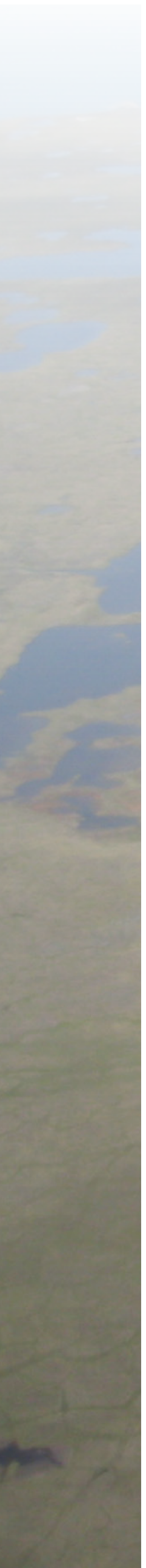
US Army Corps
of Engineers

Point Thomson Project EIS

Final Environmental Impact Statement

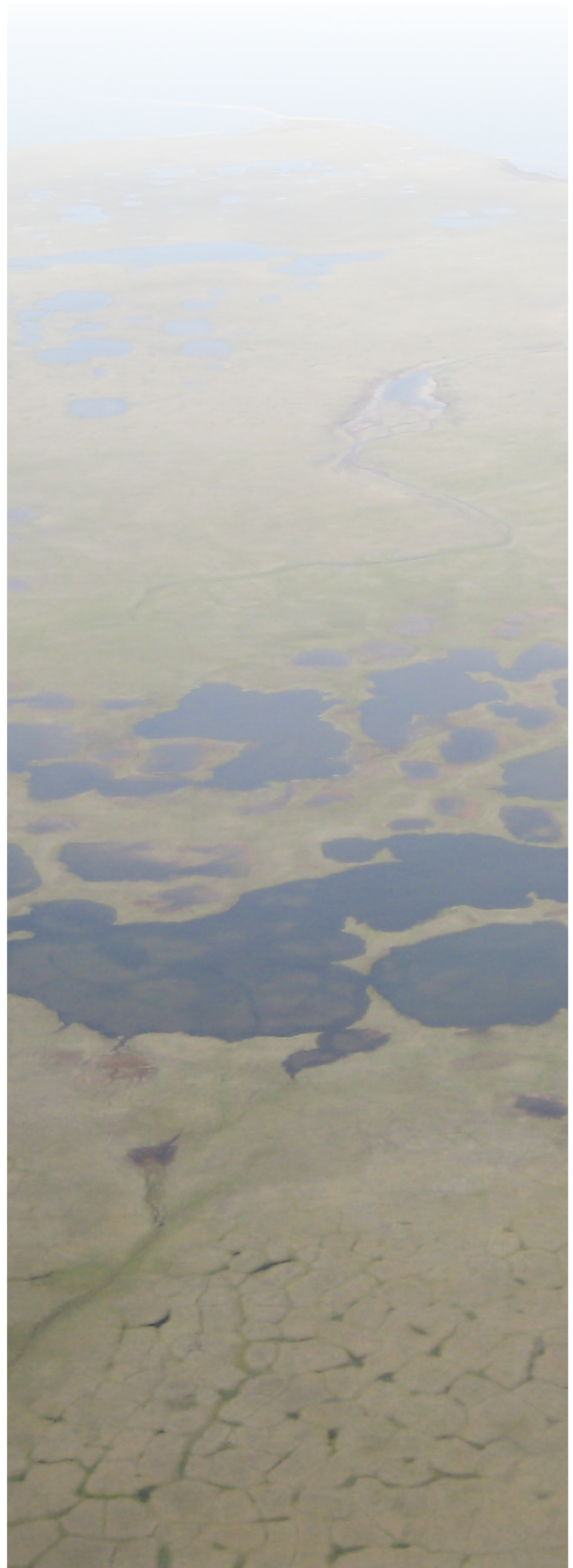
EXECUTIVE SUMMARY

July 2012



POINT THOMSON
PROJECT EIS

Photography credit (front cover): "Hunting by Boat" © Arthur Taqtu Neakok; "Polar Bear" © Susanne Miller / USFWS



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, ALASKA
REGULATORY DIVISION
P.O. BOX 6898
JBER, ALASKA 99506-0898

REPLY TO
ATTENTION OF:

Regulatory Division
POA-2001-1082-M1

Subject: Point Thomson Project Final Environmental Impact Statement (EIS)

Dear Reader:

The U.S. Army Corps of Engineers (Corps) is pleased to provide you with the Point Thomson Project Final EIS. This Final EIS incorporates changes based on over 660 individual comments received and considered by the Corps. The Corps held 5 public meetings during the Draft EIS review period and also held separate meetings for agencies with regulatory jurisdiction over land or development, or with a permitting nexus. The Corps also met with representatives from Kaktovik Village, the Native Village of Nuiqsut, the Inupiat Traditional Government Native Village of Barrow, and the Inupiat Community of the Arctic Slope. The Corps' responses to comments received can be found in Appendix W of the Final EIS.

Based on comments received, errors in the Draft EIS were corrected and sections edited for clarity and accuracy. The Final EIS is the result of these changes. Overall impact findings did not change between the Draft and Final EIS, although how they are described may have been modified for clarity.

This Final EIS analyzes potential impacts to the human and the natural environments that could result from the proposed project and the alternatives developed. All of the action alternatives are compared to the environmental impacts associated with the No Action Alternative, which would primarily involve long-term monitoring of the existing wells at the Point Thomson site.

The EIS also presents the Applicant's proposed design measures to avoid or minimize impacts from the proposed project. These design measures have been included in the analyses of impacts. The Corps is also considering additional mitigative measures, including those proposed by the public and agencies to avoid, minimize, rectify, reduce or compensate for potential impacts to the environment.

As a result of the Corps' review of the Applicant's permit application some minor discrepancies were identified and corrected. Corps requests for additional information also resulted in the Applicant making minor modifications to the application. The project description did not change substantively; however, the Corps concluded that changes made were sufficient to warrant a second Public Notice. Therefore, concurrent with the release of this Final EIS, the Corps will solicit public comments on the Applicant's revised permit application with another 30-day Public Notice. The public is encouraged to comment on the Public Notice, which will run for 30 days from the Notice of Availability of this Final EIS.

After the release of this Final EIS and after consideration of the comments received on the Public Notices, the Corps will finalize its decision of whether to grant or deny a permit. The Corps' decision will be documented in a Record of Decision (ROD) and will be based on information from this Final EIS, analysis of the proposed project's compliance with the 404(b)(1) Guidelines, the Public Interest Review, comments received, and other required decision documents. There will be a period of at least 30-days from publication of this Final EIS before the ROD can be signed.

If you have questions regarding the Final EIS, they can be addressed to me at the letterhead address above, by e-mail at harry.a.baij@usace.army.mil, or by phone at 800-478-2712. For further information on the Corps' Regulatory Program, visit our Alaska District website at www.poa.usace.army.mil/.reg.

Sincerely,

H. Baij

Harry A. Baij Jr.
Project Manager

POINT THOMSON PROJECT EIS

Final Environmental Impact Statement

To the Reader

This Executive Summary is intended to give the reader basic information about the Point Thomson Project while providing enough detail to understand the challenges and trade-offs that must be weighed. The U.S. Army Corps of Engineers will be deciding between denying the application for this project and granting permits to allow development in the Point Thomson area of the North Slope of Alaska. If the project is approved, a plan of development (action alternative) would be chosen.

This Executive Summary and the Final Environmental Impact Statement (EIS) has been revised based on comments received on the Draft EIS and Executive Summary. Text has been edited for further clarity and to correct errors. Overall findings in the document have not been changed. To aid in the readability of this Executive Summary, the maps corresponding to the alternative descriptions have been grouped together and are located at the end of the alternative section.

This document is intended to provide the factors that differentiate the alternatives from one another. Further detail concerning the alternatives and their potential impacts may be found in the Final EIS which is contained on one of the two CDs found at the back of this document. The other CD holds the Appendices.

Lead Agency	U.S. Army Corps of Engineers
Cooperating Agencies	U.S. Environmental Protection Agency U.S. Fish and Wildlife Service State of Alaska, Department of Natural Resources
Project Location	Development site is located approximately 60 miles east of Prudhoe Bay on the North Slope of Alaska.
Filed with EPA:	July 20, 2012

Contents

Figures

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Acronyms and Abbreviations

ACP	Arctic Coastal Plain
ADNR	Alaska Department of Natural Resources
ANILCA	Alaska National Interest Lands Conservation Act
AOGCC	Alaska Oil and Gas Conservation Commission
Applicant	Exxon Mobil Corporation
Arctic Refuge	Arctic National Wildlife Refuge
bbl	barrels
BMPs	Best Management Practices
cfs	cubic feet per second
CO_2	carbon dioxide
Corps	U.S. Army Corps of Engineers
CPF	Central Processing Facility
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
GHG	greenhouse gases
HSM	horizontal support member
LEDPA	least environmentally damaging practicable alternative
mcy	million cubic yards
MG	million gallons
MPRSA	Marine Protection, Research, and Sanctuaries Act
NEPA	National Environmental Policy Act
NSB	North Slope Borough
OSRO	oil spill response organizations
PTU	Point Thomson Unit
ROD	Record of Decision
SPMT	self propelled mobile transport
TAPS	Trans Alaska Pipeline System
USFWS	U.S. Fish and Wildlife Service
VSM	vertical support member

ES 1. | INTRODUCTION

The U.S. Army Corps of Engineers, Alaska District, Regulatory Division (Corps) received a draft permit application from the Exxon Mobil Corporation[1] (Applicant) on October 19, 2009 requesting authorization for the placement of fill material in waters of the U.S., in connection with the Applicant's proposed Point Thomson Project. The Corps, as part of its permit review process, developed this Final Environmental Impact Statement (EIS) in compliance with the National Environmental Policy Act (NEPA).

ES 1.1 | Background

Exploration in the Point Thomson area began in the winter of 1969/1970 with the drilling of the first exploration well. To date 21 exploratory wells have been drilled on and off shore in the general Point Thomson area, and several gravel structures remain in the area from those exploration activities.

In 2002, the U.S. Environmental Protection Agency (EPA) started a NEPA process in response to the Applicant's proposed oil and gas development plans for the Point Thomson area, located on the North Slope of Alaska 60 miles east of Prudhoe Bay on the Beaufort Sea coast (see **Figure ES-1**). At the time, the EPA was the lead federal agency because the development plans called for the potential designation of ocean dredged-material disposal sites, which would have required EPA authorization under Section 102 of the Marine Protection, Research, and Sanctuaries Act (MPRSA). Preparation of the EIS was discontinued before its completion at the request of the Applicant.

In 2006, the Alaska Department of Natural Resources (ADNR) began an effort to terminate the Point Thomson Unit and leases, claiming the leaseholders had failed to drill, develop, and produce the Point Thomson Unit and leases in adequate time. The State of Alaska and the Point Thomson Unit Operator, Exxon Mobil Corporation, and working interest owners were involved in a series of legal disputes concerning the Point Thomson Unit until March 29, 2012, when parties involved signed a settlement agreement. The operators and working interest owners have committed to produce condensate liquids from the Point Thomson Reservoir for delivery into the TransAlaska Pipeline System (TAPS) by the end of the 2015-1016 winter. The settlement agreement also outlines scenarios and deadlines for future reservoir development and lease schedules.

The Applicant's current development plan is substantially different from the 2002 plan, and would not be subject to Section 102 of the MPRSA. However, the current development

[1] PTE Pipeline LLC was included as the Applicant with Exxon Mobil Corporation in the final permit application submitted to the Corps.

plan would require authorization from the Corps to construct structures in navigable waters of the U.S. under Section 10 of the Rivers and Harbors Act and to discharge, dredge and/or fill material into waters of the U.S., including wetlands under Section 404 of the Clean Water Act. Therefore, the Corps is the lead federal agency for this Final EIS and is conducting its review of the Department of the Army Permit Application concurrently with the NEPA process.

The EPA is a cooperating agency due to its role of oversight of many project-related actions pursuant to the Clean Water Act, the Clean Air Act, the Resource Conservation and Recovery Act, the Safe Drinking Water Act, and the Oil Pollution Act. The U.S. Fish and Wildlife Service (USFWS) is a cooperating agency because of its responsibilities regarding the Endangered Species Act and its interest in activities near the Arctic National Wildlife Refuge (Arctic Refuge), which is managed by the agency. The ADNR is also a cooperating agency. It has authority over leases for the state lands where the Point Thomson Project is located and for approving state-required permits.

ES 1.2 | Project Overview

The proposed project involves development of hydrocarbon resources (gas condensate and possibly oil) from the Thomson Sand Reservoir in the Point Thomson area (see **Figure ES-1**). The project area is located on the northern edge of Alaska's Arctic Coastal Plain (ACP), 60 miles east of Deadhorse and Prudhoe Bay and 60 miles west of Kaktovik, on the coast of Lion Bay. It is named after a local geographic landform called Point Thomson.

Activities on the North Slope are shaped by the extreme conditions of the climate. The sun does not rise above the horizon for about two months in the winter, which leads to an average minimum winter temperature in the project area of -24ºF. In summer, the continuous sunlight only results in an average maximum temperature of 55ºF due to the latitude. The project area is covered with snow for about 8 months of the year; however, snow may fall at any time of the year.

The project area is defined to extend eastward from Deadhorse to the Staines River, and from the lagoon side of Flaxman Island along the Beaufort Sea coast to approximately 8 miles south of the coast line. Most of the Thomson Sand Reservoir is offshore under state coastal waters, while most of the proposed facilities would be located on land. The western boundary of the Arctic Refuge is approximately 2 miles from the easternmost extent of the proposed project. An export pipeline and transportation routes would extend from the Point Thomson facilities to existing facilities to the west.

Since the 1970s, hydrocarbons from the North Slope have contributed a substantial share of U.S. domestic production. Production at Point Thomson would help offset current declines in North Slope production and maintain efficiency of the TAPS.

The primary hydrocarbon resource at Point Thomson is natural gas and liquid gas condensate from the Thomson Sand Reservoir; there is also some oil present. Evaluating these hydrocarbon resources is part of the proposed action and would include identifying and assessing the location, size, and characteristics of the reservoir and the resources contained therein, as well as determining the commercial viability of producing those resources. Short-term and long-term flow

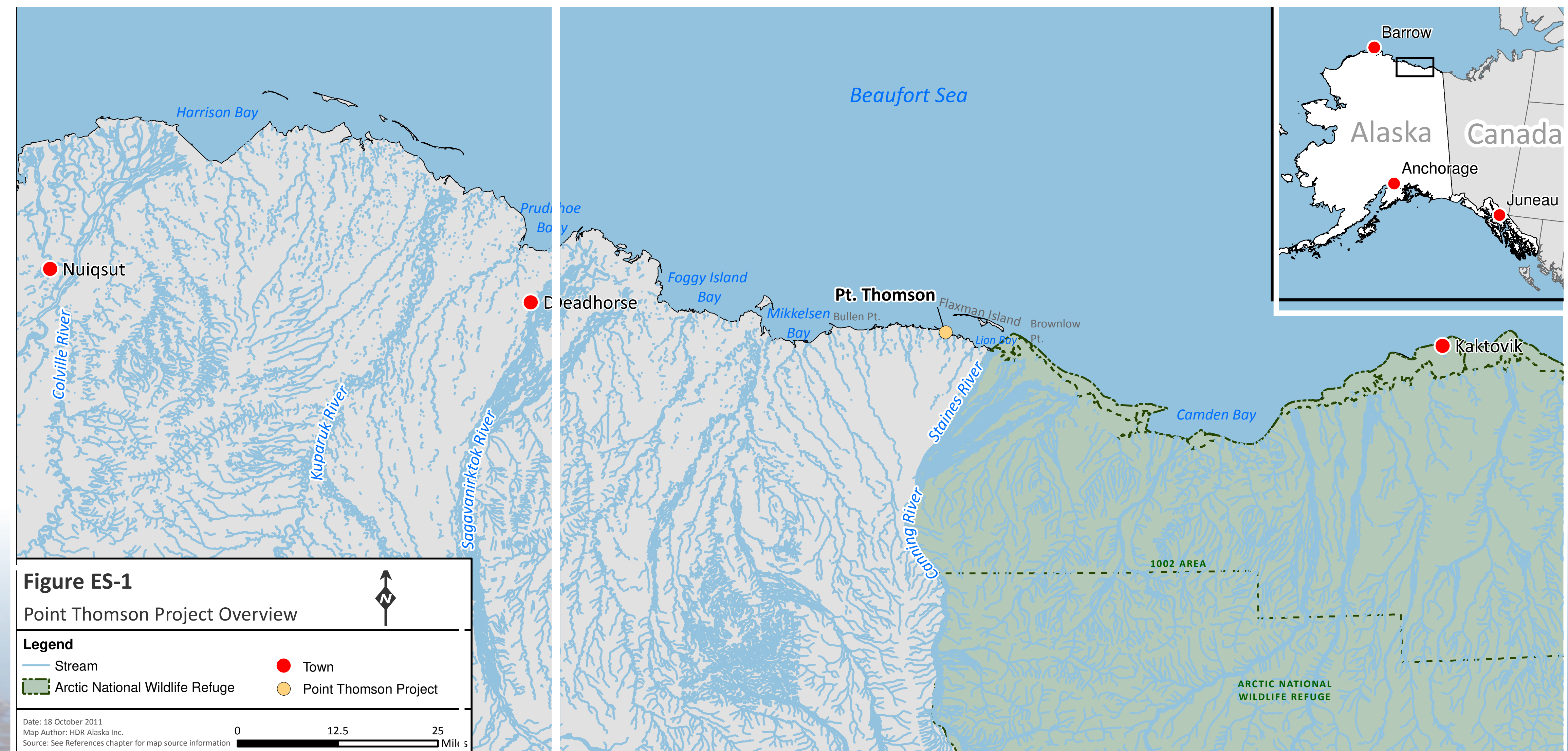


Figure ES-1
Point Thomson Project Overview

March in the project area

tests would be required to further define the formation fluids and their producing characteristics and to understand how the reservoir properties and connectivity vary between wells.

There are several unique characteristics associated with the Point Thomson Project. These characteristics were considered by the Corps during the NEPA process, and in some cases also influenced the Applicant's design, construction, and operational plans for the project.

High-pressure Reservoir / The target reservoir for the Point Thomson Project is several thousand feet deeper and under much higher pressure than the other North Slope hydrocarbon reservoirs. To recover the gas condensate, the project would require specialized, high-pressure drilling and recovery techniques that have not been used on the North Slope. Hydrocarbons would be extracted under pressure and the liquid condensate removed as the pressure drops. The extracted gas would be repressurized and injected back into the reservoir to maintain the overall reservoir pressure. The amount of condensate that would ultimately be recovered would depend on the extent and connectivity of the underground reservoir.

Coastal Location / Because the majority of the Thomson Sand Reservoir is offshore, developing the project facilities offshore would maximize access to the reservoir. The possibility of offshore development was explored as a conceptual alternative during development of the Draft EIS, but was dismissed as a concept because of the added environmental risks in the arctic environment and the availability of technology, in the form of long-reach directional drilling, that would allow the Applicant to access a majority of the reservoir from onshore well pads, thereby avoiding the offshore impacts altogether.

The April 20, 2010 accident on the Deepwater Horizon drilling rig in the Gulf of Mexico, as well as the resulting investigations and findings, provided additional context of concern for this coastal project. The circumstances of the Deepwater Horizon accident were considered during the development of the alternatives and also helped shape the spill analysis within this EIS.

Remote Location / Another unique characteristic of the project is the remote location of Point Thomson, which adds to the challenge of resource development. There are no pipelines or permanent roads leading to the project area to facilitate importing supplies and exporting product. The harsh climate, remote location, and challenges of building on tundra add to the complexity involved in tapping the Point Thomson Reservoir. The Point Thomson Project would be the first permanent oil and gas infrastructure in this remote region of the eastern North Slope, and would require an array of logistical solutions to safely and effectively develop the resource.

