ATTACHMENT B8 PUBLIC INTEREST REVIEW

Factor No. 1: Soils		
Context which factor evaluated[1]	Local	
Where analyzed in EIS	Section 4.14 Soils	
Comments received (positive) toward factor	None	
Comments received (negative) toward factor	Scoping Report: None CAR: Soils—Construction Soils—Copper in dust Soils—Dispersion Model for Deposition Soils—Erosion Soils—Fugitive Dust Control Plan Soils—Fugitive Dust Impacts Soils—Fugitive Dust Impacts in Post-Closure Soils—Fugitive Dust Mitigation and Planning	CAR (continued): Soils—Material Source Characterization Soils—Permafrost Evaluation Insufficient - comment on analysis more so than on resource Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel Fate and Behavior Surface Water Hydrology—flood hazards Threatened and Endangered Species (Federally Listed)—Analysis Area Soils—Baseline Data Geology— asbestos
USACE consideration of comments[2]	There would be direct impacts to soils in the project area and in the area adjacent to the project with the deposition of dust. Spills of materials which meet the definition of discharges of dredged or fill material and are in excess of any DA permit, if issued, would be considered in non-compliance with the DA permit. USACE will address non-compliance issues, if they occur, in accordance with our enforcement regulations. Spills of other materials are outside the purview of the USACE and are not considered further in this analysis.	
Benefits of the project related to factor[3]	None	
Reasonably foreseeable detriments of the project related to factor[3]	Impacts to soils resources would include those related to soil disturbance, soil quality, and erosion within the project footprint. Asbestos is not expected to occur along the transportation corridors or at the mine site. There are no expected impacts associated with asbestos.	
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	1-3, 6-9, 14-15, 39, 44-46, 58-59, 68, 83, 88, 96-97, 99, 102, 118-121, 134-146, 154, 170-172, 176 [FEIS Table 5-2] Project Design Features [DA Application June 2020, Tab 23] Protection of Wetlands and Waters [DA Application June 2020, Tab 23] Restoration of Temporary Impacts [DA Application June 2020, Tab 23] Reclamation of Permanent Impacts [DA Application June 2020, Tab 23] Implementation of Environmental Plans and Controls and Adaptive Management [DA Application June 2020, Tab 23]	
USACE determination of factor[4]	The proposed project would have adverse effects on soils at the local level.	

Factor No. 2: Shore erosion and accretion—33 CFR 320.4(a)(1)	
Context which factor evaluated[1]	Local, Regional
Where analyzed in EIS	Section 4.16 Surface Water Hydrology

Factor No. 2: Shore erosion and accretion—33 CFR 320.4(a)(1)	
Comments received (positive) toward factor	None
Comments received (negative) toward factor	Scoping Report 3.4.2.10 CAR: Vessel Traffic—Impacts-Transportation Corridor- General Water and Sediment Quality—Lower Cook Inlet
USACE consideration of comments[2]	Iliamna Lake is not within the footprint of the proposed project and impacts from structures in Iliamna Lake are not further considered in this analysis.
Benefits of the project related to factor[3]	None
Reasonably foreseeable detriments of the project related to factor[3]	Direct and Indirect Impacts: Historical and current photos of the coastline in the vicinity of the port show no evidence of littoral (i.e., coastal) sediment transport (no definitive alongshore current) which would appear as accumulations (accretion) or areas of erosion. The dock would be a minor coastal feature on the scale of the bay. Erosion or accretion at the shoreline is not expected to be long-term or cover a large geographic area. The caisson design of the dock would allow littoral flow and decrease accretion of sediment that may be caused by disruptions of littoral sediment transport. The potential for increased channel erosion downstream from road culverts in the mine site would be expected during construction. The magnitude of the impact is estimated to be small. Cumulative Impacts: Additional roadway may result in increased channel erosion downstream from road culverts in the mine site during construction. The magnitude of the impact is estimated to be small.
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	180 [FEIS Table 5-2, in Attachment B10 of the ROD] Caisson dock [FEIS Table 5-3]
USACE determination of factor[4]	The proposed project would cause a negligible adverse effect on shore erosion and accretion at the local and regional levels.

Factor No. 3: Flood hazards—33 CFR 320.4(a)(1); 33 CFR 320.4(l)(2)—floodplain management		
Context which factor evaluated[1]	Local	
Where analyzed in EIS	Section 4.16 and Appendix K4.16 Surface Water; Section 4.27 Spill Risk; Section 4.15 Geohazards and Seismic Conditions	
Comments received (positive) toward factor	None	
Comments received (negative) toward factor	Scoping Report: None	CAR: Surface Water Hydrology—Climate Change-Gen Surface Water Hydrology—flood hazards Surface Water Hydrology—Freeboard
USACE consideration of comments[2]	The EIS analyzed effects of climate change and the surface water hydrology in the project area, however climate change is outside of USACE purview.	

Factor No. 3: Flood hazards—33 CFR 320.4(a)(1); 33 CFR 320.4(l)(2)—floodplain management	
Benefits of the project related to factor[3]	None
Reasonably foreseeable detriments of the project related to factor[3]	Flood magnitude and frequency have not been estimated for the streams and rivers that would be crossed by components of the Applicant's Preferred Alternative. Where sufficient streamflow data are not available to determine flood magnitude and frequency, it is standard practice in Alaska to design the drainage structures using regional regression equations to predict peak-flood discharge. Stream crossings would be designed to accommodate peak-flood discharge, and impacts such as bank erosion, scour, and flooding of areas upstream of the crossing would be minimized or avoided. During construction of the stream crossings there is potential for temporary, local impacts from upstream flooding, but these impacts would be avoided or reduced through implementation of Erosion and Sediment Control Plans and following industry standard BMPs. The project features and facilities presenting potential risks to aquatic resources primarily involve those that ultimately could directly or indirectly alter or degrade surface water or groundwater hydrology and aquatic habitats. Impacts to streamflow at the mine site would include diversion/storage of streamflow in some tributaries, minor increased flow in some reaches, and substantial streamflow reduction across other reaches of area streams. Placement of fill would occur during construction of project facilities and would result in altered surface water flow and potential obstructions to flow, and changes in topography, creating flood hazards. Mine site features would be designed to prevent flooding impacts from mine site features through water management and design of project features. Cumulative impacts would include: The increased mine site footprint under the expanded mine scenario would increase the open pit size, would require additional new facilities to store tailings and waste rock, and associated infrastructure within floodplains, which would contribute to cumulative effects on future flood hazards.
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	40, 62, 66, 68, 78-81, 84, 86, 135-137, 139, 141-143, 145-146, 180 [FEIS Table 5-2, in Attachment B10 of the ROD] Project Design Features [DA Application June 2020, Tab 23] Protection of Wetlands and Waters [DA Application June 2020, Tab 23] Protection of Aquatic Resources [DA Application June 2020, Tab 23]
USACE determination of factor[4]	A flood hazard exists when existing infrastructure is subject to inundation during a 100-year flood (i.e. probability of inundation in any given year is 1 percent). As "flood hazard" is typically used, it refers to the potential hazard to infrastructure and humans. There are currently no structures where the proposed project would be constructed within a 100-year floodplain, and therefore the proposed project would have negligible adverse effects, specifically at the mine site. The impacts related to flood hazards in the transportation corridor and the port site would also be adverse, but negligible. There would be no effect related to flood hazards within the marine environment.

Factor No. 4: Floodplain values—33 CFR 320.4(a)(1)		
Context which factor evaluated[1]	Local	
Where analyzed in EIS	Sections 3.16 and 4.16 and Appendices K3.16 and K4.16 Surface Water Hydrology; Sections 3.18 and 4.18 Water and Sediment Quality; Sections 3.22 and 4.22 Wetlands and Other Waters/Special Aquatic Sites	
Comments received (positive) toward factor	None	
Comments received (negative) toward factor	Scoping Report: Section 3.4.2.4 Surface and Groundwater Hydrology Section 3.4.3.3 Wetlands and Special Aquatic Sites CAR:	CAR (continued): Surface Water Hydrology—Design engineering Surface Water Hydrology—Erosion Surface Water Hydrology—flood hazards

Factor No. 4: Floodplain values—33 CFR 320.4(a)(1)	
	Surface Water Hydrology—2014 Watershed Assessment is Biased Surface Water Hydrology—Analysis Area Surface Water Hydrology—Additional Clarification Surface Water Hydrology—Baseline Data Surface Water Hydrology—Climate Change-Gen Surface Water Hydrology—coastal engineering analysis Surface Water Hydrology—Conceptual Design Level Only Surface Water Hydrology—Freeboard Surface Water Hydrology—Streamflow reduction Surface Water Hydrology—SW/GW Interchange Surface Water Hydrology—water extraction Surface Water Hydrology—Water Management Plan Wetlands—Wetlands-Functions
USACE consideration of comments[2]	Impacts to waters of the US which would result from discharges of dredged or fill material under USACE authority are analyzed in detail in Section B2 of the ROD, the analysis of impacts under the 404(b)(1) guidelines. Impacts resulting from dewatering, water withdrawals, and to water quantity are under the authority of the State of Alaska and, to the extent that they fall under USACE purview, are considered in the water supply and conservation factor, below. Impacts to water quality are evaluated in Section B2 of the ROD, the analysis of impacts under the 404(b)(1) guidelines, and the water quality factors, below. See the wetland factor for additional discussion of floodplains related to wetland functions. See the flood hazards factor for a discussion of floodplains in the context of flood hazards.
Benefits of the project related to factor[3]	None
Reasonably foreseeable detriments of the project related to factor[3]	Impacts from mine development to wetlands, other waters, special aquatic sites, and regionally important wetlands represent less than 1 percent of the Bristol Bay watershed. Outside the mine site footprint, floodplain function and values in each watershed would be permanently affected to some degree, but these changes are not expected to have a measurable impact based on the modeled flow changes and extent of impact. Potential impacts to floodplain functions and values during pipeline construction could result from excavation and placement of fill; removal of vegetation; compaction, rutting, and mixing of wetland soils where present; and the alteration of stream channels. Pipeline construction would occur over a period of 2 years; therefore, the duration of impacts to floodplain wetlands are anticipated to be temporary, because disturbed areas are expected to return to natural conditions soon after pipeline construction. Sections of the pipeline that require overland (buried) installation would also result in temporary impacts to wetlands and other waters. Wetlands in floodplains provide numerous water resource values and functions, including tidal, storm and floodwater retardation; floodwater storage; aquifer recharge; filtration; nutrient cycling; carbon sequestration; and biodiversity. These functions would be reduced in wetlands directly impacted by the project footprint. The project features and facilities would directly or indirectly alter or degrade surface water or groundwater hydrology and aquatic habitats. This alteration or degradation of hydrology and related aquatic habitats could have numerous cascading effects, including a permanent loss of wetlands and other waters, a change in soil saturation (and ultimately soil type), and new vegetative species colonization in the area, as well as reductions in the connectivity, ecological function, and value of aquatic resources. Floodplains provide important living resource values, including habitat for diverse fish and wildlife. Of particular interest to the public, fringe riparian wetlands provide important salmon rearing habitat some of which the proposed project would directly impact. In addition to the ecosystem functions provided by floodplains, certain wetland types and locations are valued by Alaska Natives for their subsistence value. Culturally important plants have been identified from an ethnobotanical study from the Yukon-Kuskokwim region. In a largely roadless area, rivers and lakes provide transportation and critical habitat for subsistence and commercial resources; therefore, lakes, rivers, and their associated wetlands are highly valued by residents of and visitors to the Bristol Bay region and are often the focal point of communities with high recreational, economic, subsistence, and heritage value. Flats wetlands provide habitat for prey species, and therefore have hunting value. Expansive wetland flats can be a defining characteristic of the landscape with aesthetic value. The considerable sequestration of carbon in large organic flats wetlands provides opportunity for scientific research, especially related to climate change. Slope wetlands are widely used for subsistence and recreation. Due to the

Factor No. 4: Floodplain values—33 CFR 320.4(a)(1)	
	provision of habitat for waterfowl, depressional wetlands are attributed hunting and subsistence use values. Coastal wetlands are dynamic and productive habitats that support a variety of subsistence resources. As an uncommon component of the broader coastal landscape, they are attributed high aesthetic, recreational, and uniqueness value. Due to the increased variability of coastal processes in the context of a changing climate, coastal fringe wetlands are ascribed additional value for the opportunities for education and scientific research they provide. Marine and freshwater waterbodies function to mitigate and retain storm and floodwater flows are additionally valued for recreation, hunting, fishing, and navigation opportunities. Placement of fill would occur during construction of project facilities and would result in altered surface water flow and potential obstructions to flow, and changes in topography. The construction of facilities within wetlands would likely reduce floodplain storage capacity, and therefore the downstream baseflow. Cumulative impacts would be similar to the direct and indirect impacts described above, but at a larger scale with the increased infrastructure and development associated with a larger mine.
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	1, 6-9, 14, 15, 28-40, 44-46, 58, 62, 66, 68, 78-81, 83, 86, 88, 97, 99, 118-119, 134-143, 145-146, 154, 170-171, 175 [FEIS Table 5-2, in Attachment B10 of the ROD] Project Design Features [DA Application June 2020, Tab 23] Protection of Wetlands and Waters [DA Application June 2020, Tab 23] Restoration of Temporary Impacts [DA Application June 2020, Tab 23] Implementation of Environmental Plans and Controls and Adaptive Management [DA Application June 2020, Tab 23] Protection of Aquatic Resources [DA Application June 2020, Tab 23]
USACE determination of factor[4]	The proposed project would have an adverse effect to floodplain values, specifically at the mine site. This adverse effect would be lessened by the implementation of water management measures at the mine site. The impacts to floodplain values in the transportation corridor and the port site would be adverse, but negligible. There would be no effect to floodplain values within the marine environment.

