Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
Require specific wildlife awareness training for drivers operating in the area.	Avoid and minimize impacts to wildlife.	General	Construction/ Operations/ Closure	Wildlife Values; Health and Safety
PLP will evaluate the use of wildlife detection systems at identified high traffic animal crossings. Animal detection systems use sensors to detect large animals that approach the road. Once a large animal is detected, warning signals are activated to inform the drivers that a large animal may be on or near the road at that time.	Avoid and minimize impacts to wildlife.	Transportation Corridor	Operations	Wildlife Values; Health and Safety
Winter management of snow berms along roadways should include periodic breaks or cleared areas in snow berms to allow wildlife to get off the road during the approach of oncoming vehicles.	Avoid and minimize impacts to wildlife.	Mine Site/ Transportation Corridor	Construction/ Operations/ Closure	Wildlife Values
A conceptual Fugitive Dust Control Plan (FDCP) has been prepared to identify project design features and best management practices (BMPs) that would be implemented to minimize fugitive dust emissions (PLP 2019 – RFI 134). Detailed implementation plans will be developed based on final project designs and permit conditions and the FDCP will be updated, as required, to support state permitting. This will include establishing a requirement for the development and implementation of an industry standard operations and maintenance plan prior to construction that would identify specific dust control measures, implementation triggers, equipment-specific requirements, individual responsibilities and contact	Avoid and minimize impacts resulting from fugitive dust associated with mine activities.	Mine Site/ Transportation Corridor	Construction/ Operations/ Closure	Air Quality; Water and Sediment Quality; Fish Values; Soils; Health and Safety

EPA-6692-0003177

Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
details, training requirements, and other measures. The objective of the FDCP is to reduce the potential for airborne dust and control fugitive dust emissions from the activities associated with the construction, operations, and closure of the mine.				
Use dust palliatives (i.e., substances applied to a road surface) to reduce airborne dust.	Avoid and minimize impacts resulting from fugitive dust associated with mine activities.	Mine Site/ Transportation Corridor	Construction/ Operations/ Closure	Air Quality; Water and Sediment Quality; Fish Values; Soils; Health and Safety
PLP will evaluate identified high traffic crossings of the access road for the incorporation of crossing controls such as mandatory stop signs or other traffic control measures,	Improve public safety by reducing the potential for accidents at high use crossings.	Transportation Corridor	Construction	Transportation and Navigation
Measure hydrocarbon concentration and related compounds in surface and groundwater during the periodic water quality monitoring events where appropriate as identified in the Project monitoring plans.	Monitor for potential spills to minimize impacts to water quality resulting from hydrocarbon spills.	Mine Site/ Transportation Corridor	Construction/ Operations/ Closure	Water and Sediment Quality
Avoid discharging bilge water into Iliamna Lake or contain and treat bilge water to remove more than oil before discharging to protect lake ecology.	Avoid impacts to surface water resulting from the discharge of bilge water.	Transportation Corridor	Operations	Water and Sediment Quality
Culverts and bridges would be designed to accommodate fish passage, and the project would use BMPs for design, construction, and maintenance. PLP will use culvert designs that meet USFWS guidelines (Culvert Design Guidelines for Ecological Function, U.S. Fish and Wildlife Service Alaska Fish Passage Program, Revision 5, February 5th,	Avoid impacts to aquatic resources resulting from impaired flow and impaired fish passage.	Transportation Corridor	Construction	Soils; Water and Sediment Quality; Fish Values; Surface Hydrology

