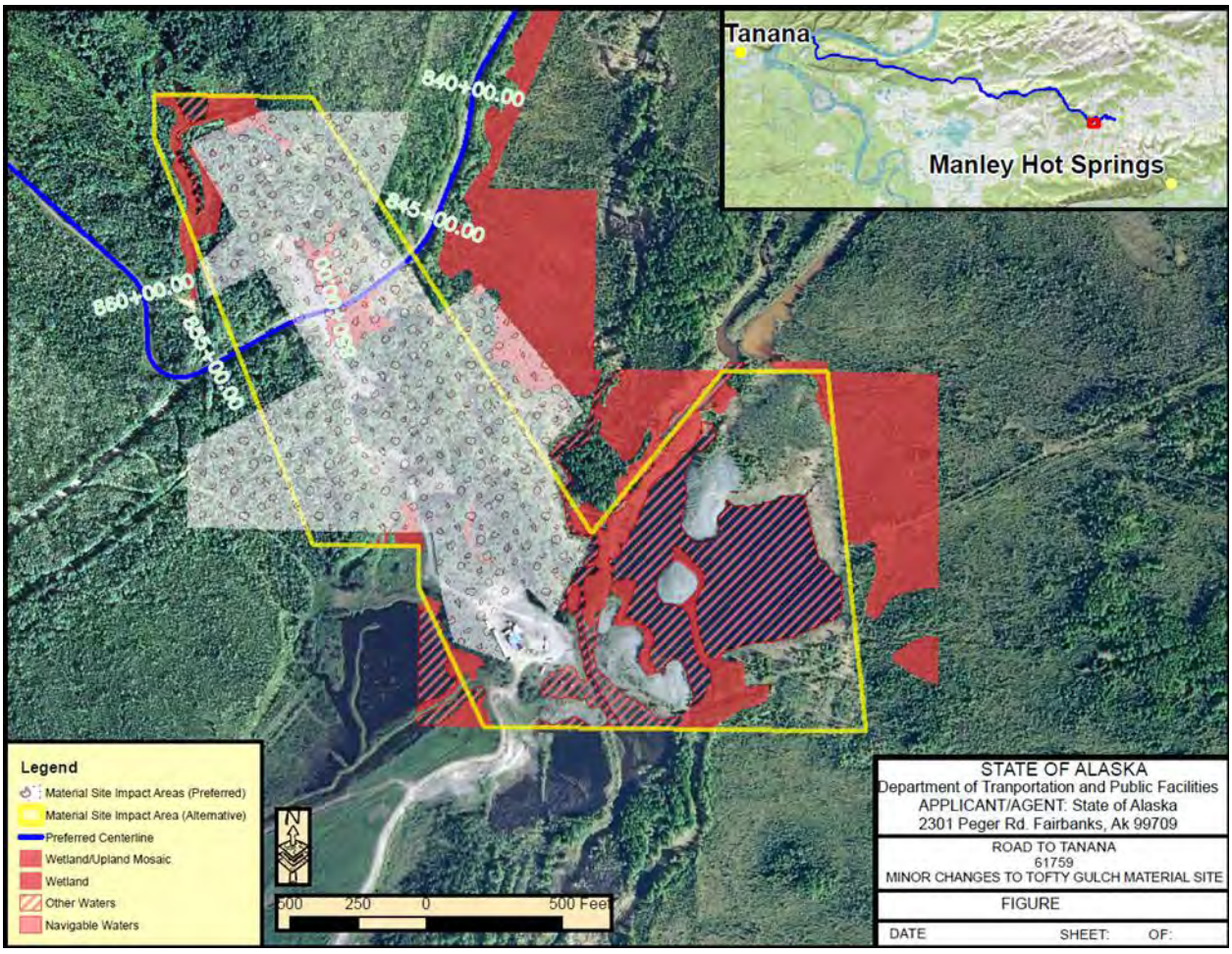

Figure 23.1.3-1: Tofty Gulch Material Site Redesign Minimization Measures

Boulder Creek Material Site: Boulder Creek material site (Figure 23.1.3-2) spans approximately from station 1580+00 to 1595+30 (MP 29.9 to 30.2), and is situated west of the preferred alternative alignment and just north of Boulder Creek (see Sheet 122 for a larger format version of this figure). Boulder Creek material site contains large quantities of gravel tailings from prior gold placer mining activity, and is expected to serve as the primary crushed aggregate source for this project. Satellite imagery, as well as the wetlands report, revealed the existence of numerous pockets of wetlands and ponds previously created or altered by past placer mining activities.