Factor No. 5: Wetlands—33 CFR 320.4(a)(1) and 33 CFR 320.4(b)		
Context which factor evaluated[1]	Local, Regional	
Where analyzed in EIS	Sections 3.22 and 4.22 and Appendix 4.22 Wetlands and Other Waters/Special Aquatic Sites	
Comments received (positive) toward factor	None	
Comments received (negative) toward factor	Scoping Report: Section 3.4.3.2 Fish and Aquatic Resources Section 3.4.3.3 Wetlands and Special Aquatic Sites Section 3.4.2.4 Surface and Groundwater Hydrology CAR: Clean Water Act Compliance—Compliance with 404(b)(1) Guidelines Wetlands—Wetlands-Cumulative Effects Wetlands—Wetlands- Data Analysis and Reporting Wetlands—Wetlands-Downstream-Indirect Effects	CAR (continued): Proposed Action and Alternatives—Transportation Corridor Alternatives Proposed Project Purpose and Need—P and N should include preserving fisheries Surface Water Hydrology—coastal engineering analysis Surface Water Hydrology—Erosion Surface Water Hydrology—flood hazards Surface Water Hydrology—Streamflow reduction Surface Water Hydrology—suspended sediment

Factor No. 5: Wetlands—33 CFR 320.4(a)(1) and 33 CFR 320.4(b)		
	Wetlands—Wetlands-Fragmentation Wetlands—Wetlands- Fugitive Dust Wetlands—Wetlands-Functions Wetlands - Wetlands Regional Significance Wetlands—Wetlands-Thresholds Mitigation or Monitoring Measures—Compensatory Mitigation	Cumulative Effects Analysis—exceeds EPA thresholds Cumulative Effects Analysis—cumulative effects of dewatering Cumulative Effects Analysis—cumulative effects of dust Cumulative Effects Analysis—cumulative effects on aquatic resources Cumulative Effects Analysis—ignores cumulative effects on ecosystems
USACE consideration of comments[2]	A functional assessment is not required for evaluation of the proposed impacts to wetlands and other waters. The analysis of impacts to wetlands and other waters was informed by coordination with EPA and other cooperating agencies. The applicant has incorporated avoidance and minimization measures which avoid impacts to wetlands and other waters to the extent practicable. The proposed impacts to wetlands would result in losses of functions, including the provision of habitat which supports aquatic or land species and functions that support the filtering of water. Construction activities, including the discharge of dredged or fill material would increase suspended sediments in wetlands and other waters, potentially change current patterns, and fragmentation would alter drainage characteristics. The proposed project would result in losses of riparian wetlands and side channels which store storm and flood waters. Wetlands and other waters in the project footprint provide baseflows to downstream resources, including aquatic species. As a result of comments received during scoping, impacts to wetlands identified as regionally important were analyzed in the EIS. The current impacts to wetlands and or other waters in the watersheds that would be impacted by the proposed project represent very small percentages of the existing wetlands and other waters. The proposed project would introduce impacts to wetlands and other waters in watersheds that are largely unimpacted.	
Benefits of the project related to factor[3]	None	
Reasonably foreseeable detriments of the project related to factor[3]	The information in the 404(b)(1) analysis, as documented in the factual determination matrix and in Section B2 of the ROD, is hereby incorporated into the analysis of the public interest determination for wetlands under 320.4(a)(1) and 320.4(b). Wetland functions which would be lost or negatively impacted by the proposed project include: food chain support, provisions of habitat for fish and wildlife, maintenance of stream baseflows, aquifer recharge, filtration and provision of nutrients, trapping of sediments, reduction of erosion, and flow attenuation. EIS scoping comments identified certain wetland types in the analysis area as having specific regional importance. Regionally important wetlands types provide habitat for culturally important plants and animals, are rare or high-quality, and/or are pristine and/or difficult to replace. Regionally important wetland types and components identified for the analysis area include: Riparian wetlands, Forested wetlands, Estuarine wetlands, Fens, Culturally important wetland plants. The proposed project would cause the permanent impacts to 132 acres of riparian wetlands, less than 1 acre of estuarine wetlands, 72 acres of fens, and 5 acres of forested wetlands.	
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	1, 6-9, 14, 15, 28-40, 44-46, 58, 83, 88, 97, 99, 118, 119, 134-143, 145, 154, 170, 171, 175 [FEIS Table 5-2, in Attachment B10 of the ROD] Project Design Features [DA Application June 2020, Tab 23] Protection of Wetlands and Waters [DA Application June 2020, Tab 23] Restoration of Temporary Impacts [DA Application June 2020, Tab 23] Implementation of Environmental Plans and Controls and Adaptive Management [DA Application June 2020, Tab 23] Protection of Aquatic Resources [DA Application June 2020, Tab 23]	

Factor No. 5: Wetlands—33 CFR 320.4(a)(1) and 33 CFR 320.4(b)	
USACE determination of factor[4]	The overall impact to wetlands would be adverse at both the local and regional scale. As demonstrated through the 404(b)(1) analysis, the proposed project would cause significant degradation to wetlands. The applicant's proposed compensatory mitigation would not offset the significant degradation.

Factor No. 6: Fish and wildlife values—33 CFR 320.4(a)(1); 33 CFR 320.4(c)—fish and wildlife		
Context which factor evaluated[1]	Local, Regional, State, National, Global, Endangered Species	
Where analyzed in EIS	Section 4.23 Wildlife; Sections 4.24 and Appendix K4.24 Fish Values; Section 4.25 and K4.25 TES; Section 4.5 Recreation; Section 4.6 Commercial and Recreational Fisheries	
Comments received (positive) toward factor	Scoping Report: None CAR: Commercial Fisheries—Beneficial Impacts	
Comments received (negative) toward factor	Scoping Report: 3.4.3.2 Fish and Aquatic Resources 3.4.3.4 Wildlife and Non-Threatened and Endangered Birds and Mammals 3.4.3.5 Threatened and Endangered Species 3.4.4.2 Subsistence 3.4.4.3 Traditional Culture and Way of Life 3.4.4.7 Recreation CAR: Birds—Birds-general impacts Birds—Birds-impacts to sensitive avian species Birds—Birds-selenium concentrations Birds—Pit Lake Impacts Birds—Wildlife-diesel spill impacts Birds—Wildlife-fugitive dust impacts Birds—Wildlife-lighting impacts Birds—Wildlife-raptor impacts Commercial Fisheries—Analysis Area Commercial Fisheries—CF Permit Loss Commercial Fisheries—Cost-benefit analysis Commercial Fisheries—Ferry operations Commercial Fisheries—Impacts—General Commercial Fisheries—Impacts from Spills Commercial Fisheries—Impacts- Economic Impacts Not Adequately Addressed	CAR (continued): Fish and Aquatic Resources—Fish-Marine-Derived Nutrients Fish and Aquatic Resources—Fish-Metals Fish and Aquatic Resources—Fish-Regulatory Fish and Aquatic Resources—Fish-Selenium Fish and Aquatic Resources—Fish-Water Withdrawal-TransCorr Threatened and Endangered Species (Federally Listed)—Analysis Area Threatened and Endangered Species (Federally Listed)—Birds-Short-tailed Albatross impacts Threatened and Endangered Species (Federally Listed)—Birds-Steller's eider impacts Threatened and Endangered Species (Federally Listed)—Fish-Impacts-Port Threatened and Endangered Species (Federally Listed)—Impacts from shipping Threatened and Endangered Species (Federally Listed)—Mitigation Threatened and Endangered Species (Federally Listed)—TES-Project Infrastructure Impacts Threatened and Endangered Species (Federally Listed)—TES-General Impacts Threatened and Endangered Species (Federally Listed)—TES Noise Impacts Threatened and Endangered Species (Federally Listed)—Wildlife-Beluga whale impacts

Factor No. 6: Fish and wildlife values—33 CFR 320.4(a)(1); 33 CFR 320.4(c)—fish and wildlife		
	Commercial Fisheries—Impacts- King Salmon Population	Threatened and Endangered Species (Federally Listed)—Wildlife-diesel spill impacts
	Commercial Fisheries—Impacts- Natural Gas Pipeline	Threatened and Endangered Species (Federally Listed)—Wildlife-duration of impacts
	Commercial Fisheries—Lower Cook Inlet	Threatened and Endangered Species (Federally Listed)—Wildlife-humpback whale impacts
	Commercial Fisheries—Permit Earnings and Values	Threatened and Endangered Species (Federally Listed)—Wildlife-northern sea otter impacts
	Commercial Fisheries—Reputation and Branding	Threatened and Endangered Species (Federally Listed)—Wildlife-Steller Sea Lion Impacts
	Commercial Fisheries—Reputation and Branding- No Effect	Wildlife—Bears—McNeil River State Game Sanctuary
	Commercial Fisheries—Visuals	Wildlife—Bears-Impacts-General
	Fish and Aquatic Resources—Fish- Impacts—HDD	Wildlife—Beaver Impacts
	Fish and Aquatic Resources—Fish- Mercury	Wildlife—Caribou- Impacts
	Fish and Aquatic Resources—Fish—Impacts—Groundwater	Wildlife—Fugitive Dust Impacts to Ecological Receptors
	Fish and Aquatic Resources—Fish--Iliamna Lake—Zooplankton	Wildlife—Impacts from shipping
	Fish and Aquatic Resources—Fish-Affected Environment	Wildlife—Migration Barriers
	Fish and Aquatic Resources—Fish-Blasting Impacts	Wildlife—Risk Assessment for Wildlife
	Fish and Aquatic Resources—Fish- Biotic Ligand Model	Wildlife—Road Access
	Fish and Aquatic Resources—Fish-Egg Development	Wildlife—Wildlife- Affected Environment
	Fish and Aquatic Resources—Fish-Habitat Characterization	Wildlife—Wildlife- MM-Vessel Disturbance
	Fish and Aquatic Resources—Fish-Impacts Analysis –General	Wildlife—Wildlife-barriers to movement/wildlife crossings
	Fish and Aquatic Resources—Fish-Impacts-Culverts	Wildlife—Wildlife-concentrate spill impacts
	Fish and Aquatic Resources—Fish-Impacts-Duration	Wildlife—Wildlife-cumulative effects
	Fish and Aquatic Resources—Fish-Impacts-EFH	Wildlife—Wildlife-diesel spill impacts
	Fish and Aquatic Resources—Fish-Impacts-EIS Analysis Area	Wildlife—Wildlife-fugitive dust impacts
	Fish and Aquatic Resources—Fish-Impacts-Headwater Streams	Wildlife—Wildlife-habitat fragmentation
	Fish and Aquatic Resources—Fish-Impacts-Invertebrates	Wildlife—Wildlife-habitat loss-marine mammals
	Fish and Aquatic Resources—Fish-Impacts-Modeling	Wildlife—Wildlife-Iliamna Lake Seal Impacts
	Fish and Aquatic Resources—Fish-Impacts-NGP-Cook Inlet	Wildlife—Wildlife-Impacts-General
	Fish and Aquatic Resources—Fish-Impacts-Port	Wildlife—Wildlife-Marine Mammals- Impacts- Gen
	Fish and Aquatic Resources—Fish-Impacts-Portfolio Effect	Wildlife—Wildlife-MM-Contamination
	Fish and Aquatic Resources—Fish-Impacts-Relocation	Wildlife—Wildlife-noise impacts general
	Fish and Aquatic Resources—Fish-Impacts-Resident Fish	Wildlife—Wildlife-pipeline stringing impacts
	Fish and Aquatic Resources—Fish-Impacts-Sedimentation	Wildlife—Wildlife-selenium impacts
	Fish and Aquatic Resources—Fish-Impacts-Smolt-Iliamna	Wildlife—Wildlife-Small Mammals
	Fish and Aquatic Resources—Fish-Impacts-Spills	Wildlife—Wildlife-waste management
	Fish and Aquatic Resources—Fish-Impacts-Strategic Timing of Water Release	
	Fish and Aquatic Resources—Fish-Impacts-Water Temperature	

Factor No. 6: Fish and wildlife values—33 CFR 320.4(a)(1); 33 CFR 320.4(c)—fish and wildlife	
	Fish and Aquatic Resources—Fish-Intermittent Stream Habitat Wildlife—Wildlife-Wildlife Interaction Plan Wildlife—Wildlife-Wood Frog-Impacts
USACE consideration of comments[2]	The impacts of the proposed project to essential fish habitat are extensively discussed in the Essential Fish Habitat Assessment. The proposed project would have direct impacts to fish values with the direct loss of habitat in the mine site area. The project modeling has shown that the proposed project would not impact fish values down to the Bristol Bay Fishery, but may have a local portfolio effect. The potential for impacts to fish and wildlife in McNeil River State Game Refuge and Sanctuary has been minimized by the applicant's preferred alternative. As the proposed project no longer crosses Iliamna Lake, there would be no impacts to the Iliamna Lake seals. The Amakdedori port site and the structures in Iliamna Lake are no longer included in the proposed project description, so associated comments are not addressed further.
Benefits of the project related to factor[3]	None
Reasonably foreseeable detriments of the project related to factor[3]	The project features and facilities presenting potential risks to aquatic resources primarily involve those that ultimately could directly or indirectly alter or degrade surface or groundwater and aquatic habitats. This includes construction of mine infrastructure, access roads, and related facilities; mining and earth moving activities; pumping/dewatering and other activities involving groundwater, surface water, and stormwater; wastewater or contact water conveyance, treatment, and disposal; storage and handling of fuel, process chemicals/by-products, and hazardous waste; and other site management practices near and upslope, or otherwise hydraulically connected to surface waters that might be a source of contamination. The discharge of dredged or fill material from the project will result in the loss or change of breeding and nesting areas, escape cover, travel corridors, and preferred food sources of resident and migratory wildlife species associated with the aquatic ecosystem. Impacts to non-federally listed wildlife are discussed in the FEIS in Chapter 4: Section 4.23 and are grouped into several categories: birds (raptors, waterbirds, landbirds and shorebirds), terrestrial wildlife (caribou, moose, brown and black bears, gray wolves), small terrestrial vertebrates (furbearers and wood frogs), and marine mammals. Wildlife associated with aquatic ecosystem includes resident and migratory mammals, birds, and wood frogs. Overall, there would be a loss of 10,168 acres of habitat occupied by a variety of wildlife species. This includes waters, wetlands, streams, and other aquatic features that provide important foraging, nesting, resting, migrating, and breeding habitat for species. Additional habitat would be temporarily disturbed during construction, including trenching the natural gas and fiber-optic cable route through Cook Inlet including Cottonwood Bay. The Applicant’s proposed project would result in a permanent loss of fish and wildlife habitat, fragmentation, and degradation from development of the mine site, placement of fill for transportation component facilities, and installation of the natural gas pipeline and fiber optic cable. The proposed project would have detrimental impacts that would differ for species in the terrestrial versus marine environment. Behavioral disturbance along with potential for injury and mortality would be the greatest impacts to species in the marine environment. Habitat loss and disturbance would be the greatest impacts to terrestrial wildlife. Potential project impacts to brown bears in this region are unknown and could extend for several miles around project facilities. Cumulative impacts include: The mine site footprint would have a larger open pit and more facilities to store tailings and waste rock, and collect and store water. The primary potential future impacts to fish and wildlife from the Pebble Project expansion scenario would be direct loss of habitat; displacement and injury; habitat degradation; sedimentation; and changes in the natural flow regime. These impacts would be similar to the direct and indirect impacts described previously in this section.
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	9, 14-32, 39-40, 44-47, 56, 59, 67-68, 82, 85-86, 96-97, 102, 106, 108, 111-112, 114, 116-119, 129, 131-132, 135-137, 139-140, 143-146, 150, 159-161, 163, 172-173, 179, 180 [FEIS Table 5-2, in Attachment B10 of the ROD] Project Design Features [DA Application June 2020, Tab 23] Protection of Aquatic Resources [DA Application June 2020, Tab 23]

Factor No. 6: Fish and wildlife values—33 CFR 320.4(a)(1); 33 CFR 320.4(c)—fish and wildlife	
	Protection of Wetlands and Waters [DA Application June 2020, Tab 23] Restoration of Temporary Impacts [DA Application June 2020, Tab 23] Reclamation of Permanent Impacts [DA Application June 2020, Tab 23] Spill Prevention and Response and Groundwater Protection [DA Application June 2020, Tab 23] Implementation of Environmental Plans and Controls and Adaptive Management [DA Application June 2020, Tab 23]
USACE determination of factor[4]	The proposed project would have an adverse effect on the fish communities at the local level due to localized direct and indirect impacts to fish habitat. The impact to fish values at the regional level would be adverse, but negligible. At the state, national, and global levels, there would be no effect. The proposed project would have an adverse effect on conservation of wildlife resources at the local level with the direct loss of habitat and disturbance from project activities, and the potential to cause behavior modification due to disturbance. Regionally, the project could adversely affect wildlife in the vessel transit corridors because if present they would be directly harassed by vessels' presence. The project would have an adverse effect on endangered species.