Proximity to Arctic Refuge / The Corps recognizes that development of Point Thomson, with its associated export pipeline and transportation infrastructure, would increase the possibility of other hydrocarbon developments near the Arctic Refuge boundary. The proposed development near the Arctic Refuge could spur debate and pressure on Congress to make a decision to either open the 1002 Area to oil and gas drilling or to formally include it in the Wilderness Preservation System. However, neither the opening of the 1002 Area to oil and gas exploration and development, nor the permanent closing by formal designation as a part of the National Wilderness Preservation System is considered a reasonably foreseeable future action; therefore, neither is addressed in this EIS. Reasonably foreseeable future developments on the North Slope, including the potential for the proposed project to open the way for further development near the Arctic Refuge, are addressed as part of the cumulative impacts assessment in this EIS.

Future Gas Development / Future development in the project area is expected to include full field development of the Point Thomson Project itself. Full field development is defined in this document as the additional equipment, manpower, and infrastructure that would be needed beyond what is proposed in this EIS to recover and produce additional hydrocarbon resources from the Thomson Sand Reservoir. These additional resources include both additional liquid gas condensate, which would require more infrastructure to recover, and natural gas. The requirements for full field development cannot be accurately defined until further evaluation of the hydrocarbon resources within the Thomson Sand Reservoir has been completed under the proposed action. The full field development of Point Thomson is considered a reasonably foreseeable future action within the cumulative impacts assessment of this EIS. In the future, this EIS may serve as a foundational NEPA document for further development of the Point Thomson Project. For example, future project evaluations may tier from this document, or may use this document as a basis for a supplemental EIS.

ES 1.3 | Process

The Corps, as the lead federal agency, conducted scoping, prepared a Draft EIS, held a Draft EIS comment period, and has now issued this Final EIS. The objective of this process is to evaluate and describe the environmental effects associated with the development activities as proposed by the Applicant during construction, drilling, and operation of the Point Thomson Project. The Corps is assisted by a team of independent third-party contractors led by HDR Alaska, Inc., working under the sole direction and guidance of the Corps. The EPA, the USFWS, and the ADNR are serving as cooperating agencies.

ES 1.3.1 | Scoping

The scoping period ran from January 11, 2010 to February 25, 2010, during which five public meetings were held in Kaktovik, Nuiqsut, Barrow, Anchorage, and Fairbanks. The Corps also held separate scoping meetings for agencies with regulatory jurisdiction over land or development, or with a permitting nexus. A teleconference was also held with Tribal representatives from the Native Village of Kaktovik, the Native Village of Nuiqsut, the Iñupiat Traditional Government Native Village of Barrow, and the Iñupiat Community of the Arctic Slope.

During the formal scoping period, more than 300 issue-specific comments were identified in the communications received from the public and agencies. The comments highlighted public concerns for impacts that could occur as a result of this project. Some of the many concerns included impacts to subsistence activities, long-term impacts caused by coastal erosion, and environmental consequences of the project. The proximity of the project to the Arctic Refuge as well as the conflict between oil and gas development on the North Slope and the wilderness experience in and around the Arctic Refuge were at the root of many comments.

Comments received during scoping helped shape the alternatives developed for the Draft EIS as well as additional studies necessary to assess impact. For example, the Corps conducted noise and visual studies to address concern over impacts to the Arctic Refuge.

ES 1.3.2 | Draft EIS Comment Period

The Draft EIS comment period began November 18, 2011 with the publication of the Notice of Availability in the Federal Register. It was originally scheduled to end on January 3, 2012 but was extended until January 18, 2012 after requests for an extension were received.

As with the scoping period, public meetings during the Draft EIS review period were held in Kaktovik, Nuiqsut, Barrow, Anchorage, and Fairbanks. The Corps held separate meetings for agencies with regulatory jurisdiction over land or development, or with a permitting nexus. These meetings were held in Barrow, Anchorage, and Fairbanks. The Corps also met with representatives from the Native Village of Kaktovik, the Native Village of Nuiqsut, the Iñupiat Traditional Government Native Village of Barrow, and the Iñupiat Community of the Arctic Slope. During the comment period, the Corps received 247 comment submissions. These submissions came in the form of emails, completed comment forms, letters, public testimony, and e-filing through the project Web site. Within the comment submissions, 666 individual comments were recorded and responded to. The comments and their responses can be found in Appendix W of the Final EIS.

The topics of comments received were similar to those in scoping. Commenters voiced concern over infrastructure proposed along the coast and in close proximity of the Arctic Refuge. Suggestions were offered on how to modify alternatives in order to lower impacts. Some comments were supportive of the project; others were not.

Based on comments received, errors in the Draft EIS were corrected and sections edited for clarity. The Final EIS is the result of these changes and additions. Overall impact findings did not change between the Draft and Final EIS, although how they are described may have changed. This Executive Summary has been revised to reflect updates in the Final EIS.

ES 2. | PROJECT PURPOSE AND NEED

For the purposes of satisfying requirements of NEPA, the Corps understands the purpose of the Applicant's proposed project is to produce hydrocarbon liquids (condensate and possible oil) from the Thomson Sand Reservoir and further evaluate and delineate the reservoir and evaluate the Brookian Group sandstones. The need for the proposed project is to provide for increased domestic hydrocarbon production.

The Corps' overall project purpose is used to define alternatives for evaluation in the EIS and to determine the least environmentally damaging practicable alternative (LEDPA) under the Section 404(b)(1) Guidelines. The Point Thomson Project's overall project purpose, as defined by the Corps, is to produce liquid hydrocarbons from the Thomson Sand Reservoir and further evaluate and delineate the reservoir and evaluate the Brookian Group sandstones.

ES 3. | ALTERNATIVES

Prior to developing the range of reasonable alternatives, nine alternative concepts (themes) and a number of component options for achieving the purpose of the project were initially considered. These concept themes and component options came from a variety of sources, including cooperating agencies' meetings and public comments. Also influencing the development of these concepts were challenges associated with construction on the North Slope, including extreme cold, seasonal access limitations, whaling season, and the fact that the North Slope is primarily wetlands. The concept themes and component options were initially screened based on their viability, which resulted in several themes and options being eliminated. Viability was defined as whether or not the theme or option was able to meet certain criteria. These included being responsive to the purpose and need, technological feasibility, general assessment of the concept/component's environmental risks, and allowing for full-field development.

The viability analysis resulted in carrying forward six alternatives (which also included several component options) as the full range of alternatives that met the stated purpose and need, and were responsive to the issues identified during the scoping process. The six viable alternatives were further developed and refined, adding more logistic and technological details. Alternatives that were not feasible or were conceptually redundant were eliminated from further consideration. An alternative was determined feasible if it satisfied the project purpose and was technologically feasible. The Corps conducted its feasibility analysis with substantial review and input from the cooperating agencies, as well as technical information

requested from the Applicant. The feasibility analysis resulted in one of the six alternatives being eliminated because it wasn't sufficiently different from another of the alternatives. The five remaining alternatives were carried forward and analyzed in this EIS. Through this comprehensive process, the Corps believes that it has captured all of the alternatives and components necessary to determine whether the Applicant's proposed project is the LEDPA.

The five reasonable alternatives assessed in this EIS are:

- **Alternative A**: No Action
- **Alternative B**: Applicant's Proposed Action
- **Alternative C**: Inland Pads with Gravel Access Road
- **Alternative D**: Inland Pads with Seasonal Ice Access Road
- **Alternative E**: Coastal Pads with Seasonal Ice Roads

Maps corresponding to the reasonable alternatives are grouped together starting on page ES-24.

ES 3.1 | ALTERNATIVE A: No Action Alternative

The No Action Alternative is used as a benchmark for comparison of the environmental effects of the action alternatives.

Under the No Action Alternative, the Applicant would suspend project engineering and planning activities for the evaluation of hydrocarbon resources at Point Thomson. The No Action Alternative could result from the Corps not issuing a permit for gravel fill and other construction activities. Without a Corps permit, gravel could not be placed outside of the boundaries of existing pads and the existing pads are not large enough to support further reservoir evaluation; see **Figure ES-2** (on page ES-24). Two existing, drilled-and-capped production wells on the existing Central Pad (PTU-3 Pad) would continue to be monitored in accordance with Alaska Oil and Gas Conservation Commission (AOGCC) regulations and prudent operator practices until the time that they are closed or brought into production in a future project. The No Action Alternative would include personnel traveling to and within the project site by helicopter. The Applicant would continue to evaluate project components to determine how the project could be redesigned to make permitting possible, and would endeavor to maintain state oil and gas leases.

ES 3.2 | COMMON COMPONENTS: to All Action Alternatives

While each action alternative is distinct, several components are common due to the use of standard North Slope construction and operational practices. Each of the action alternatives would enable the Applicant to delineate and produce hydrocarbon liquids (condensate and possible oil) from the Thomson Sand Reservoir and delineate other hydrocarbon resources at Point Thomson. All action alternatives would include the following common components associated with the exploration and recovery of hydrocarbon resources: gravel pads to support drilling and production operations; export and infield pipelines; gravel and/or ice roads and airstrips to support transportation needs; and waste disposal and support facilities.

ES 3.2.1 | Common Components: Production Pads

Each alternative has a unique configuration of pads for drilling and production. In general, each alternative incorporates a combination of a Central Well Pad, a Central Processing Facility (CPF), an East Well Pad, and a West Well Pad. The pad containing the CPF is the largest in all the alternatives and would be the primary location for construction, drilling, and operations activities. Each alternative would have five wells capable of either production or injection. Additionally, one disposal well would be drilled at the CPF. Production and injection wells would be drilled using long reach directional drilling techniques to access the offshore reservoir. The East and West Pads would have wells that would be used initially to delineate and evaluate the reservoir, and to determine whether the rim of oil surrounding the gas reservoir would be viable for production.

ES 3.2.2 | Common Components: Pipelines

Each alternative would include a configuration of infield gathering lines to bring produced fluids from the well pads to the CPF for processing. An export pipeline would then transport condensate to a common carrier export pipeline with a connection to TAPS at Prudhoe Bay for shipment to market. Pipelines would be elevated on vertical support members (VSMs) with a minimum 7-foot clearance between the bottom of the pipe and the tundra surface. The 7-foot clearance would allow free passage by wildlife and subsistence hunters on snow machines. Construction of pipelines would occur in the winter from ice roads. Pipeline stream crossings would be accommodated by adjusting the spacing of VSMs. Piping facilities associated with the export pipeline would include pig launchers/receivers, isolation valves, metering equipment, leak detection equipment, data acquisition equipment, and control/safety systems.

Existing well covers at the Central Pad

ES 3.2.3 | Common Components: Access and Transportation

During construction, personnel, equipment, and supplies would be transported to and within Point Thomson by air, land, and in some alternatives, sea. Each alternative would use a combination of tundra and/or sea ice roads, gravel roads and airstrips.

All alternatives include the construction of a gravel airstrip with an attached helipad. After completion, the gravel airstrip would provide the only year-round fixed-wing aircraft access to the Point Thomson area.

Gravel roads would cross creeks and small tundra streams with culverts or bridges. Bridges would be used to cross the larger drainages. Infield gravel roads would, wherever possible, be located a minimum of 500 feet from elevated pipelines to satisfy caribou migration guidelines. In order to build gravel roads, ice roads would be built along the proposed alignment and most gravel would be laid in the winter.

ES 3.2.4 | Common Components: Support Facilities

All alternatives would have similar support facilities that would include offices, warehouses and workshops, maintenance buildings, temporary and permanent personnel camps, treatment systems for drinking water and wastewater, waste management facilities, communication facilities, electric power generation and distribution facilities, and an emergency response boat launch ramp. Depending on the alternative, these facilities would be located in different locations and may be designed differently. Alternative-specific descriptions are discussed under each alternative.

ES 3.2.4.1 | Gravel Source

The primary source for gravel would be from a new gravel mine site. The location, layout, and size of the new mine would be determined by the gravel requirements of the alternative and from the analysis of core samples prior to construction. After mining is complete, the new gravel mine site would be rehabilitated, including replacement of the overburden and contouring to create stable side walls.

ES 3.2.4.2 | Water Needs and Sources

During construction, freshwater would be required for the construction and maintenance of ice roads and pads, the compaction of gravel for new gravel pads, dust suppression on gravel infrastructure, and camp use. Required freshwater would be supplied from between Endicott and the Point Thomson area and would be transported by truck. Drilling water needs would include camp use and water to create drilling fluids, or "muds" used to lubricate and cool the drill bit during drilling. Before water withdrawal would occur, permits would be obtained from ADNR, Division of Mining, Land and Water.

Operations water use would consist largely of camp water and routine maintenance activities such as dust suppression on gravel roads or the construction and maintenance of any operational ice roads. Water needs would fluctuate based on the level of activity in a particular year.

ES 3.2.5 | Common Components: Logistics

Logistics and sequencing varies by alternative, though each follows similar phasing of construction within the project area. Construction of each action alternative would begin with mobilization using various modes of transportation for equipment, supplies, and personnel depending on the alternative. The construction phase would include gravel mining, infrastructure installation (roads, pads, airstrips, and pipelines), and facility modules transport, installation and commissioning. The operations phase would begin as soon as the first wells are complete and sending condensate to the CPF. In each alternative, production would start while the final wells are being drilled.

The following descriptions of the action alternatives are generally organized and described first in terms of well and production pads, pipelines, access, and transportation, then support facilities and logistics. See **Table ES-1**, at the end of the alternative descriptions, for a detailed comparative summary of the components comprising each of the alternatives.

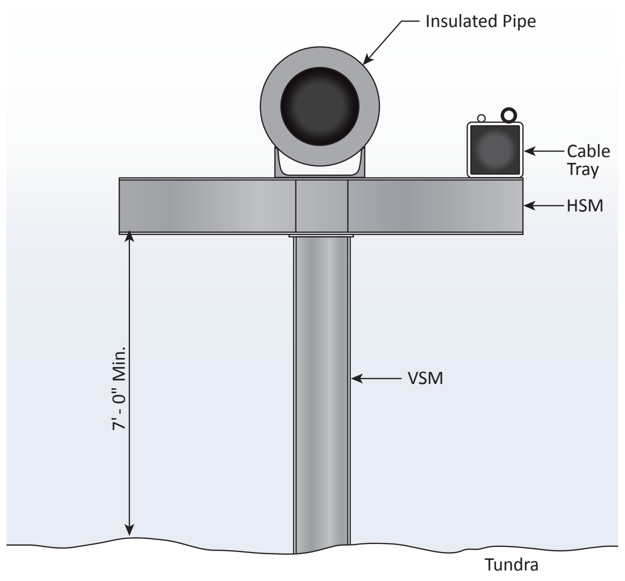
ES 3.3 | ALTERNATIVE B: Applicant's Proposed Action

Alternative B is the Applicant's Proposed Action and is characterized by three coastal gravel pads (Central, East, and West), two of which are expansions of existing gravel pads (PTU-3 and North Staines River State No. 1); see **Figure ES-3** (on page ES-26) and **Figure ES-4** (on page ES-28). This alternative would use marine transport for large facility modules.

ES 3.3.1 | Alternative B: Production Pads

The three coastal gravel pads would be connected by a network of gravel roads and infield gathering pipelines. Additional pads would include a small water source pad, a gravel mine stockpile pad, a storage pad, and auxiliary pads at Badami. The Central Pad would be located at the site of the existing PTU-3 gravel pad, and would collocate the Central Well and the CPF. The East Pad would include and expand the existing North Staines River State No. 1 Pad. The West Pad would be located on an undeveloped site near the coastline west of the Central Pad.

Figure ES-5: T-shaped Pipeline Support Structure



Not to scale

ES 3.3.2 | Alternative B: Pipelines

The 23-mile export pipeline would be constructed from the Central Pad to connect to the existing common carrier pipeline at Badami. The proposed pipeline route from Point Thomson to Badami would be generally located more than a mile inland. Infield gathering pipelines would be constructed to deliver produced hydrocarbons from the East and West Pads to the CPF for processing. The proposed pipeline support design would be T-shaped, with one horizontal support member (HSM) atop one VSM (see **Figure ES-5**).

ES 3.3.3 | Alternative B: Access and Transportation

Alternative B would utilize seasonal and infield ice roads, marine transport by coastal and oceangoing (sealift) barges, air transport by helicopters and fixed-wing aircraft, and gravel roads. This alternative includes construction of a sealift facility and a service pier along the coast. Infield gravel roads would be constructed to connect the Central, East, and West Pads, airstrip, gravel mine and stockpile, and freshwater supply sources. During construction, there would be at least two primary seasonal ice roads and infield ice roads between the pads and water sources. During operations, an ice access road to the Point Thomson area would only be used on an as-needed basis which is estimated to be once every five years. A gravel airstrip that would accommodate a C-130 cargo plane would be constructed south of the Central Pad, approximately 3 miles inland from the coast.

The Applicant has voluntarily signed a Conflict Avoidance Agreement in which the Applicant agrees to avoid barging during the whaling season (generally from August 24 to September 23), to the greatest extent possible, in order to minimize potential impacts to subsistence hunting. When barging during the whaling season is needed, the Applicant will follow the protocols outlined in the Conflict Avoidance Agreement to avoid or minimize interactions with whaling vessels and whales.

ES 3.3.4 | Alternative B: Support Facilities

Most support facilities would be located at the Central Pad. In addition to the pads common to all action alternatives, Alternative B would require two small gravel pads at Badami. The first pad would be connected to the existing Badami pad by a short gravel road. A second pad to facilitate ice road crossing of the export pipeline would be located south of the Badami Main Pad. These pads and connector road would constitute less than 1 acre.

Temporary camps may be located at the East and West Pads during drilling. Ice pads would also be used to support construction works in Alternative B. Mobile construction camps would be located on ice pads until gravel pads become usable.

An injection well for waste disposal would be located on the Central Pad. Materials that could not be injected or burned would be stored until they could be shipped to Deadhorse for disposal.

ES 3.3.4.1 | *Alternative B: Gravel Sources*

Most gravel for Alternative B would come from the new gravel mine site located approximately 2 miles south of the Central Pad and just north and east of the proposed airstrip. After the gravel has been mined (two winter seasons), overburden would be replaced and the area contoured.

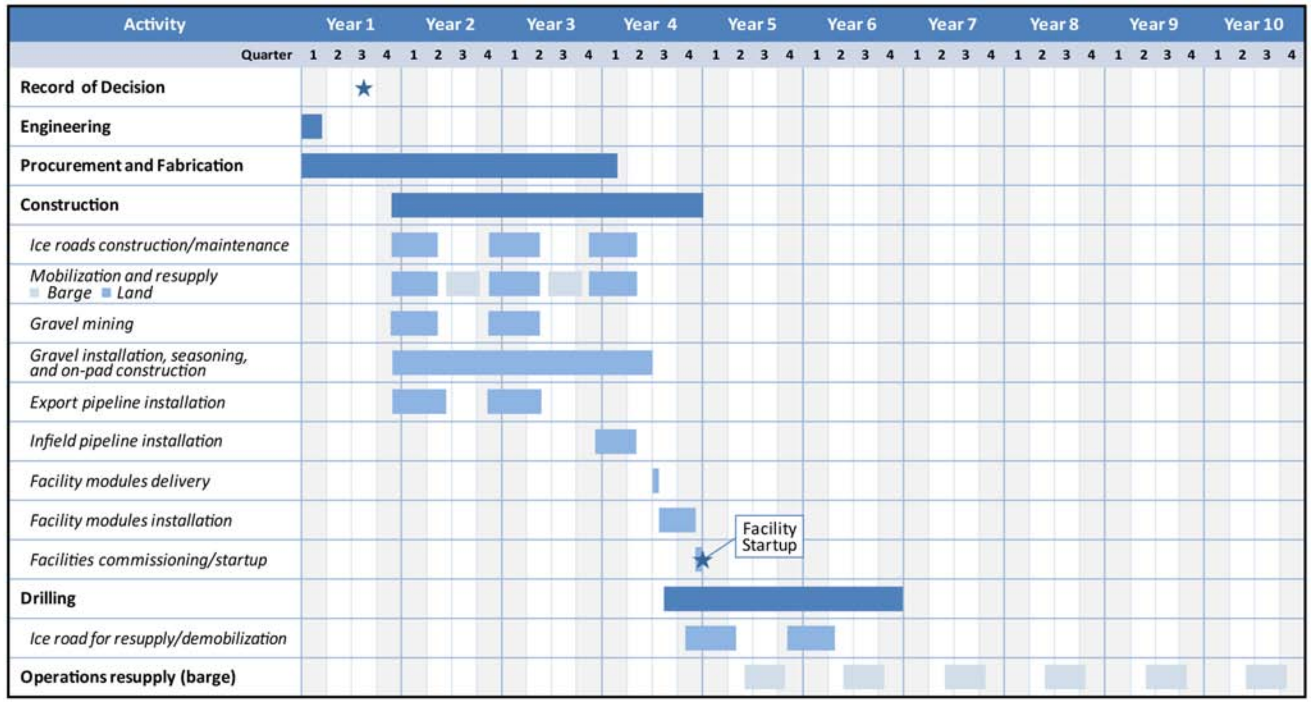
ES 3.3.4.2 | *Alternative B: Water Needs and Sources*

Freshwater would be required for the construction of ice roads and pads, camp operations, and drilling and would be trucked from permitted water sources. Freshwater for camp use during construction, drilling, and operations would be transported from the existing C-1 mine site reservoir by truck. The C-1 mine site reservoir would continue to be the primary water source during operations.