EPA-6692-0003178

Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
2020). Road designs, including culvert placement and design will be completed and construction will be monitored by professional engineers with appropriate experience. Culverts would be monitored over the project life to identify any problems, and any identified would be addressed promptly.				
Road designs, including bridges will be completed and construction will be monitored by professional engineers with appropriate experience. Bridge designs will minimize the footprint below the OHW mark to the extent practicable given the load design criteria. Hydrologic surveys will be completed prior to final design to confirm they accommodate for flow under normal and flood conditions.	Avoid impacts to wetlands, waterbodies, and aquatic resources resulting from impaired flow.	Transportation Corridor	Construction	Water and Sediment Quality; Surface Hydrology; Fish Values
Establish flight restrictions (e.g., elevation restrictions) to reduce caribou hunting impacts.	Impacts to human and wildlife use resulting from aircraft noise.	General	Construction/ Operations/ Closure	Wildlife Values; Subsistence
An automated pressure-based leak detection system will be incorporated into the design of the concentrate pipeline and tailings pipelines.	Avoid spills associated with a pipeline leak and the resulting potential for impacts to wetlands, other waters, and aquatic resources.	Mine Site	Operations	Soils; Water and Sediment Quality; Fish Values; Wetlands and Other Waters/Special Aquatic Sites
PLP will consult with ADFG during permitting to evaluate the potential for further optimizing discharge locations.	Reduce impacts to aquatic resources resulting from flow changes.	Mine Site	Operations/ Closure	Water and Sediment Quality; Fish Values
PLP will work with the boroughs, landowners, and the state to develop a road management agreement that provides rules for how the road will	This can result in decreased costs for goods and services for borough residents.	Transportation Corridor	Operations/ Closure	Transportation and Navigation

EPA-6692-0003179

Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
accommodate use by borough residents and businesses.				
PLP will incorporate best practice to address lighting impacts to wildlife and minimize overall lighting requirements, while meeting operational and safety needs.	This will reduce impacts to wildlife resulting from lighting and reduce aesthetic impacts to the night sky.	Mine Site/ Transportation Corridor	Operations	Wildlife Values and Aesthetic Resources
PLP will conduct additional studies of the potential for Lake Clark Fault splays in the vicinity of the Project.	Reduce the risk of a seismic event leading to spills from infrastructure impacts.	Mine Site	Operations/ Closure	Geohazards and Seismic Conditions, Spill Risk
PLP will perform a site-specific tsunami runup analysis at the port.	Avoid the potential for impacts to human health and safety and spills resulting from tsunami inundation of the port site.	Transportation Corridor	Construction/ Operations/ Closure	Geohazards and Seismic Conditions, Spill Risk
PLP will perform subsurface geotechnical investigation at the port site.	Reduce the risk of a seismic event leading to spills from infrastructure impacts.	Transportation Corridor	Construction	Geohazards and Seismic Conditions, Spill Risk
PLP will conduct geotechnical studies at horizontal directional drilling (HDD) sites.	Reduce the risk of a frac out and resulting impacts to waters.	Transportation Corridor	Construction	Geohazards and Seismic Conditions, Water Quality
Conduct further evaluation of the closest private well to the HDD route at Anchor Point (Figure 3.17-16), designated well 53874 by ADNR (2016): - Contact owner to confirm status, use, and pumping rate at the well; - Survey location of well compared to HDD final design route;	Reduce the potential for impacts to drinking water resulting from the drilling of the Anchor Point HDD.	Transportation Corridor	Construction	Groundwater Hydrology, Water Quality

EPA-6692-0003180

Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
- Modify the HDD design to address any concerns identified during engineering - Monitor well flow and quality during all construction activities in the area; and - Provide and implement (if necessary) contingency plans to provide a comparable source of water in the event groundwater flow or quality at the well is altered as a result of HDD installation.				
Provide a response and recovery vessel in the event that the ferry breaks down.	Further reduce the potential for spills associated with a ferry grounding.	Transportation Corridor	Operations	Spill Risk
PLP will implement measures, that may include the use of dust suppressants, to reduce dust from the bulk TSF during and after closure until the tailings can be permanently capped.	Reduce fugitive dust emissions and resultant impacts to air quality.	Mine Site	Operations/ Closure	Air Quality
PLP will wash heavy equipment to reduce dust that collects on the wheels, body, and undercarriage of heavy equipment.	Reduce fugitive dust emissions and resultant impacts to air quality.	General	Operations	Air Quality; Water and Sediment Quality
Use non-toxic palliatives/dust BMPs to reduce fugitive dust.	Avoid potential impacts to air and water quality resulting from the use of toxic palliatives.	Mine Site/ Transportation Corridor	Construction/ Operations/ Closure	Air Quality; Water and Sediment Quality
Provide natural gas–generated shore power to vessels while they are at the dock in port, rather than having the vessels idle, to reduce NOx at the port.	Avoid air impacts resulting from additional emissions associated with running tug engines	Transportation Corridor	Operations	Air Quality

