

APPENDIX X

FERC Staff's Recommended Mitigation from the Draft EIS Agreed to by AGDC for Implementation on the Alaska LNG Project

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Acronyms

ADF&G	Alaska Department of Fish & Game
AGDC	Alaska Gasline Development Corporation
ARD/ML	acid rock drainage and metal leaching
AWC	Anadromous Waters Catalog
BLM	Bureau of Land Management
DMT	directional micro-tunneling
EFH	Essential Fish Habitat
EIS	environmental impact statement
FERC	Federal Energy Regulatory Commission
LNG	liquefied natural gas
MP	milepost
NNIS	non-native invasive plant species
NSA	noise sensitive area
OEP	Office of Energy Projects

TABLE X-1

FERC Staff's Recommended Mitigation from the Draft EIS Agreed to by AGDC ^a

Recommendation No.	EIS Section No. ^b	Recommendation
17	4.1.2.3	Prior to construction, Alaska Gasline Development Corporation (AGDC) shall file with the Secretary, for the review and written approval of the Director of the Office of Energy Projects (OEP), an updated Gravel Sourcing Plan and Reclamation Measures, finalized in coordination with appropriate state and federal agencies, including the Bureau of Land Management (BLM), that identifies the material volumes to be acquired from each material site. This plan shall include measures for testing material sites for potential acid rock drainage and presence of contaminants, such as mercury, arsenic, antimony, etc., that may not be suitable fill material for construction of granular fill pads and access roads.
18	4.1.3.10	Prior to construction of the Mainline Facilities, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, a modified Pipeline Operation and Maintenance Plan that specifies the applicable Project facilities and locations, and provides details of the equipment, monitoring parameters, and frequency of data collection that it will implement to minimize potential impacts from permafrost degradation on the Mainline Facilities.
19	4.1.3.10	Prior to construction of the Mainline Facilities, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, the results of all site-specific evaluations for acid rock drainage and metal leaching (ARD/ML) and a map set depicting sampling locations along the Mainline Pipeline. Additionally, AGDC shall file a copy of the Project-wide ARD/ML Management Plan for the review and written approval of the Director of the OEP. This ARD/ML Management Plan shall include mitigation measures specific to blasting, trenching, and granular fill pads/roads; and include details for surface and groundwater monitoring in areas of known high ARD/ML potential.
21	4.1.5	Prior to construction of the Mainline Facilities, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, final installation design and drilling plans for each directional micro-tunneling (DMT) crossing outlining bedrock and permafrost characterization along with proposed mitigation measures, if required. Additionally, AGDC shall provide the results of jacking force and stress analyses for each DMT crossing.
23	4.1.5.1	Prior to construction of the Mainline Facilities, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, a revised Feasibility Crossing Study that provides updated site-specific geotechnical information for the Middle Fork Koyukuk River with borings conducted at the proposed crossing location and to depths at least as deep as the proposed crossing depth.
24	4.1.5.4	Prior to construction of the Mainline Facilities, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, a revised Feasibility Crossing Study for the Chulitna River that consistently identifies the proposed entry and exit locations of the DMT throughout the document including all figures, appendices, and drill path descriptions.
29	4.2.5.2	Prior to construction of the Mainline Facilities, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, a final Revegetation Plan for use during construction and operation. This final plan shall incorporate all surface layer segregation information, including milepost ranges in which surface layer segregation will be executed between mileposts (MPs) 0 and 607, and provide an analysis and justification of where the surface layer would and would not be segregated between MPs 607 and 807.
30	4.2.5.2	During construction of the Mainline Facilities, AGDC shall use closed-cell extruded polystyrene or other closed cell foams rather than non-extruded expanded polystyrene foam.
34	4.3.2.4	<p>Prior to construction, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, site- specific waterbody crossing plans and mitigation measures that address, as applicable:</p> <ul style="list-style-type: none"> <li data-bbox="565 1608 1414 1703">a. channel diversion crossings (e.g., locations of dams and diversion channels, construction procedures, justification that disturbed areas are limited to the minimum needed to construct the crossing, and identification of any aboveground disturbance or clearing) (section V.B.6.d of the Project Procedures); <li data-bbox="565 1713 1414 1766">b. aerial span crossings (e.g., locations of abutments and piers and all areas to be disturbed or cleared for construction) (section V.B.8 of the Project Procedures); and <li data-bbox="565 1776 1414 1829">c. navigational issues for major waterbody crossings (e.g., compliance with Coast Guard, U.S. Army Corps of Engineers, and Pipeline and Hazardous Material Safety Administration requirements) (section V.B.11 of the Project Procedures).