ES 3.3.5 | Alternative B: Logistics

Under this alternative, ice roads would be constructed between the Endicott Spur Road and Point Thomson to facilitate the construction of the export pipeline and movement of pioneer camp modules, equipment, and supplies. Once constructed, the sealift facility and service pier would be used for importing and exporting supplies and the gravel airstrip would provide year-round access.

Figure ES-6: Alternative B–Logistics Plan



Helicopters from Deadhorse would provide access for personnel when other modes were not available. Air travel would be dependent on weather, which can change very quickly on the North Slope. Busing on the ice roads would transport personnel from late January to mid-April during years that an ice road would be built.

Construction, drilling and operation phases would overlap. See **Figure ES-6** for a step plan of activities. Startup of production would occur at the end of Year 4 with drilling continuing into Year 6.

ES 3.4 | ALTERNATIVE C: Inland Pads with Gravel Access Road

Alternative C was developed to minimize impacts to coastal resources to the extent possible by locating project components inland from the coastline and reducing coastal access to the Point Thomson site. The alternative is composed of four gravel pads (a Central Processing Pad 2 miles inland, East and West Pads both one-half mile inland, and a Central Well Pad at the existing PTU-3 pad) and a gravel access road between Point Thomson and the Endicott Spur Road in lieu of constructing a coastal barge facility at Point Thomson; see **Figure ES-7** (on page ES-30) and **Figure ES-8** (on page ES-32). The gravel access road would allow year-round access to Point Thomson and would remove direct marine transport; however, it would not be built in time to facilitate construction and drilling. This alternative also attempts to minimize impacts to hydraulic connectivity by moving linear facilities further inland and orienting infield gravel roads in a north-south alignment, the area's predominant hydraulic gradient.

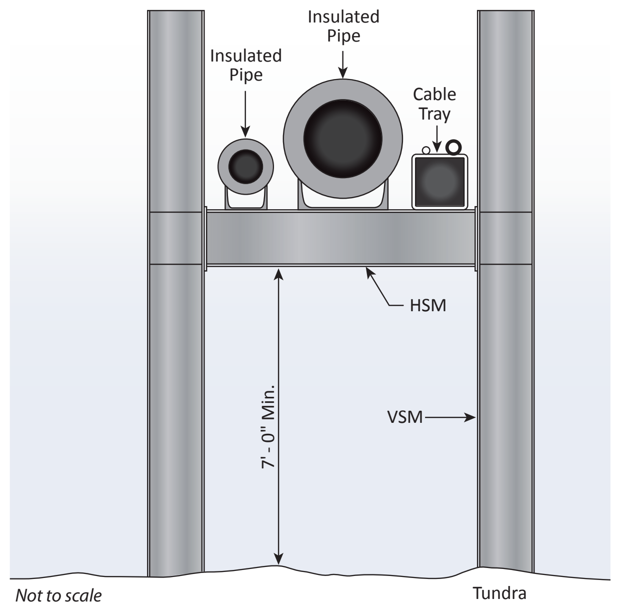
ES 3.4.1 | Alternative C: Production Pads

The four gravel pads would be connected by a network of gravel roads and infield gathering pipelines. Additional pads would include a small water source pad and a gravel mine stockpile pad. The Central Processing Pad would be located 2 miles inland, southwest of the Central Well Pad. The Central Well Pad would be located near the coast and would be an expansion of the existing PTU-3 gravel pad. The Central Well Pad would contain the drilling and well infrastructure and an emergency boat launch. The East Pad would be located approximately 4.5 miles east of the Central Processing Pad and about one-half mile inland from the coastline and the North Staines River State No. 1 Pad. The West Pad would be located a little more that 3 miles west of the Central Processing Pad, and about one-half mile inland. The East, West, and Central Processing Pads would be located on previously undeveloped sites.

ES 3.4.2 | Alternative C: Pipelines

A 51-mile export pipeline would be constructed from the Central Pad to connect to the existing Endicott common carrier pipeline. The proposed pipeline route from Point Thomson to Endicott would be 500 feet south of and parallel to the gravel access road. Infield gathering pipelines would be constructed to deliver produced hydrocarbons from the Central Well, East, and West Pads to the CPF

Figure ES-9: H-shaped Pipeline Support Structure



for processing. The support members for the production pipeline and injection flow line for Alternative C would be H-shaped (see **Figure ES-9**), with two parallel VSMs and an HSM spanning the distance between them. Similar to T-shaped pipeline support structures, the H-shaped support structures would have a minimum 7-foot clearance to allow caribou passage. An injection pipeline would run between the CPF and the Central Well Pad using the same VSMs as the gathering line.

The infield water pipeline to convey freshwater for operations would be constructed aboveground on timber supports to raise the pipes 12 inches off the ground. The total height would be approximately 24 inches. The water line would generally following the infield road from the C-1 mine reservoir to the Central Processing Pad. It would not go to the well pads.

ES 3.4.3 | Alternative C: Access and Transportation

Alternative C relies on ice roads, gravel roads, and aircraft. No barge facilities would be constructed at Point Thomson and no barges or other watercraft would be used as routine transportation to or from Point Thomson. Within Point Thomson, the infield gravel road network would be the primary way for personnel, materials, and equipment to travel. Modules/equipment would be staged in Deadhorse awaiting ice road opening. While Alternative C does not include barge transportation to Point Thomson, modules would be transported from their fabrication site to Prudhoe Bay via sealift barge. Prudhoe Bay infrastructure would need to be evaluated and may require upgrades to accommodate the landing of sealift barges. Studies would have to be completed to determine the maximum size modules that the roads and bridges in the Deadhorse area could support. Either the modules would have to be designed to meet the road/bridge specifications or the roads and bridges would need to be upgraded, depending on the results of the studies.

Aerial view of tundra polygons

A gravel access road would be constructed to provide access to and from Point Thomson during operations. This road would be located inland between 3 and 8 miles south of the coastline, beginning at the Endicott Spur Road south of the Badami common carrier pipeline, and continue eastward to Point Thomson. The gravel access road would generally be located approximately 500 feet to the north of the export pipeline. A tundra ice road would be built to support the construction of the gravel road. Another tundra ice road would be constructed for VSM and export pipeline construction. A third tundra ice road would be built parallel to the pipeline ice road. This ice road would be used for transporting materials, supplies, and modules to and from Point Thomson. Perpendicular ice roads would be built between the pipeline and transport ice roads so that trucks would be able to maneuver around slow moving modules. Other ice roads would be built for construction as well as on an as-needed basis during operations.

A gravel airstrip would be constructed in the location of the abandoned West Staines gravel airstrip, which would also be incorporated into

C-1 Mine site reservoir

the new gravel access road alignment. The new airstrip would accommodate a C-130 cargo plane.

Infield gravel roads would be constructed to connect the Central, East, and West Pads to the CPF, airstrip, gravel mine and stockpile, and freshwater supply sources. Infield gravel roads would be oriented north-south and located a minimum of 500 feet from elevated pipelines, where possible.

ES 3.4.4 | Alternative C: Support Facilities

There would be about 3 years of construction activities occurring before the gravel access road would be ready for use. Until that time, supplies, including the annual fuel supply, would need to be delivered to Point Thomson by ice road for construction and drilling. Because of the lack of summer access to Point Thomson, fuel and other supplies would have to be brought in while the ice access roads are available and stockpiled at the Central Processing Pad.

An injection well for waste disposal would be located on the Central Processing Pad. Materials that could not be injected or burned would be stored until they could be shipped to Deadhorse for disposal.

Alternative C would require additional gravel storage pads, including gravel storage pads at each mine site along the gravel access road, a gravel pad at the C-1 mine site reservoir, and a new gravel pad at Deadhorse for module storage. Ice pads would also be used to support construction works. Mobile construction camps would be located on ice pads until gravel pads became usable.

ES 3.4.4.1 | *Alternative C: Gravel Sources*

Gravel for pads would come from the new gravel mine site located near the proposed Central Processing Pad. Construction of the gravel access road would require up to 5 additional gravel mines, sited approximately every 10 miles along the proposed road corridor.

ES 3.4.4.2 | *Alternative C: Water Needs and Sources*

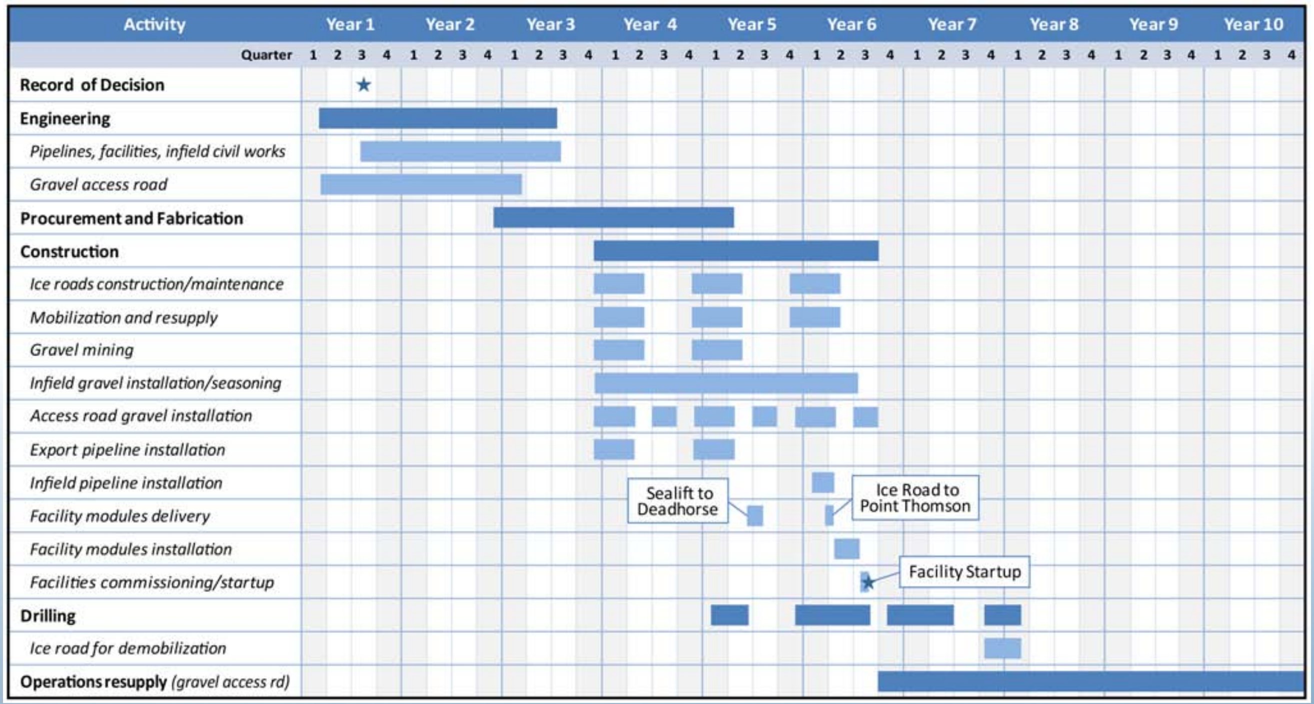
During construction, freshwater would be transported from the C-1 mine site reservoir by truck and stored in onsite tanks. Once construction is complete, water would be delivered to the Central Processing Pad via an elevated pipeline. Water needed at the well pads would be delivered by truck and stored in onsite tanks.

ES 3.4.5 | Alternative C: Logistics

The key logistics feature of Alternative C would be the first 3 years of engineering design and procurement of materials that would occur after the ROD.

- Construction would begin late in Year 3. The gravel access road would not be available for use until late in Year 6. Prior to that time all supplies and personnel would be transported to Point Thomson via air (helicopter or fixed-wing) or over ice road.
- During the first construction season (Year 3/Year 4), the primary means of transporting personnel would be by helicopter from Deadhorse, supplemented by crew busses on the ice access road from late January to mid-April. After the gravel airstrip was completed in late Year 4, personnel transfer would take place primarily by fixed-wing aircraft from Anchorage or Fairbanks for the remainder of construction.
- All sealift modules and some truckable modules would have to be delivered to Deadhorse during open water season of Year 5, staged for 6 to 9 months, and then transported during the following ice road season in Year 6.
- See **Figure ES-10** for a step plan of activities. Startup of production would occur in Year 6 with drilling continuing into Year 8.

Figure ES-10: Alternative C–Logistics Plan



- Before the opening of the gravel access road, enough fuel and supplies would have to be trucked in during the ice road use window to last throughout the rest of the year.

ES 3.5 | ALTERNATIVE D: Inland Pads with Seasonal Ice Access Road

Alternative D was developed to minimize impacts to coastal resources to the extent possible by locating project components inland from the coastline and reducing coastal access to the Point Thomson site. The alternative is composed of the same four gravel pads as described in Alternative C, but the tundra ice road would run east from the Endicott Spur Road to the northern end of the Point Thomson Project area; see **Figure ES-11** (on page ES-34) and **Figure ES-12** (on page ES-36). The alternative also attempts to minimize impacts to hydraulic connectivity, as in Alternative C, by aligning most infield gravel roads in a north-south orientation.

ES 3.5.1 | Alternative D: Production Pads

Alternative D would locate drilling and production facilities onto four gravel pads, similar to Alternative C. The well pads would be connected by a network of gravel roads and infield gathering pipelines. The Central Well Pad would be located near the coast at the site of the existing PTU-3 gravel pad, while the Central Processing Pad would be located approximately 2 miles inland. Because of the seasonal nature of ice road-only access to Point Thomson, additional storage would be needed through operations as compared with other alternatives. The East Pad would be located a little over 3 miles east of the Central Processing Pad and about one-half mile inland from the coastline and the existing North Staines River State No. 1 Pad. The West Pad would be located about 5 miles west of the Central Processing Pad and about one-half mile inland. Both the East and West Pads would be located on undeveloped sites.

ES 3.5.2 | Alternative D: Pipelines

The infield gathering pipelines, production lines, injection flow lines and their supports would be the same as in Alternative C. Infield gathering pipelines would be constructed to deliver produced hydrocarbons from the Central, East, and West Pads to the CPF for processing. The 23-mile export pipeline would be constructed from the Central Pad to connect to the existing common carrier pipeline at Badami. The proposed pipeline route from Point Thomson to Badami would generally be located more than 4 miles inland.

ES 3.5.3 | Alternative D: Access and Transportation

Alternative D would utilize infield ice roads, marine transport by sealift barges to Prudhoe Bay, air transport by helicopters and fixed-wing aircraft, and infield gravel roads. Large modules would be brought to Point Thomson by ice road from the Endicott Spur. The ice road and aircraft would be the primary way to transport materials, equipment, and personnel to and from Point Thomson. Within Point Thomson the infield gravel road network would be used for transport. While Alternative D does not include barge transportation to Point Thomson, modules would be transported from their fabrication site to Prudhoe Bay via sealift barge. Prudhoe Bay infrastructure would need to be evaluated to ensure that roads and bridges would be able to support Point Thomson modules, or modules would need to be sized to be able to travel over existing roads and bridges.

Tundra ice roads would be the primary access to Point Thomson during construction, drilling, and operations. During construction, up to three seasonal tundra ice roads may be constructed in one winter from the Endicott Spur to Point Thomson. The Applicant may construct a sea ice road instead of or in addition to the tundra ice road to maximize the ice road season during any or all years of construction. After completion of construction, a single ice access road would be built annually between the Endicott Spur Road and Point Thomson for annual resupply of fuel and consumables, as well as personnel transport.

A gravel airstrip would be constructed south of the Central Pad, approximately 3 miles inland from the coast, located northeast of the former West Staines gravel airstrip. A tundra ice airstrip would be built as needed in years prior to the gravel airstrip being available.

Infield gravel roads would be constructed to connect the Central, East, and West Pads, airstrip, gravel mine and stockpile, and freshwater supply sources. The infield gravel roads would be aligned in a north-south orientation to minimize impedance of water flow. Infield gravel roads would, wherever possible, be located a minimum of 500 feet from elevated pipelines.

ES 3.5.4 | Alternative D: Support Facilities

Like Alternative C, Alternative D would have limited access to Point Thomson. Supplies would have to be delivered by air or annual ice road. Fuel and other supplies would have to be stockpiled at the Central Processing Pad because of the lack of summer access. Unlike Alternative C, the access limitation would last the life of the project.

C-1 Storage pad and reservoir

In addition to those pads common to all action alternatives, Alternative D would require a gravel storage area at the existing C-1 storage pad, a water source access pad, as well as auxiliary pads at Badami and a module staging pad at Deadhorse. Ice pads would also be used to support construction works in Alternative D. Mobile construction camps would be located on ice pads until gravel pads became usable.

Additional pads would include infield nondrilling or production pads, including a small water source pad, a gravel mine stockpile pad, and the C-1 storage pad.

An injection well for waste disposal would be located on the Central Processing Pad. Material that could not be injected or burned would be stored until it could be shipped to Deadhorse for disposal.

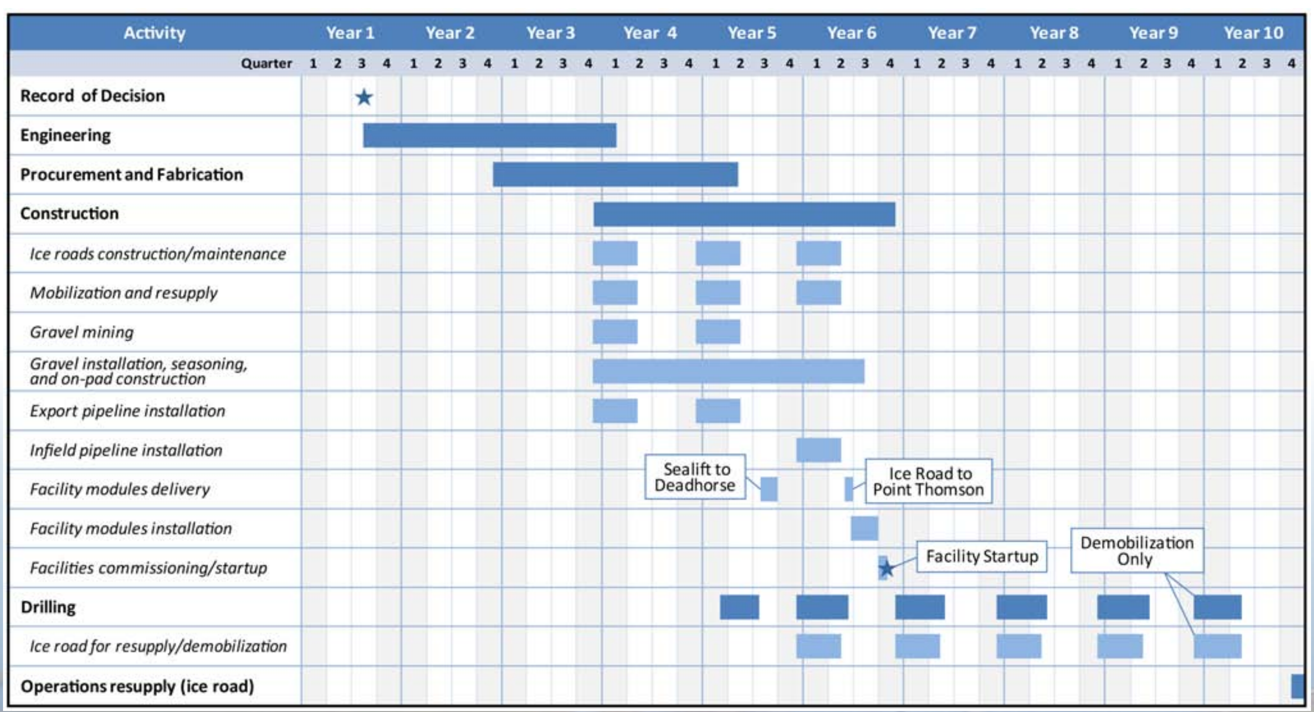
ES 3.5.4.1 | *Alternative D: Gravel Source*

Most gravel for Alternative D would come from the new gravel mine site located approximately 2 miles south of the Central Pad, near the proposed Central Processing Pad. The gravel mine for Alternative D would be larger than in Alternative B. After completion of mining activity, the gravel mine site would be rehabilitated and used as a freshwater reservoir.