EPA-6692-0003181

Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
	while berthed in the port.			
PLP will maintain and update the Invasive Species Management Plan which will address Project construction, operations, and closure for all Project facilities.	Avoid and minimize the spread of invasive species as a result of project activities and resultant impacts to native species, waters and other aquatic resources.	General	Construction/ Operations/ Closure	Wetlands and Other Waters/Aquatic Resources
Inspect boats, trailers, and other boating equipment and remove any visible plants, animals, or mud before leaving any waters or boat-launching facilities for transport to new waters.	Avoid and minimize the spread of invasive species as a result of project activities and resultant impacts to native species, waters and other aquatic resources.	General	Construction/ Operations/ Closure	Wetlands and Other Waters/Aquatic Resources
Clean, drain, and dry boats, trailers, equipment, clothing, boots, waders before transporting it to new waters.	Avoid and minimize the spread of invasive species as a result of project activities and resultant impacts to native species, waters and other aquatic resources.	General	Construction/ Operations/ Closure	Wetlands and Other Waters/Aquatic Resources
Drain water from motor, live well, bilge, and transom wells while on land before leaving the vicinity.	Avoid and minimize the spread of invasive species as a result of project activities and resultant impacts to native species, waters and other aquatic resources.	General	Construction/ Operations/ Closure	Wetlands and Other Waters/Aquatic Resources
To minimize infestation and spread of spruce bark beetle, timber along rights-of-way for roads and pipelines should be cut in the fall and the logs utilized before the next spring. All	Avoid and minimize the spread of invasive species as a result of project activities and resultant impacts to	Transportation Corridor	Construction	Vegetation

EPA-6692-0003182

Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
slash and logs four inches in diameter and larger should be disposed of by burning, burying, chipping, or peeling. Stumps should be cut as low as possible. Trees next to the right-of-way should be examined for beetle attacks in late summer following cutting. If trees are infested, they should be removed. Care should be taken to avoid scarring trunks with mechanical equipment, severing roots, altering drainage patterns, or severely compacting the soil.	native species, waters and other aquatic resources.			
Use bear-proof containers and bear-proof trash receptacles for food and garbage. Food should only be left inside vehicles or other unsecured locations when staff are present and can remove the food source in response to wildlife attracted to the food source.	Avoid attracting bears to project facilities and the resulting habituation and hazing or lethal action required to manage habituated bears	General	Construction/ Operations/ Closure	Wildlife Values; Health and Safety
Encounters with an occupied brown bear den not previously identified by ADF&G will be reported to the Division of Wildlife Conservation, ADF&G, within 24 hours. Mobile activities shall avoid such discovered occupied dens by one-half mile unless alternative mitigation measures are approved with concurrence from ADF&G. Non-mobile facilities will not be required to relocate. Before commencement of any activities, lessees shall consult with ADF&G to identify locations of brown bear den sites. Additional surveys may be required pre and post construction to determine denning areas and changes in denning use due to project impacts.	Minimize impacts to denning brown bears resulting from project activities.	General	Construction/ Operations/ Closure	Wildlife Values; Health and Safety