A large percentage of the site"s useable material is contained within these wetland areas. The initial delineation of the material site boundary (as shown in yellow on Figure 23.1.3-2) was estimated to have impacted 20.17 acres of wetlands. As shown by the grey shade pattern, the material site boundary was subsequently altered and reduced in size in order to avoid impacts to wetlands, particularly those intact wetland acres not previously affected by placer mining activity. Material extraction within the revised material site boundary proposed in this application is anticipated to impact only 7.46 acres of wetlands, thereby avoiding 12.72 acres of wetland impact. Boulder Creek Material Site will also be reclaimed upon completion of mining activity.

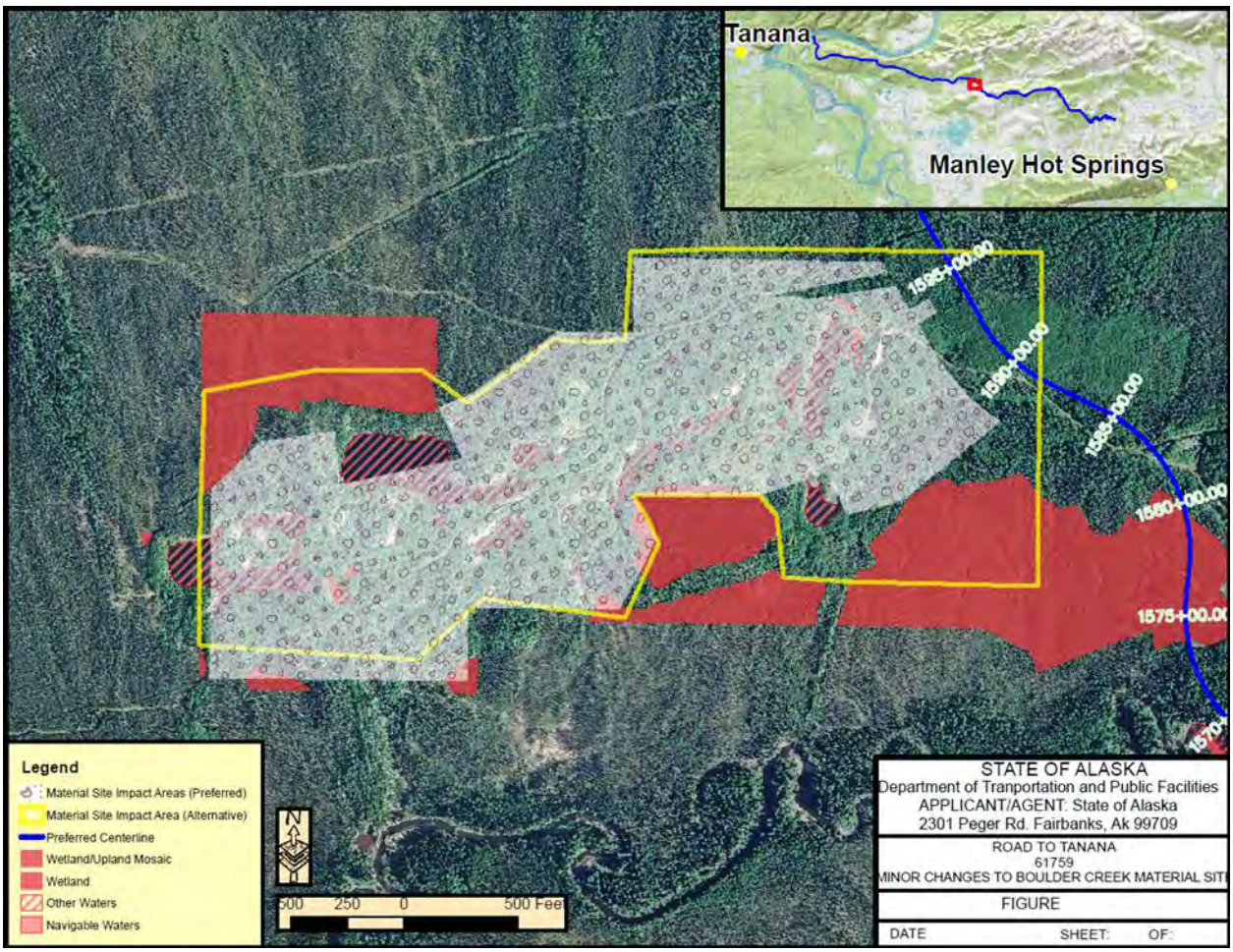

Figure 23.1.3-2: Boulder Creek Material Site Minimization Measures

In conclusion, the Applicant has avoided and minimized their potential footprint in wetlands through a number of actions. These are summarized in Table 23.1-2 below.