ES 3.5.4.2 | *Alternative D: Water Needs & Resources*

Freshwater for camp use during construction would be transported by truck from the C-1 mine site reservoir. Freshwater for operations would be transported by an insulated water line that would be buried within the gravel of the road between the new mine site reservoir and the Central Processing Pad. Water tanks for drilling activities on the well pads would be refilled by truck from either permitted surface water or the new mine reservoir.

Figure ES-13 Alternative D–Logistics Plan



After completion of mining activity, the gravel mine site would be rehabilitated, and used as the primary reservoir. To recharge the reservoir, an inlet structure would be constructed to divert water from an adjacent stream during peak discharges. The C-1 mine site reservoir could serve as a secondary water source.

ES 3.5.5 | Alternative D: Logistics

The logistics for Alternative D would be similar to those described in Alternative C, though Alternative D would use an annual ice access road to resupply its drilling and operations activities each year. Construction would begin at the end of Year 3, startup of production would occur towards the end of Year 6 and drilling would continue into Year 9 with the rig being demobilized via ice road in early Year 10. See **Figure ES-13** for the step plan of activities.

ES 3.6 | ALTERNATIVE E: Coastal Pads with Seasonal Ice Road

Alternative E was developed to reduce impacts to wetlands and surrounding water resources by minimizing the development footprint. To achieve this, this alternative would reduce the amount of gravel fill needed for some of the project components; see **Figure ES-14** (on page ES-38) and **Figure ES-15** (on page ES-40). During drilling, the gravel well pad footprints would be expanded by multiyear ice pads to support all the necessary equipment. Over the long term during operations, the ice pad footprint would be removed and only the gravel fill would remain. The gravel footprint would also be reduced by the use of ice roads in much of the infield road system.

ES 3.6.1 | Alternative E: Production Pads

Similar to Alternative B, Alternative E would locate the drilling and production facilities onto a three-pad configuration that would consist of an enlarged Central Pad (Central Well/Central Processing Pad) and two other ice-gravel combination pads (the East and West Pads). The Central Pad would be located on an expanded version of the PTU-3 gravel pad. The gravel footprint of the East and West Pads would allow for adequate pad space for operations and would be supplemented with a multiseason ice pad extension during the drilling phase. The Central Pad would be larger under this alternative to provide more storage and additional support space to compensate for the smaller gravel footprint of and limited access to the East and West Pads. The East Pad would encompass the existing North Staines River No. 1 Pad, while the West Pad would be located on an undeveloped site near the coastline at the same location as Alternative B. Access to the East and West Pads would either be by ice road in the winter or helicopter year-round.

ES 3.6.2 | Alternative E: Pipelines

The 22-mile export pipeline would be similar to Alternative B. The pipeline route would be generally located between 1 and 2 miles from the coastline. An ice road would be built and used to construct the export pipeline. Infield pipelines would be constructed to deliver the produced hydrocarbons from the East and West Pads to the CPF.

An infield water pipeline to supply freshwater during operations would be constructed on VSMs between the C-1 mine site reservoir and the operations camp.

ES 3.6.3 | Alternative E: Access and Transportation

All modes of transport would be used for this alternative. Barges would bring modules and equipment. Supplies would be transported either by barge or over ice roads. Personnel would be flown in and out of Point Thomson and would travel between pads by helicopter when ice roads are not available. The only infield gravel road would run south from the Central Pad to the airstrip, the C-1 storage pad, and C-1 mine site reservoir.

Ice roads are essential to Alternative E. As stated above, the only gravel road would be an infield road running south from the Central Pad. All other roads would be seasonal ice roads. Road access to the East and West Pads would be by seasonal ice roads throughout the life of the project.

For construction, tundra ice access roads and/or a sea ice access road would be constructed seasonally to bring supplies and equipment and to facilitate the building of the export pipeline. During operations, an ice access road to Point Thomson would only be constructed on an as-needed basis which is estimated to be once every five years.

Under Alternative E, as in Alternative B, both coastal and sealift barging would be used to transport supplies and modules. Equipment barged to Point Thomson and meant for the East or West Pad would be stored at the Central Pad until infield ice roads could be built.

Alternative E would include a shorter gravel airstrip than the other alternatives. The shorter airstrip would prevent the use of a C-130 cargo plane, which could limit the ability of the project to bring in large equipment by air. The airstrip would be constructed south of the Central Pad, approximately 2 miles inland from the coast. A seasonal full length sea ice airstrip would be constructed initially until the gravel airstrip is useable. The Central, East and West Pads would also include a helipad and associated support systems, because access to the East and West Pads during the summer would primarily be by helicopter, though occasionally by tundra-safe, low ground-pressure vehicles.

ES 3.6.4 | Alternative E: Support Facilities

Most support facilities would be located at the Central Pad, and would include stockpiling areas to accommodate materials transported by barge in the summer.
An injection well for waste disposal would be located on the Central Pad. Material that could not be injected or burned would be stored until it could be shipped to Deadhorse for disposal.

Development of other gravel pads would include a gravel storage pad, the existing C-1 storage, and a water source access pad. Two small gravel pads would also be required at Badami.

ES 3.6.4.1 | Alternative E: Gravel Sources

Gravel for Alternative E would come from the new gravel mine site located approximately 2 miles south of the Central Pad and just north and east of the proposed airstrip. After completion of mining activity, overburden would be placed back in the mine and contoured.

ES 3.6.4.2 | Alternative E: Water Needs and Sources

Freshwater for camp use during construction, drilling, and operations would be transported from the C-1 mine site reservoir by truck, and the C-1 mine site reservoir would be the primary water source for all activities during operations. The rehabilitated Point Thomson gravel mine would be available as a secondary water source.

ES 3.6.5 | Alternative E: Logistics

Logistics of Alternative E would be similar to those described in Alternative B. After the ROD, engineering would occur for a year prior to the start of construction at the end of Year 2. Additional logistical challenges would be posed by the use of infield ice infrastructure. Because of the lack of access to the East and West Pads throughout much of the year, additional storage and safety modules would need to be constructed. Startup of production would occur at the end of Year 5 with drilling continuing into Year 8 due to the difficulty of moving the drill rig between pads only during ice road availability. The drill rig would be demobilized at the beginning of Year 9. See **Figure ES-16** for the step plan of activities.

Figure ES-16: Alternative E–Logistics Plan

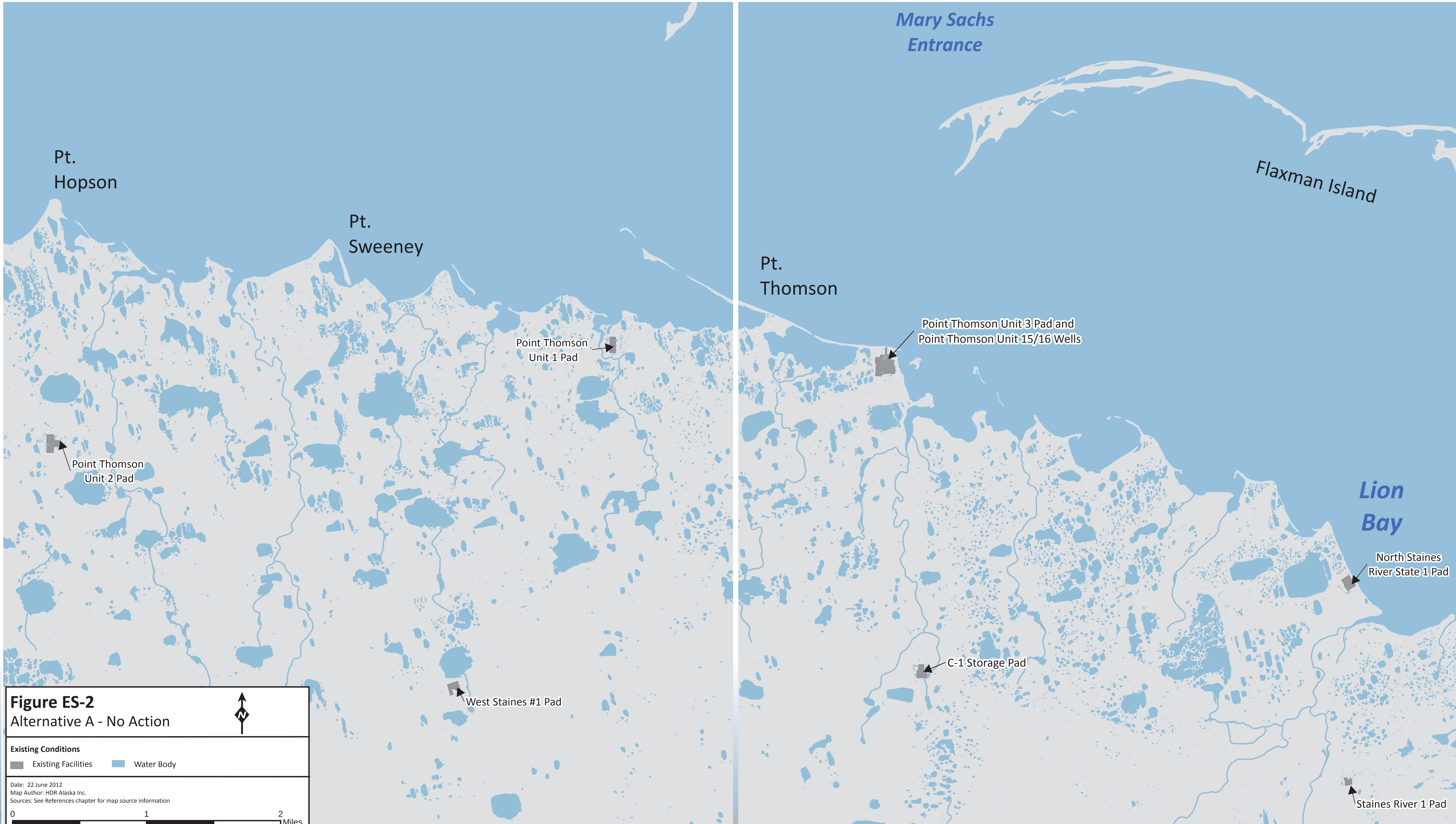


Figure ES-2
Alternative A - No Action

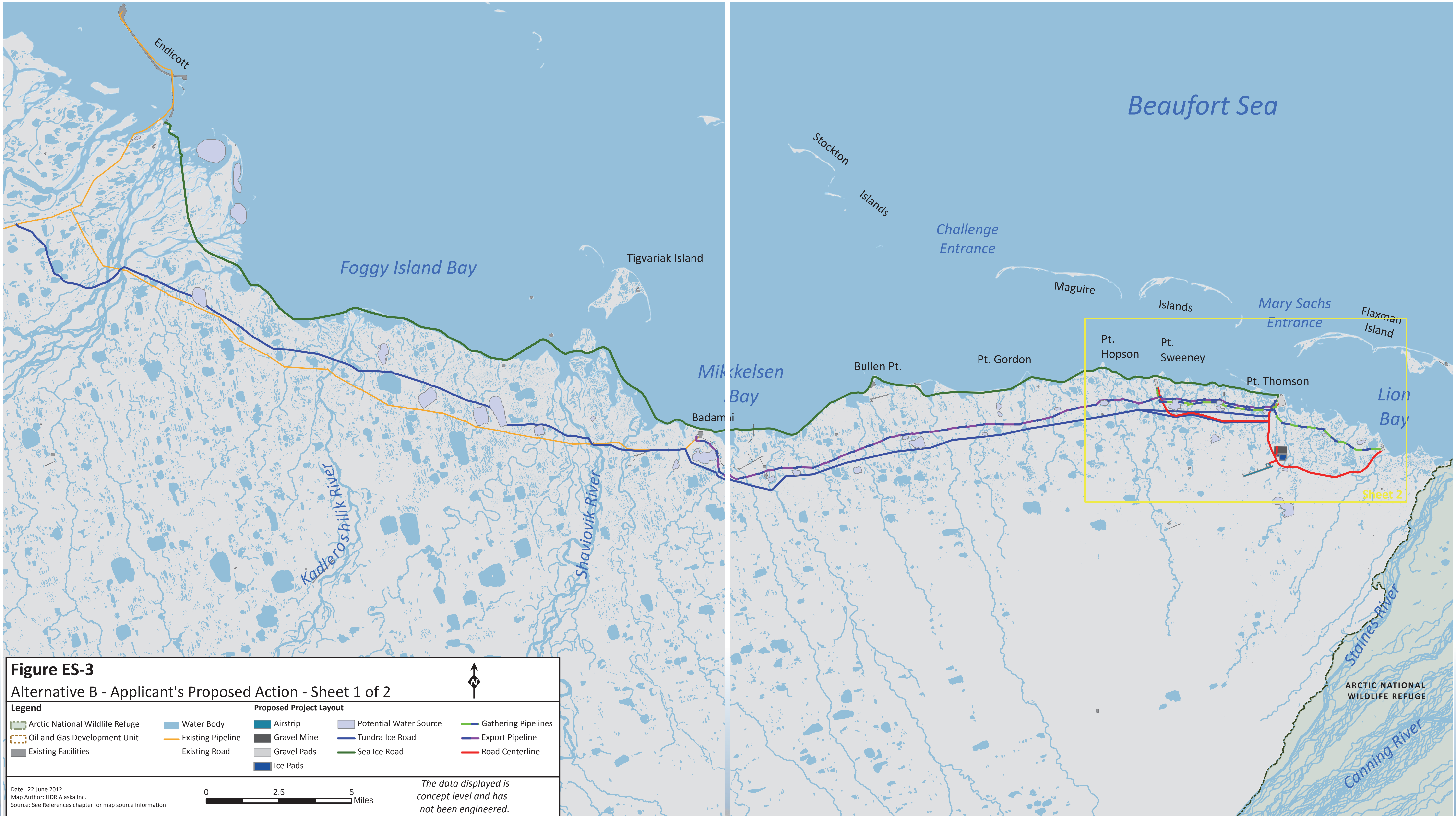


Figure ES-3

Alternative B - Applicant's Proposed Action - Sheet 1 of 2

Legend

- Arctic National Wildlife Refuge
- Oil and Gas Development Unit
- Existing Facilities
- Water Body
- Existing Pipeline
- Existing Road

Proposed Project Layout

- Airstrip
- Gravel Mine
- Gravel Pads
- Ice Pads
- Potential Water Source
- Tundra Ice Road
- Sea Ice Road
- Gathering Pipelines
- Export Pipeline
- Road Centerline

Date: 22 June 2012
Map Author: HDR Alaska Inc.
Source: See References chapter for map source information

0 2.5 5 Miles

The data displayed is concept level and has not been engineered.