TABLE X-1 (cont'd)

FERC Staff's Recommended Mitigation from the Draft EIS Agreed to by AGDC ^a

Recommendation No.	EIS Section No. ^b	Recommendation
35	4.3.2.5	Prior to construction, AGDC shall design temporary bridges to withstand at least a 10-year flood event or file with the Secretary, for the review and written approval of the Director of the OEP, site-specific justification showing that a design for a 2-year flood event is adequate. AGDC shall also repair and/or upgrade the bridges, where necessary, for the duration of Project use.
36	4.3.3.3	Prior to construction of the Mainline Facilities, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, revised construction plans, including site-specific shoreline crossings plans, that incorporate the use of the DMT continuation methodology for the shoreline crossings at Beluga Landing and Suneva Lake, or provide a site-specific justification, supported by additional site-specific geotechnical investigations conducted during detailed engineering design, demonstrating that the methodology is not feasible.
37	4.3.4.3	Prior to construction, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, a final Water Use Plan that provides final water volumes, source locations (including aquifers for all groundwater wells), discharge locations, and proposed water treatments required for Project construction and operation. The plan shall include water use volumes and sources for all construction camps and aboveground facility camps. The plan shall also identify estimated operational water use volumes and sources. The plan shall demonstrate that reuse of water (e.g., for hydrostatic testing) has been considered and applied where practicable.
38	4.4.1.2	AGDC shall file with the Secretary final wetland delineation reports on an annual basis during active construction that document the results of all field delineations completed during the previous growing season. The reports shall identify the type, location, and acreage for each wetland and provide impact summaries, indicating if permanent fill (including granular fill and cut fill material) was placed in the wetland and if the final elevation was contoured to match the pre-construction elevation.
39	4.4.1.2	During the growing season immediately prior to planned winter construction segments of the Mainline Pipeline, AGDC shall field-delineate wetland areas. The field-delineated boundaries shall be identified with markers in the field and on revised construction alignment sheets that shall be filed with the Secretary prior to construction through these areas. The results of these field surveys shall be included in the final wetland delineation reports filed with the Secretary.
41	4.5.2.3	Once the interim performance standards from the Project Revegetation Plan have been met, AGDC shall conduct canopy cover surveys at representative monitoring evaluation sites in all construction workspaces every 3 years until the final performance standards are met. Following each monitoring season, AGDC shall file with the Secretary the corresponding survey reports.
42	4.5.2.3	Prior to construction, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, an updated Revegetation Plan that includes: <ul style="list-style-type: none"> <li data-bbox="565 1308 1425 1360">a. an updated interim performance standard that includes at least 5-percent live-canopy cover of native non-seeded plant species in all subregions of the Project; and <li data-bbox="565 1360 1425 1434">b. updated seed mixes that exclude red fescue except for reseeding steep slopes or other areas with a high erosion risk when there are no other effective species available to help stabilize soils.
43	4.5.8.3	Prior to construction, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, an updated Revegetation Plan, Invasives Plan, and Invasive Species Prevention and Management Plan incorporating, as part of the final performance standards for both construction and operational activities, a 0-percent increase in high-risk non-native invasive plant species (NNIS) canopy cover in the Project area.
44	4.5.8.3	Once the interim performance standards from the Project Revegetation Plan have been met, AGDC shall conduct annual canopy cover surveys at representative monitoring evaluation sites in all construction and operational workspaces with NNIS infestations until the final performance standards are met. Following each monitoring season, AGDC shall file with the Secretary the corresponding survey reports.
45	4.5.8.3	Prior to construction, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, an updated Invasives Plan that includes a measure to clean construction equipment prior to entering and leaving Alexander Creek.