Table 23.1-2: Summary of Avoidance Measures through the Design Process

Facility or Alternative	Estimate of Wetland or Water Acres Avoided or Minimized Through Design Measures
Major Alternative 1	29.00
Minor Alternative 1	0.33
Minor Alternative 2	2.08
Minor Alternative 3	2.42
Minor Alternative 4	3.06
Minor Alternative 5	1.56
Boulder Ridge Material Site	0.00
Ridge Base Material Site	14.31
Tofty Gulch Material Site	14.50
Boulder Creek Material Site	12.72
TOTAL WETLAND IMPACTS AVOIDED	**79.98**

23.2 MINIMIZATION ACTIVITIES PROPOSED DURING CONSTRUCTION

After the preliminary and final design avoidance processes, the Applicant evaluated a suite of best management practices (BMPs) to further minimize anticipated impacts from the proposed project. The BMPs listed below will be included in all construction contract documents, in an effort to further minimize impacts to the aquatic environment.

23.2.1 Road Construction Minimization Measures

Vegetation Clearing Activities

Vegetation clearing of the proposed ROW will be coordinated with the Alaska Department of Natural Resources, Division of Forestry (DOF) to minimize potential for post-harvest engraver beetle and other deleterious insect infestation of cleared areas.

Areas where spruce and mixed spruce-hardwood cover types predominate will require clearing no earlier than July and no later than March. Removal of slash and or other BMPs to reduce potential for infestation will be conducted as per ADNR-DOF recommendations.

Vegetation clearing in wetlands not proposed to be filled or excavated will be accomplished by hand, using low ground-pressure, wheeled ATVs for access to minimize temporary impacts.

Construction Timing and Sequencing

Concurrent to these BMPs vegetation clearing will follow Migratory Bird Treaty Act-based recommendations by USFWS regarding migratory bird nesting and rearing windows, with the net outcome of conducting clearing activities during pre-nesting or post-fledge periods for avian protection.

Construction timing will follow recommendations of the USFWS and ADF&G regarding establishment of seasonal windows or other BMPs or stipulations (i.e., pre-construction nesting bird reconnaissance; site clearing prior to bird migration; temporary bypass for fish) to minimize construction impacts to fish and wildlife resources.

Final clearing windows will be developed cooperatively with these agencies and implemented as a construction stipulation in project bid documents. Clearing will be conducted in a manner that prevents soil or vegetation disturbance outside the vegetative clearing limits.

Water crossing construction will be accomplished during annual periods historically coinciding with low-water flows (and/or frozen water/soils) in planned stream crossing locations.

Invasive Species Control Measures

Construction activities requiring reseeding of vegetative cover will utilize certified seed materials meeting requirements of the State of Alaska Seed Regulations (11 AAC 34 Articles 1 & 4) regarding purity, germination and weed content.

Erosion Control Measures

In general, erosion control and construction methods will be described in the Contractor-prepared SWPPP, and will be required to comply with the requirements of the U.S Environmental Protection Agency"s (EPA) National Pollutant Discharge Elimination System (NPDES), Construction General Permit AKR# 100000. The Contractor will also be required to obtain a letter of non-objection from the ADEC prior to commencement of construction activities.

BMPs for embankment stabilization, including contouring and seeding will be required project-wide to reduce embankment erosion and potential sediment runoff into wetland areas.

Project wide, any stockpiling of material, equipment staging, and mobilization and temporary construction access will avoid wetlands to the fullest extent practicable. When filling in wetlands, temporary straw waddles, silt fencing, a permitted vegetative buffer, or other BMPs will be employed to reduce sediment runoff into temporary impact areas. Embankments will also be tracked and stabilized in accordance with BMPs to further prevent embankment erosion and sediment runoff.