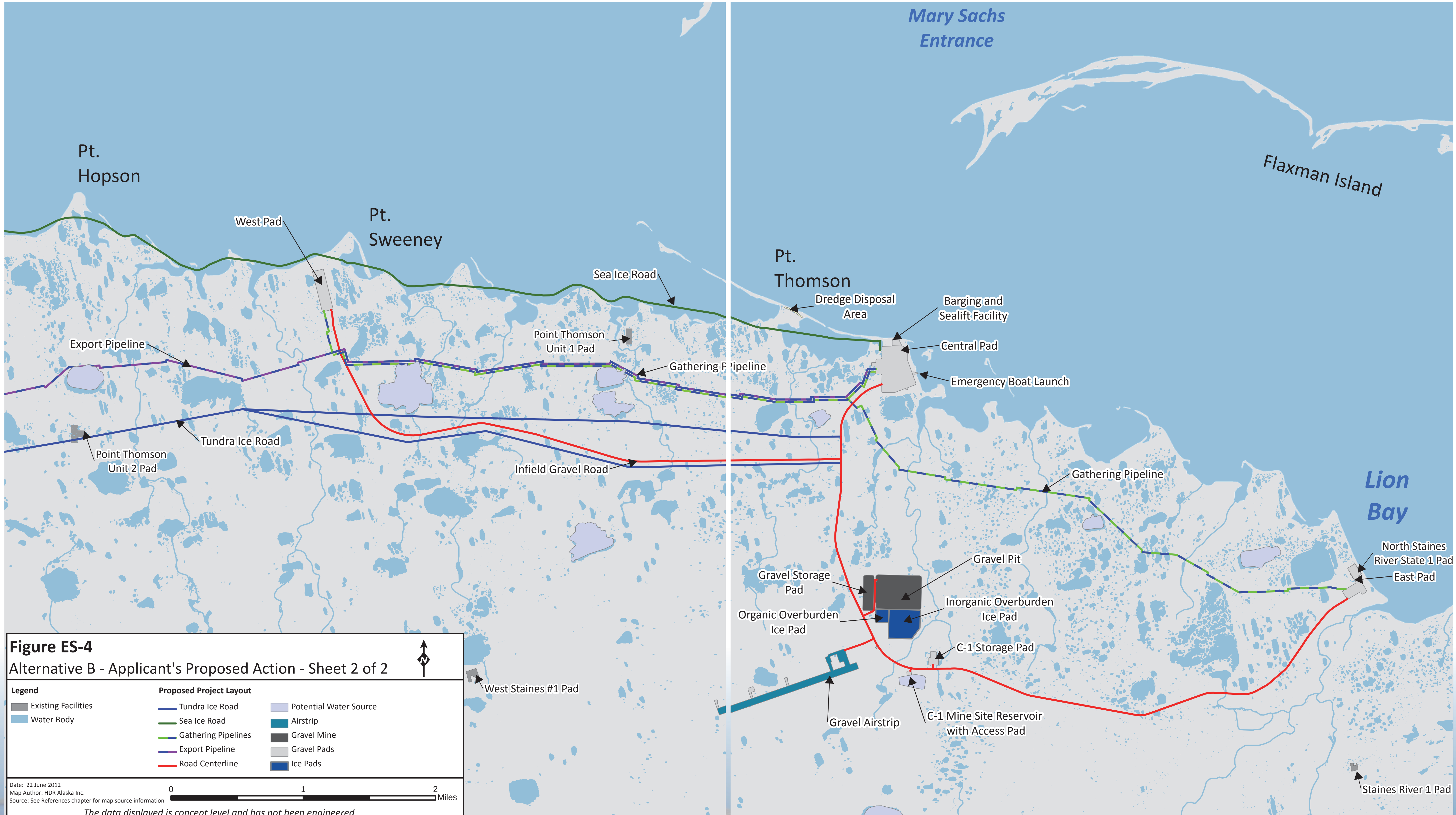


Figure ES-4
Alternative B - Applicant's Proposed Action - Sheet 2 of 2

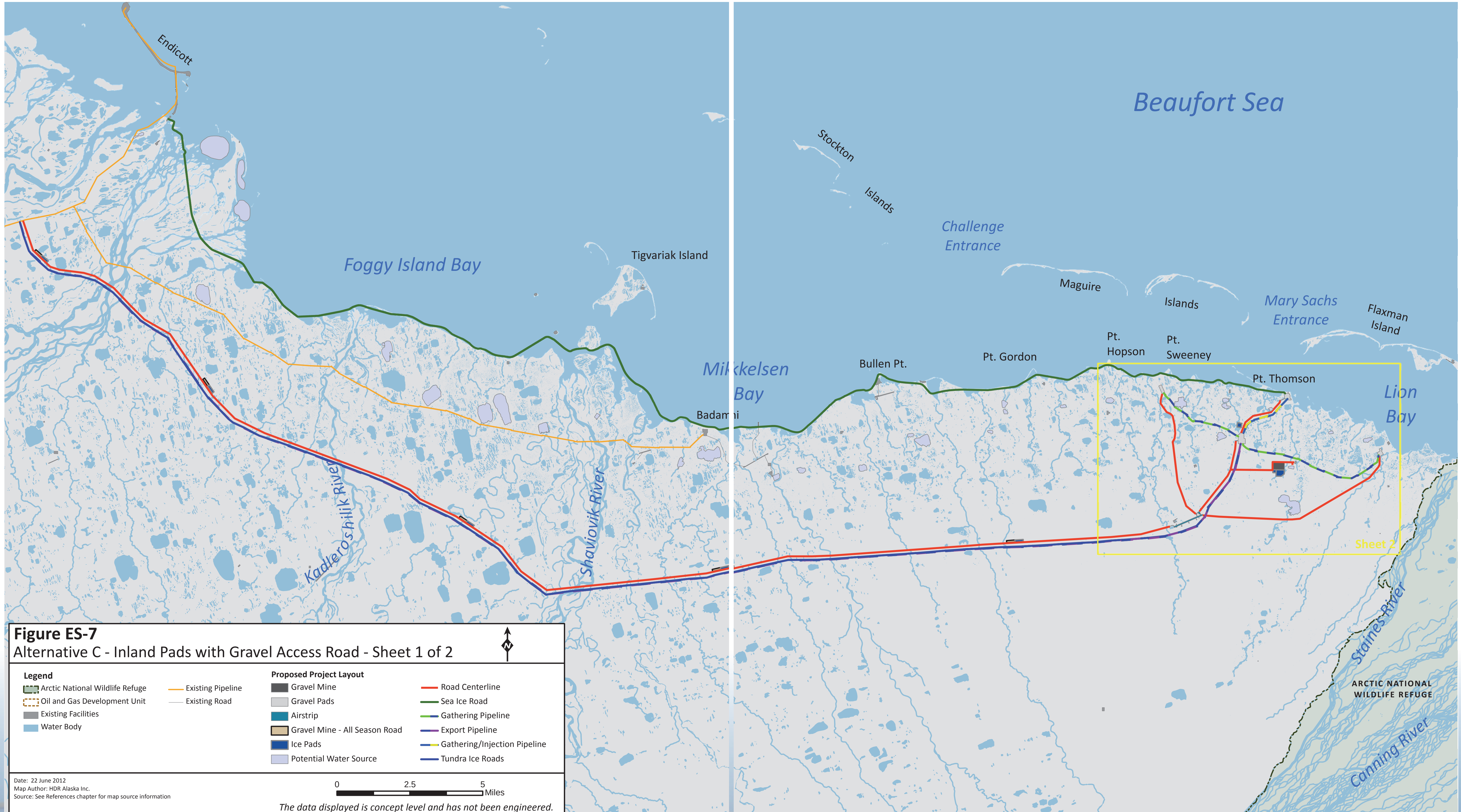


Figure ES-7
Alternative C - Inland Pads with Gravel Access Road - Sheet 1 of 2

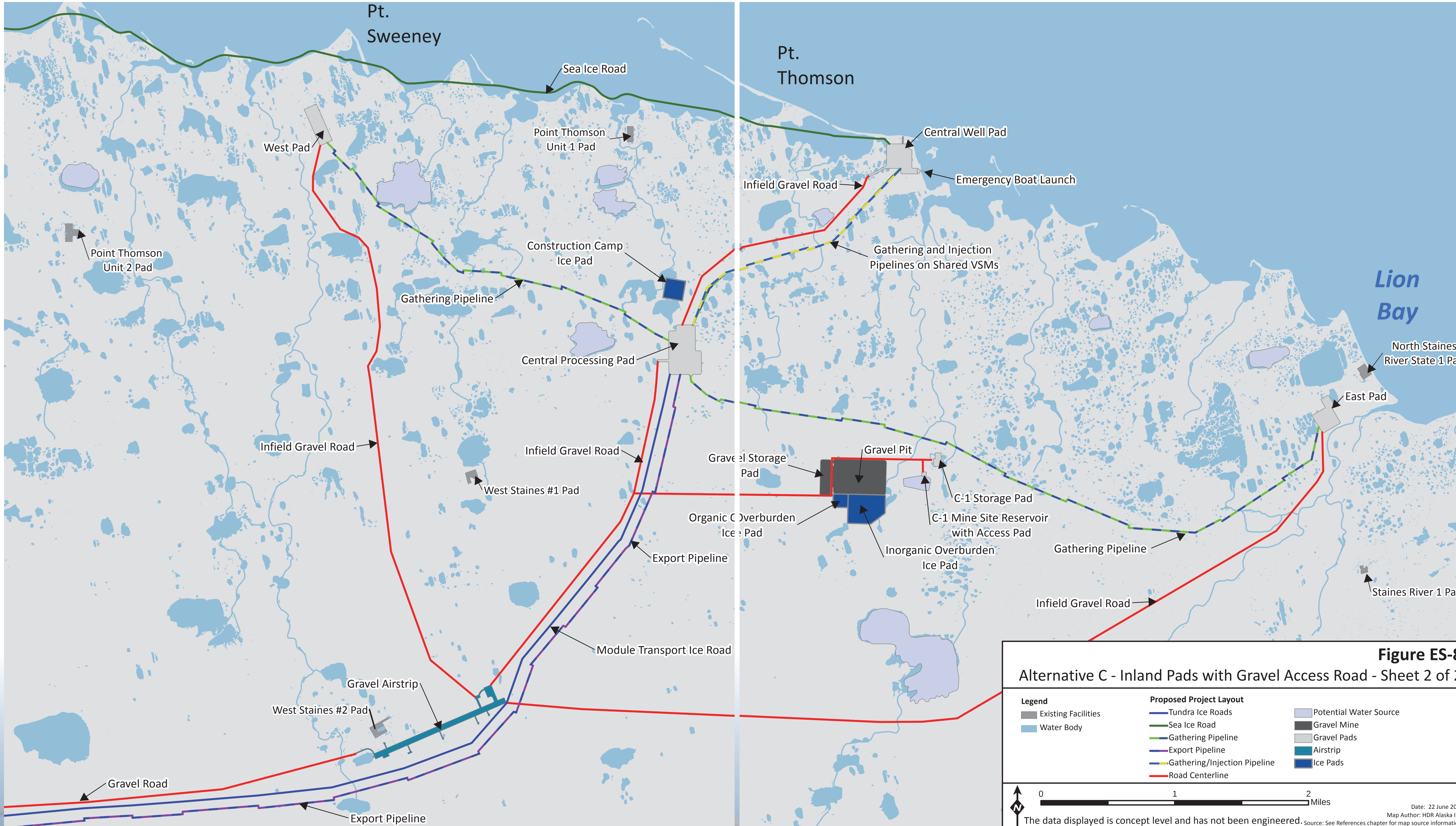


Figure ES-8

Alternative C - Inland Pads with Gravel Access Road - Sheet 2 of 2

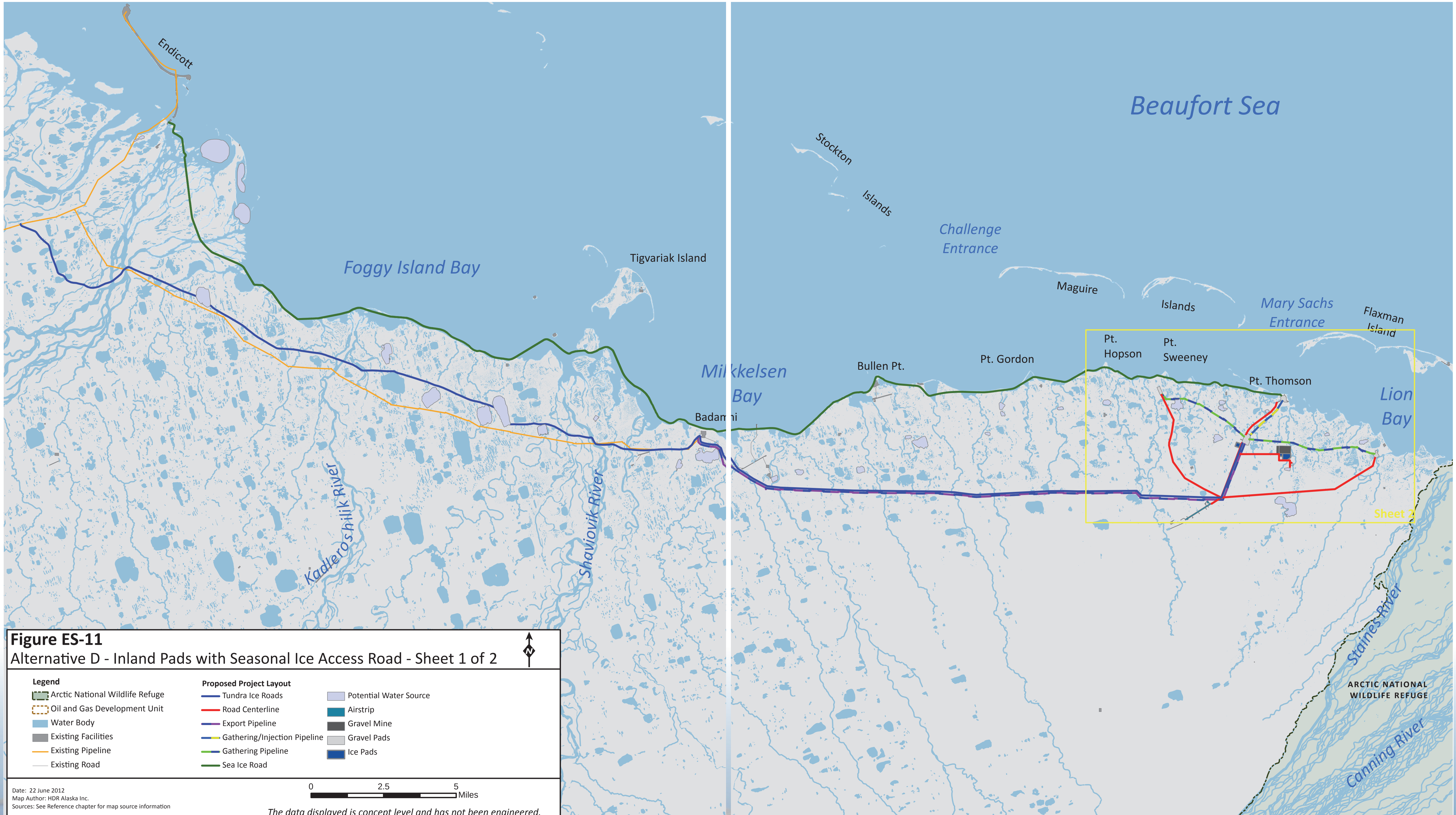


Figure ES-11
Alternative D - Inland Pads with Seasonal Ice Access Road - Sheet 1 of 2

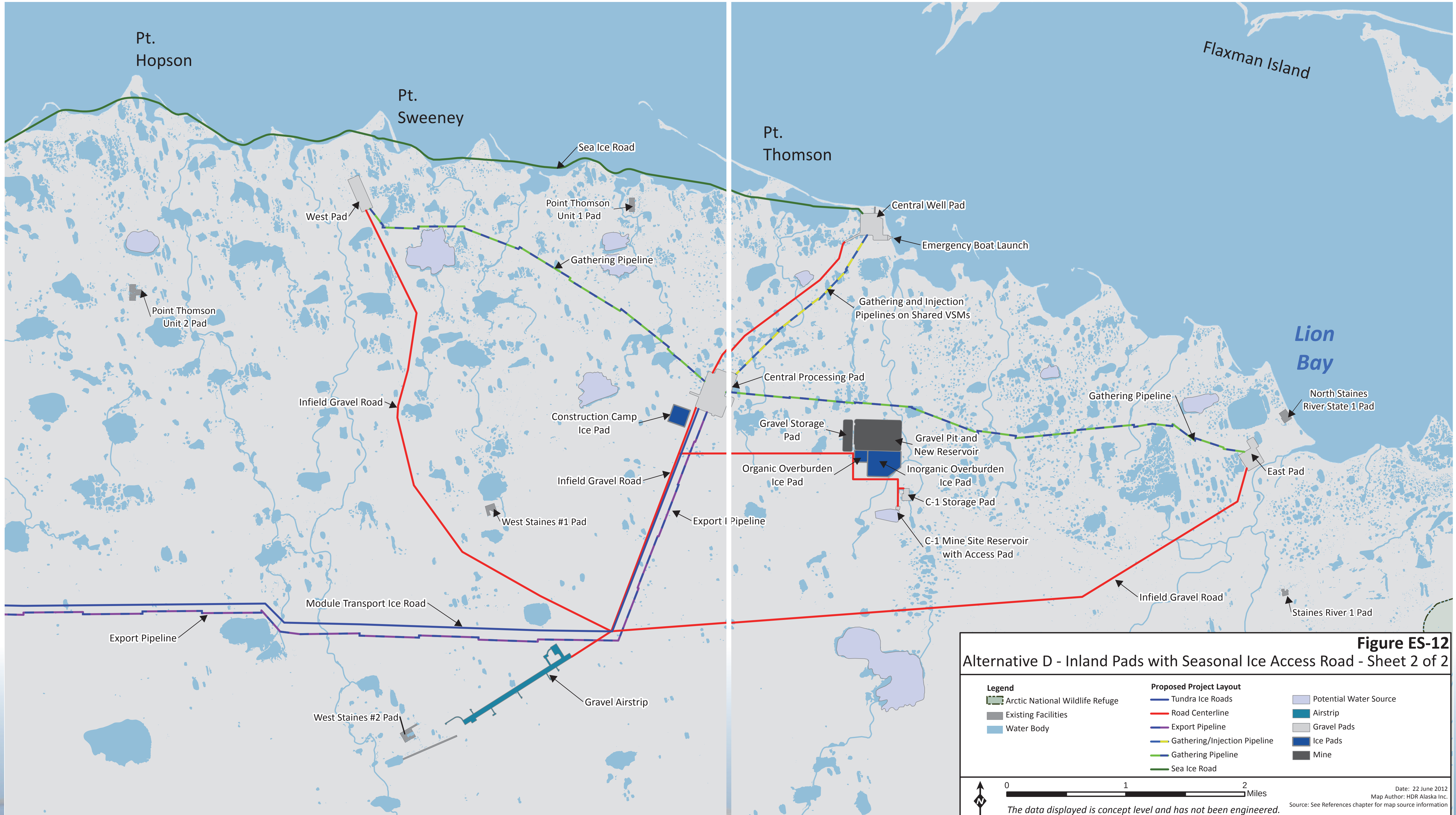


Figure ES-12
Alternative D - Inland Pads with Seasonal Ice Access Road - Sheet 2 of 2

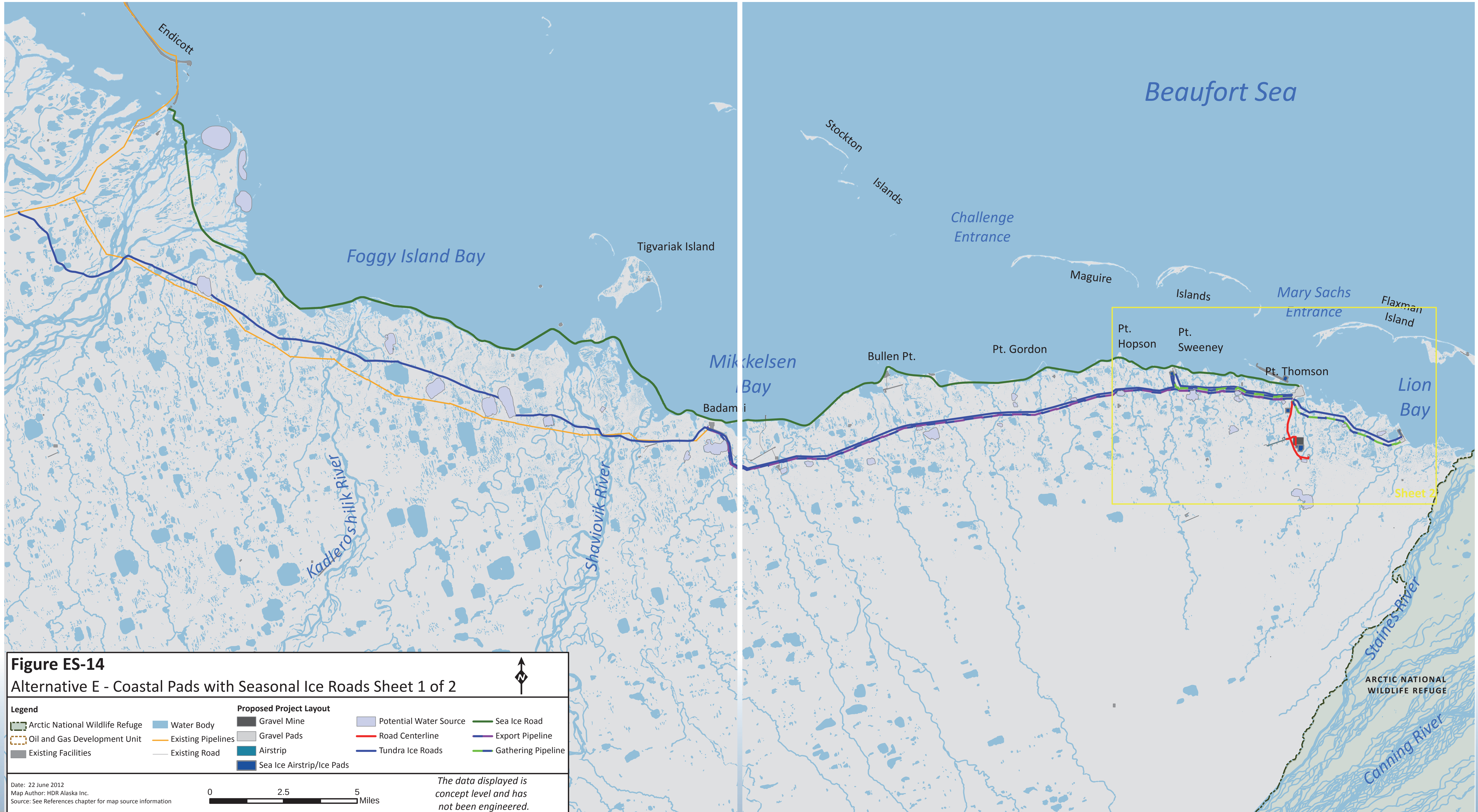


Figure ES-14
Alternative E - Coastal Pads with Seasonal Ice Roads Sheet 1 of 2

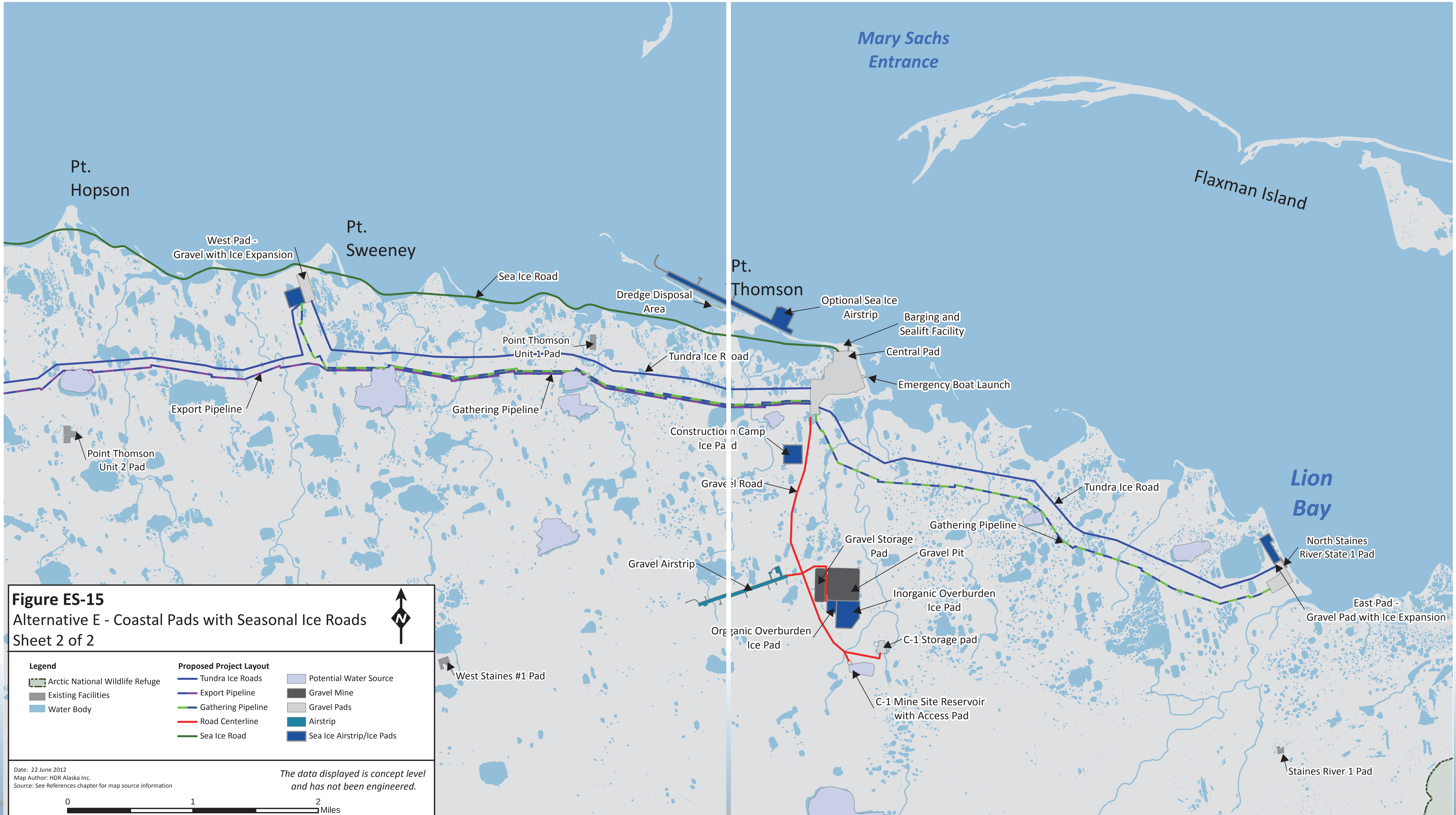


Figure ES-15
Alternative E - Coastal Pads with Seasonal Ice Roads
Sheet 2 of 2

Table ES-1: Summary of Alternatives (1 of 2)