TABLE X-1 (cont'd)

FERC Staff's Recommended Mitigation from the Draft EIS Agreed to by AGDC ^a

Recommendation No.	EIS Section No. ^b	Recommendation
46	4.5.8.3	<p>Prior to construction, AGDC shall file the following documents with the Secretary, for the review and written approval of the Director of the OEP, and provide them to the appropriate land use agencies:</p> <ul style="list-style-type: none"> a. the results of pre-construction NNIS surveys, including species-specific maps of NNIS locations and up-to-date invasiveness rankings for each NNIS found in the Project area; and b. an updated Revegetation Plan, Invasives Plan, and Invasive Species Prevention and Management Plan that include a measure to reseed areas with NNIS infestations within the first growing season following ground-disturbing activities.
48	4.6.2.3	<p>Prior to vegetative mowing or clearing during the migratory bird nesting season, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, documentation necessary to satisfy the requirements of Section VII.A.5 of the Federal Energy Regulatory Commission's (FERC's) Plan.</p>
49	4.6.2.5	<p>During construction and operation within the boundaries of the IBAs, AGDC shall conduct vegetation clearing or initial granular fill placement outside of the nesting seasons, as listed in table 4.6.2-3 of the EIS.</p>
52	4.7.1	<p>Prior to construction, AGDC shall complete fish surveys at waterbodies where fish survey data are not available within 290 feet of the current pipeline crossing location and file with the Secretary final reports documenting Anadromous Waters Catalog (AWC) streams, Essential Fish Habitat (EFH), and waterbodies with Pacific salmon identified during the fish surveys. AGDC shall implement the appropriate minimization measures from the Project Procedures, Fisheries Conservation Plan, and other regulatory requirements at these waterbodies.</p>
53	4.7.1.6	<p>Prior to construction, AGDC shall develop a Fisheries Conservation Plan, filed with the Secretary for the review and written approval of the Director of the OEP, that includes a Culvert Design and Maintenance Plan and follows the guidance in Anadromous Salmonid Passage Facility Design (NMFS, 2011a) for all fish bearing streams. ^c The Maintenance Plan component shall indicate the frequency of inspections for permanent culverts.</p>
54	4.4.7.1.6 and 4.7.1.7	<p>Prior to construction, AGDC shall include the following measures in its Fisheries Conservation Plan (required by the previous condition 53):</p> <ul style="list-style-type: none"> a. withdraw no more than 20 percent of current flow rates in waterbodies listed as AWC, including EFH, or with known populations of Chinook, sockeye, coho, pink, and/or chum salmon, to reduce the risk of low water levels and downstream impacts; b. do not exceed 0.5-foot-per-second water withdrawal velocities at the operating pump intake in waterbodies listed as AWC, including EFH, or with known populations of Chinook, sockeye, coho, pink, and/or chum salmon, if water withdrawals would occur when sensitive fish fry and/or juveniles would be in-stream; c. raise water withdrawal pump intakes from the stream bed to avoid the entrainment of eggs or fry from the gravel bed; d. use screen openings on all water withdrawal equipment of 0.25 inch (0.1 inch or less in areas with sensitive life stages, e.g., pink and chum salmon fry, whitefish fry, and arctic grayling fry) to reduce the risk of impingement of small or juvenile fish; e. avoid in-stream construction in the winter (i.e., when frozen conditions limit streamflow) in waterbodies with known overwintering habitat (as listed in appendix I of the EIS); and f. conduct in-stream construction in the timeframes provided by the Alaska Department of Fish & Game (ADF&G), as listed in appendix N-2 of the EIS, in waterbodies listed as AWC, including EFH, or with known populations of Chinook, sockeye, coho, pink, and/or chum salmon.
55	4.7.1.7	<p>After completing in-stream construction activities at the Unnamed Tributary of the Chulitna River, AGDC shall remove all granular fill from the adjacent wetland near MP 655.2.</p>