Factor No. 7: Water quality—33 CFR 320.4(a)(1), 33 CFR 320.4(b)(2)(vii), 33 CFR 320.4(d)		
Context which factor evaluated[1]	Local, Regional	
Where analyzed in EIS	Section 4.4 Environmental Justice; Section 4.10 and Appendix K4.10 Health and Safety; Section 4.14 Soils; Section 4.16 Surface Water Hydrology; Sections 3.17 and 4.17 and Appendices 3.17 and 4.17 Groundwater Hydrology; Section 3.18 and Section 4.18 Water and Sediment Quality; Section 4.20 and Appendix K4.20 Air Quality; Sections 3.22 and 4.22 Wetlands and Other Waters/Special Aquatic Sites; Section 4.23 Wildlife Values. Section 4.24 Fish Values; Section 4.26 Vegetation; Section 4.27 Spill Risk; Appendix E (E1.2) describes Section 401 and 402 of the Clean Water Act, in particular 402 as applies to a mine project.	
Comments received (positive) toward factor	None	
Comments received (negative) toward factor	SCOPING REPORT: 3.4.2.4 Surface and Groundwater Hydrology 3.4.2.10 Water Quality and Quantity 3.4.3.3 Wetlands and Special Aquatic Sites CAR: Cumulative Effects Analysis - cumulative effects of dewatering, Cumulative Effects Analysis - cumulative effects of dust Cumulative Effects Analysis - geochemical risk, Cumulative Effects Analysis - Impacts of block caving on groundwater Cumulative Effects Analysis - Quantify water quality impacts, Water and Sediment Quality - Acid Generation and Metal Leaching Fish and Aquatic Resources—Fish- Biotic Ligand Model	CAR (continued): Groundwater Hydrology—Seasonal groundwater level fluctuations, Groundwater Hydrology—Stream stage effects on groundwater Groundwater Hydrology—Unclear volumes of water requiring management, Groundwater Hydrology—Underdrains Groundwater Hydrology—Watershed Model and Water Balance Mitigation or Monitoring Measures—Fugitive Dust Plan is Needed, Mitigation or Monitoring Measures—Request for proposed management plans Public Health—Drinking Water Protection Areas, Public Health—Fugitive Dust Control Plan Public Health—Fugitive Dust Impacts on Water Quality Soils—Copper in dust, Soils—Dispersion Model for Deposition, Soils—Fugitive Dust Control Plan, Soils—Fugitive Dust Impacts Soils—Fugitive Dust Impacts in Post-Closure, Soils—Fugitive Dust Mitigation and Planning

Factor No. 7: Water quality—33 CFR 320.4(a)(1), 33 CFR 320.4(b)(2)(vii), 33 CFR 320.4(d)		
	Fish and Aquatic Resources—Fish-Metals General Safety Concerns—Concentrate Dust Health Hazard Groundwater Hydrology—Baseline Data, Groundwater Hydrology—Bulk TSF Filter/Transition Zone Groundwater Hydrology—Bulk TSF groundwater table changes and leakage, Groundwater Hydrology—Bulk TSF Seepage Analysis Groundwater Hydrology—Closure cover infiltration effects, Groundwater Hydrology—Continuous groundwater divides Groundwater Hydrology—Effects of groundwater model uncertainties on EIS, Groundwater Hydrology—Expanded mine analysis Groundwater Hydrology—Foundation Conditions, Groundwater Hydrology—Groundwater analysis reliability Groundwater Hydrology—Groundwater Best Management Practices, Groundwater Hydrology—groundwater leakage from TSFs and WMPs Groundwater Hydrology—Groundwater model code selection, Groundwater Hydrology—Groundwater model pit capture zones Groundwater Hydrology—Groundwater modeling incomplete assessment, Groundwater Hydrology—groundwater permanent sink Groundwater Hydrology—Groundwater pit dewatering design, Groundwater Hydrology—Groundwater system failure analysis Groundwater Hydrology—GW aquifer mapping, Groundwater Hydrology—GW characterization of deep groundwater flow Groundwater Hydrology—GW Cross-basin flow: SFK to UTC, Groundwater Hydrology—GW Effects of faults Groundwater Hydrology—GW impacts to private wells, Groundwater Hydrology—GW quantification of contact water infiltration Groundwater Hydrology—GW seepage through TSF saddles, Groundwater Hydrology—GW/SW Interactions details	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Fugitive Dust Impacts, Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Fugitive Dust Mitigation and Planning Tailings Dam Failures—Downstream Impacts Water and Sediment Quality - ANFO/Nitrogen/Ammonia effects, Water and Sediment Quality - Ballast Water Discharge Water and Sediment Quality - Baseline Water Quality, Water and Sediment Quality - Construction Water and Sediment Quality - Data and Process, Water and Sediment Quality - Diamond Point Port Site Water and Sediment Quality - Downstream Impacts, Water and Sediment Quality - Drinking Water Water and Sediment Quality - Drinking Water Protection Areas, Water and Sediment Quality - Effluent Discharge Limits Water and Sediment Quality - Frying Pan Lake Water Quality, Water and Sediment Quality - Fugitive Dust Impacts Water and Sediment Quality - Groundwater Impacts from Dredged Material Disposal, Water and Sediment Quality - Groundwater Quality Water and Sediment Quality - HDDs Terminating Underwater, Water and Sediment Quality - Lower Cook Inlet Water and Sediment Quality - Mercury, Water and Sediment Quality - Natural Gas Pipeline Impacts to Water Quality Water and Sediment Quality - Number of WTP Discharge Locations, Water and Sediment Quality - Permit Exceedances Water and Sediment Quality - Pit Lake Chemistry and Stratification, Water and Sediment Quality - Pit Lake Management in Closure/Post Closure Water and Sediment Quality - Power Plant Impacts, Water and Sediment Quality - Selenium Water and Sediment Quality - Stormwater Management, Water and Sediment Quality - Table K4.18-2, Water and Sediment Quality - Temperature of Treated Water Discharge Water and Sediment Quality - Testing of the Water Treatment System, Water and Sediment Quality - Water Quality Exceedances in Impoundments Water and Sediment Quality - Water Quality in Closure and Post Closure, Water and Sediment Quality - Water Treatment in Closure/Post Closure, Water and Sediment Quality - Zero Effluent Discharge into UTC Wetlands—Wetlands-Functions, Wetlands—Wetlands- Fugitive Dust, Wetlands—Wetlands-Downstream-Indirect Effects Wildlife—Fugitive Dust Impacts to Ecological Receptors, Wildlife—Wildlife-fugitive dust impacts, Wildlife - Risk Assessment for Wildlife

Factor No. 7: Water quality—33 CFR 320.4(a)(1), 33 CFR 320.4(b)(2)(vii), 33 CFR 320.4(d)	
	Groundwater Hydrology—Inadequate science, Vessel Traffic—Impacts-Transportation Corridor- General Groundwater Hydrology—Liners and core zones
USACE consideration of comments[2]	Certification of compliance with applicable effluent limitations and water quality standards required under provisions of Section 401 of the Clean Water Act will be considered conclusive with respect to water quality considerations unless the Regional Administrator, EPA, advises of other water quality aspects to be taken into consideration. The EPA Regional Administrator has not advised USACE of other water quality aspects to take into consideration. The analysis of impacts for the proposed project is based upon the expectation that the applicant would comply with the most stringent ADEC water quality standards. There are no point sources proposed as part of the proposed project. Impacts resulting from dewatering, water withdrawals, and to water quantity are under the authority of the State of Alaska and, to the extent that they fall under USACE purview, are considered in the water supply and conservation factor below. There are no Municipal water supplies within the vicinity of the proposed action. There is one known private well (Anchor Point). Some Iliamna Lake communities take drinking water directly from Iliamna Lake or the Kvichak River. Downstream impacts to drinking water are not anticipated due to capture and containment of mine site water. Water withdrawals for the purposes of dewatering or dust control or other extraction uses are under the authority of the State of Alaska. Spills of materials which meet the definition of discharges of dredged or fill material and are in excess of any DA permit, if issued, would be considered in non-compliance with the DA permit. USACE will address non-compliance issues, if they occur, in accordance with our enforcement regulations. Spills of other materials are outside the purview of the USACE and are not considered further in this analysis. The proposed impacts to wetlands would result in losses of functions, including the filtering of water. Iliamna Lake is not within the footprint of the proposed project and impacts from structures in Iliamna Lake are not further considered in this analysis.
Benefits of the project related to factor[3]	None
Reasonably foreseeable detriments of the project related to factor[3]	The project would result in direct and indirect detriments to water quality and chemistry as a result of geochemical alteration of mined rock and its interaction with air and water, the discharge of treated effluent, project-related fugitive dust, seepage from mine site facilities, and potential sedimentation and turbidity from construction and the operation of ferries and barges in shallow water. The discharge of treated effluent would alter water chemistry; however, because treated water would be required to meet the most stringent water quality criteria, alterations in water chemistry are not anticipated to result in water quality exceedances. Indirect impacts to water quality, such as alterations to water chemistry as a result from project-related fugitive dust, are not anticipated to result in exceedance of regulatory limits. Other impacts include short-term increases in turbidity at areas along the transpiration corridor (e.g., such as stream crossings during culvert installation); ferry terminal sites during "capture" and construction; and in marine water (Cook Inlet) along the buried portion of the natural gas pipeline during construction. Fugitive dust generated from various mine site sources and activities would have the potential to affect sediment chemistry in waterbodies, particularly the concentration of metals. In terms of magnitude, total increases in metals concentration in sediment due to dust deposition are predicted to be less than 1 percent for all metals except antimony, which would be expected to increase by about 3 percent. Dust deposition would not be expected to result in exceedance of the most stringent sediment quality criteria. ADEC regulates point sources discharges, wastewater discharges, solid waste disposal through various permits, including APDES Individual Permit, Integrated Waste Management Permit, APDES Multi-sector General Permit for Stormwater Discharges Associated with Industrial Activity (Permit Number AKR06000), and State Wastewater Discharge Permit. The State of Alaska APDES permit may be conditioned to ensure that discharges comply with State water quality standards. For proposed exceedances of water quality criteria in surface water and groundwater (see FEIS Table K3.18-1), there are currently no plans to incorporate site-specific baseline levels of constituents into discharge limits (ADEC 2018-RFI 064a). However, an applicant for an APDES permit may choose to seek

Factor No. 7: Water quality—33 CFR 320.4(a)(1), 33 CFR 320.4(b)(2)(vii), 33 CFR 320.4(d)	
	site-specific criteria in accordance with 18 AAC 70 rather than implement the required water quality treatment technology to meet existing criteria. The proposed project is not expected to cause direct or indirect impacts to water supply and conservation as pertains to human use of water resources. The project features and facilities presenting potential risks to aquatic resources primarily involve those that ultimately could directly or indirectly alter or degrade surface water or groundwater hydrology and aquatic habitats. The affects of dewatering to drawdown the groundwater table would be expected to occur primarily at and around the open pit, but also in the vicinity of the quarries, tailings storage facilities, and water management ponds. Altered surface water flow and groundwater/surface water interaction resulting from lowering of the groundwater table would be expected to impact area wetlands, surface flow, and vegetation within the capture zone. Sedimentation from shore erosion and accretion is evaluated under shore erosion and accretion and is incorporated here by reference. The submerged aquatic vegetation characteristic of vegetated shallows maintains water quality by absorbing nutrients, trapping sediments, reducing erosion, and producing oxygen. Impacts to these wetlands could alter groundwater discharge that maintains hydrology and water quality in these streams. Essential services of estuaries include buffering from extreme forces of open waters, filtration, sediment trapping, Disruption of wetland hydrology can interfere with the filtration, aquifer recharge, and storm and floodwater modification functions of a wetland. Impacts to these wetlands could alter groundwater discharge that maintains hydrology and water quality in these streams. The loss of this riffle and pool habitat would degrade the quality of downstream habitat through the reduced capacity for aeration and filtration, and increased scour, sedimentation, and turbidity. Further impacts to wetlands are evaluated in wetlands, and is incorporated here by reference.
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	3, 6- 9, 14, 15, 28-40, 44-46, 47, 58, 59, 62, 63, 65, 66, 69, 71, 72, 76, 79, 80, 83-86, 88-92, 94, 96, 97, 98, 99, 100, 101, 103-112, 115, 118-121, 134-143, 145, 149, 154, 156, 170, 171, 173-175, 179, 180 [FEIS Table 5-2, in Attachment B10 of the ROD] The proposed project would return water from the concentrate pipeline back to the mine site for re-use. [FEIS Chapter 2] Caisson dock [FEIS Table 5-3] Project Design Features, Protection of Wetlands and Waters, Reclamation of Permanent Impacts, Restoration of Temporary Impacts, Spill Prevention and Response and Groundwater Protection, Implementation of Environmental Plans and Controls and Adaptive Management, Protection of Aquatic Resources, Human Health and Safety Measures [DA Application June 2020, Tab 23]
USACE determination of factor[4]	Further detailed analyses of water quality impacts are described in Section B2. of the ROD, as part of the 404(b)(1) guidelines analysis. The proposed project would have an adverse effect on groundwater hydrology in the vicinity of the proposed project, specifically at the mine site. Impacts to groundwater hydrology in the transportation corridor and at the port site would be adverse, but negligible. There would be no impact to groundwater hydrology in the marine portions of the natural gas pipeline. The proposed project would have adverse impacts on sediment quality and increased fugitive dust impacts at the local level. Regionally there would be no effect. The proposed project would cause a negligible adverse effect to shoreline erosion and accretion. The proposed project would have an adverse local effect on wetlands and other waters that provide minimum baseflows. The impact at a regional level would be adverse but negligible. The proposed project would have no effect on water supply and conservation. Evaluation of the request for certification under Section 401 of the Clean Water Act has not been completed by the State of Alaska as of the time of this decision. The proposed project would have an adverse effect to water quality at the local level and a negligible adverse impact to water quality at the regional level.