Theme	**Alternative A** No Action	**Alternative B** Applicant's Proposed Action	**Alternative C** Inland Pads with Gravel Access Road	**Alternative D** Inland Pads with Seasonal Ice Access Road	**Alternative E** Coastal Pads with Seasonal Ice Roads
	No Corps permit issued	**Applicant's Proposed Action**	**Minimize coastal impacts, with gravel access road**	**Minimize coastal impacts, with no gravel access road**	**Reduce development footprint**
Main Pads[a]	▪ Existing 12[b]-acre PTU-3 Pad	▪ 55-acre Central Well/Processing Pad near coast ▪ 15-acre East Pad near coast ▪ 17-acre West Pad near coast ▪ 1-acre Badami auxiliary pads	▪ 52-acre Central Processing Pad ~2 miles inland ▪ 27-acre Central Well Pad near coast ▪ 19-acre East Pad ~ ½ mile inland ▪ 19-acre West Pad ~ ½ mile inland ▪ 1-acre Endicott auxiliary pad ▪ Deadhorse module staging pad (pending detailed engineering)	▪ 52-acre Central Processing Pad ~ 2 miles inland ▪ 27-acre Central Well Pad near coast ▪ 19-acre East Pad ~ ½ mile inland ▪ 19-acre West Pad ~ ½ mile inland ▪ 1-acre Badami auxiliary pads ▪ Deadhorse module staging pad (pending detailed engineering)	▪ Enlarged 77-acre Central Well/Processing Pad near coast ▪ 17-acre gravel East Pad, with 11-acre ice expansion ▪ 13-acre gravel West Pad, with 11-acre ice expansion ▪ 1-acre Badami auxiliary pads
Transportation to/from field – **Construction** – **Air**	▪ Helicopter	▪ Helicopter, fixed-wing aircraft ▪ 5,600-foot x 200-foot gravel airstrip (Year 2 onward)	▪ Helicopter, fixed-wing aircraft ▪ 5,600-foot x 200-foot gravel airstrip (Year 5 onward)	▪ Helicopter, fixed-wing aircraft ▪ 5,600-foot x 200-foot tundra ice airstrip (2 years) ▪ 5,600-foot x 200-foot gravel airstrip (Year 5 onward)	▪ Helicopter, fixed-wing aircraft ▪ 3,700-foot x 200-foot sea ice airstrip (2 years) ▪ 3,700-foot x 200-foot gravel airstrip (Year 4 onward)
Transportation to/from field – **Construction** – **Land**	—	▪ 52-mile seasonal tundra ice road between the Endicott Spur Road and Point Thomson for transporting materials and supplies (3 years) ▪ 30-mile seasonal tundra ice road between Badami and Point Thomson for VSM and export pipeline construction (2 years) ▪ 47-mile seasonal sea ice road for supplemental materials and equipment transport (up to 3 years, optional each year) ▪ Tundra-safe, low ground-pressure vehicles as permitted	▪ 49-mile seasonal tundra ice road between Endicott Spur Road and Point Thomson for transporting materials and supplies (3 years) ▪ 44-mile seasonal tundra ice road between Endicott and Point Thomson for VSM and export pipeline construction (2 years) ▪ 47-mile seasonal sea ice road for supplemental materials and equipment transport (up to 3 years, optional each year) ▪ Tundra-safe, low-pressure vehicles as permitted	▪ 48-mile seasonal tundra ice road between the Endicott Spur Road and Point Thomson for transporting materials, modules, and supplies (3 years) ▪ 22-mile seasonal tundra ice road between Badami and Point Thomson for VSM and export pipeline construction (2 years) ▪ 47-mile seasonal sea ice road for supplemental materials and equipment transport (up to 3 years, optional each year) ▪ Tundra-safe, low ground-pressure vehicles as permitted	▪ 44-mile seasonal tundra ice road between the Endicott Spur Road and Point Thomson for transporting materials, small modules, and supplies ▪ 22-mile seasonal tundra ice road between Badami and Point Thomson for VSM and export pipeline construction (2 years) ▪ 47-mile seasonal sea ice road for supplemental materials and equipment transport (up to 3 years, optional each year) ▪ Tundra-safe, low ground-pressure vehicles as permitted
Transportation to/from field – **Construction** – **Water**	—	▪ Coastal barging access via service pier ▪ Sealift facility, including bulkhead and mooring dolphins	▪ No direct coastal access to Point Thomson	▪ Same as Alternative C	▪ Same as Alternative B
Transportation to/from field – **Drilling**	—	▪ Helicopter, fixed-wing, ice roads, coastal barging	▪ Helicopter, fixed-wing, ice roads ▪ 45-mile gravel access road from Endicott Spur Road (Year 6 onward)	▪ Helicopter, fixed-wing, ice roads 48-mile seasonal ice access road from Endicott Spur Road (Year 3 onward)	▪ Helicopter, fixed-wing, ice roads, coastal barging
Transportation to/from field – **Operations**	—	▪ Same as drilling ▪ 52-mile tundra ice access road as needed (conservatively every 5 years)	▪ Helicopter and gravel airstrip ▪ 45-mile gravel access road	▪ Helicopter and gravel airstrip ▪ 48-mile seasonal tundra ice road (ongoing)	▪ Same as drilling ▪ 44-mile tundra ice access road as needed (conservatively every 5 years)

[a] Pads consist of gravel, except where denoted differently (ice pad extensions).
[b] All measurements have been rounded up to the nearest whole unit.

Table ES-1: Summary of Alternatives (2 of 2)

	Alternative A No Action	**Alternative B** Applicant's Proposed Action	**Alternative C** Inland Pads with Gravel Access Road	**Alternative D** Inland Pads with Seasonal Ice Access Road	**Alternative E** Coastal Pads with Seasonal Ice Roads
Module Transport	—	▪ To Point Thomson by sealift barge	▪ To Deadhorse by sealift barge ▪ 49-mile heavy-duty tundra ice road (3 years; this ice road would also be used for materials and supplies, above) ▪ 49-mile heavy-duty tundra ice road to demobilize drill rig (1 year)	▪ To Deadhorse by sealift barge ▪ 48-mile heavy-duty tundra ice road (3 years; this ice road would also be used for materials and supplies, above) ▪ 48-mile heavy-duty tundra ice road to demobilize drill rig (1 year)	▪ Same as Alternative B
Infield Transportation	▪ Existing modes, includes ice roads	▪ 23 miles of ice roads during construction ▪ 12 miles of gravel roads	▪ 15 miles of ice roads during construction ▪ 20 miles of gravel roads	▪ 14 miles of ice roads during construction ▪ 18 miles of gravel roads	▪ Helicopter ▪ 9 miles of seasonal ice roads connecting to East and West Pads ▪ 4 miles of gravel road between airstrip and Central Pad ▪ Tundra-safe, low ground-pressure vehicles as permitted
Infield Pipelines[c]	—	▪ 10 miles of 8-inch heat traced gathering pipelines	▪ 9 miles of 8-inch heat-traced gathering pipelines ▪ 3 miles of 10-inch production and 3 miles of 12-inch high pressure gas injection pipeline between the two Central Pads	▪ 8 miles of 8-inch heat-traced gathering pipelines ▪ 2 miles of 10-inch production and 2 miles of 12-inch high pressure gas injection pipeline between the two Central Pads	▪ 10 miles of 8-inch heat-traced gathering pipelines
Export Pipeline[c]	—	▪ 23-mile 12-inch export pipeline; tie-in at Badami	▪ 51-mile, 12-inch export pipeline; tie-in at Endicott	▪ 23-mile, 12-inch export pipeline; tie-in at Badami	▪ 22-mile, 12-inch export pipeline; tie-in at Badami
Other Infrastructure	▪ Existing 4-acre C-1 Pad	▪ 5,600-foot x 200-foot, 43-acre gravel airstrip and facilities ▪ 58-acre infield gravel mine ▪ Additional gravel pads for stockpiling, storage, and water access; ice pads for construction camps	▪ 5,600-foot x 200-foot, 43-acre gravel airstrip and facilities, located at former West Staines No. 2 airstrip site ▪ 66-acre field gravel mine; up to five additional 13 acre gravel mines along the gravel access road ▪ Additional pads for stockpiling, storage, and water access ▪ Ice pads for temporary storage and camps (construction)	▪ 5,600-foot x 200-foot, 43-acre gravel airstrip and facilities, located ~1 mile ▪ 66-acre infield gravel mine ▪ Additional pads for stockpiling, storage, and water access ▪ Ice pads for temporary storage and camps (construction)	▪ Additional pads for stockpiling, storage, and water access ▪ Ice pads for temporary storage and camps (construction) 44-acre infield gravel mine ▪ Additional pads for stockpiling, storage, and water access ▪ Ice pads for temporary storage and camps (construction)

[c] **Pipelines (export pipeline, infield gathering pipelines, and high-pressure gas reinjection pipelines) are elevated on vertical support members (VSMs) with a 7-foot clearance.**

ES 4. | AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The Corps analyzed the existing social and environmental conditions of the project area to serve as a baseline for comparing the potential impacts of alternatives. This analysis included evaluation of issues raised by agencies and the public during scoping and issues discussed by the Corps and cooperating agencies during development of the Draft EIS. This Executive Summary focuses its discussion on resources with greater potential impacts, resources identified during scoping as being resources of concern, and/or those resources that provide substantive differentiation among alternatives. All resources are discussed in detail in Chapters 3 and 5 of this Final EIS and impacts to all resources are summarized in **Table ES-2**.

ES 4.1 | Soils and Permafrost

On the ACP, the thermal regime of the soil and permafrost drives soil formation and properties. Stability of the thermal regime is affected by climate and disturbance activities, with human disturbance having immediate and potentially long-term effects on permafrost stability. Permafrost strongly influences surface morphology and hydrology. Changes to soils and permafrost could result in changes in or disturbance to vegetation and hydrology, which could lead to changes in wildlife habitat. The extraction and placement of gravel and long-term movement of dust and gravel have the greatest potential to impact soils and permafrost.

Key Impacts/Issues

- The main difference among the action alternatives is that gravel fill in Alternative C would cover three times more area than under Alternative B and require five additional gravel mines. Alternative E would have about 20 percent less gravel infrastructure than other action alternatives.
- Over time, fugitive dust and gravel from roads and pads onto the surrounding tundra could impact adjacent soils and permafrost. Such impacts would be more extensive under Alternative C due to the gravel access road.
- Little change would occur in the thermal regime or compaction of soil as the result of seasonal ice pad or ice road construction. Multiyear, multiseason ice pads proposed for Alternative E, only, could cause compaction of the underlying soil and inhibition of vegetation regeneration.

ES 4.2 | Hydrology

The climate and presence of impervious permafrost shape the hydrology of the project area. Hydrologic processes are active during the short summer season. Breakup (spring melting of snow and ice creating sheetflow of water) occurs on the tundra in late May to early June. Freeze up generally occurs in late September. During summer, tundra is mostly saturated and supports numerous streams, lakes, and ponds. Streams range in size from large braided rivers originating in the mountains to smaller streams originating on the tundra, and flow towards the Beaufort Sea. Thaw lakes (lakes recharged annually by surface water) occur in abundance across the ACP, but are more prominent and well defined west of the project area. Surface water bodies provide habitat for aquatic species important to the North Slope ecosystem, and even small modifications to the hydrologic regime can also affect vegetation and aquatic resources.

Potential impacts to hydrology include changes to streamflow and drainage patterns as a result of project components. For instance, while streams would be crossed using bridges or culverts sized to allow passage of a 50-year flood event, there could be some constriction of stream channel conveyance, which would affect stream stage and modify erosion and sedimentation conditions. Ice infrastructure could also alter natural drainage patterns, stream stage, and streamflow during spring breakup. Water withdrawal from lakes and reservoirs for ice infrastructure and other project needs could lower water levels if annual recharge doesn't keep pace. However, water use permits would require recharge monitoring, and continued water withdrawal would not be allowed if adequate recharge does not occur in the permitted water source.

Key Impacts/Issues

- The action alternatives differ in their potential effect on hydrology as a result of differences in construction and use of gravel roads, the gravel airstrip, and the gravel mine reservoir. The biggest differentiator relative to hydrologic impacts is the absence of the project (Alternative A) versus the presence of the project (action alternatives).
- Under Alternative C, the impacts from the gravel access road and associated gravel mines would extend across a larger area. Three major rivers would be crossed by the gravel access road.
- Gravel airstrips under Alternatives B and E would have greater impacts on streamflow than the other airstrip alternatives, both diverting about half the flow from Stream 22.
- Ice infrastructure impacts would be the same for the action alternatives, but would occur annually over the project lifetime under Alternative E.
- Under Alternative D, only, the infield gravel mine would be used as a primary water source during operations and Stream 24 would be diverted during breakup for 3 years to fill the reservoir. Diversion of Stream 24 to fill the gravel mine could alter streamflow and cause downstream erosion and sedimentation.

ES 4.3 | Vegetation and Wetlands

Vegetation in the study area is dominated by sedge and dwarf shrub species that are tolerant of the soil's cold and high-moisture conditions. Wetlands occupy the most land area by far (71 percent), followed by water bodies (29 percent), and uplands (less than 1 percent). The dominant wetland cover classes in the Point Thomson study area include wet tundra (28 percent), moist tundra (22 percent), and moist/wet tundra complexes (17 percent).

Vegetation and wetlands would be impacted by fill placement, development of gravel mines, dust production, and by changes in drainage, thermokarst, and snow accumulation. Thermokarst is irregular ground surface caused by melting of massive ground ice. Connection of the Point Thomson Project to Alaska's road system increases the risk of nonnative plant species establishment and this risk would continue to be high for the life of the connection.

Key Impacts/Issues

- All action alternatives would impact vegetation and wetlands through the placement of gravel fill for roads and pads, fugitive dust produced from use of gravel infrastructure, and the development of gravel mines.

- Construction of the gravel access road in Alternative C would impact approximately 2.5 times the amount of acreage and require additional gravel mines.
- The permanent gravel road associated with Alternative C would increase the risk of nonnative species establishment.
- Vegetation and wetland impacts for Alternatives B, D, and E are similar in magnitude and extent, and all are less than those for Alternative C.

ES 4.4 | Terrestrial Mammals

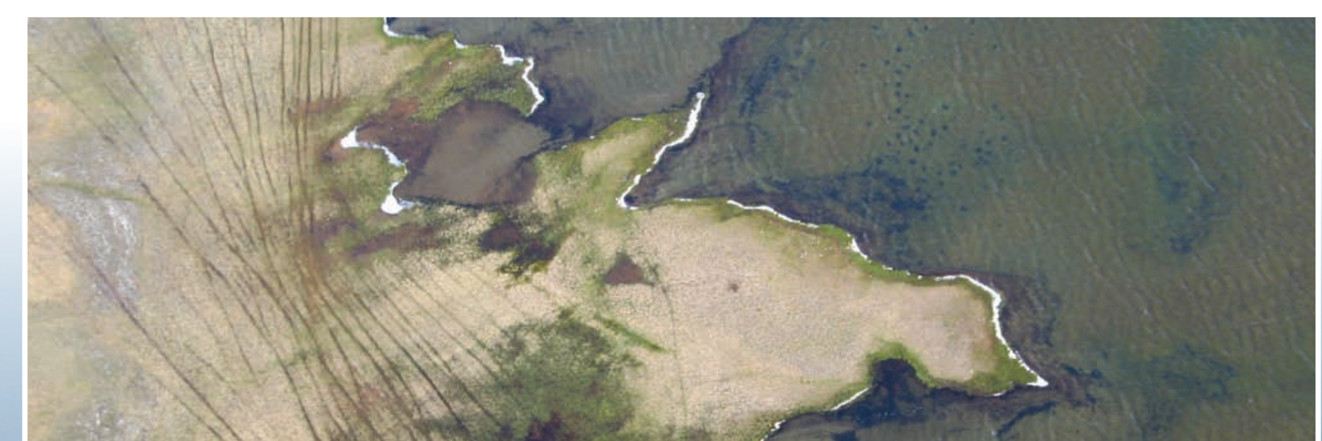
The terrestrial mammals of concern for the Point Thomson Project are caribou, muskoxen, brown bears, foxes, and small mammals. Caribou use the study area for calving, summer foraging, and parasitic insect relief. Caribou are an important subsistence resource and are hunted recreationally. Muskoxen use the study area year-round, using riverine and riparian habitats in the summer and windswept hilltops, slopes, and plateaus in winter. Brown bears occur at a low to moderate density on the North Slope. Within the study area they have been observed foraging and moving through riparian habitats. Arctic foxes spend summers on land and winters primarily along the coast and on sea ice. They are attracted to human development and their numbers on the North Slope have been stable in recent years. Red foxes tend to be most abundant in the foothills and riparian areas on the North Slope. Small mammals, such as arctic ground squirrels, collared and brown lemmings, root voles, and barren ground shrews occur in the study area. Small mammals are important because they form the prey base for many mammals and birds, and because they are an integral part of the arctic ecosystem.