EPA-6692-0003183

Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
Require mandatory training for mine workers on ethical behavior around brown bear populations (e.g., strict use of bear safe trash cans; strict prohibition of bear feeding and harassing).	Avoid attracting bears to project facilities and the resulting habituation and hazing or lethal action required to manage habituated bears	General	Construction/ Operations/ Closure	Wildlife Values; Health and Safety
Instruct employees and contractors on relevant rules and regulations that protect wildlife. See the Fish and Wildlife Service webpage on regulations and policies (https://www.fws.gov/birds/policies-and-regulations.php).	Minimize impacts to avian wildlife resulting from project activities.	General	Construction/ Operations/ Closure	Wildlife Values
PLP will follow BMPs with respect to powerline design and placement to minimize the potential for bird collisions. This could include the use of flight diverters and other deterrent devices.	Minimize impacts to avian wildlife resulting from power infrastructure required for the project.	Mine Site/ Transportation Corridor	Construction	Wildlife Values
Material site design and reclamation and closure plans will incorporate measures to make the sites blend with the natural conditions after closure.	Minimize long term visual impacts and provide additional habitat for wildlife in the reclaimed material sites.	Transportation Corridor	Construction	Aesthetic Resources, Wildlife Values
Update bear denning surveys prior to construction.	Minimize impacts to denning brown bears resulting from project activities.	Mine Site/ Transportation Corridor	Construction	Wildlife Values
PLP will follow USFWS Land Clearing Timing Guidance for Alaska to avoid destruction of active bird nests. [HYPERLINK "https://www.fws.gov/alaska/pages/nesting-birds-timing-recommendations-avoid-land-disturbance-vegetation-clearing"]	Minimize impacts to nesting and breeding raptors resulting from land clearance activities.	General	Construction	Wildlife Values

EPA-6692-0003184

Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
Complete a detailed Bear Interaction Plan designed to minimize conflicts between bears and humans that would be incorporated into the Wildlife Interaction Plan. The plan should be coordinated with ADF&G. At a minimum the plan should include measures to: • minimize attraction of bears to facility sites; • organize layout of buildings and work areas to minimize interactions between humans and bears; • warn personnel of bears near or on facilities and the proper actions to take; • if authorized, deter bears from facility sites; • provide contingencies in the event bears do not leave the site; • provide for the proper storage and disposal of food, garbage or other industrial materials that may be attractants to bears; • provide for the proper storage and disposal of materials that may be toxic to bears; • provide a systematic record of bears on the site and in the immediate area: and • additional measures as developed in consultation with ADF&G.	Avoid attracting bears to project facilities and the resulting habituation and hazing or lethal action required to manage habituated bears	General	Construction/ Operations/ Closure	Wildlife Values
PLP will consult with ADFG on	Minimize impacts to	General	Construction	Wildlife Values

EPA-6692-0003185

Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
additional wildlife surveys that may be required prior to construction.	wildlife resulting from project activities.			
The following measures are detailed in the NMFS Biological Assessment (Appendix H) and summarized herein. For measures that are already listed elsewhere (such as spill response measures in Table 5-2), they are not repeated below. These measures are preliminary and not considered final until issuance of a biological opinion by the NMFS. • The project would employ Protected Species Observers (PSOs) to monitor shutdown exclusion zones during Project construction activities that produce underwater noise levels above harassment or injury take thresholds. • To mitigate for construction noise impacts to cetaceans and pinnipeds during construction, the Applicant would develop and implement a Marine Mammal Monitoring and Mitigation Plan (4MP). Details of the 4MP include the use of PSOs, ramp-up procedures, monitoring of zones, and others. • Blasting in Iliamna Bay above the high tide line for construction of the Diamond Point port access road would be timed to coincide when tides are at or near	Minimize impacts to threatened and endangered species resulting from Project construction and operational activities.	Transportation Corridor	Construction/ Operations	Threatened and Endangered Species