Factor No. 8: Conservation—33 CFR 320.4(a)(1) Water supply and conservation—33 CFR 320.4(a)(1) and 33 CFR 320.4(m) energy conservation and development—33 CFR 320.4(n)	
Context which factor evaluated[1]	Regional
Where analyzed in EIS	Ch. 4 Environmental Consequences (general conservation discussion); Sections 4.18.4 and 4.18.8 Water and Sediment Quality; Section 4.17 Groundwater Hydrology; Section 4.10 Health and Safety; Section 4.4 Environmental Justice; Section 4.27 Spill Risk
Comments received (positive) toward factor	Lands, physical and biological resources, especially fish, should be conserved [CAR and Scoping Report, various topics]
Comments received (negative) toward factor	Scoping Report 3.4.2.4; 3.4.2.8 CAR: Water and Sediment Quality—Drinking Water Water and Sediment Quality—Drinking Water Protection Areas Groundwater Hydrology—GW impacts to private wells Public Health—Drinking Water Protection Areas CAR (continued): Tailings Dam Failures—Downstream Impacts Natural Gas Supply—Public's Interest in Energy Conserve and Develop Natural Gas Supply—Cook Inlet Gas Supply Natural Gas Supply—Impacts of Natural Gas Demand Natural Gas Supply—Natural Gas from Prudhoe Bay
USACE consideration of comments[2]	Other than the footprint of the proposed project, the project is not anticipated to affect the region's ability conserve natural resources. There are no Municipal water supplies within the vicinity of the proposed action. There is one known private well (Anchor Point). Some Iliamna Lake communities take drinking water directly from Iliamna Lake or the Kvichak River. Downstream impacts to drinking water are not anticipated due to capture and containment of mine site water. Further analysis of potential impacts to water supply are provided in Section B2 of the ROD. Water withdrawals for the purposes of dewatering or dust control or other extraction uses are under the authority of the State of Alaska. The purpose of the proposed project does not include the development of new energy sources. The proposed project would acquire natural gas from the open market and is not anticipated to require more natural gas resources than are there are available in the Cook Inlet region.
Benefits of the project related to factor[3]	None
Reasonably foreseeable detriments of the project related to factor[3]	The proposed action would include direct and indirect impacts to wetlands and other waters, fish and wildlife, vegetation, soils, air, land, minerals, and subsistence plants and animals. The proposed project is not expected to cause direct or indirect impacts to water supply and conservation as pertains to human use of water resources. The project would consume significant amounts of energy in the form of natural gas, diesel and other fuels to provide the energy needs of the project.
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	55, 58, 68, 83, 88, 99, 137, 142, 145, 170, 86, 175 [FEIS Table 5-2, in Attachment B10 of the ROD] The proposed project would return water from the concentrate pipeline back to the mine site for re-use. [FEIS Chapter 2] Project Design Features [DA Application June 2020, Tab 23] Protection of Wetlands and Waters [DA Application June 2020, Tab 23] Minimization of Social Impacts [DA Application June 2020, Tab 23]

Factor No. 8: Conservation—33 CFR 320.4(a)(1) Water supply and conservation—33 CFR 320.4(a)(1) and 33 CFR 320.4(m) energy conservation and development—33 CFR 320.4(n)	
USACE determination of factor[4]	Considering the direct, indirect and cumulative effect of the proposed project, there would be a negligible adverse effect to conservation at the regional level.

Factor No. 9: General environmental concerns—33 CFR 320.4(a)(1)		
Context which factor evaluated[1]	Local, Regional, State, National, Global	
Where analyzed in EIS	Section 4.27, Section 3.1, Section 3.9, Section 3.16 and Appendix K3.16.3, Section 3.17, Section 3.18, Section 3.20, Section 3.22, Section 3.23, Section 3.24, Section 3.25, Section 4.15, Section 4.16, Section 4.17, Section 4.20 and Appendix K4.27 Spill Risk	
Comments received (positive) toward factor	None	
Comments received (negative) toward factor	Scoping Report: 3.4.2.2 3.4.2.6 Spill Risks and Releases 3.4.2.7 Hazardous Materials 3.4.3.2 Fish and Aquatic Resources 3.4.4.2 Subsistence 3.5.3 Proposed Action and Alternatives CAR: Climate Change (Includes GHG)—Climate Change (CC) Not Occurring in Alaska Climate Change (Includes GHG)—CC Project Area Impacts Climate Change (Includes GHG)—CC-Analysis Timeframe Climate Change (Includes GHG)—CC-Cost Climate Change (Includes GHG)—CC-Cumulative Effects Climate Change (Includes GHG)—CC-Fish Habitat Analysis Climate Change (Includes GHG)—CC-Infrastructure Impacts Climate Change (Includes GHG)—Climate Change-General Climate Change (Includes GHG)—Project Contribution to CC	CAR (continued): Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Concentrate Recovery Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Concentrate Spill—Seasonal conditions Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Concentrate spill downstream impacts Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Concentrate Spill Response Plan Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Concentrate Spills—Cumulative Impacts Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Concentrate Spills in Kamishak Bay Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Concentrate Transport Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Cumulative impacts of spills Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel Fate and Behavior Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel spill impacts Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel spill impacts to fish Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel spill probability Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel Spill Response Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel spill scenarios

Factor No. 9: General environmental concerns—33 CFR 320.4(a)(1)		
	Climate Change (Includes GHG)—Wildlife-climate change impacts Cumulative Effects Analysis—impacts to birds Earthquakes or seismic concerns—Hazards to pipeline and roads Fish and Aquatic Resources—Fish-Impacts-Modeling Fish and Aquatic Resources—Fish-Impacts Analysis –General Groundwater Hydrology—Groundwater system failure analysis Birds—Birds-general impacts Surface Water Hydrology—Climate Change-Gen Tailings Dam Failures—TSF Water Management Threatened and Endangered Species (Federally Listed)—Birds-Short-tailed Albatross impacts Threatened and Endangered Species (Federally Listed)—Birds-Steller's eider impacts Threatened and Endangered Species (Federally Listed)—Wildlife-humpback whale impacts Threatened and Endangered Species (Federally Listed)—Wildlife-northern sea otter impacts Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Acid Generation Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Concentrate Pipeline	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel transport by Marine Vessel Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel transport by Truck Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Failure of water treatment systems Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Fugitive Dust Impacts Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Fugitive Dust Mitigation and Planning Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Metals Toxicity Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Mitigation Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Molybdenum concentrate Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Natural Gas Release Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Reagents Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Sodium Ethyl Xanthate Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Spill Response Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Spill Scenarios Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Spill Scenarios Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Spills from Ferry Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Spills to Frying Pan Lake Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Subsistence Impacts Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Vessel Traffic Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Wetlands—Spills
USACE consideration of comments[2]	Spills of materials which meet the definition of discharges of dredged or fill material and are in excess of any DA permit, if issued, would be considered in non-compliance with the DA permit. USACE will address non-compliance issues, if they occur, in accordance with our enforcement regulations. Spills of other materials are outside the purview of the USACE and are not considered further in this analysis.	
Benefits of the project related to factor[3]	None	
Reasonably foreseeable detriments of the project related to factor[3]	Project GHG emissions would be integrated with the atmosphere and transported globally without directly causing short-term and local impacts. The combination of project emissions with all other global emissions past and present has the potential to translate to impacts in the analysis area. GHG emissions remain in the atmosphere for extended time periods and are globally transported, the impact duration would be permanent, and the geographic extent global. The project would contribute to global GHG emissions during all phases of construction, operations, and closure.	

Factor No. 9: General environmental concerns—33 CFR 320.4(a)(1)	
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	48-51, 55, 57, 62-64, 70-75, 77-78, 81, 85, 93, 95, 102, 113-114, 128, 133, 156-158, 164, 167, 178, 179 [FEIS Table 5-2, in Attachment B10 of the ROD] Spill Prevention and Response and Groundwater Protections [DA Application June 2020, Tab 23]
USACE determination of factor[4]	Considering the direct, indirect, and cumulative effects of the project, there would be an adverse effect to General Environmental Concerns from the activities under USACE authority to the local and the region.

Factor No. 10: Needs and welfare of the people—33 CFR 320.4(a)(1)		
Context which factor evaluated[1]	Local, Regional, State	
Where analyzed in EIS	Section 4.3 Needs and Welfare of the People; Section 4.4 Environmental Justice; Section 4.5 Recreation; Section 4.10 Health and Safety; Section 4.12 Transportation and Navigation; Section 4.19 Noise; Section 4.25 TES; Section 5.2 Monitoring	
Comments received (positive) toward factor	Scoping Report: 3.4.4 Social Resources	CAR: Socioeconomics Impacts—Economic Impact—Beneficial Socioeconomics Impacts—Local Support Policies Socioeconomics Impacts—Infrastructure—Beneficial
Comments received (negative) toward factor	Scoping Report: 3.4.4 Social Resources, 3.4.4.8 Environmental Justice, 3.4.4.6 Transportation and Navigation ;3.5.6 Monitoring and Adaptive Management CAR: Mitigation or Monitoring Measures—Additional Mitigation Mitigation or Monitoring Measures—BMPs Industry Standards and Permit Requirements Mitigation or Monitoring Measures—Design Features Mitigation or Monitoring Measures—Effectiveness of Mitigation Measures Mitigation or Monitoring Measures—Oversight of Mitigation Mitigation or Monitoring Measures—Request for proposed management plan Socioeconomics Impacts—Economic Impact—Adverse Socioeconomics Impacts—Economic Impact—Beneficial Socioeconomics Impacts—Inadequate Analysis—Long-term Aesthetics or Visual Concerns—Noise	CAR (continued): Birds—Birds-general impacts Cumulative Effects Analysis—noise and vibration impacts Recreation—Recreation Setting Impacts Wildlife—Bears—McNeil River State Game Sanctuary Wildlife—Caribou- Impacts Wildlife—Migration Barriers Wildlife—Wildlife-Iliamna Lake Seal Impacts Wildlife—Wildlife-Impacts-General Wildlife—Wildlife-Marine Mammals- Impacts- Gen Environmental or Social Justice—EJ-Economic Value Environmental or Social Justice—Human Rights Declaration Environmental or Social Justice—Inadequate Analysis Transportation—General Impacts Transportation—Pipeline Construction impacts to traffic Transportation—Road Access
USACE consideration of comments[2]	The proposed project would have beneficial and detrimental socioeconomic impacts at a local, regional and State scales. The project would create jobs and offer steady income to those employed. However, it would be anticipated that the impacts would be localized and of brief duration.	

Factor No. 10: Needs and welfare of the people—33 CFR 320.4(a)(1)	
	The applicant's preferred project has reduced potential noise impacts by including the use of caissons instead of pile driving (which is much louder and would have a greater impact on marine species, particularly TES). The potential for noise impacts to McNeil River State Game Refuge and Sanctuary has been minimized by the applicant's preferred alternative. As the proposed project no longer crosses Iliamna Lake, there would be no noise impacts to the Iliamna Lake seals. The proposed project would cause impacts to communities that meet the definition of minority and/or low income. There are few existing roadways in the area. Iliamna Lake is a primary route in the winter for connections between villages. Iliamna Lake and Amakdedori Port are no longer part of the proposed project. The existing Williamsport-Pile Bay Road is used to transport commodities, supplies, and fishing vessels. The proposed project would cause increases in vessel traffic in Cook Inlet and Iliamna Bay, increases in vehicle traffic from Williamsport to the mine site, and increases in air traffic in Iliamna, Pile Bay, and Pedro Bay.
Benefits of the project related to factor[3]	The increase in job opportunities, year-round or seasonal employment, steady income, and lower cost of living would have beneficial impacts on the project area during construction and operations of the project, including the reduction of seasonal employment fluctuations that are prevalent in the region. Tax revenues would provide income for local governments and the State of Alaska. The project may also reduce the cost of living at the local and regional scale by potentially providing residents in the vicinity with an opportunity to use natural gas instead of the more expensive fuel oil that is commonly used presently. The project may also allow lowered cost of goods by providing upgraded port and transportation corridor, which could provide cheaper transportation costs of goods.
Reasonably foreseeable detriments of the project related to factor[3]	The project road would increase traffic, both mine operations traffic and public traffic, in Pedro Bay because this road would connect previously unconnected communities to each other and to Cook Inlet over land. The construction and operation of a new port would increase congestion and marine traffic in Iliamna Bay and Iniskin Bay, especially during bad weather, when vessels take refuge in the bay. There would be several detriments from the project at mine closure, including the decline of jobs and associated income. Locals who had gotten used to the steady income supporting their maintenance and operating costs of rural life would have to adjust their lifestyles. As jobs in the area decrease, some residents may move to find new employment. Some decreases of cost of living may increase to pre-project levels. There would be detriments related to subsistence, as detailed under the land use PIR factor. Air traffic in the area would increase from current conditions, as Pedro Bay would receive 5 to 10 employee flights per week during operations (PLP 2018-RFI 027a). Iliamna would also receive an estimated one cargo flight per week, and six unscheduled cargo flights per year, in addition to the above passenger flights (PLP 2018-RFI 027).
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	5, 10-13, 42-43, 52-55, 87, 124-127, 131-132, 147, 153-154, 157-158 [FEIS Table 5-2, in Attachment B10 of the ROD] Minimization of Social Impacts [DA Application June 2020, Tab 23] Project Design Features [DA Application June 2020, Tab 23] Protection of Wildlife [DA Application June 2020, Tab 23]
USACE determination of factor[4]	The proposed project would have off-setting adverse and beneficial impacts to the local area, the region, and to the state. The proposed project would have a beneficial effect on regional and local surface transportation by making it more economical and improving infrastructure. The proposed project would have a negligible adverse effect on regional and state air transportation and vessel transportation by increasing travel along existing routes without increasing infrastructure.