23.2.2 Drainage Construction Minimization Measures

To minimize potential sediment suspension and transport, stream crossing structures will be constructed during periods of low flow regimes in respective streams. Erosion Sediment Control Plans (ESCPs) and Stormwater Pollution Prevention Plans (SWPPPs) will be developed and

implemented by the Contractor to prevent introduction of sediments and consequent turbidity into flowing and other waters during construction.

BMPs will be utilized project wide, to maintain in-stream water quality and stream bank stability. Riprap will be installed at bridge abutments and culvert inlet and outlet aprons. Drainage structures will be installed during periods of low flow when practical. Temporary diversion channels and or a dam/de-watering pump system will be employed as needed by the Contractor, and will be detailed in the Contractor provided SWPPP. Depending on the drainage structure installation method used, riprap or other BMPs for velocity dissipation will be utilized at the outfall of the diverted stream water to minimize erosion of the existing streambed. Velocity dissipaters and sediment filtration devices will also be used with de-watering pump systems.

Fish passage structures will be installed at all crossing locations where fish have been identified as resident, and additionally in several locations where fish have not been found but where habitat criteria suggest fish may likely be present. Structures will allow continued free movement of fish beneath the proposed roadway. In existing disturbed areas, these improvements may provide more consistent and beneficial conditions to fish movement. Further, drainage improvements, including cross-drainage, will potentially improve wetland functions adjacent to the existing road and trail, as flows are restored at locations where current crossings are accomplished via hardened fords or aging, compromised drainage structures.

23.2.3 Material Site Construction & Operation Minimization Measures

In addition to deploying the same BMPs applied to other facility types above, material sites have been further designed to support the following environmental and safety considerations:

Access Roads, Work Pads and Facilities

Access to each material site will be directly from the Tofty Road ROW. To improve public safety, material site access roads will be located to provide sight distances on approach roadways that are equal or greater than minimum stopping sight distances calculated from signed traffic speeds and local road grades.

Access to the material site and work pad will be retained at the end of an individual project to be used for material crushing, screening, and stockpiling. When possible, the work pad will be at least 5 acres in size. Once the entire material site is depleted, the work pad and access road will be reclaimed and the pit closed out.

Blasting Permits

Where required due to waterbody proximity, an ADF&G Fish Habitat permit will be obtained by the operator prior to blasting. These permits are required for blasting that will occur either in or near a fish-bearing waterbody.

Buffers

Buffers are provided within material site boundaries to provide a barrier between mining activity and adjacent land use. Buffer widths vary but are typically 30 feet or more in this application. Other than disturbance required to create access to the mining area, the buffers are managed to eliminate any disturbance (i.e. soil, vegetation) within these areas. Mining and overburden

storage areas, work pads, stockpile locations or other developments will not be located within buffers.

Project Mining and Reclamation Plans

Prior to use of these sites, the construction contractor or operator shall submit a detailed Project Mining and Reclamation Plan, in accordance with AS.27.19,11 AAC 97 and the project contract documents, for approval by both the land owner agency and the Applicant.

The Project Mining and Reclamation Plan, by sketch map and narrative, shall describe the proposed method of operation and must comply with the conditions outlined above. After approval of this plan, it will be followed by the contractor or user and if applicable, the Project Engineer. Revisions to the plan require approval of DOT&PF and, if applicable, the regulatory agencies having jurisdiction.

In general, all data should be shown graphically unless it can be better described in the accompanying narrative. Section and profile drawings should be used as appropriate. Where applicable (i.e., material sites with mapped wetlands or waterbodies), Project Mining and Reclamation Plans for Material Sites will include the following:

- Existing ponds, wetlands, and waterbodies will be avoided to the maximum extent possible. When historically placer mined waterbodies are re-entered, the reclamation plan will include measures to stabilize the shorelines of the expanded ponds as noted above. Similarly, if groundwater is intercepted as part of mining operations in non-placer mined areas, the resulting ponds and waterbody shorelines will be stabilized as part of the reclamation plan.

As noted on Sheets 107-110 of the original submittal, different reclamation plans are needed depending on the type of material being mined. The following material specific guidelines will also be mandated:

<u>Sites with Unconsolidated Deposits (i.e. Silt, Sand, and/or Gravels)</u>

Standard excavation techniques are generally adequate for development and mining of these sites. Depending on contractor or user preference and project timing; blasting, excavation equipment, or natural thawing may be employed to loosen frozen material. If a contractor or user elects to use natural thawing, multiple cells may be stripped and excavated concurrently.