EPA-6692-0003186

Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
minimum elevation to avoid in-water transfer of sound. • Vessel speeds would be limited to 10 knots within lower Cook Inlets north of Augustine Island to mitigate potential vessel strike with marine mammals. The mooring systems and components of the anchor cable would be annually inspected each fall after the close of the Cook Inlet salmon setnet fishery to ensure they are in good working order. Any debris caught on the cables would be removed and properly disposed of at that time.				
The following measures are detailed in the USFWS Biological Assessment (Appendix G) and summarized herein. For measures that are already listed elsewhere (such as spill response measures in Table 5-2), they are not repeated below. These measures are preliminary and not considered final until issuance of a biological opinion by the USFWS. • The project would employ Protected Species Observer(s) (PSOs) to monitor shutdown exclusion zones during Project construction activities that produce underwater noise levels above harassment or injury take thresholds for northern sea otter.	Minimize impacts to threatened and endangered species resulting from Project construction and operational activities.	Transportation Corridor	Construction/ Operations	Threatened and Endangered Species

EPA-6692-0003187

Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
• To mitigate for construction noise impacts to sea otters, the Applicant would develop and implement a Marine Mammal Monitoring and Mitigation Plan (4MP). Details of the plan include the use of PSOs, ramp-up procedures, monitoring of 984-foot exclusion zones around fill placement activities, and others. • Vessel speeds would be limited to 10 knots for all Project construction vessels operating inside the northern sea otter critical habitat. • During operations, supply barges, fuel barges, and concentrate bulk vessels would travel at their normal cruising speeds when entering lower Cook Inlet but would reduce speeds to less than 10 knots when entering sea otter foraging habitat (delimited by the 66-foot depth contour). All lightering barges would operate at speeds less than 10 knots. • Guide cables will not be used to secure the communications tower to minimize avian collision risk. • Develop a lighting plan to reduce construction and operation lights that might attract eiders or implement lighting that might assist				

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Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
eiders in early detection of structures, including: • PLP would follow USFWS best practices for communication tower lighting by avoiding or minimizing the use of lights or utilizing flashing light options that comply with FAA requirements. • Any light stanchions or equipment located on the causeway/wharf during the first summer of construction would be lowered or removed before winter if not in use, thereby reducing or eliminating eider collision risk. • Utilize lighting options for the causeway and jetty that minimize bird attraction (such as orienting the lighting downward) while still providing enough light for safe operational activities. • Mitigation lighting for anchored bulk carriers would also be examined. • Measures to reduce accidental spills include use of marine radar to avoid other vessels and accurately approach the wharf. • The concentrate conveyor would be fully enclosed to contain dust and shed snow. • The barge loader would be fitted with a mechanical dust collection system and each				

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Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
barge would have a cover system to minimize fugitive dust and protect the concentrate from precipitation. During lightering operations, the barge's internal system would retrieve and convey concentrate to the bulk carrier via a self-discharging boom conveyor. The boom would be fully enclosed and equipped with a telescoping spout and would have mechanical dust collection to prevent spillage of fugitive dust.				
Use erosion control measures such as silt fences, silt curtains, and cofferdams to trap and prevent sediment and pollutants from being transported into surrounding waterbodies (e.g., lakes, streams, wetlands, coastal waters, temporary diversion channels).	Prevent sediment from being transported into surrounding wetlands and waters and impacting water quality and aquatic life.	General	Construction/ Operations/ Closure	Fish Values; Water and Sediment Quality, Wetlands and Other Waters/Aquatic Resources
Streambank restoration should incorporate bioengineering techniques (e.g., root wads, bundled water-tolerant willows and other measures outlined in the Streambank Revegetation and Protection: A Guide for Alaska [ADF&G 2005]), where possible, to maintain natural velocities, prevent bank erosion, and promote healthy riparian system functions that are important to aquatic species.	Minimize impacts to aquatic resources resulting from Project construction activity by restoring streambanks in a manner that promotes a healthy riparian system.	Mine Site/ Transportation Corridor	Construction/ Operations/ Closure	Fish Values
PLP has designed the Project to minimize impacts to wetlands and with eventual reclamation in mind. At	Minimize long term impacts to wetlands by	Mine Site/ Transportation Corridor	Closure	Vegetation, Wetlands and Other