Factor No. 11: Recreation—33 CFR 320.4(a)(1) and 33 CFR 320.4(e)	
Context which factor evaluated[1]	Local, State, Regional
Where analyzed in EIS	Sections 3.5 and 4.5 Recreation; Section 4.6 Commercial and Recreational Fishing
Comments received (positive) toward factor	None
Comments received (negative) toward factor	Scoping Report: 3.4.4.7 Recreation CAR: Recreation—Bear Viewing Impacts Recreation—Impacts to National Park Visitors Recreation—Inadequate Analysis Recreation—Recreation Setting Baseline CAR (continued): Recreation—Recreation Setting Impacts Recreation—Use increase Recreational Fisheries Cumulative Effects Analysis—Amakdedori indirect impacts Wildlife—Bears—McNeil River State Game Sanctuary
USACE consideration of comments[2]	The potential for impacts to bear viewing and other recreation at Amakdedori, McNeil River State Game Refuge and Sanctuary and Katmai National Park and Preserve has been minimized by the applicant's preferred alternative. The project would negatively impact the recreational experience in the area, including access to fishing and hunting, views from certain elevations, and increases in noise and light levels. There would be increased access to formerly remote recreation areas for residents and non-residents. Mine employees or support personnel may compete for recreational opportunities. Visitors to Lake Clark National Park may be impacted by the proposed project.
Benefits of the project related to factor[3]	No direct impacts are identified. Indirect impacts would include: Potential for increase in recreation use due to increase in full-time resident population and potential for additional recreation use along the pipeline ROW and road corridor. [Can be both beneficial or detrimental] Indirect and Cumulative Impacts could include increased recreation in the region due to easier access to recreational equipment or more affordable recreational equipment.
Reasonably foreseeable detriments of the project related to factor[3]	Direct impacts would include: Permanent loss of 10,132 acres of area available for recreation, Impacts to Recreation experience, Recreation setting, Recreation activities, Recreation Use [EIS Section 4.5] Visual impacts would appear dominant to viewers in recreational or local low-altitude aircraft. When viewed from the air, the project would result in moderate to strong visual contrast due to vegetation removal and ground disturbance in access roads and the mine site. Transportation activity may disrupt recreational fishing effort where the corridor intersects with streams and other waterbodies, but this effort would redistribute along the waterbodies. The impacts on recreation at the mine site would be the loss of lands which support the fish and wildlife that attract anglers and sport hunters. Noise related impacts which result from the proposed project, such as blasting and equipment operation and helicopters, would negatively impact the recreational experience for recreators in the vicinity of the project. The proposed project would negatively impact recreational fishing along the transportation corridor. Indirect Impacts would include:

Factor No. 11: Recreation—33 CFR 320.4(a)(1) and 33 CFR 320.4(e)	
	Changes in the view from Lake Clark park unit may occur, as a result of the shift from a relatively undisturbed area to an industrial area. Potential for increase in recreation use due to increase in full-time resident population and potential for additional recreation use along the pipeline ROW and road corridor. [Can be both beneficial or detrimental] Cumulative Impacts would include: Additional years of mining and infrastructure construction and a larger disturbance footprint would remove the footprint acreage from potential recreation use and displace wildlife over a larger area and thus opportunities for hunting, fishing, and wildlife viewing would be reduced. Recreation opportunities in the footprint and wildlife-related recreation opportunities surrounding the mine site area would be displaced. The expanded mine scenario alone would affect 31,541 acres that would be unavailable for recreation. In addition, oil and gas exploration and development would result in noise, aircraft traffic, and the sight of exploration equipment affecting the recreation experience in the immediate vicinity of activities.
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	13, 42 [FEIS Table 5-2, in Attachment B10 of the ROD] Minimization of Social Impacts [DA Application June 2020, Tab 23]
USACE determination of factor[4]	The proposed project would have an overall adverse effect on recreation at a local level, due to losses of areas available for recreation, and impacts to fish and wildlife and habitat which attract recreators. There would be a negligible positive effect due to the ease of access if new transportation corridors are available to resident and/or non-resident use or equipment is more readily available. The adverse impacts would be less severe at the regional level and adverse but negligible at the state level.

Factor No. 12: Aesthetics—33 CFR 320.4(a)(1)		
Context which factor evaluated[1]	Local	
Where analyzed in EIS	Section 4.11 Aesthetics	
Comments received (positive) toward factor	None	
Comments received (negative) toward factor	Scoping Report: 3.4.4.10 Visual Resources and Aesthetics CAR: Aesthetics or Visual Concerns—Flight Paths Aesthetics or Visual Concerns—General Impacts	CAR (continued): Aesthetics or Visual Concerns—KOPs Aesthetics or Visual Concerns—Lighting Recreation—Recreation Setting Impacts
USACE consideration of comments[2]	The proposed project would have an impact on the visual landscape, especially for flight paths over the project site. Night sky impacts could reach up to 20 miles from the mine site.	
Benefits of the project related to factor[3]	None	
Reasonably foreseeable detriments of the project related to factor[3]	Direct Impacts would include: Within the project footprint, a predominantly undeveloped area would be converted to an industrial area, resulting in increased noise and light levels, and negatively impacting the visual landscape, especially from certain elevations and for flight paths over the project site. Night sky impacts could reach up to 20 miles from the mine site. Due to aesthetic changes to the landscape, the use of certain cultural areas may be limited or altered. Cumulative impacts would include:	

Factor No. 12: Aesthetics—33 CFR 320.4(a)(1)	
	Under the expanded mine scenario, there would be a larger footprint with increased visual and noise components, contributing to the cumulative impacts of aesthetics in the region. The increased impacts could be experienced by local subsistence hunters in the area, and by recreational users that are dropped off and float the upper reaches of the Koktuli and Stuyahok rivers.
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	119, 150 [FEIS TABLE 5-2, in Attachment B10 of the ROD] Restoration of Temporary Impacts [DA Application June 2020, Tab 23] Reclamation of Permanent Impacts [DA Application June 2020, Tab 23]
USACE determination of factor[4]	The proposed project would have adverse effects on local aesthetics, particularly the area surrounding the mine site.

Factor No. 13: Noise		
Context which factor evaluated[1]	Local, Regional	
Where analyzed in EIS	Section 4.19 Noise; Section 4.5 Recreation; Section 4.25 TES	
Comments received (positive) toward factor	None	
Comments received (negative) toward factor	Scoping Report: 3.4.2.5 Noise CAR: Aesthetics or Visual Concerns—Noise Birds—Birds-general impacts Cumulative Effects Analysis—noise and vibration impacts Noise—helicopter Recreation—Recreation Setting Impacts Threatened and Endangered Species (Federally Listed)—Impacts from shipping Threatened and Endangered Species (Federally Listed)—TES Noise Impacts	CAR (continued): Threatened and Endangered Species (Federally Listed)—Wildlife-Beluga whale impacts Threatened and Endangered Species (Federally Listed)—Wildlife-Steller Sea Lion Impacts Wildlife—Bears—McNeil River State Game Sanctuary Wildlife—Caribou- Impacts Wildlife—Migration Barriers Wildlife—Wildlife-Iliamna Lake Seal Impacts Wildlife—Wildlife-Impacts-General Wildlife—Wildlife-Marine Mammals- Impacts- Gen Wildlife—Wildlife-noise impacts general
USACE consideration of comments[2]	The noise associated with the proposed project would disturb birds in areas of project activity. The noise associated with in water activity of the proposed project elements would likely cause behavioral changes (i.e. avoidance of areas) of threatened and endangered species. The applicant's preferred project has reduced potential noise impacts by including the use of caissons instead of pile driving (which is much louder and would have a greater impact on marine species, particularly TES). The potential for noise impacts to McNeil River State Game Refuge and Sanctuary has been minimized by the applicant's preferred alternative. As the proposed project no longer crosses Iliamna Lake, there would be no noise impacts to the Iliamna Lake seals.	
Benefits of the project related to factor[3]	None	
Reasonably foreseeable detriments of the project related to factor[3]	Mining activities including blasting and heavy equipment operation could affect noise related aesthetics, but the remote location would limit the number of human noise receptors who might experience the anthropogenic sounds. Project noise would also indirectly change the recreation setting at river crossings from quiet and remote to developed and active.	

Factor No. 13: Noise	
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	87, 131, 132 [FEIS TABLE 5-2, in Attachment B10 of the ROD] Project Design Features [DA Application June 2020, Tab 23] Protection of Wildlife [DA Application June 2020, Tab 23]
USACE determination of factor[4]	The proposed project would have adverse effects on the local soundscape due to construction and operations at the project site. The project would have adverse effects to the regional soundscape due to increased vessels and activity going to and from the project site.

Factor No. 14: Historic properties; historic, cultural, scenic, and recreational values, and historic properties—33 CFR 320.4(a)(1) and 33 CFR 320.4(e) and 33 CFR 320.4(l)(1)(iii)		
Context which factor evaluated[1]	Local, Regional	
Where analyzed in EIS	Sections 3.2 and 4.2 Lands; Sections 3.5 and 4.5 Recreation; Sections 3.7 and 4.7 Cultural Resources; Section 4.9 Subsistence; Sections 3.22 and 4.22 Wetlands and Other Waters/Special Aquatic Sites	
Comments received (positive) toward factor	None	
Comments received (negative) toward factor	Scoping Report: 3.4.4.2 Subsistence 3.4.2.4 Surface and Groundwater Hydrology 3.4.4.3 Traditional Culture and Way of Life 3.4.4.4 Archeological and Cultural Resources 3.4.4.7 Recreation 3.4.4.10 Visual Resources and Aesthetics 3.5.1 The NEPA and EIS Process 3.5.9 Research and Evaluation Needs CAR: Aesthetics or Visual Concerns—Flight Paths Aesthetics or Visual Concerns—General Impacts Aesthetics or Visual Concerns—KOPs Aesthetics or Visual Concerns—Lighting Cultural Resources—Amakdedori Cultural Resources—ANCSA 14(h)(1) Cultural Resources—Important sites	CAR (continued): Cultural Resources—Traditional Use Areas Historic Properties—Identification Historic Properties—Important sites Historic Properties—Inadequate Analysis Lands—Management Mitigation or Monitoring Measures—Cultural Resource Management Plan Recreation—Bear Viewing Impacts Recreation—Impacts to National Park Visitors Recreation—Recreation Setting Baseline Recreation—Recreation Setting Impacts Section 106 Compliance—Data and Process Surface Water Hydrology—flood hazards Statements by Federally Recognized Tribes during government-to-government consultation and as part of consultation under Section 106 of the NHPA, as documented in Memorandum for record, are hereby incorporated into this analysis.
USACE consideration of comments[2]	Amakdedori is no longer within the footprint of the applicant's preferred alternative, and therefore this area is outside of the USACE purview. Identification of potential historic properties is ongoing and, if a permit is issued, would continue as specified in the PA. In accordance with Section 106 of the NHPA, adverse impacts to historic properties will be considered as specified in the PA, including avoidance, minimization, and mitigation. The PA is being developed in consultation with Advisory Council on Historic Preservation, State Historic	

Factor No. 14: Historic properties; historic, cultural, scenic, and recreational values, and historic properties— 33 CFR 320.4(a)(1) and 33 CFR 320.4(e) and 33 CFR 320.4(l)(1)(iii)	
	Preservation Office, Indian Tribes, and other consulting parties, and consultation would continue throughout the duration of the PA, if a permit is issued. There are no ANCSA 14(h)(1) sites within the permit area, nor in the area of potential effect, therefore no potential effects to these sites would occur. Areas traditionally used for hunting and other activities may be impacted by the proposed project. Tribes have emphasized that all of the land is a cultural area, used for a variety of cultural purposes. The project may affect areas which are culturally important to Tribes, including traditional use areas, trails, and archeological sites. Some of the cultural sites would be eligible for listing in the National Register of Historic Places, and there is potential for the project to adversely affect historic properties. The project would negatively impact current subsistence practices and cultural uses of the land in the vicinity of the proposed project. There would be negative impacts to the aesthetics of the project area, some of which would be permanent. The potential for impacts to McNeil River State Game Refuge and Sanctuary and Katmai National Park and Preserve has been minimized by the applicant's preferred alternative. No project components are proposed within the boundaries of a conservation unit. Visitors to Lake Clark National Park may be impacted by the proposed project.
Benefits of the project related to factor[3]	Potential for increase in recreation use due to increase in full-time resident population and potential for additional recreation use along the pipeline ROW and road corridor. [Can be both beneficial or detrimental] Indirect and Cumulative Impacts could include increased recreation in the region due to easier access to recreational equipment or more affordable recreational equipment.
Reasonably foreseeable detriments of the project related to factor[3]	Direct and Indirect Impacts to known historic properties: Mine Site: No known historic properties in the mine site analysis area. Transportation Corridor: 1 known historic property would be subject to direct and indirect impacts. Diamond Point Port: No known historic properties identified to date. Natural Gas Pipeline: 1 known historic property would be subject to direct and indirect impacts. The full extent of impacts to historic properties is yet to be determined. In accordance with Section 106 of the NHPA, if a permit is issued, further identification of historic properties, as well as avoidance, minimization and mitigation of adverse impacts to historic properties would be completed in accordance with the Programmatic Agreement that would be attached to the permit. Cultural Resources may be determined to be historic properties. Direct and Indirect Impacts to cultural resources: Mine Site: 8 known sites or features would be directly impacted and 37 known sites or features would be indirectly impacted Transportation Corridor: 40 known sites or features would be directly impacted and 125 sites or features would be indirectly impacted Diamond Point Port: No known sites or features would be directly impacted and 8 known sites or features would be indirectly impacted Natural Gas Pipeline: 38 known sites or features would be subject to direct impacts and 94 known sites or features would be indirectly impacted Impacts to Cultural Areas: Traditional and contemporary cultural use of Frying Pan Lake and Groundhog Mountain could experience indirect impacts. Access restrictions, noise, pollution, lack of privacy, and visual and olfactory intrusions can all negatively impact cultural landscapes,