Mining will take place in these areas following these guidelines for each cell:

1. Survey and mark material site and buffer boundaries in the area to be mined prior to breaking ground.
2. Windrow or stockpile surface vegetation and organic soils for future use in reclamation adjacent to buffers.
3. Windrow or stockpile overburden adjacent to the vegetation and organic soils, or preferably use directly for reclamation of previously mined areas.
4. Minimize stockpiling overburden where it will need to be moved for future stripping/mining.
5. Conserve material for future mining by not placing overburden stockpiles on top of material that could be mined in the future.

6. Conduct mining activities to put materials to their highest and best use.
7. The side slopes of the active pit should not be steeper than 1:1 so stockpiled berms do not fall or slough in to the active pit.
8. All mining activities will be in accordance with the Construction General Permit (CGP) and an approved Storm Water Pollution Prevention Plan (SWPPP).

Reclamation has several general objectives:

1. Not to disturb previously reclaimed or undisturbed areas whenever possible.
2. To merge with previous reclamation and surrounding topography.
3. To prevent erosion and sediment transport to surrounding undisturbed areas.
4. To allow reestablishment of native vegetation, and encourage development of wildlife habitat.
5. To leave the site in safe condition that does not endanger people or wildlife.
6. Not to preclude or unduly hinder future development of un-mined areas.
7. All reclamation activities will be in accordance with applicable CGP and SWPPP.

Reclaim cells as soon as possible after depletion. Perform concurrent reclamation of disturbed areas to the maximum extent possible as part of the active project.

Reclamation activities will include the following activities and follow these general guidelines:

1. Reclaim slopes along the material site boundaries (not including buffers), or where future development is not anticipated.
2. Grade slopes above the water table to 3(H):1(V), or flatter.
3. Grade slopes within 30 feet of the shore in areas that are either underwater or expected to be underwater, to provide shallow water habitat, with water depth less than three feet.
4. Spread available organic soils over re-graded slopes. Spread available vegetative material over the organic soils to aid reestablishment of native species.
5. Contact agencies to determine site-specific seeding and fertilization requirements.
6. Grade the pit floor or pad to a flat or gently sloping shape, and remove all equipment and non-native debris and waste. Grade slopes above the water table and adjacent to areas of future production to 1(H):1(V) or flatter. Overburden or organic material need not be re-spread on these slopes.
7. Reclaim the active work area and remove or reclaim access roads once the site is depleted.
8. Where not covered by the above items, or typical sections, final contouring and grading pond margins will occur in accordance with the appropriate sections of the State of Alaska Department of Fish and Game Technical Report 93-9, North Slope Gravel Pit Performance Guidelines.

See also Sheets 107-109 of the original submittal for Unconsolidated Site Typical Reclamation Plan drawings.

<u>Bedrock Sites and Sites with Consolidated Deposits</u>

Bedrock sites and those with consolidated deposits contain hard materials that typically require drilling and blasting for production. Sheet 110 shows the typical restoration plan for these areas.

These sites may be mined as described for unconsolidated deposits, if material is soft enough to allow excavation without blasting. Where blasting is necessary, or selected as the mining method, mining shall occur in benches, nominally 20-feet high. Contractors or users may have specific plans or equipment constraints that make flexibility in bench size, height and location necessary. However, maximum bench height is 40 feet. Developing pits with benches is intended to:

- Provide multiple working faces.
- Limit safety hazards to operators, the public, and wildlife due to falling rock.
- Provide safer slopes for continued development.

Mining will take place in these areas following these guidelines:

1. Survey and mark material site and buffer boundaries in the area to be mined prior to breaking ground.
2. Windrow or stockpile surface vegetation and organic soils for future use in reclamation.
3. Windrow or stockpile overburden separate from the vegetation and organic soils, or incorporated directly into areas being reclaimed.
4. Do not stockpile overburden where it will need to be moved for future stripping/mining.
5. Conserve material for future mining by not placing overburden stockpiles on top of material that could be mined in the future.
6. Use appropriate offsets between overburden berms and the active pit so berms do not fall into the active pit.
7. Mining will proceed in a benched manner. Individual benches will be no more than 40-feet apart vertically, and will be no narrower than 20-feet wide. Multiple benches can be in production at one time.
8. Individual bench faces may be vertical, but overall slope angles within the active pit will be no steeper than 0.5(H):1(V), flatter slopes are acceptable.
9. All mining activities will be in accordance with the Construction General Permit (CGP) and an approved Storm Water Pollution Prevention Plan (SWPPP).
10. Conduct mining activities to put materials to their highest and best use.
11. During riprap production, sort all mined material not directly used on the project and stockpile by riprap class for future use.
12. Maintain access to all benches during and at the end of production.
13. Grade the pit floor or pad to a flat or gently sloping shape, and remove all equipment and non-native debris and waste.
14. Located stockpiles within the work area for future use. Leave stockpiles in a neat and orderly fashion, and appropriately signed.