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Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
closure wetlands will be restored where practicable.	restoring wetlands functions at closure.			Waters/Aquatic Resources
PLP will stockpile overburden for use in reclamation in compliance with State regulations and best practices.	Promote rapid and healthy revegetation at closure by providing suitable growth media.		Construction/ Operations	Vegetation
PLP will use interim seeding and other BMPs to address surface runoff and erosion from overburden stockpiles during operations.	Prevent sediment from being transported into surrounding wetlands and waters and impacting water quality and aquatic life.	Mine Site	Operations	Fish Values; Water and Sediment Quality, Wetlands and Other Waters/Aquatic Resources
During reclamation slopes will be contoured to blend with surrounding topography where feasible and erosion control measures will be implemented to stabilize slopes	Minimize visual impacts post closure by mimicking local undisturbed conditions. Promote plant growth and reduce water runoff and sedimentation.	Mine Site	Closure	Vegetation, Aesthetic Resources, Fish Values; Water and Sediment Quality, Wetlands and Other Waters/Aquatic Resources
Where seeding is the preferred approach to reestablishing vegetation, PLP will use native weed-free applied at specified rates in compliance with the approved Closure and Reclamation Plan.	Promote rapid and healthy revegetation and avoid the introduction of invasive species.	General	Closure	Vegetation
Where appropriate and feasible, PLP will use plastic-free erosion and sediment control products.	Avoid impacts to wildlife and aquatic resources resulting from entanglement in netting and the introduction of plastic products into waters.	General	Closure	Fish Values; Water and Sediment Quality, Wildlife Values
Identify locations of known invasive plant infestations. Plan activities accordingly to manage infestations.	Avoid the introduction of invasive species.	General	Construction/ Operations/ Closure	Vegetation,

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Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
Use certified weed-free materials, including gravel, topsoil, hay/straw, or erosion control tubes, especially when working near sensitive habitats such as streams and wetlands.	Avoid the introduction of invasive species.	General	Construction/ Operations/ Closure	Vegetation
Revegetate bare soils with approved techniques as soon as feasible to minimize the possible establishment of invasive plant species.	Avoid the introduction of invasive species.	General	Construction/ Operations/ Closure	Vegetation
Clean vehicles and equipment in accordance with the requirements of the Invasive Species Management Plan.	Avoid the introduction of invasive species.	General	Construction/ Operations/ Closure	Vegetation
Avoid cleaning equipment in waterways or wetlands, which are particularly sensitive to invasion and could result in changes to aquatic organism habitat/function.	Avoid the introduction of invasive species.	General	Construction/ Operations/ Closure	Vegetation
Conduct the following evaluations of WTP processes during design engineering and permitting: • Further evaluate proposed treatment solutions to confirm the nature and potential for remobilization of precipitation solids. • Further evaluate conditions within the pyritic TSF and the potential for remobilization of salt mass to validate treatment assumptions. • Further evaluate the proposed removal efficiencies for various constituents to fully assess proposed treatment solutions; in particular, review the use of biological treatment technologies for selenium removal.	Avoid impacts to water quality resulting from water treatment plant discharges that do not meet approved water discharge requirements.	Mine Site	Construction	Water and Sediment Quality