Factor No. 14: Historic properties; historic, cultural, scenic, and recreational values, and historic properties— 33 CFR 320.4(a)(1) and 33 CFR 320.4(e) and 33 CFR 320.4(l)(1)(iii)	
	traditional cultural properties, and sites of religious or ceremonial significance to tribes, including burial grounds. Access to these areas and the associated cultural practices could be limited or eliminated. Impacts to Conservation Areas, Recreation Areas and Scenic Areas: Visual impacts would appear dominant to viewers in recreational or local low-altitude aircraft. When viewed from the air, the project would result in moderate to strong visual contrast due to vegetation removal and ground disturbance in access roads and the mine site. Night sky could be affected as far as 20 miles from the mine site. Visual impacts are expected to be of medium to high magnitude, and would decrease with distance from the facilities. [EIS Section 4.11] No physical project-related infrastructure would be developed on any federal land or in other legislatively designated areas. Therefore, project construction, operations, or closure would not result in any direct effects on the management, ownership, or use of federal lands. However, project-related activities could indirectly and cumulatively affect the environment, resources, and visitor experience of four federal management units: Lake Clark National Park and Preserve, Kachemak Bay National Estuarine Research Reserve, and the Alaska Maritime Wildlife Refuge. There is a small likelihood that adaptation in land management may be needed in response to potential adverse indirect impacts, such as noise and visual disturbance to recreationists and wildlife from project components. [EIS Section 4.2.3.2] Potential for increase in recreation use due to increase in full-time resident population and potential for additional recreation use along the pipeline ROW and road corridor. [Can be both beneficial and detrimental] Permanent loss of area available for recreation, Impacts to Recreation experience, Recreation setting, Recreation activities, Recreation Use [EIS Section 4.5] Changes in the view from Lake Clark park unit may occur, as a result of the shift from a relatively undisturbed area to an industrial area. The impacts on recreation at the mine site would be the loss of lands which support the fish and wildlife that attract anglers and sport hunters. Noise related impacts which result from the proposed project, such as blasting and equipment operation and helicopters, would negatively impact the recreational experience for recreators in the vicinity of the project. Transportation activity may disrupt recreational fishing effort where the corridor intersects with streams and other waterbodies, but this effort would redistribute along the waterbodies. Certain wetland types and locations are valued by Alaska Natives for their subsistence value. Rivers and their associated floodplains, including the wetlands, are highly valued by residents of and visitors to the Bristol Bay region. In a largely roadless area, rivers provide transportation and critical habitat for subsistence and commercial resources. Floodplains in the area provide subsistence and recreation, have education value where unique wetlands occur and where cultural practices are taught, and have aesthetic value in this largely undeveloped region. Cumulative Impacts: Impacts to historic properties prior to the proposed project were likely minor due to the undeveloped nature of the area. Some structures in the vicinity of the transportation corridor are themselves historic properties. Reasonably foreseeable future actions would result in expansion of areas affected by ground disturbance, noise, and other impacts, as well as the duration of effects, resulting in direct and indirect impacts to additional historic properties or potential historic properties and direct and indirect effects to areas of traditional and cultural importance to tribes.
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	1, 6-10, 13-15, 26-42, 44-46, 53, 58, 83, 88, 97, 99, 118, 119, 124, 134-143, 145, 150, 154, 155, 170, 171, 175 [FEIS Table 5-2, in Attachment B10 of the ROD] Protection of Cultural Resources and Minimization of Social Impacts [DA Application June 2020, Tab 23] Restoration of Temporary Impacts [DA Application June 2020, Tab 23] Reclamation of Permanent Impacts [DA Application June 2020, Tab 23]

Factor No. 14: Historic properties; historic, cultural, scenic, and recreational values, and historic properties—33 CFR 320.4(a)(1) and 33 CFR 320.4(e) and 33 CFR 320.4(l)(1)(iii)	
	Project Design Features [DA Application June 2020, Tab 23] Protection of Wetlands and Waters [DA Application June 2020, Tab 23] Implementation of Environmental Plans and Controls and Adaptive Management [DA Application June 2020, Tab 23] Protection of Aquatic Resources [DA Application June 2020, Tab 23]
USACE determination of factor[4]	The proposed project would have an adverse effect on historic properties. The avoidance and minimization of impacts, as well as the mitigation of adverse impacts would be determined in accordance with a PA, if a permit is issued. Compliance with the PA would resolve adverse effects to historic properties in compliance with Section 106 of the NHPA. The proposed project would adversely affect cultural resources and cultural areas, including cultural resource values from floodplains. Federally Recognized Tribes have expressed that all of the Bristol Bay landscape, including the landscape in the vicinity of the mine site, is culturally important. The proposed project would block use of certain portions of the landscape, and limit or alter the use of other cultural areas due to aesthetic changes to the landscape or due to wildlife avoidance of the area in the vicinity of the project. The overall effect of the project on scenic areas and recreation areas would be adverse due to large portions of the area being converted from wildland to industrial use, with resultant changes in visual impacts, sounds, and smells, as well as access to areas available for recreation. There would be a negligible benefit to recreation areas due to increased ease of access to formerly roadless areas. There would be a negligible adverse impact to conservation areas.

Factor No. 15: Land use—33 CFR 320.4(a)(1), 33 CFR 320.4(j)(2)		
Context which factor evaluated[1]	Local, Regional	
Where analyzed in EIS	Sections 3.2 and 4.2 Lands; Sections 3.7 and 4.7 Cultural Resources; Section 4.9 Subsistence; Section 4.10 and Appendix K4.10 Health and Safety; Section 4.23 Wildlife Values; Section 4.27 Spill Risk; Ch. 5 Mitigation; Section 4.10 and Appendix K4.10 Health and Safety	
Comments received (positive) toward factor	Scoping Report: 3.4.4.1 Socioeconomic Impacts, 3.4.4.2 Subsistence 3.4.4.5 Land Ownership, Management and Use	
Comments received (negative) toward factor	Scoping Report: 3.4.3.2 Fish and Aquatic Resources 3.4.4.2 Subsistence 3.4.4.3 Traditional Culture and Way of Life 3.4.4.4 Archeological and Cultural Resources 3.4.4.5 Land Ownership, Management and Use 3.4.4.9 Public Health 3.4.2.10 Water Quality and Quantity CAR: Lands—Access Lands—Conservation easement	CAR (continued): Subsistence—Analysis Area Subsistence—Baseline Data Subsistence—Believed Contamination Subsistence—Chinook Salmon Subsistence—Competition Subsistence—General Impacts Subsistence—Iliamna Seal Impacts Subsistence—Increased Costs Subsistence—Jobs Hurt Culture Subsistence—Mulchatna Caribou Herd

Factor No. 15: Land use—33 CFR 320.4(a)(1), 33 CFR 320.4(j)(2)		
	Lands—Easements	Subsistence—Native Allotments
	Lands—Impacts—Regulatory	Subsistence—Pedro Bay
	Lands—Land Use	Subsistence—Sharing and Social Networks
	Lands—Management	Subsistence—Socio-cultural
	Lands—Native Allotments	Subsistence—TEK
	Lands—Permits	Subsistence—Traditional learning
	Lands—Regulatory—ANILCA	Subsistence—Traditional Use Areas
	Lands—Subsurface rights	Subsistence—Upper Talarik Creek
	Lands—Telecommunications Infrastructure	Tailings Dam Failures—Downstream Impacts
	Cultural Resources—Amakdedori	Wildlife—Wildlife-fugitive dust impacts
	Cultural Resources—ANCSA 14(h)(1)	Bonding or Financial Assurance—Liability for Failures/Spills
	Cultural Resources—Important sites	Public Health—Contamination of Food
	Cultural Resources—Traditional Use Areas	Recreation—Use increase
	Subsistence—Access	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Subsistence Impacts
	Subsistence—Adaptation	
USACE consideration of comments[2]	The BBAP designates land uses in the footprint of the mine and transportation corridor. The BBAP specifies that these lands are to be retained in public ownership and managed for multiple uses—including recreation, timber, minerals, and fish and wildlife—as well as natural scenic, scientific, and historic values. This does not preclude construction of the mine or related facilities. [EIS Section 4.2.3.2] The State of Alaska has made no specific determinations whether the proposed project is consistent with the BBAP. There are no zoning designations within the footprint of the proposed project. There are no known issues of overriding national importance. Land use of surface and subsurface lands privately owned by Alaska Native corporations are subject to the approval of the landowners (including where the transportation corridor would cross the Newhalen River). Any activity would be conducted in accordance with lease and surface use agreements that PLP would establish with the landowners. [EIS Section 4.2.3.2] There are no ANCSA 14(h)(1) sites within the permit area, nor in the area of potential effect, therefore no potential effects to these sites would occur. Areas traditionally used for hunting and other activities may be impacted by the proposed project. Tribes have emphasized that all of the land is a cultural area, used for a variety of cultural purposes. The project may affect areas which are culturally important to Tribes, including traditional use areas, trails, and archeological sites. The project will negatively impact cultural uses of the land in the vicinity of the proposed project. Impacts to subsistence in waters downstream of the proposed project from tailings dams failures are outside of USACE purview. No ANILCA 810 Analysis is required for this project.	
Benefits of the project related to factor[3]	Direct Impacts would include: The State of Alaska would realize benefits of mineral potential in State managed lands. Indirect and Cumulative Impacts would include: New employment and income would be beneficial, increasing the ability of households to meet the high costs of subsistence equipment and fuel.	
Reasonably foreseeable detriments of the project related to factor[3]	Direct Impacts would include:	

Factor No. 15: Land use—33 CFR 320.4(a)(1), 33 CFR 320.4(j)(2)	
	Land use at the mine site would change from minimal disturbance from exploration and subsistence activities to intense industrial development. The transportation corridor from Pile Bay to the mine site would introduce a land use change from an undeveloped area primarily used for subsistence and recreation to an industrially used transportation system. Use of the Williamsport-Pile Bay Road would shift from seasonal use to daily industrial use. At the Diamond Point port site, the area would change from development activities for active resource extraction and seasonal vessel traffic once active resource extraction begins to an industrial port. The proposed project would result in a change in vessel traffic in Iliamna Bay with the addition industrial ship traffic to the current uses by fishing vessels and small barges. Direct Impacts to subsistence include reductions in subsistence resource abundance and habitat availability, restrictions on access to traditional use areas, and increased competition for subsistence resources (from in and outside the region). Indirect impacts to subsistence include sociocultural changes due to employment, out-migration, and shift work. Historic and current cultural use of Frying Pan Lake and Groundhog Mountain may be negatively, indirectly impacted by the proposed project. Direct negative impacts to cultural areas would include disruptions of travel and access to cultural areas, increases or changes in noise, increases in pollution, lack of privacy, and visual and olfactory changes would impact cultural areas. Indirect impacts to cultural areas: disruptions of travel and access to cultural areas and the associated cultural uses could be reduced or eliminated.
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	4, 5, 7, 10, 13, 26-27, 41, 42, 53, 124, 155 [FEIS TABLE 5-2, in Attachment B10 of the ROD] Protection of Cultural Resources and Minimization of Social Impacts [DA Application June 2020, Tab 23]
USACE determination of factor[4]	The proposed project would result in adverse and beneficial changes in land use at local and regional scales. The State of Alaska has designated much of the area for uses which include mineral extraction; changes to an industrial use for mineral extraction would benefit the State of Alaska. However, changes from a generally unimpacted landscape would have adverse impacts to the remainder of the current and potential uses to which the area is suited. The overall impact of the project on subsistence would be adverse at the local and regional level. The proposed project would adversely affect cultural resources and cultural areas. Federally Recognized Tribes have expressed that all of the Bristol Bay landscape, including the landscape in the vicinity of the mine site, is culturally important. The proposed project would block use of certain portions of the landscape, and limit or alter the use of other cultural areas due to aesthetic changes to the landscape or due to wildlife avoidance of the area in the vicinity of the project. The effects which would result due to changes in land use would be more severe and overwhelmingly negative at the local and the regional scale. No land use authorizations have been applied for, therefore no land use authorizations have been denied or approved. The lack of denials or approvals does not inform the determination whether the proposed project is contrary to the public interest.

Factor No. 16: Food and fiber production—33 CFR 320.4(a)(1); 33 CFR 320.4(l)(1)(iv)—floodplain management	
Context which factor evaluated[1]	Local, Regional, State, Global
Where analyzed in EIS	Section 4.21, Food and Fiber; Section 4.9, Subsistence
Comments received (positive) toward factor	None

Factor No. 16: Food and fiber production—33 CFR 320.4(a)(1); 33 CFR 320.4(l)(1)(iv)—floodplain management	
Comments received (negative) toward factor	Scoping Report: 3.4.4.2 Subsistence CAR: Subsistence—General Impacts
USACE consideration of comments[2]	Subsistence and fisheries are tangentially related to food and fiber production - the land use factor has discussion of the impact of the project on subsistence, and the fish and wildlife values factor and the economics factor have discussions of the project impacts on fisheries.
Benefits of the project related to factor[3]	Not applicable because there are no cultivated resources in, or within the vicinity of, the proposed project area.
Reasonably foreseeable detriments of the project related to factor[3]	Not applicable because there are no cultivated resources in, or within the vicinity of, the proposed project area.
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	5, 10, 13, 26-27, 42, 53, 124, 155 [FEIS TABLE 5-2, in Attachment B10 of the ROD] Minimization of Social Impacts [DA Application June 2020, Tab 23]
USACE determination of factor[4]	There are no cultivated resources in, or within the vicinity of, the proposed project area, and so therefore there would be no effect to cultivated resource values. Subsistence and fisheries are tangentially related to food and fiber production; the land use factor has discussion of the impact of the project on subsistence, and the fish and wildlife values factor and the economics factor have discussions of the project impacts on fisheries.

Factor No. 17: Consideration of property ownership—33 CFR 320.4(a)(1); 33 CFR 320.4(g)—consideration of property ownership		
Context which factor evaluated[1]	Local, Regional, State	
Where analyzed in EIS	Section 4.2 Lands	
Comments received (positive) toward factor	Scoping Report: 3.4.4.5 Land Ownership, Management and Use	
Comments received (negative) toward factor	Scoping Report 3.4.4.5 Land Ownership, Management and Use CAR: Lands—Easements Lands—Impacts—Regulatory Lands—Land Use Lands—Management Lands—Native Allotments Lands—Telecommunications Infrastructure Lands - Subsurface rights	CAR (continued): Lands - Permits Lands - Native Allotments Lands - Impacts - Regulatory Lands - Easements Lands - Conservation Easements Lands - Additional Clarification Lands - Access Proposed Action and Alternatives—Alternatives 2 and 3 are Not Available
USACE consideration of comments[2]	The applicant does not own lands which would be utilized for the proposed project. Per 33 CFR Part 320.4(g), a Department of the Army permit does not convey any property rights, either in real estate or material, or any exclusive privileges. The proposed project would cross Native Allotments. The applicant must obtain ownership or access agreements from landowners or their representatives	

Factor No. 17: Consideration of property ownership—33 CFR 320.4(a)(1); 33 CFR 320.4(g)—consideration of property ownership	
	in order to utilize areas within the proposed project footprint. Compliance with other Federal, State, and Local environmental requirements is documented in the ROD.
Benefits of the project related to factor[3]	The applicant does not own lands which would be utilized for the proposed project. The applicant would be required to obtain temporary use permits, easements, and ROWs for the transportation corridor and natural gas pipeline. Uses on these surface and subsurface lands privately owned by Alaska Native corporations are subject to the approval of the landowners. The applicant must obtain ownership or access agreements from landowners or their representatives in order to utilize areas within the proposed project footprint. The proposed project would not inhibit the access of riparian landowners which are adjacent to the proposed project to navigable waters, nor would it inhibit the public's right to navigation, except within the footprint of the proposed project. The project effect on land ownership would be a change in land status, along with an encumbrance on use along the mine roads, transportation corridor, port access roads, and pipeline corridor. These changes in land status constitute a direct impact, neither beneficial nor detrimental, as there are no competing uses of encumbered lands at this time.
Reasonably foreseeable detriments of the project related to factor[3]	Land in the project footprint would not be conveyed or sold, although a mining lease would be acquired, and associated State authorizations may be sought for mining activities and facilities on State lands. The transportation corridor and natural gas pipeline would bisect one R.S. 2477 ROWs, 2 17(b) easements, and 2 public access easements for which and temporary use permits, easements, and ROWs would be issued. The project effect on land ownership would be a change in land status, along with an encumbrance on use along the mine roads, transportation corridor, port access roads, and pipeline corridor. These changes in land status constitute a direct impact, neither beneficial nor detrimental, as there are no competing uses of encumbered lands at this time.
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	155 [FEIS Table 5-2, in Attachment B10 of the ROD]
USACE determination of factor[4]	The Applicant's signature on an application is an affirmation that the Applicant possesses or will possess the requisite property interest to undertake the activity proposed in the application. The permit, if issued, would not convey a property right, nor authorize any injury to property or invasion of other rights. The project effect on land ownership would be a change in land status, along with an encumbrance on use along the mine roads, transportation corridor, port access roads, and pipeline corridor. These changes in land status constitute a direct impact, neither beneficial nor adverse at a local, reginal or State scale, as there are no competing uses of encumbered lands at this time.