TABLE X-1 (cont'd)

FERC Staff's Recommended Mitigation from the Draft EIS Agreed to by AGDC ^a

Recommendation No.	EIS Section No. ^b	Recommendation
56	4.7.1.7	<p>Prior to construction, AGDC shall develop measures to minimize impacts on fish in or near material extraction sites and include the measures in its Fisheries Conservation Plan (required by the previous condition 53). Specifically AGDC shall:</p> <ul style="list-style-type: none"> a. avoid extraction in material sites within or near waterbodies listed as AWC, including EFH, during sensitive spawning time periods, as determined in consultation with the ADF&G; and b. develop measures in consultation with the U.S. Fish and Wildlife Service and ADF&G to minimize long-term impacts from material sites south of the Brooks Range that are hydrologically connected to streams listed as AWC, including EFH, or that have known populations of Chinook, sockeye, coho, pink, and/or chum salmon.
57	4.7.1.7	<p>Prior to construction, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, an updated Project Blasting Plan with the following requirements for all fish-bearing streams where blasting would occur:</p> <ul style="list-style-type: none"> a. monitoring protocol of stream flow after blasting and prior to completion of in-stream activities; b. implementing contingency measures to remediate loss of stream flow caused by fracturing the rock or permafrost from blasting; and c. indicating the timeframe for response and implementation of contingency measures.
60	4.8.1.3	<p>Prior to construction, AGDC shall file with the Secretary its commitment to restrict pile-driving activities for construction of the Mainline material offloading facility during the months of June and July, to minimize noise impacts on the Cook Inlet beluga whale population.</p>
61	4.9.1.2	<p>Prior to construction within Byers Lake Campground (MP 630.1) and the river tour operator site (MP 560.0), AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, and provide to the Alaska Department of Natural Resources Division of Parks and Outdoor Recreation and the affected river tour operator, as appropriate, a detailed schedule of construction activities within Byers Lake Campground and the river tour operator site.</p>
62	4.9.4.1	<p>Prior to construction across the Iditarod National Historic Trail, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, a revised site-specific crossing plan for the Iditarod National Historic Trail—developed in consultation with the Alaska Department of Natural Resources, BLM, USFWS, U.S. Forest Service, and the Iditarod Historic Trail Alliance—that identifies the locations of detours, signs, or alternate access to the trail, and provides for public notice of construction dates and any required trail closures.</p>
63	4.9.4.2	<p>Prior to construction, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, a site- specific crossing plan for the Lower Troublesome Creek Trail, including the locations of the temporary bridge or trail reroute.</p>
64	4.9.6.3	<p>Prior to construction, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, an updated Project Unanticipated Contamination Discovery Plan that addresses operation and maintenance activities and includes phone numbers for applicable emergency responders (e.g., Alaska state troopers, BLM fire dispatch) and a FERC notification requirement for any discovery or release of contamination outside the permitted Project area resulting from Project activities. The notification requirement shall include copies of the associated regulatory agency correspondence regarding the off-site contamination.</p>
66	4.10.2.2	<p>Prior to construction of the Healy Compressor Station, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, a site-specific lighting plan for the station that conforms to International Dark-Sky Association Guidelines, including having a color temperature of 3,000 Kelvins or less; or provide site-specific justification for why the facility cannot conform to these lighting guidelines.</p>
68	4.14.2.6	<p>Prior to construction, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, the Project Local Subsistence Implementation Plan and a signed Conflict Avoidance Agreement prepared in coordination with National Marine Fisheries Service and the Alaskan Eskimo Whaling Commission.</p>