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Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
Adopt the following adaptive management steps with regard to the WTPs: • If proposed treatment strategies for managing TDS treatment and salt buildup in the pyritic TSF prove to be ineffective, modify the WTPs with additional unit processes to maintain approved discharge requirements. • Further evaluate whether engineering and construction for such significant changes to the treatment processes can be completed within the three-year period of available mine site water storage capacity (PLP 2019-RFI 021h).	Avoid impacts to water quality resulting from water treatment plant discharges that do not meet approved water discharge requirements.	Mine Site	Operations	Water and Sediment Quality
PLP will pump excess tailings supernatant to the main WMP to enhance stability, by further removing water from the TSFs.	Minimize the potential for overtopping and the resultant safety concerns.	Mine Site	Operations	Safety
Collect additional data to characterize the hydraulic properties of the bedrock in the vicinity of the interpreted fault mapped along the western margin of the bulk TSF to inform design of the facility.	Avoid impacts to ground and surface water resulting from uncontrolled seepage.	Mine Site	Construction	Groundwater; Water Quality
Monitor the ferry crossing for evidence of smolt/fish impacts. If birds are observed feeding on disoriented fish, require the ferry to use deterrents such as water spray or streamers to reduce bird predation.	Avoid impacts to smolt resulting from the Iliamna Lake ferry.	Transportation Corridor	Operations	Fish Values; Wildlife Values
To detect changes to water quality and its effects to fish and wildlife, water quality will continue to be monitored on a regular basis until the mine reclamation is complete.	Avoid impacts resulting from undetected releases of process contacted water to	Mine Site	Construction/ Operations/ Closure	Water Quality; Fish Values; Wildlife Values

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Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
Results will be reported to the State of Alaska in compliance with permit requirements and management plans.	surface and groundwater.			
Reclamation plans will include clear goals with measurable objectives and performance standards, and discuss all phases of development to include interim and final reclamation. Depending on the phase of development during interim or post-operations reclamation, data collected may include the following: • Ground cover (composition and density), including plant cover with percent of desirable species and variety of desirable species, percent not covered (bare ground), and the percent and type of invasive species (see conservation measures for invasive species). • Streambank and wetland stability. • Channel monitoring to determine diversity of aquatic species; may be counted by species or trophic groups (e.g., forage fish, juvenile, nursery, piscivorous). • Measurement of erosion control success (evidence of rilling, gullies, rutting, slumping, etc.). • Evidence of wildlife (e.g., tracks, scat, nests). • Photo documentation.	Avoid impacts to vegetation, wetlands, and other aquatic resources resulting from erosion and sedimentation due to a failure to reestablish ground cover in compliance with reclamation standards.	General	Closure	Vegetation; Wetlands and Other Waters/Special Aquatic Sites
Conduct reclamation monitoring as appropriate for all phases of the Project.	Avoid impacts to vegetation, wetlands, and other aquatic resources resulting from erosion and sedimentation due to a	General	Construction/ Operations/ Closure	Vegetation; Wetlands and Other Waters/Special Aquatic Sites

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Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
	failure to reestablish ground cover in compliance with reclamation standards.			
Monitor culverts along project roads for fish passage, and develop a maintenance plan for culverts that may become blocked by debris or ice or hydrological changes.	Avoid impacts to fish resulting from impaired passage due to malfunctioning culverts.	Transportation Corridor	Construction/ Operations/ Closure	Fish Values
Conduct periodic audits (performed by a third party) for compliance with project permits, and to ensure adequate oversight of the mine by state regulators.	Avoid impacts resulting from undetected non-compliance with permit requirements.	General	Operations	General
Conduct monitoring of groundwater conditions around the pit to confirm that hydraulic containment would be maintained.	Avoid impacts to groundwater and surface water near the pit resulting from undetected seepage away from the pit.	Mine Site	Closure	Groundwater; Water Quality
Update water management plans and models during operations, closure, and post-closure until pit lake conditions reach steady state.	Avoid impacts to ground and surface water resulting from outdated management strategies.	Mine Site	Operations/ Closure	Groundwater Hydrology, Water and Sediment Quality
The Monitoring and Adaptive Management Plan will identify how the monitoring could be used to assess impacts from mine operations.	Allow for early detection of any impacts to ground and surface water resulting from mine operations.	Mine Site	Operations	Groundwater Hydrology, Water and Sediment Quality
Fill placed below the HTL will consist of select rock fill and armor rock protection. Select rock fill will consist of durable, coarse free draining material with minimal fines to minimize sedimentation.	Minimize impacts to wetlands and aquatic resources resulting from impaired flow and sediment release during road construction and operations.	Transportation Corridor	Construction/ Operations/ Closure	Water and Sediment Quality; Surface Hydrology; Fish Values, Wetlands and Other Waters/Special Aquatic Sites