Factor No. 18: Navigation—33 CFR 320.4(a)(1) and 33 CFR 320.4(o)		
Context which factor evaluated[1]	Local, Regional, State, National, Global	
Where analyzed in EIS	Section 4.12 Transportation and Navigation	
Comments received (positive) toward factor	None	
Comments received (negative) toward factor	Scoping Report: 3.4.4.6 Transportation and Navigation CAR: Transportation—Vessel Traffic Vessel Traffic—Construction	CAR (continued): Navigation - Coastal Engineering Study Needed Navigation - Ferry operations Navigation - ice conditions Navigation - Iliamna Lake Wind Ice

Factor No. 18: Navigation—33 CFR 320.4(a)(1) and 33 CFR 320.4(o)	
	Navigation—Pipeline would be Anchoring Hazard Navigation—vessel piloting Navigation - Amakdedori not suitable for a port
USACE consideration of comments[2]	The USACE jurisdiction over navigable waters of the US within the footprint of the proposed project is limited to the tidal waters of the Cook Inlet, Including Ursus Bay, Iliamna Bay, and Iniskin Bay. The Newhalen River, Iliamna River, and the Pile River have not been designated by the USACE to be navigable waters of the US under the Rivers and Harbors Act. The USCG considers these three rivers to be navigable under the Bridge Act. Iliamna Lake is considered a navigable water of the US by USACE under Section 10 of the Rivers and Harbors Act. The Amakdedori port site and the structures in Iliamna Lake are no longer within the proposed project footprint and will not be considered further in this analysis. Within Cook Inlet, vessel pilots would be required for the proposed project vessels. Compulsory vessel pilotage boundaries for Cook Inlet are all waters inside a line extending from Cape Douglas to the western tip of Perl Island then northward to the shoreline of the Kenai Peninsula. Alaska State regulation 12 AAC 56.960(a) states that a pilot shall be on duty at the conn, piloting the vessel at all times when the vessel is in transit or maneuvering in compulsory pilotage waters. The passage of the proposed project bulk carriers from the mouth of Cook Inlet to the mooring location would require the establishment of new protocols with the Southwest Alaska Pilots Association that would be developed during detailed design and in coordination with the shipping companies that operate the bulk carriers. The shipping companies would coordinate arrangements for the transfer of pilots from shore to the bulk carriers and back with the Southwest Alaska Pilots Association. Transportation of pilots to the ships could use pilot vessels and/or helicopters, most likely departing from Homer. If a permit is issued, a special condition would be included which would require the applicant to submit information to USCG for the Local Notice to Mariners, as well as local harbor masters, and media outlets to inform vessel operators of construction locations in navigable waters of the US. If a permit is issued, a copy of the permit would be provided to NOAA so that the location of any structures in navigable waters of the US can be included on NOAA navigational charts.
Benefits of the project related to factor[3]	None
Reasonably foreseeable detriments of the project related to factor[3]	Direct Impacts: Diamond Point port structures would pose an allision risk for the infrequent traffic that occurs on the west side of the Cook Inlet. Dredging and lightering activities at Diamond Point would cause an increase in the number of vessels in the area. The proposed dock and transportation structures in Iliamna and Iniskin Bay would limit navigation access within the footprint of the proposed structures but would not limit the public's access to navigation. The construction of the natural gas pipeline would represent a temporary collision hazards for vessels transiting Cook Inlet. However, the waterbody is large and access to navigation would be maintained. Once the pipeline is fully operational, effects on navigation and anchoring in Cook Inlet would be reduced. Vessel operators would be notified (via a USCG-approved method) of the pipeline location and the dock and lightering location. Indirect Effects: The construction and operation of the mooring facility would result in the addition of industrial ship traffic to Iniskin Bay, an area which is primarily used by fishing vessels and other small vessels. The negative impacts would include increasing congestion, particularly during bad weather when vessels take refuge in the bay. Cumulative impacts: Construction of a diesel pipeline and additional dock would represent a temporary collision hazards for vessels transiting the construction area. Once the pipeline is fully operational, effects on navigation and anchoring in marine waters would be reduced. Vessel operators would be notified (via a USCG-approved method) of the pipeline location. Offshore oil and gas projects in Cook Inlet could contribute cumulatively to detrimental impacts to boat traffic and navigation on the inlet if construction periods overlapped.

Factor No. 18: Navigation—33 CFR 320.4(a)(1) and 33 CFR 320.4(o)	
	Completion of development of Diamond Point Quarry would result in additional vessel traffic in Iliamna Bay resulting in a further increase of vessel traffic, which would be in addition to the Williamsport landing, the proposed project and a new deepwater port in Iniskin Bay that is proposed as part of the expanded mine scenario.
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	10-11, 42, 54, 124-127, 147, 154, 157-158 [FEIS Table 5-2, in Attachment B10 of the ROD] Minimization of Social Impacts [DA Application June 2020, Tab 23] Spill Prevention and Response and Groundwater Protection [DA Application June 2020, Tab 23]
USACE determination of factor[4]	The proposed project would have a negligible adverse effect on navigation. The proposed project would not be located within an established harbor and would have no effect to harbor lines. There are no known potential impacts to navigational or anchorage interests in connection with the National Pollutant Discharge Elimination System program. The proposed project would have an adverse effect on vessel traffic locally in Iliamna Bay, and it would have negligible adverse effects to at the regional and state levels. There would be no effect to national and global vessel traffic since vessels would be expected to use established vessel courses.

Factor No. 19: Energy needs—33 CFR 320.4(a)(1) and 33 CFR 320.4(n)		
Context which factor evaluated[1]	Local, Regional	
Where analyzed in EIS	Section 4.3 Needs and Welfare of the Public; Section 4.4 Environmental Justice; Section 4.10 Health and Safety	
Comments received (positive) toward factor	Scoping Report: 3.4.2.8 Natural Gas: Pipeline and Gas Supply, 3.4.4.9 Public Health CAR: Socioeconomics Impacts—Economic Impact—Beneficial Socioeconomics Impacts—Local Support Policies Socioeconomics Impacts—Infrastructure—Beneficial	
Comments received (negative) toward factor	Scoping Report: 3.4.2.8 Natural Gas: Pipeline and Gas Supply 3.4.4.9 Public Health	CAR: Natural Gas Supply—Cook Inlet Gas Supply Natural Gas Supply—Impacts of Natural Gas Demand Natural Gas Supply—Natural Gas from Prudhoe Bay Natural Gas Supply—Public's Interest in Energy Conserve and Develop Socioeconomics Impacts—Infrastructure—Adverse
USACE consideration of comments[2]	The proposed project would acquire natural gas from the open market and is not anticipated to require more natural gas resources than are there are available in the Cook Inlet region. The proposed project would increase tax revenues for the local communities, which could be used to increase or improve community services. The provision of natural gas from the applicant's natural gas pipeline to communities in the vicinity of the pipeline may be temporary and would require outlay of resources by those communities in order to utilize the natural gas.	
Benefits of the project related to factor[3]	The applicant has committed to designing an oversized natural gas pipeline to allow for regional access to gas. PLP would engage with state and/or local governments about options to continue operation of the pipeline when it is no longer required by the project. Energy supplied to nearby communities by allowing access to the proposed natural gas pipeline would be an indirect benefit of the project, but could be considered as a beneficial effect by those local communities.	

Factor No. 19: Energy needs—33 CFR 320.4(a)(1) and 33 CFR 320.4(n)	
Reasonably foreseeable detriments of the project related to factor[3]	The project would consume significant amounts of energy in the form of natural gas, diesel and other fuels to provide the energy needs of the project. The communities with access to the natural gas pipeline would have to expend resources to convert facilities to use the natural gas. If natural gas is no longer provided to communities once the proposed project ends, the communities would have to expend resources to convert facilities to use other energy sources.
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	12, 55, 147 [FEIS Table 5-2, in Attachment B10 of the ROD] Minimization of Social Impacts [DA Application June 2020, Tab 23]
USACE determination of factor[4]	The proposed project would have a negligible beneficial effect on energy needs at the local and regional level, no effect on energy development and an adverse effect on energy conservation. This purpose and need for this project is not energy needs, however it could provide a temporary benefit to nearby communities. The overall impact on energy needs would be adverse due to the amount of natural gas that would be consumed by the project.

Factor No. 20: Economics—33 CFR 320.4(a)(1); 33 CFR 320.4(q)		
Context which factor evaluated[1]	Local, Regional, State, National (based on comments received, the context was expanded from what was identified in the MFR dated December 26, 2017 to include local, state and national contexts, in addition to regional context)	
Where analyzed in EIS	Ch. 1 Purpose and Need; Section 4.3, Needs and Welfare of the People—Socioeconomics; Section 4.7, Cultural Resources; Section 4.9, Subsistence; Section 4.10 Health and Safety	
Comments received (positive) toward factor	Scoping Report: 3.4.4.1 Socioeconomic Impacts 3.4.4.9 Public Health CAR: Socioeconomics Impacts—Economic Impact—Beneficial Socioeconomics Impacts—Local Support Policies	CAR (continued): Socioeconomics Impacts—Infrastructure—Beneficial NSB—Support Project—Support Project (e.g.: I-3-1; I-57-1; I-591-2; I-887-1; I-948-1; I-335-1; I-19-1; I-42-1; I-578-1; I-748-1; I-40-1; I-943-1; I-993-1; I-33-1; I-1068-1; I-1185-1; et al).
Comments received (negative) toward factor	Scoping Report: 3.4.4.1 Socioeconomic Impacts 3.4.4.2 Subsistence 3.4.4.3 Traditional Culture and Way of Life 3.4.4.9 Public Health 3.5.2 Purpose and Need of the Action and USACE Permits CAR: Commercial Fisheries—Impacts- Economic Impacts Not Adequately Addressed Cumulative Effects Analysis—Economic feasibility of expansion Environmental Justice—EJ-Economic Value NEPA Process—Economic Feasibility Study	CAR (continued): Public Health—Protection of Public Safety Socioeconomics Impacts—Local Workforce Subsistence—Jobs Hurt Culture Socioeconomics Impacts—Economic Impacts—Unrealistic Estimates Socioeconomics Impacts—Economic Impact—Adverse Socioeconomics Impacts—Economic Impact—Employment Context to State Socioeconomics Impacts—Infrastructure—Adverse Socioeconomics Impacts—Economic Impacts—High Risk Subsistence—Chinook Salmon

Factor No. 20: Economics—33 CFR 320.4(a)(1); 33 CFR 320.4(q)		
	Proposed Project Purpose and Need—P and N Too Narrowly Focused Public Health—Baseline Health Disparities Public Health—Increase in Crime and Drugs Use	Subsistence—Socio-cultural Subsistence—Jobs Hurt Culture Subsistence—Sharing and Social Networks Subsistence—Traditional learning
USACE consideration of comments[2]	There were comments related to the economic feasibility of an expansion, and while the EIS analyzed an expansion scenario, the USACE evaluates the project as proposed. It is also generally assumed that prior to applying for a permit, the appropriate economic evaluations have been completed, and that proposals are economically viable. The project has the potential to benefit the regional economic base with the creation of jobs and infrastructure. Based on our analysis, the proposed project would not have a direct detrimental impact to the commercial fishing economy; although, while it is not anticipated to occur, there is a potential for negative impacts due the perceived decrease in the quality of the fish from Bristol Bay. The project modeling has shown that the proposed project would not impact fish values down to the Bristol Bay fishery but may have a local portfolio effect. However, USACE acknowledges there are limitations to the project modeling based on the scenarios analyzed and associated assumptions that were made, and there are risks that were not part of the analysis due to the very low probability of occurrence. Commenters expressed concern about a reduction in quality of recreational fishing, both in catch rates and in aesthetic quality of the experience, particularly on streams directly impacted by the project. With regard to recreational fishing, the extent of project impacts would be displacement of recreational fishing effort by mining activities along a short length of the upper Koktuli River, and by road transportation crossings of streams with measurable recreational fishing effort. There would be a potential boom and bust in job opportunities during construction and operation, and the benefit to local employment may be limited by the available work force and its training. The increase in jobs could negatively affect regional culture by decreasing reliance on subsistence and introducing outside workers and their influences on the area. The proposed project should not have an impact on the fish taxes revenue. The proposed project would increase local and state tax revenues, as determined by those entities. The new economic opportunities in the area could negatively impact community cohesion for a community that is currently reliant on subsistence and community sharing lifestyles. The proposed project would increase tax revenues for the local communities, which could be used to increase or improve community services. However, it is unlikely that there would be an increase in-mitigation, so it is not likely that community infrastructure would be significantly impacted.	
Benefits of the project related to factor[3]	Direct Impacts would include: The increase in job opportunities, year-round or seasonal employment, and steady income. The project would provide year-round operations employment, which would help reduce the impacts of the seasonal employment fluctuations that are prevalent in the region. Employment would draw from local, state and national talent pools. Project construction and operations would generate revenues for local governments, regional entities, the State of Alaska, and the nation. The communities along the corridor of the natural gas pipeline may develop infrastructure to take advantage of the supply of natural gas or experience reduced costs of goods and services through access to the project transportation system. Indirect Impacts would include: With the influx of money into the region, with increased employment opportunities, tax revenues, and easier access to supplies (particularly natural gas), there is a potential for a lower cost of living during construction and operations of the project. New employment and income would increase the ability of households to meet the high costs of subsistence equipment and fuel.	