Reclamation has several general objectives:

1. Not to disturb previously reclaimed or undisturbed areas whenever possible.
2. To merge with previous reclamation and surrounding topography.
3. To prevent erosion and sediment transport to surrounding undisturbed areas.
4. To allow reestablishment of native vegetation, and encourage development of wildlife habitat.
5. To leave the site in safe condition that does not endanger people or wildlife.

6. Not to preclude or unduly hinder future development of un-mined areas.
7. All reclamation activities will be in accordance with applicable CGP and SWPPP.

Reclamation activities will follow these general guidelines:

1. Grade overburden or unusable material piles after each use to slopes of 3(H):1(V), or flatter.
2. Reclaim pit or quarry walls where future development is not anticipated t the end of each project, as long as access to the working faces or benches is not impacted. Grade pit or quarry walls to 2(H):1(V) or flatter. Stockpiled overburden or unusable material can be used for grading.
3. Spread available organic soils over re-graded slopes. Spread available vegetative material over the organic soils to aid reestablishment of native species.
4. Contact agencies to determine site-specific seeding and fertilization requirements.
5. At the end of each use, un-reclaimed faces shall be scaled of loose and dangerous rock so that the faces are left in a condition such that they will not collapse or allow loose rock that presents a safety hazard to fall from them.
6. A pit or quarry wall is exempt from the requirements of 2-4 of this section if the steepness of the wall makes them impracticable or impossible to accomplish.
7. After each use, the pit floor or pad will be graded to a flat or gently sloping shape, and the contractor or user will remove all equipment and on-native debris and waste.
8. Reclaim the active work area and remove or reclaim access roads once the site is depleted.

23.3 COMPENSATORY MITIGATION

The Applicant has reviewed the project‟s anticipated impacts, after making substantial efforts to avoid and minimize impacts to wetlands and other waters of the U.S. during both the design and proposed construction phases of the project. These efforts have or will cost the Applicant substantial amounts of time and money. In light of these mitigation expenses already incurred (or agreed to as construction minimization practices), the Applicant proposes that no additional compensatory mitigation be required for the temporary construction impacts from the 13.9 acres of vegetation clearing activities.

The Applicant accepts that the permanent loss of 34.6 wetland acres should be further compensated per the 2008 Mitigation Rule, and using functional assessment data collected for this purpose has rated the wetlands per the requirements of the Alaska District‟s Mitigation Regulatory Guidance Letter (RGL) number 09-01.

The Applicant‟s consultants have applied *A Rapid Procedure for Assessing Wetland Functional Capacity Based on Hydrogeomorphic Classification* (Magee 1998) to 50 representative wetlands in the study area (see PJD). This methodology rates a wetlands capacity to perform a suite of eight functions wetlands typically perform. While a separate rating is obtained for each function, the average for the plots evaluated is used in the following general discussion. To learn more about the specific wetlands in the project area, readers should refer to the PJD. Table 23.3-1 displays the results from a very basic analysis of wetland functions in the project area.

Table 23.3-1: Wetland Ratings by HGM Class, Per the Magee Method

HGM Type	Acres Impacted	FCI Range; Average FCI	Magee Overall Rating
Cut/Fill (i.e. Permanent Impacts)			
Depressional	8.2	0.0 to 0.89; 0.48	Low to Moderate
Flat	16.5	0.0 to 0.94; 0.51	Moderate
Riverine	3.5	No Plots Available	Assumed Moderate to High
Riverine Channel	0.1	No Plots Available	Assumed High
Slope	6.3	0.0 to 0.93; 0.53	Moderate
Subtotal	34.6		
Vegetation Clearing Only (i.e. Temporary Impacts)			
Flat	9.1	0.0 to 1.0; 0.54	Moderate
Riverine	1.4	No Plots Available	Assumed High
Slope	3.4	No Plots Available	Assumed Moderate
Subtotal	13.9		

Results shown in Table 23.3-1 were collected within the proposed impact areas. Where no plots were completed within the actual boundaries of the final design footprint, other data collected in the project area were used to create the "assumed" ratings. If no data were collected in a particular type in the study area, assumed ratings are based on other findings in interior Alaska.