Key Impacts/Issues

- Impacts from gravel infrastructure would include loss of habitat, alteration of the habitat from dust accumulation and hydrologic changes, and disturbance from traffic, noise, and human movements.
- The gravel access road under Alternative C and the inland location of gravel infrastructure under Alternatives C and D have the greatest potential to impact terrestrial mammals from gravel placement, including the following:
    - The proposed location of the all-season gravel access road would be near documented caribou calving areas, muskoxen habitat, and brown bear den sites.
    - Siting infield roads, pads, and the airstrip to the south places the infrastructure closer to caribou calving areas and brown bear den sites.
    - Separating the processing and camp facilities from the Central Drilling Pad may increase traffic between the two pads, which would increase disturbance to caribou and other animal movements in the vicinity of the infield connecting road.
- Aboveground pipelines that are less than 500 feet from gravel roads could impact caribou movements during summer insect relief periods for all action alternatives.
- Caribou and muskoxen could be reluctant to cross over the low water pipeline proposed under Alternative C. Some animals may cross and others may not, which could lead to the separation of cows from calves and could increase stress amongst the affected group of caribou. If the low pipeline is adjacent to a road, animals agitated by the pipeline could find themselves trapped between the pipeline and road and susceptible to traffic disturbance.
- The noise associated with aircraft takeoffs and landings could result in the inability of affected animals to hear biologically important sounds such as mating calls, predator alarm calls, and approaching predators. This could lead to increased stress levels, decreased reproductive capacity, and decreased survivorship in noisy areas such as airstrips and helipads.
- Alternative E would have the greatest potential noise disturbance to terrestrial mammals because the primary summer means of transportation between the Central Pad and East and West Pads would be by helicopter.

Caribou on tundra

Aerial view of caribou trails



ES 4.5 | Marine Mammals

The bowhead and beluga whale, ringed and bearded seal, and polar bear are the marine mammal species of greatest concern for the Point Thomson study area because of the location of project activities relative to known species distributional ranges and anticipated timing of project activities. Marine mammals that use the study area are sensitive to:

- Habitat loss or alteration due to physical habitat changes, species' displacement from or to altered habitat, disturbances from noise or activity, or fragmentation.
- Land/ice vehicle or sea vessel collision injury or mortality.
- Altered survival or productivity related to changes in predator and prey abundance, distribution, feeding strategies, or predation risk, or from increased exposure to garbage, and spills and leaks of toxic materials.

Key Impacts/Issues

- All action alternatives would impact polar bear critical habitat because proposed infrastructure would be located within polar bear denning critical habitat.
- Alternatives C, D, and E have the greatest potential to affect polar bears and polar bear critical habitat. The gravel access road under Alternative C would increase the gravel footprint within the critical habitat. The need for annual ice roads (Alternatives D and E) would increase the potential for encountering polar bear dens during ice road construction.
- Noise from barge traffic (Alternatives B and E) has the potential to disturb bowhead whales.

Southern project area in summer

ES 4.6 | Fish and Essential Habitat

Fifty-eight fish species have been found in the Alaskan Beaufort Sea and nearshore environment near the study area. Thirteen fish species have been documented in freshwater habitats between the Canning/Staines River to the Sagavanirktok River. Of these species, the following are discussed in this Final EIS: arctic cisco, least cisco, Dolly Varden char, arctic grayling, broad whitefish, humpback whitefish, arctic cod, Pacific salmon, and ninespine stickleback. Of these, the most commonly observed in freshwater environments of the study area are ninespine stickleback and Dolly Varden. Freshwater habitat of the study area includes shallow, seasonally flooded ponds and wetlands, small tundra streams, and larger, braided rivers and streams. Most freshwater habitat in the study area is available only during the open water season because most of these habitats freeze to the bottom during winter. Deep lakes and pools in streams that do not freeze to the bottom and provide overwintering fish habitat are rare and valuable habitats in the study area. Marine habitat in the study area includes coastal waters between the Canning/Staines and Sagavanirktok Rivers. The marine study area, particularly the nearshore environment, is used for migration, foraging, and spawning. Freshwater and marine Essential Fish Habitat (EFH), defined as waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (50 CFR Part 600), has been designated for portions of the marine and freshwater study area. EFH is designated for arctic cod and pink, chum, sockeye, Chinook, and coho salmon (sockeye, Chinook, and coho are rare in the study area).

Northern project area in summer

Bridges and culverts at fish-bearing streams could result in long-term impacts to fish because changes in hydrology at the crossing structure (culvert pipe or bridge abutment) can lead to reduced water quality, changes in the streambed, and entrainment of fish in small whirlpools on the downstream sides of the crossing structures. Over time, culverts tend to have higher impacts than bridges on fish. These impacts could reduce fish access to spawning, summer feeding, and overwintering habitats upstream of bridges and culverts constructed over streams, particularly in the western portion of the study area. Bridges and culverts in the western portion of the study area also could adversely affect EFH.

Over time, water withdrawal from water bodies containing overwintering fish can reduce overwintering habitat quality through lower water levels, reduced water quality, and increased proportion of frozen water. In addition, individual fish may be impinged or entrained in water withdrawal equipment, resulting in their death. Depending on the water source, water withdrawal could affect EFH.

Noise from pile driving and blasting is documented to impact fish by causing hearing loss, masking biologically important sounds, increasing stress levels, impacting immune systems, and causing death.

Key Impacts/Issues

- Bridges and culverts at stream crossings for the gravel access road under Alternative C (21 culverts and 27 bridges) would impact fish habitat and fish movements, and EFH. Alternatives B (5 culverts and 4 bridges) and D (5 culverts and 2 bridges) would have similar potential to impact fish within the infield gravel roads. Alternative E would have lower impacts, with only 1 bridge.
- Annual ice road access between Point Thomson and Deadhorse (Alternative D) would require annual water withdrawals from multiple water sources for the life of the project.
- Annual infield ice roads between the Central Pad and East and West Pads (Alternative E) would require annual water withdrawals from multiple water sources for the life of the project.
- Alternative C has the greatest potential to impact fish through pile driving at bridge crossings and blasting mine sites in the western portion of the gravel access road near fish overwintering areas.
- Diversion of water from Stream 24 to the gravel mine site under Alternative D could impact the ability of Dolly Varden char to move up and downstream during spring runoff in the initial years when the reservoir is filling. This impact would not occur for other action alternatives because no stream diversion would occur.
- Because the gravel access road under Alternative C would cross large braided streams, some VSMs for the export pipeline could be constructed in stream channels and floodplains. The VSMs could have similar impacts as bridge abutments and culverts and could affect EFH.
- Alternatives D and E have the most potential to have long-term impacts on overwintering of fish species because of water withdrawals.

ES 4.7 | Arctic National Wildlife Refuge

The Arctic Refuge, part of the National Wildlife Refuge System, is evaluated due to its proximity to the project and to the Thomson Sand Reservoir. The western edge of the Canning/Staines River delta forms the western refuge boundary, which is approximately 5.5 miles from PTU-3 and 2 miles from the North Staines River State 1 Pad. The Alaska National Interest Lands Conservation Act (ANILCA) identified a portion of the Arctic Refuge on the coastal plain as a study area for potential future oil and gas development. This area is commonly referred to as the "1002 Area" (see **Figure ES-1**). Congress has repeatedly considered opening the 1002 Area to oil and gas development, and has seen at least one bill proposing to designate the area as official wilderness. However, Congress has not made a final decision on the status of the 1002 Area, therefore the national debate continues regarding the status of the 1002 Area.

Key Impacts/Issues

- All of the action alternatives would generally have the same potential effect on the Arctic Refuge. The primary difference in

Coastline near North Staines River State No. 1 Pad

Brooks Range from Arctic Refuge

the Arctic Refuge evaluation is between the absence of the project (No Action Alternative) and the presence of the project (action alternatives). However, greater use of helicopter and fixed-wing aircraft under Alternative E would further add to the conspicuous nature of the project site to visitors at the western edge of the Arctic Refuge.

- Proximity of the Point Thomson development to the Arctic Refuge may influence how the Arctic Refuge is managed due to potential impacts to polar bear movement, subsistence activities and traditional land use, recreation, wilderness perception, and research activities.
- The proximity of industrial facilities could be perceived as an effect to wilderness values in the Arctic Refuge and lead to an increase in the perception nationwide that wilderness qualities in the area would be diminished.

ES 4.8 | Visual Aesthetics

The project is located in a minimally developed and uninhabited area within a few miles of the Arctic Refuge. Proposed industrial facilities, particularly processing facilities, communications towers, flare stacks, support facilities, air traffic, and facility lights are expected to create strong "visual contrast" when compared to baseline conditions. Under all action alternatives, the pads and CPF would be dominant with strong contrast from the coastal corridor. Although removal of the drilling rig from the pads following completion of all wells would reduce the visual contrast, visual contrast would remain due to visibility of the communications tower and flare stack.

Key Impacts/Issues

- Differences between the action alternatives are small. The greatest difference is between presence of the project (any action alternative) and absence of the project (Alternative A).
- Alternatives C and D set several project components, including the CPF, back from the coastline, reducing the view of the facility from the coastal corridor; the contrast for color and texture would be expected to be stronger under Alternatives C and D than under B and E.
- Environmental consequences of changes to the viewshed include potential changes in the perception of wilderness values and experience of visitors within the northwestern corner of the Arctic Refuge, and the perception and experience of subsistence resource users traveling through or staying in the coastal corridor in summer and winter.

ES 4.9 | Noise

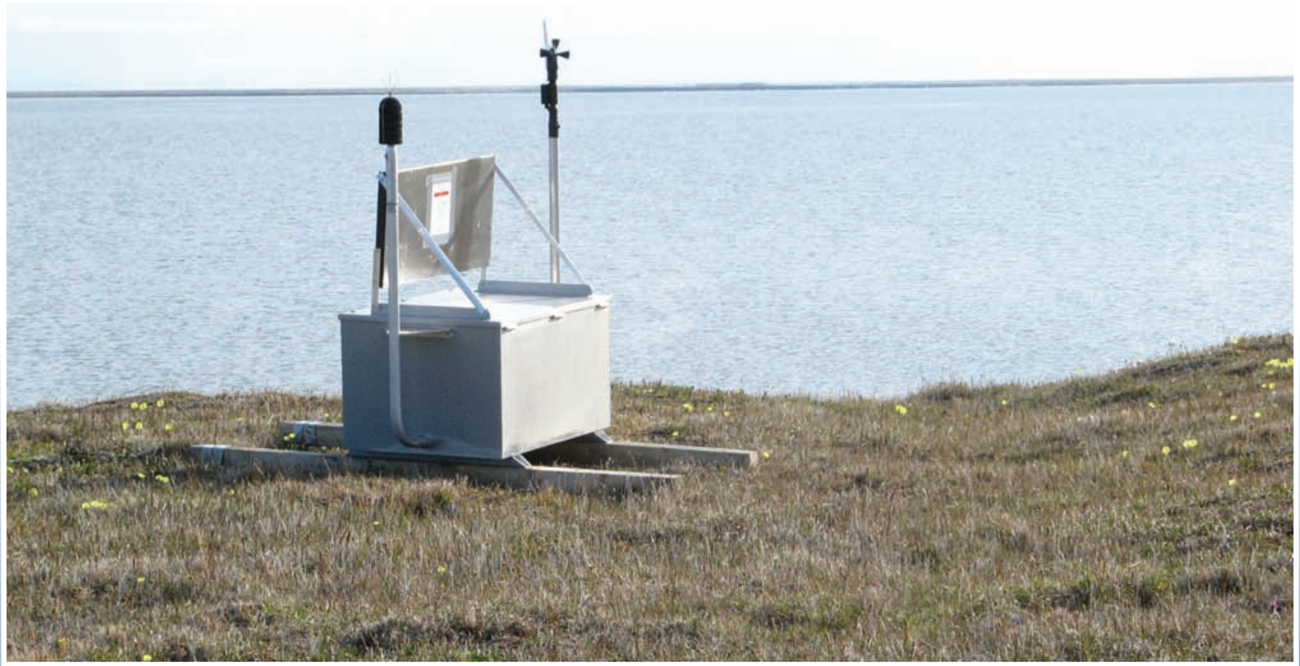
Noise from human activities, other than currently permitted industrial activities, is largely absent from the ambient soundscape in the study area. Existing sound levels during winter and summer conditions are dominated by natural sounds, atmospheric/meteorological phenomena, water features, and animals. The broad coastal plain surrounding the study area is principally undeveloped, but is known to have noise-sensitive human and wildlife uses year-round.

Key Impacts/Issues

- Under each alternative, noise is predicted to increase the greatest amount above existing levels at locations in immediate proximity to the project site during construction, drilling, and operations.

Visual simulation of Central Well Pad

Noise monitor



Berry picking. © Thomas C Brower III

- Alternatives B and E are predicted to have a larger increase in noise over existing levels than Alternatives C and D at areas within 8 miles of the project site such as Brownlow Spit, Flaxman Island, and the sea coast during winter construction and drilling and at Mary Sachs Island during summer construction and drilling.
- On a long-term basis, operational noise from Alternative E is distinctly different from the other build alternatives due to the extensive use of helicopters.
- The most dominant noise sources during operations for all alternatives are the CPF and aircraft overflight (fixed-wing and helicopter).
- Modeling of project-related noise levels in the Arctic Refuge generally showed little difference between the alternatives, but would be higher during construction in winter compared to summer. For all alternatives, the increase over existing noise levels in the Arctic Refuge would be less than 10 dBA at a distance of 10 miles away from the western border of the Refuge.
- Based on monitoring data, noise from operations during winter and summer could be audible from 2 to 3 miles from the Central Pad, particularly when winds are below 11 mph. Visitors to the western-most portions of Arctic Refuge could experience project-related noise when winds are very still, but in summer, environmental conditions may help reduce project-related noise levels at locations inside the Refuge.

ES 4.10 | Subsistence and Traditional Land Use Patterns

Subsistence is a central aspect of North Slope culture and life, which is rooted in the traditional relationship of the Iñupiaq people with their environment. The majority of Kaktovik and Nuiqsut subsistence uses in the Point Thomson area occur along the coast or offshore during the open water season. Residents of the North Slope of Alaska rely on subsistence harvests of plant and animal resources for nutritional sustenance and cultural and social well-being. Subsistence is not only a source of food for North Slope residents, but the activities associated with subsistence strengthen community and family social ties; reinforce community and individual cultural identity; and provide a link between contemporary Iñupiaq and their ancestors. The two communities closest to the Point Thomson Project, Kaktovik and Nuiqsut, use areas in or adjacent to the Point Thomson Project area for subsistence purposes; residents from these communities also harvest subsistence resources, such as caribou and waterfowl, which may migrate through the project area. Of the various subsistence resources harvested by Kaktovik and Nuiqsut residents, the primary activities of concern for impact from the development of the Point Thomson Project are caribou hunting, bowhead whale hunting, seal hunting, waterfowl hunting, and fish harvesting.

The primary impacts on subsistence uses resulting from the action alternatives include impacts on subsistence use areas, resource availability, and user access for caribou. These impacts, in turn, could also result in increased competition and increased costs and time for caribou hunters. Ultimately, effects on subsistence related to the proposed project could result in reduced harvests of caribou and reduced opportunities to participate in subsistence harvesting and associated activities. When subsistence users' opportunities to engage in subsistence activities are limited, then their opportunities to transmit knowledge about those activities, which are learned through participation, are also limited.

Subsistence caribou harvest.
© Thomas C Brower III

Whaling
© Thomas C Brower III

Key Impacts/Issues

- Avoidance of the project area or avoidance of certain resources (e.g., arctic cisco, caribou) may occur if residents from Nuiqsut and Kaktovik perceive these resources to be absent near the Point Thomson Project area, or if they perceive that these resources are contaminated.
- Alternatives B and E, which include barge traffic and nearshore infrastructure, would likely have the greatest impacts on residents' subsistence activities resulting from changes in user access due to pipelines and infrastructure being located within 1 to 2 miles of residents' coastal hunting areas.
- Alternative E would rely more heavily on air transport, including helicopter and airplane traffic, and therefore may increase the likelihood of hunter avoidance or reduced availability of caribou due to localized changes in caribou behavior or distribution.
- Alternatives C and D would have the least direct impact on coastal subsistence uses related to hunter avoidance or user access due to the elimination of barge activity and the placement of infrastructure farther inland from residents' coastal and offshore hunting areas. However, the gravel access road proposed under Alternative C may cause greater disruption to caribou movement than other alternatives and greater cumulative impacts by opening the area to further oil and gas development.

ES 4.11 | Spills

The likelihood and magnitude of spills associated with the proposed project were assessed based on past spill experience on the North Slope combined with the specific characteristics of the project, such as the type of the produced fluids and high reservoir pressures. The Corps concluded, based on historic spill data, that the probability of a small spill occurring over the life of the project is relatively high. The likelihood of large spills is substantially less; however, the consequence of larger spills is greater. Based on past experience on the North Slope, the likelihood of a very large spill associated with the project is very low and might approach zero as the size of the potential spill increases. The fate of spilled materials is affected by response actions (e.g., containment and cleanup), response time, and environmental factors such as:

- Physical and chemical properties of the spilled material
- Environmental degradation processes acting directly on the spilled material
- Season of the year
- Weather conditions at the time of the spill and for days to weeks thereafter
- Location relative to sensitive habitats and resources

While highly unlikely, a very large spill event would be catastrophic and could be exacerbated by environmental conditions that could enhance the spread of spilled materials or interfere with response and cleanup. A very large spill from either a blowout or uncontrolled release or from a major containment berm failure would be likely to reach both land and adjacent water bodies, especially if the spill occurs in the ice-free seasons. Because of the high reservoir pressures at Point Thomson, a blowout or uncontrolled release of produced fluids at the wellhead may result in a greater discharge rate than might be experienced in a similar situation elsewhere on the North Slope where the reservoir pressures are lower. The proximity of the drilling and production wells to streams near the pads may be the most important factor in such spill scenarios. In general, if the spilled material flows to upland tundra, the spill probably would not disperse far. However, if a very large spill reached a flowing stream, the spill could be dispersed substantial distances downstream and eventually to Lion Bay. Whether a very large spill would reach these streams would depend on several variables, including the spill type; ambient water and air temperature; temperature and volume of material released; topographic relief and slope; presence of snow or vegetation; and response time and actions. The most likely spill scenario is a very small or small spill of material such as diesel, hydraulic fluid, transmission oil, or antifreeze, on gravel or ice infrastructure. Rarely would these spilled materials reach the tundra or water bodies. If they were to occur, the spills would impact the area adjacent to the road or pad and would be limited in effect. Some of these small spills could result from slow and small (pin hole) leaks of produced fluids or export fluids from the proposed pipeline, and they could occur on the tundra or into water bodies remote from the roads and pads.

A similar scenario exists for medium-to-large spills except they are much less common and occasionally reach the tundra or water bodies adjacent to the roads, pads, and airstrips. These spills would be more likely to consist of produced fluids or condensate,

Swans in lagoon between barrier islands and the mainland

although medium to large spills of antifreeze, diesel, and drilling muds may occur.

The actions taken by the Applicant and its contractors, including oil spill response organizations, would influence the potential impacts of any spill to the natural environment and human uses of it. The Applicant has designed and committed to a comprehensive slate of processes, procedures, and systems to prevent, detect, and mitigate potential spills that could occur during drilling, as well as construction, maintenance, and operation of the proposed pipeline.

Key Impacts/Issues

- Because Alternative A involves suspending project engineering and planning activities, there would be no likelihood of a spill.
- In general, the impact of any particular spill is not likely to be different between the action alternatives.
- A large or very large spill would be very unlikely to occur. However, if such a spill were to occur, the resources that would be most affected are wetlands and vegetation, birds, and marine mammals. Impacts on subsistence would be minor to moderate, but could be magnified by the perception that subsistence resources are contaminated even if they are not.
- Alternatives C and D do not have barging facilities so would not have the potential for marine spills associated with barges.
- Compared against Alternative B, there is a greater potential for more fuel-truck related spills under Alternatives C and D, and a greater potential for larger pipeline spill volumes under Alternative C.
- The shorter airstrip under Alternative E would constrain the size of aircraft that could be accommodated. In the event of a large or very large spill, delivery of heavy equipment, supplies, and external support would be more difficult and could hinder spill response efforts.

ES 4.12 | Climate Change

Any of the action alternatives would emit greenhouse gases (GHG) during construction, drilling, and operations. However, the net annual change in these emissions due to the construction or operation of any of the action alternatives would be a tiny fraction of the total anthropogenic CO_2 emissions in the world. The direct annual CO_2 emissions increase associated with construction, drilling, and operation phases of the alternatives would contribute approximately 0.001 percent to the global CO_2 emissions. Over time periods of a year or longer, CO_2 emissions are essentially evenly distributed throughout the atmosphere across the globe. Therefore, the location of the GHG emissions would make little difference to any effects on global climate.