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Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
Blasting adjacent to tidal waters will be timed to coincide when tides are at or near minimum elevation.	Avoid noise impacts to marine mammals and other aquatic species resulting from blasting.	Transportation Corridor	Construction	
PLP will implement measures in the design and construction of culverts/bridges in jurisdictional wetlands or open waters to attenuate flood flows, prevent extreme ponding or drying, maintain flooplain functions, maintain aquatic life movement, maintain sediment transport, and other functions provided by wetlands and open waters, including installing floodplain culverts, permeable roadbeds, or oversized culverts. A typical specification for shot rock that would be used in permeable roadbeds is: Maximum stone size to be 30 inch and not more than 20% shall be smaller than 6 inch. Material passing the No. 200 sieve shall not exceed 2% by weight. Rock to be competent and resistant to degradation during placement and compaction. Equalization culverts will be installed and strategically located to facilitate surface water movement within wetland areas. Culverts will be set with the invert below grade or slightly below base water level to maintain equal water levels on both side of a fill. In area with a natural slope and surface water flow, the culvert will be set a minimum of 30 percent of the culvert diameter below grade and set with a grade to match the natural ground surface. Equalization culverts used in intertidal areas to maintain	Minimize impacts to wetlands and aquatic resources resulting from impaired water movement and flow.	Transportation Corridor	Construction/ Operations/ Closure	Water and Sediment Quality; Surface Hydrology; Fish Values, Wetlands and Other Waters/Special Aquatic Sites

EPA-6692-0003196

Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
ebb and flow of marine waters, will be sized and set to promoted near natural rate of fill and draining of enclosed marine areas. To the extent possible, marine equalization culverts will design to allow passage of marine aquatic life. Culvert material used will be selected to endure marine conditions.				
Construction of roads at wetlands/stream crossings will be kept to narrowest possible footprint.	Minimize impacts to wetlands by minimizing the fill footprint.	Transportation Corridor	Construction	Water and Sediment Quality; Surface Hydrology; Fish Values, Wetlands and Other Waters/Special Aquatic Sites
There will be no relocation of active stream channels in the transportation corridor.	Avoid impacts to wetlands and aquatic resources resulting from impaired water movement and flow.	Transportation Corridor	Construction	Water and Sediment Quality; Surface Hydrology; Fish Values, Wetlands and Other Waters/Special Aquatic Sites
Material sidecast from trenches above HTL and outside the transportation corridor would be segregated by top organics and subsurface layers and would be replaced back in the trench in order which they were removed.	Promote restoration of wetlands and natural conditions in areas of temporary impact associated with project construction.	Transportation Corridor	Construction	Water and Sediment Quality; Surface Hydrology, Wetlands and Other Waters/Special Aquatic Sites
Material sidecast from trenching of the pipelines would be placed within the footprint of the permanent fill or in uplands.	Minimize impacts to wetlands by minimizing the fill footprint.	Transportation Corridor	Construction	Water and Sediment Quality; Surface Hydrology, Wetlands and Other Waters/Special Aquatic Sites
To avoid constricting the natural channel and to allow connectivity of the floodplain stream crossings will meet the USFWS guidelines: (Culvert	Avoid impacts to aquatic resources resulting from impaired	Transportation Corridor	Construction	Water and Sediment Quality; Surface Hydrology; Fish Values, Wetlands and

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Proposed Measure	Description of Impact Being Mitigated	Project Component(s)	Project Phase(s)	Primary Resource(s) Affected
Design Guidelines for Ecological Function, U.S. Fish and Wildlife Service Alaska Fish Passage Program, Revision 5, February 5th, 2020)	flow and impaired fish passage.			Other Waters/Special Aquatic Sites

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