Factor No. 20: Economics—33 CFR 320.4(a)(1); 33 CFR 320.4(q)	
	The increased tax revenues in the local communities from the project could be used to increase or improve community services, such as healthcare and safety services. Cumulative beneficial impacts would be similar to the proposed project impacts, except that the impacts would last for a longer time frame.
Reasonably foreseeable detriments of the project related to factor[3]	Direct Impacts would include: There would be several detriments from the project at mine closure, including the decline of jobs and associated income. At closure, additional tax revenues would cease. Indirect Impacts would include: Sharing is an important aspect of community cohesion, and if high-harvesting members of the community find project-related employment and have less time for subsistence activities, the rest of the community and households in other communities could end up receiving less wild food through sharing and trading relationships. Increased employment of adults in the communities could impede the amount of time spent teaching young people to hunt, fish, gather, process, and preserve subsistence resources which would impact the amount and quality of traditional knowledge passed on to younger generations, potentially resulting in a long-term or permanent adverse effect to communities. Locals who had gotten used to the steady income supporting their maintenance and operating costs of rural life would have to adjust their lifestyles. As jobs in the area decrease, some residents may move to find new employment. Some decreases of cost of living may increase to pre-project levels. Additionally, some project employees, when outside of the mine site, might require public safety services from nearby communities (e.g., Kokhanok, Iliamna, or Newhalen). For example, if a mine vehicle accident occurred along the transportation corridor near one of these communities, then local public first responders may be the first on scene. The temporary construction and long-term operations camps used to house workers would be self-contained, operated and maintained by PLP throughout the project, and located in remote areas without access to services in local communities. Therefore, local community services would not be negatively impacted by additional workforce population needs; conversely, any local workers would not have access to their usual services while on their shift, and local businesses should not expect an increase in business from an influx of workers in the area. It is possible that the project could produce additional strain on the health and safety services of the potentially affected communities if violent crimes increase due to increased psychosocial and family stress due to the project. Cumulative detriment impacts would be similar to the proposed project impacts, except that the impacts would last for a longer time frame, or in the case of closure detriments, they would be delayed.
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	5, 10, 11, 12, 42, 43, 53, 52, 55, 153 [FEIS TABLE 5-2, in Attachment B10 of the ROD] Minimization of Social Impacts [DA Application June 2020, Tab 23] A shift schedule would be established to enable local employees to maximize opportunities to remain active in subsistence harvest activities. [EIS Section 5.2.2]
USACE determination of factor[4]	The proposed project would have off-setting adverse and beneficial impacts to the local area, the region, the state, and the nation. The adverse effects would outweigh the benefits at the local and regional level, and the benefits would outweigh the detriments at the state, and national level.

Factor No. 21: Mineral needs—33 CFR 320.4(a)(1)	
Context which factor evaluated[1]	Global

Factor No. 21: Mineral needs—33 CFR 320.4(a)(1)	
Where analyzed in EIS	Chapter 1 Purpose and Need; Appendix B; Section 4.1 Introduction to Environmental Consequences; Section 3.2 Land Ownership, Management, and Use
Comments received (positive) toward factor	Scoping Report: 3.5.1 The NEPA and EIS Process 3.5.2 Purpose and Need of the Action and USACE Permits CAR: Geology—Important mineral source
Comments received (negative) toward factor	Scoping Report: 3.5.2 Purpose and Need of the Action and USACE Permits 3.5.3 Proposed Action and Alternatives CAR: Proposed Project Purpose and Need—Alternative—recycling Proposed Project Purpose and Need—Project not needed in AK or US Cumulative Effects Analysis—impacts of other mines
USACE consideration of comments[2]	The proposed project would result in the provision of copper, gold, and molybdenum to the global market. The extraction and transportation of copper, gold, and molybdenum is described in the application for the proposed project. The proposed Pebble Mine may produce other commodities, such as rhenium, palladium, and silver, however these minerals (gold, silver and palladium in the copper-gold concentrate and rhenium in the molybdenum concentrate) would be transported to East Asia. Rhenium extraction is not evaluated in the Final EIS. Executive Order 13817 stated that the policy of the Federal Government to reduce the nation's vulnerability to disruptions in the supply of critical minerals, which constitutes a strategic vulnerability for the security and prosperity of the United States. Federal Register Volume 83, number 97, page 23295, dated May 18, 2018 lists the 35 critical minerals to which the Executive Order applies. Rhenium is one of the 35 critical minerals listed. The applicant has indicated that the amount of rhenium in the deposit could generate as much as 15 tons per year, approximately half of the amount of rhenium which the US imported in 2017. (Pebble Memo, re: rhenium, July 6, 2020). US Geological Survey (2017, John, D.A., Seal, R.R., II, and Polyak, D.E., 2017, Rhenium, chap. P of Schulz, K.J., DeYoung, J.H., Jr., Seal, R.R., II, and Bradley, D.C., eds., Critical mineral resources of the United States—Economic and environmental geology and prospects for future supply: U.S. Geological Survey Professional Paper 1802, p. P1–P49, https://doi.org/10.3133/pp1802P.) states that most non-recycled rhenium comes from porphyry copper-gold-molybdenum deposits. At least two mines in the US currently produce rhenium from their porphyry copper ores and a number of porphyry copper deposits occur in the US. The State of Alaska's Bristol Bay Area Plan identifies portions of the mine area as designated for mineral development.
Benefits of the project related to factor[3]	The ore-containing bedrock at the mine is considered a rare resource. There is current demand for copper, gold, and molybdenum in the nation and globally. There is an increasing demand for copper, in particular, due to its applications such as in electronics, power production, and power transmission. Minerals produced from the proposed project would be transported to East Asia.
Reasonably foreseeable detriments of the project related to factor[3]	None
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	None
USACE determination of factor[4]	The proposed project would have a beneficial effect on the national and global need for minerals, specifically copper, gold, and molybdenum.

Factor No. 22: Safety—33 CFR 320.4(a)(1)		
Context which factor evaluated[1]	Local, Regional	
Where analyzed in EIS	Ch. 2 Alternatives, Sections 3.15 and 4.15 and Appendices K3.15 and K4.15 Geohazards and Seismic Conditions; Section 3.25 Threatened and Endangered Species; Ch. 5 Mitigation; Section 4.10 and Appendix K4.10 Health and Safety; Section 4.23 Wildlife Values; Section 4.27 Spill Risk and Append K4.27 Spill Risk	
Comments received (positive) toward factor	None	
Comments received (negative) toward factor	Scoping Report: 3.4.2.7 Hazardous Materials 3.4.2.3 Geology and Seismic Activity 3.4.2.6 Spill Risks and Releases 3.4.2.7 Hazardous Materials 3.4.3.2 Fish and Aquatic Resources 3.4.4.2 Subsistence 3.5.3 Proposed Action and Alternatives CAR: Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Acid Generation Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Concentrate Pipeline Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Concentrate Recovery Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Concentrate Spill—Seasonal conditions Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Concentrate spill downstream impacts Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Concentrate Spill Response Plan Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Concentrate Spills—Cumulative Impacts Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Concentrate Spills in Kamishak Bay Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Concentrate Transport Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Cumulative impacts of spills Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel Fate and Behavior Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel spill impacts	CAR (continued): Earthquakes or seismic concerns—Background Earthquake Earthquakes or seismic concerns—Closure cover infiltration effects Earthquakes or seismic concerns—cumulative effects not adequately addressed Earthquakes or seismic concerns—Design life Earthquakes or seismic concerns—Dynamic character of earthquakes Earthquakes or seismic concerns—Effects similar to Anchorage M7 earthquake Earthquakes or seismic concerns—Factor of Safety Earthquakes or seismic concerns—Fault branching Earthquakes or seismic concerns—Foundation Conditions Earthquakes or seismic concerns—Freeboard Earthquakes or seismic concerns—General earthquake setting Earthquakes or seismic concerns—Hazards to pipeline and roads Earthquakes or seismic concerns—Human safety Earthquakes or seismic concerns—Inactive faults Earthquakes or seismic concerns—Independent Review Earthquakes or seismic concerns—Insufficient Seismicity Information Earthquakes or seismic concerns—Lake Clark fault Earthquakes or seismic concerns—Landslide and subsidence effects on embankments Earthquakes or seismic concerns—Liquefaction evidence for LCF activity Earthquakes or seismic concerns—Location of seismic analysis in EIS Earthquakes or seismic concerns—Long-term monitoring Earthquakes or seismic concerns—Maximum Earthquake Considered in Design Earthquakes or seismic concerns—Mining-induced earthquakes Earthquakes or seismic concerns—NEPA factors of analysis Earthquakes or seismic concerns—Numerical seismic modelling

Factor No. 22: Safety—33 CFR 320.4(a)(1)		
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel spill impacts to fish	Earthquakes or seismic concerns—Pile Bay area faults
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel spill probability	Earthquakes or seismic concerns—pit lake tsunami/seiche potential
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel Spill Response	Earthquakes or seismic concerns—Pit Wall Stability
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel spill scenarios	Earthquakes or seismic concerns—Port stability
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel transport by Marine Vessel	Earthquakes or seismic concerns—Post-closure embankment stability
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Diesel transport by Truck	Earthquakes or seismic concerns—Potential for Embankment Liquefaction
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Failure of water treatment systems	Earthquakes or seismic concerns—Seismic analysis in EIS compared to EPA assessment
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Fugitive Dust Impacts	Earthquakes or seismic concerns—Seismic focusing
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Fugitive Dust Mitigation and Planning	Earthquakes or seismic concerns—Seismic Stability Analysis—Bulk TSF Main Dam
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Metals Toxicity	Earthquakes or seismic concerns—Seismic Stability Analysis—Other Embankments
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Mitigation	Earthquakes or seismic concerns—Stacked container stability
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Molybdenum concentrate	Earthquakes or seismic concerns—State dam safety guidelines
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Natural Gas Release	Earthquakes or seismic concerns—Tailings Liquefaction and Stability Upstream Face
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Reagents	Earthquakes or seismic concerns—Tailings pond seiche impacts
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Sodium Ethyl Xanthate	Earthquakes or seismic concerns—Transverse cracks
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Spill Response	Earthquakes or seismic concerns—Tsunami analysis Cook Inlet
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Spill Scenarios	Earthquakes or seismic concerns—Tsunamis in Iliamna Lake
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Spill Scenarios	Earthquakes or seismic concerns—Update seismic hazard analysis
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Spills from Ferry	Mitigation or Monitoring Measures—Secondary Containment
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Spills to Frying Pan Lake	Tailings Dam Failures—Risk of TSF Failure in Perpetuity
		Threatened and Endangered Species (Federally Listed)—Birds-Short-tailed Albatross impacts
		Hazardous Materials Storage or Transport—Solid Waste
		Hazardous Materials Storage or Transport—Use of toxic substances
		Public Health—Impacts—General
		Public Health—Potential Impacts to Children
		3.4.4 Social Resources
		3.4.2.8 Natural Gas: Pipeline and Gas Supply
		General Safety Concerns—Concentrate Dust Health Hazard
		General Safety Concerns—Driver Training
		General Safety Concerns—Emergency Response
		General Safety Concerns—Travel on Lake Ice

Factor No. 22: Safety—33 CFR 320.4(a)(1)		
	Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Subsistence Impacts Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Vessel Traffic Spill Risk (Fuel/Natural Gas/Concentrate/Reagents)—Wetlands—Spills Bonding or Financial Assurance—Liability for Failures/Spills	Pipeline Safety Concerns—Mitigation Pipeline Safety Concerns—Pipeline Engineering Pipeline Safety Concerns—PLP Pipeline Hazard Data
USACE consideration of comments[2]	The applicant would be expected to comply with safety requirements which apply to the various activities and facilities which are part of the proposed project, including Occupational Safety and Health Administration requirements for construction safety, and Pipeline and Hazardous Materials Safety Administration and Bureau of Ocean Energy Management requirements for pipeline safety. The USACE permit decision is made with the expectation that the applicant would comply with existing laws, regulations, and requirements. These safety requirements are outside of USACE authority. The regulation of hazardous materials is the purview of the State of Alaska and the applicant would need to comply with all applicable rules and regulations. The State of Alaska would evaluate the designs of all impoundments, etc., including the standards for seismic considerations. Spills of materials which meet the definition of discharges of dredged or fill material and are in excess of any DA permit, if issued, would be considered in non-compliance with the DA permit. USACE will address non-compliance issues, if they occur, in accordance with our enforcement regulations.	
Benefits of the project related to factor[3]	None	
Reasonably foreseeable detriments of the project related to factor[3]	Under ideal conditions, the proposed project would have no impact on human safety as pertains to public interest. Unplanned accidents/releases/spills could have detrimental effects to safety of people in the project area and downstream areas. Small spills are high probability with limited consequences; large spills are not reasonably foreseeable.	
Avoidance/Minimization/Mitigation that would reduce overall detriments of the project to this factor	14, 15-22, 24, 43, 48-51, 55, 57, 59-64, 102, 120-121, 133, 160, 166-167, 70-78, 81, 85, 113-114, 128, 156-158, 164, 178-179, 93-95, 164, 174, 176, 70-78, 93-94, 164, 174, 176, 128 [FEIS Table 5-2, in Attachment B10 of the ROD] Spill Prevention and Response and Groundwater Protections [DA Application June 2020, Tab 23] [FEIS Table 5-2] Project Design Features [DA Application June 2020, Tab 23] Human Health and Safety Measures [DA Application June 2020, Tab 23]	
USACE determination of factor[4]	The proposed project would have no effect on safety. If there is a spill, it would have an adverse effect at a local and regional scale.	

Notes:

[1]See MFR dated December 26, 2017.

[2]The topics and subtopics identified in the comments received, as well as the associated responses which are listed in the Comment Analysis Report, and the comments to which the topics/subtopics are assigned are hereby incorporated into the consideration of comments.

[3]Considers direct and cumulative impacts

[4]Negligible, adverse, beneficial or no effect overall

AAC = Alaska Administrative Code
ADEC = Alaska Department of Conversation
ANCSA = Alaska Native Claims Settlement Act
ANFO = Ammonium Nitrate and Fuel Oil

ANILCA = Alaska National Interest Lands Conservation Act
APDES = Alaska Pollutant Discharge Elimination System
BBAP = Bristol Bay Area Plan
CAR = Comment Analysis Report
CC = climate change
CF = commercial fisheries
DA = Department of the Army
EFH = essential fish habitat
EIS = Environmental Impact Statement
EJ = Environmental Justice
EPA = Environmental Protection Agency
FEIS = Final Environmental Impact Statement
GHG = Greenhouse Gas
GW = groundwater
HDD = horizontal directional drilling
KOP = key observation point
MFR = Memorandum for Record
MM = marine mammals
NEPA = National Environmental Policy Act
NGP = Natural Gas Pipeline
NHPA = National Historic Preservation Act
NOAA = National Oceanic and Atmospheric Administration
PA = Programmatic Agreement
PIR = Public Interest Review
PLP = Pebble Limited Partnership
RFI = Request for Information
ROD = Record of Decision
ROW = Right-of-Way
SFK = South Fork Koktuli
SW = surface water
TEK = Traditional Ecological Knowledge
TES = Threatened and Endangered Species
TSF = tailings storage facility
US = United States
USACE = US Army Corps of Engineers
USCG = US Coast Guard
UTC = Upper Talarik Creek
WMP = water management pond
WTP = water treatment plant