Consistent with the rule, the Applicant has considered a variety of mitigation options before proposing the compensation options outlined below.

First, no mitigation banks are currently operating within the impact service areas of the project. Therefore, use of an approved mitigation bank is not a viable option.

Consistent with the rule (when no mitigation banks are present), the Applicant is proposing to buy in-lieu fee program credits from *The Conservation Fund*. While other programs would be considered if available, *The Conservation Fund* is currently the only approved in-lieu program approved for operations within this project area.

In addition to data contained in the permit application document, the Applicant has submitted a preliminary jurisdictional determination document which provides the information required by Section 4 of the RGL for all proposed impact areas.

Section 5 of the RGL also requires that the Applicant determine their mitigation ratios and debits per the guidance provided. Suggested ratios are as follows for Preservation (i.e. in-lieu fee programs like *The Conservation Fund*).

- Lower Value Wetlands: 1.5 to 1
- Moderate Value Wetlands 2.0 to 1
- Higher Value Wetlands 3.0 to 1

However, in light of the costly and thorough avoidance and minimization measures taken to date, and the demonstrated public need for the project as evidenced by local support among the affected communities; the Applicant proposes a 1:1 Mitigation Ratio and cost/acre rate consistent with other remote road and airport projects recently permitted in the Northern Region for all low to moderate rated acres (see Table 23.3-2), or a 1.5:1 ratio for all permanently affected acres (see Table 23.3-3) except those expected to support higher functional values, proposed at 2:1 ratios.

Recent examples of other projects meeting a demonstrated public need in the northern region include a 2011 project at the Manley Airport which impacted 44.4 acres of wetlands. This project was mitigated through *The Conservation Fund* at a rate of $500/acre.

More recently, in October of 2012, a remote airport project near Kotzebue impacted 128 acres of submerged lands at a 1.5 to 1 ratio, again with the cost/acre rate set at $500/acre.

As land costs near Manley, Alaska are the closest indicators of values for this region, 3PPI applied a net present value analysis to the $500/acre 2011 in-lieu fee mitigation costs to determine the equivalent rate in 2013. Values ranged between $545.89 to $586.89/acre depending on the discount rate used. The average of the four rates evaluated was $566.72, which has been used in the two mitigation option tables below. These options are provided for reference only. The Applicant understands that only the USACE can establish the mitigation ratios, while debit costs per acre will be determined by the in-lieu fee provider in consultation with the USACE.

Option 1:

Table 23.3-2: Mitigation Proposed at 1:1 Ratio for Low to Moderate Rated Wetlands and 2:1 for Higher Rated Wetlands @ $566.72/Acre, All Impacted Wetlands

HGM Type	Acres Impacted	Ratio	Total Fee
Cut/Fill – (i.e. Permanent Impacts)			
Depressional	8.2	1:1	$4,647
Flat	16.5	1:1	$9,351
Riverine	3.5	2:1	$3,967
Riverine Channel	0.1	2:1	$113
Slope	6.3	1:1	$3,570
Subtotal	34.6		$21,649
Vegetation Clearing Only – (i.e. Temporary Impacts)			
Flat	9.1	1:1	$5,157
Riverine	1.4	2:1	$1,587
Slope	3.4	1:1	$1,927
Subtotal	13.9		$8,671
TOTAL	**48.5**		**$30,320**

Option 2:

Table 23.3-3: Mitigation Proposed at 1.5:1 Ratio for Low to Moderate Rated Wetlands and 2:1 for Higher Rated Wetlands at $566.72/Acre, Only Permanently Affected Wetlands

HGM Type	Acres Impacted	Ratio	Total Fee
Cut/Fill – (i.e. Permanent Impacts)			
Depressional	8.2	1.5:1	$6,971
Flat	16.5	1.5:1	$14,026
Riverine	3.5	2:1	$3,967
Riverine Channel	0.1	2:1	$113
Slope	6.3	1.5:1	$5,356
TOTAL	**34.6**		**$30,433**