TABLE X-1 (cont'd)

FERC Staff's Recommended Mitigation from the Draft EIS Agreed to by AGDC ^a

Recommendation No.	EIS Section No. ^b	Recommendation
74	4.16.3.3	Prior to construction of the Liquefaction Facilities, AGDC shall file with the Secretary, for the review and written approval of the Director of the OEP, a detailed construction noise mitigation plan for the Liquefaction Facilities that includes the noise mitigation measures that AGDC will implement at the construction site. The noise mitigation plan shall also include the predicted noise attributable to construction activities at the nearby noise sensitive area (NSA) after implementing the additional mitigation showing at least a 10-dB reduction of noise levels at the NSA, a noise-monitoring plan during construction, and a procedure for resolving noise complaints.
75	4.16.4.2	AGDC shall file with the Secretary a noise survey no later than 60 days after placing the Coldfoot and Healy Compressor Stations in service. If a full load condition noise survey is not possible, AGDC shall file an interim survey at the maximum possible horsepower load within 60 days of placing the stations into service and file the full load survey within 6 months. If the noise attributable to operation of all equipment at the Coldfoot and Healy Compressor Stations under interim or full horsepower load conditions exceeds an L _{dn} of 55 dBA at any nearby NSAs, AGDC shall file a report on what changes are needed and shall install the additional noise controls to meet the level within 1 year of the in-service date. AGDC shall confirm compliance with the above requirement by filing an additional noise survey with the Secretary no later than 60 days after the additional noise controls are installed.
76	4.16.4.3	AGDC shall file with the Secretary a full power load noise survey for the Liquefaction Facilities no later than 60 days after each liquefaction train is placed into service. If the noise attributable to operation of the equipment at the Liquefaction Facilities exceeds an L _{dn} of 55 dBA at the nearest NSA, within 60 days, AGDC shall modify operation of the Liquefaction Facilities or install additional noise controls until a noise level below an L _{dn} of 55 dBA at the NSA is achieved. AGDC shall confirm compliance with the above requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.
77	4.16.4.3	AGDC shall file with the Secretary a noise survey no later than 60 days after placing the entire Liquefaction Facilities into service. If a full load condition noise survey is not possible, AGDC shall file an interim survey at the maximum possible horsepower load within 60 days of placing the Liquefaction Facilities into service and file the full load survey within 6 months. If the noise attributable to operation of the equipment at the Liquefaction Facilities exceeds an L _{dn} of 55 dBA at the nearest NSA under interim or full horsepower load conditions, AGDC shall file a report on what changes are needed and shall install the additional noise controls to meet the level within 1 year of the in-service date. AGDC shall confirm compliance with the above requirement by filing an additional noise survey with the Secretary no later than 60 days after it installs the additional noise controls.
78	4.16.4.3	Prior to commencing operation of the flares associated with the Liquefaction Facilities, AGDC shall develop a Flare Noise Mitigation Plan, to be filed with the Secretary, for the review and written approval of the Director of the OEP, detailing its plans to mitigate noise impacts associated with flare events to the extent practicable, including measures that AGDC will implement to minimize the frequency of flare events and the procedure for contacting and scheduling flare events with local community representatives.
^a	Includes recommended environmental mitigation measures only. AGDC agreed to implement these measures in their comments on the draft EIS, filed October 3, 2019. These comments are available on the FERC website at http://www.ferc.gov . Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20191003-5048 in the "Numbers: Accession Number" field.	
^b	The EIS Section No. references the section in the final EIS where the recommendation has been incorporated as a mitigation measure that would be implemented by AGDC.	
^c	National Marine Fisheries Service (NMFS). 2011a. Anadromous Salmonid Passage Facility Design. National Marine Fisheries Service, Northwest Region, Portland, Oregon. Available online at: https://www.westcoast.fisheries.noaa.gov/publications/hydropower/fish_passage_design_criteria.pdf . Accessed: May 2019.	