This Final EIS identifies the impacts climate change may have on the action alternatives. Climate change may cause greater winter precipitation, possibly resulting in changes to river streamflow and stage, changes in drainage patterns and surface water interaction with permafrost, and changes in lake distribution and quantity. Greater snowfall may increase discharge in streams in the spring and summer, affecting streamflow and stream stage, as well as likely increasing stream velocity and the erosive capacity of streams. Climate change has already lengthened and is predicted to further increase the open-water period in the Beaufort Sea coastal areas allowing for a longer exposure of the beaches to coastal processes and erosion. However, in coastal areas that are protected by barrier islands, such as the project area, these effects would not be as pronounced. Other impacts include, but are not limited to, changes in vegetation type, thawing of permafrost, drying of wetlands, and changes in groundwater recharge. The impacts of climate change on the project are expected to be similar for all action alternatives. However, impacts on Alternative D could be somewhat greater due to the reliance on seasonal, tundra ice roads for access to the project area, and Alternative E due to reliance on infield ice roads rather than all-season infield gravel roads.

ES 4.13 | Cumulative Impacts

The cumulative impact analysis evaluated project impacts combined with past, present, and reasonably foreseeable future actions. In determining cumulative impacts, the Final EIS considered the following:

- The established oilfields (Prudhoe Bay, Kuparuk, Endicott, Milne Point)
- Newer fields (Alpine, Alpine satellites, Oooguruk, Northstar, Badami)
- Exploration activity within the National Petroleum Reserve - Alaska
- Human developments and hunting associated with North Slope Borough (NSB) villages
- Subsistence and cultural uses of NSB lands and waters
- The Arctic National Wildlife Refuge
- The use of the U.S. Air Force's Alaska Radar System sites
- Ongoing scientific studies across the North Slope
- Construction of a natural gas pipeline across Alaska
- Full field development of Point Thomson
- Tourism

Key Impacts/Issues

- Potentially adverse cumulative effects were identified for coastal waters, hydrology, caribou, Arctic Refuge, environmental justice, visual aesthetics, cultural resources, and subsistence and traditional land use.
- Potentially beneficial cumulative effects were identified to the economy.

Cumulative impacts are discussed for each resource topic in Chapter 5 of this Final EIS, following the project-specific impact discussion.

ES 5. | COMPARISON OF IMPACTS AND ALTERNATIVES

ES 5.1. | Additional Context of Action Alternatives

This section is intended to give the reader information to make a comparison of the alternatives. The section begins with summary information about the design and logistics of the alternatives that may not be initially evident to the reader. This contextual information will be used, in part, by the Corps in their determination of whether the Applicant's proposed project is the LEDPA. The section is then followed by **Table ES-2**, which provides the reader an opportunity to compare impacts to the environment across the five alternatives. Each resource category is represented and categories or issues of impacts are presented so that the public can better understand the differences or similarities among the alternatives.

ES 5.1.1 | Additional Context: Alternative C

Alternative C was developed to minimize impacts to coastal resources (such as marine mammals and fish), subsistence activities, nearshore processes, and potential impacts to the project facilities from coastal erosion. To minimize these impacts, this alternative would move project components inland. The primary trade-offs with this alternative would result from 1) moving the pads inland, thereby reducing access to the reservoir; 2) the fuel and other supply constraints of seasonal access to the site during construction; 3) the cost and environmental impacts of developing an all-season gravel road; and 4) the challenges of overland module transportation.

Moving the pads inland would have the potential trade-off that future additional pads may be needed to fully access and develop the Point Thomson reservoir. Coastal pads could be deemed necessary if, upon fully delineating the reservoir and determining the extent of reservoir connectivity, it is determined that access into more northern or eastern portions of the reservoir would be required to fully develop the resource.

Only having seasonal ice road access to Point Thomson during construction would lead to challenges in transporting and storing supplies. An estimated 7.5 million gallons of fuel would have to be trucked to Point Thomson and stored to fuel all activities that would occur before the next ice road is functional. It would take one fuel truck per hour, 24 hours a day leaving Deadhorse for Point Thomson for the duration of the ice road season to deliver the needed amount of fuel. In addition, the fuel depot in Deadhorse does not have the capacity for that amount of fuel.

A third consideration under this alternative would be substantial costs incurred from the building and maintenance of a 44-mile gravel access road. However, because project costs were not determined as part of development of alternatives, there is no basis for determining an order-of-magnitude cost for comparison.

Finally, modules would be transported over an ice road by self propelled mobile transports (SPMTs). Each SPMT would travel at a walking pace and would require a large support staff. There would be an SPMT operator and guides to walk the entire distance with the module, and sufficient staff would also be needed to repair the SPMT should it malfunction. The subzero temperatures of the North Slope would double the required crew of SPMT operators and guides to allow crews to warm and rest themselves.

ES 5.1.2 | Additional Context: Alternative D

Alternative D was also developed to minimize impacts to coastal resources, similar to Alternative C, and would move project components inland and as far away from the coast as practicable and feasible. The primary trade-offs with this alternative would result from 1) moving the pads inland; thereby reducing access to the reservoir; 2) the challenges of overland module transportation; and 3) the fuel and other supply constraints of seasonal access to the site during construction, drilling and operations.

Alternative D has the same challenges as described above for Alternative C minus the cost of the gravel access road. The absence of the gravel access road results in resupply throughout drilling and operations continuing to be provided over ice roads each winter. Air transport would be the only year-round access to Point Thomson, but would be dependent on adequate weather conditions for flying. Under Alternative D transporting any large equipment or materials over the lifetime of the project would occur only during winter ice road seasons. A consequence of this logistical trade-off could include delayed development and production of the resource (e.g., materials or equipment not arriving within the necessary time frame, thereby missing a subsequent construction or drilling season). No estimates of cost risks related to logistics were completed, so cost cannot be used as a comparison between alternatives.

ES 5.1.3 | Additional Context: Alternative E

Alternative E uses the same pad locations as Alternative B and therefore has the same potential to develop the majority of the reservoir. Alternative E was developed to minimize the infrastructure footprint to reduce impacts to wetlands and surrounding water resources. This alternative would require less gravel fill overall, by not having infield gravel roads and using multiyear ice pads during drilling. The primary trade-offs of this alternative would result from 1) logistical challenges of having only seasonal overland access between pads and 2) technical and logistical challenges of using untested hybrid drill pads of gravel and multiyear ice.

Under this alternative the access to the East and West Pads would be either by helicopter, low ground pressure tundra vehicle, or by ice road in the winter. Potential effects of this logistical constraint include: not having year-round emergency response access due to no-fly days, limited ability to perform maintenance activities in the summer season, and a limited 3 to 4-month ice road window to move large equipment and materials. As with Alternative D, the logistical trade-off could include delayed development and production of the resource (such as due to missing an ice road window to move the drill rig or not being able to resupply). No estimates of cost risks related to logistics were completed, so cost cannot be used as a comparison between alternatives.

Alternative E would use multiyear ice pads adjacent to smaller, permanent ice pads in an effort to minimize gravel fill in wetlands. Multiseason ice pads (two winters, one summer) have been used elsewhere for drilling exploration wells; however, no examples were found where a multiyear ice pad was used in support of production drilling. As intended in Alternative E, the multiyear ice pad would be used for storage of equipment and materials in support of well development. A multiyear ice pad has several potential challenges such as the viability and annual maintenance of multiyear ice, safety concerns associated with irregular melting and structural integrity, and creation and maintenance of a viable connection with the permanent gravel pad.

ES 5.2 | Comparison of Impacts

Table ES-2 provides the reader an opportunity to compare impacts across the five alternatives. Each resource category is represented and categories or issues of impacts are presented so that the reader can better understand the differences or similarities among the alternatives.

Table ES-2: Comparison of Impacts[a] (1 of 7)

Impact Category	Alternative A No Action	Alternative B Applicant's Proposed Action	Alternative C Inland Pads with Gravel Access Road	Alternative D Inland Pads with Seasonal Ice Access Road	Alternative E Coastal Pads with Seasonal Ice Roads
GEOLOGY AND GEOMORPHOLOGY					
Gravel use	▪ No impact	▪ 2.2 million cubic yards (mcy) of gravel would be mined; impacts would be negligible due to regional abundance.	▪ 5.4 mcy; impacts would be negligible due to regional abundance.	▪ 2.5 mcy; impacts would be negligible due to regional abundance.	▪ 1.7 mcy; impacts would be negligible due to regional abundance.
Geomorphologic features	▪ No impact	▪ Impacts to geomorphologic features from gravel infrastructure and the mine would last at least the life of the project.	▪ Greater impacts due to gravel access road and associated gravel mines.	▪ Impacts similar to Alternative B	▪ Least impact due to reduced infrastructure
Petroleum hydrocarbon production	▪ No impact	▪ 10,000 bbl per day of condensate and up to 10,000 bbl per day of oil, if oil rim production is viable; impacts would be irreversible but this is the project purpose.	▪ Potentially 10,000 bbl per day of condensate and up to 10,000 bbl per day of oil, if oil rim production is viable from accessible portions of reservoir; the greater distance of the wells from the reservoir could reduce the extent to which the reservoir could be effectively produced for oil and gas; impacts would be irreversible but this is the project purpose.		▪ Same as Alternative B
SOILS AND PERMAFROST					
Soil compaction and alteration of the thermal regime of the permafrost due to gravel fill placement	▪ No impact	▪ 215 acres	▪ 605 acres	▪ 285 acres	▪ 155 acres
Potential for decreased albedo, increased thermal conductivity, and promotion of earlier spring thaw due to dust/snowplow/gravel spray	▪ No impact	▪ 135 acres	▪ 590 acres	▪ 185 acres	▪ 60 acres
Gravel mining could lead to talik formation and permafrost degradation	▪ No impact	▪ 55 acres of gravel mine footprint	▪ 130 acres of gravel mine footprint	▪ 65 acres of gravel mine footprint	▪ 45 acres of gravel mine footprint
Compaction of underlying soil and inhibition of vegetation regeneration due to multiseason ice pads	▪ No impact	▪ None	▪ None	▪ None	▪ 20 acres
METEOROLOGY AND CLIMATE					
	▪ No impact	▪ No impact	▪ No impact	▪ No impact	▪ No impact
AIR QUALITY					
State and federal air quality standards	▪ No impact	▪ Air pollutants, including GHGs, would be emitted but state and federal air quality standards would be met.	▪ Emissions would be similar to Alternative B except drilling emissions would be greater due to the longer wells and spread out over 4 years compared to 3 years. State and federal air quality standards would be met.	▪ Emissions would be similar to Alternative B except drilling emissions would be greater due to the longer wells and spread over 5 years instead of 3 years. State and federal air quality standards would be met.	▪ Emissions would be similar to Alternative B except drilling emissions would be spread over 5 years. State and federal air quality standards would be met.
Emissions from transportation would vary depending on the types and numbers of trips. Relative emissions produced in each alternative would generally be proportional to the number of trips by mode.	▪ No impact	▪ Fuel truck trips are particularly noteworthy relative to air quality because they produce fugitive dust and combustion emissions themselves and are associated with emissions produced by combustion of the fuel in construction equipment. About 883 fuel truck trips would be required during construction. See Transportation, below, for other trip information.	▪ About 3,458 fuel trucks would be required during construction. The additional fuel trucks would produce fugitive dust and combustion emissions above those produced in Alternative B and E. Additional emissions would also be associated with combustion of the additional fuel in construction equipment. Local air quality would not likely be measurably changed compared to Alternatives B and E because the emissions would tend to be scattered intermittently over a wide area. See Transportation, below, for other trip information.		▪ About 883 fuel truck trips would be required during construction. ▪ See Transportation, below, for other trip information.

[a] The acreages in this table have been rounded to the nearest multiple of five. See Chapter 5 of Final EIS for detailed quantities.

Table ES-2: Comparison of Impacts[a] (2 of 7)

Impact Category	Alternative A No Action	Alternative B Applicant's Proposed Action	Alternative C Inland Pads with Gravel Access Road	Alternative D Inland Pads with Seasonal Ice Access Road	Alternative E Coastal Pads with Seasonal Ice Roads
PHYSICAL OCEANOGRAPHY AND COASTAL PROCESSES					
	▪ Over time, the existing PTU-3 Pad could extend out into the sea more than the adjacent land, due to differential erosion along the coast.	▪ Primary impacts would be from dredging and screeding associated with the barge offloading facility.	No barge offloading facility; impacts slightly higher than under Alternative A due to emergency boat launch ramp.		▪ Similar to Alternative B
HYDROLOGY					
Stream crossing structures	▪ No impact	▪ 9 crossing structures could constrict channel flow during flood stage	▪ 50 crossing structures, including three at major water bodies	▪ 7 crossing structures	▪ One crossing structure
Gravel roads	▪ No impact	▪ Gravel roads could alter streamflow and drainage pattern.	▪ Gravel access road would increase the geographic extent of the streamflow and drainage pattern alterations. More sheetflow culverts could be required for infield gravel roads due to greater proportion of sheetflow versus defined channels compared to Alternative B.	▪ More sheetflow culverts could be required for infield gravel roads due to greater proportion of sheetflow versus defined channels compared to Alternative B.	▪ Gravel infrastructure is minimized under this alternative.
Gravel airstrip	▪ No impact	▪ 48% of Stream 22 (48 cubic feet per second (cfs)) would be diverted to another stream because the airstrip would block the natural drainage.	▪ 14% of Streams 18a and 18b combined (22 cfs) would be diverted.	▪ 15% of Stream 18b (15 cfs) would be diverted.	▪ 54% Stream 22 (55 cfs) would be diverted.
Water withdrawal	▪ No impact	▪ 329.1 million gallons (MG) total for construction and drilling; 2.7 MG annually for operations.	▪ 512.9 MG total for construction and drilling; 2.9 MG annually for operations.	▪ 600.2 MG total for construction and drilling; 21.1 MG annually for operations.	▪ 594.7 MG total for construction and drilling; 13.2 MG annually for operations.
Gravel mines	▪ No impact	▪ Infield gravel mine would permanently alter drainage pattern.	▪ Five additional gravel mines along gravel access road compared to other alternatives.	▪ Greater impacts to drainage pattern due to Stream 24 diversion (see below).	▪ Same as Alternative B
Stream 24 diversion	▪ No impact	▪ No diversion of Stream 24	▪ Same as Alternative B	▪ Up to 80 percent of Stream 24 would be diverted for 3 years during spring breakup to fill the mine site reservoir.	▪ Same as Alternative B
WATER QUALITY					
Freshwater	▪ No impact	▪ Primary impact would be increased turbidity due to gravel mining, gravel infrastructure, and pipeline construction.	▪ Greater impacts due to gravel access road and associated gravel mines and longer export pipeline.	Similar to Alternative B	
Marine Water	▪ No impact	▪ Construction and operation of the barge offloading facility (including summer screeding) would cause temporary turbidity increases.	The Central Processing Pad would be located inland, thus decreasing potential impacts.		▪ Similar to Alternative B
VEGETATION AND WETLANDS					
Area of wetlands and uplands impacted through fill for gravel roads and pads and excavation for gravel mining	▪ No impact	▪ 285 acres (<1% of mapped area) of excavation and fill. 92% of fill area is wetlands or water bodies.	▪ 740 acres (1% of mapped area) of excavation and fill. 98% of fill area is wetlands or water bodies. ▪ Approximately 400 acres of this fill and excavation would be for the gravel access road.	▪ 355 acres (<1% of mapped area) of excavation and fill. 95% of fill area is wetlands or water bodies.	▪ 205 acres (<1% of mapped area) of excavation and fill. 90% of fill area is wetlands or water bodies.

[a] The acreages in this table have been rounded to the nearest multiple of five. See Chapter 5 of Final EIS for detailed quantities.

Table ES-2: Comparison of Impacts[a] (3 of 7)

Impact Category	Alternative A No Action	Alternative B Applicant's Proposed Action	Alternative C Inland Pads with Gravel Access Road	Alternative D Inland Pads with Seasonal Ice Access Road	Alternative E Coastal Pads with Seasonal Ice Roads
VEGETATION AND WETLANDS (Continued)					
Area of vegetation and wetlands affected adjacent to gravel roads and pads (from dust, snow impoundment, and thermokarst effects)	▪ No impact	▪ 610 acres	▪ 2,685 acres	▪ 845 acres	▪ 260 acres
Vegetation modification from ice infrastructure	▪ No impact	▪ 985 acres of modification from ice roads during construction and drilling. During operations the impact would be reduced because an ice access road would be constructed approximately every 5 years.	▪ 1,125 acres of modification from ice roads during construction and drilling. During operations ice roads would not be constructed.	▪ 890 acres of modification from ice roads. ▪ Impact from an ice access road would occur annually for the life of the project.	▪ 875 acres of modification from ice roads and multi-season ice pads during construction and operations. ▪ Vegetation recovery from multi-season ice pads could take 10 years or more. ▪ Impact from infield ice roads would occur annually for the life of the project.
BIRDS					
Habitat loss and alteration from gravel and ice infrastructure	▪ No impact	▪ 1,365 acres of bird habitat lost or altered from gravel infrastructure; 500 acres of bird habitat altered from ice infrastructure; (<1% of available habitat)	▪ 5,710 acres of bird habitat lost or altered from gravel infrastructure; 685 acres of bird habitat altered from ice infrastructure; (3% of available habitat)	▪ 1,955 acres of bird habitat lost or altered from gravel infrastructure; 455 acres of bird habitat altered from ice infrastructure; (1% of available habitat)	▪ 636 acres of bird habitat lost or altered from gravel infrastructure; 415 acres of bird habitat altered from ice infrastructure; (<1% of available habitat)
Disturbance from air (helicopter and fixed-wing take off/landing) and boat (barge and spill response skiff) traffic	▪ Helicopter overflights to monitor wells when birds are present near the central pad could cause temporary disturbance to birds.	▪ 1,070 acres of bird habitat disturbed by air and boat traffic.	▪ 890 acres of bird habitat disturbed by air traffic.	▪ 950 acres of bird habitat disturbed by air traffic.	▪ 1,557 acres of bird habitat disturbed by air and boat traffic. ▪ Helicopter flights for infield travel could have moderate impacts on birds in affected areas.
TERRESTRIAL MAMMALS					
Habitat loss, alteration, and disturbance from gravel infrastructure	▪ No impact	▪ 880 acres of terrestrial mammal habitat (<1% of available habitat). ▪ Traffic on infield gravel roads may cause disturbance to calving caribou.	▪ 3,450 acres of terrestrial mammal habitat (1% of available habitat). ▪ Gravel access road crosses through caribou calving habitat, muskoxen wintering habitat, and potential brown bear denning habitat. ▪ Traffic on gravel roads may cause disturbance to calving caribou.	▪ 1,205 acres of terrestrial mammal habitat (<1% of available habitat). ▪ Infield gravel roads extend south farther into caribou calving habitat than Alternative B. Traffic on the infield gravel roads may cause disturbance to calving caribou.	▪ 460 acres of terrestrial mammal habitat (<1% of available habitat). ▪ Vehicle traffic disturbance during caribou calving would be limited to the gravel pads, but this disturbance may be replaced by noise from helicopters traveling between the pads.
Pipeline/roads within 500 feet of each other	▪ No impact	▪ Central Pad – 1,340 ft ▪ Badami tie in – 5,955 ft	▪ Central Pad – 2,555 ft ▪ Near Airstrip – 2,395 ft ▪ Water reservoir – 2,840 ft ▪ Water pipeline on timbers has potential to fragment caribou and muskoxen herds.	▪ Near Airstrip – 11,480 ft ▪ Badami tie in – 4,955 ft ▪ West Pad – 1,235 ft	▪ Central Pad – 6,355 ft ▪ Badami tie in – 3,955 ft ▪ Water reservoir – 5,160 ft
Habitat fragmentation and disturbance from water distribution method	▪ No impact	▪ Trucking water would increase traffic on infield roads which may disturb calving caribou.	▪ Caribou and muskoxen would be reluctant to cross the water pipeline elevated 12 inches above the ground, which could fragment herds.	No impact	

[a] The acreages in this table have been rounded to the nearest multiple of five. See Chapter 5 of Final EIS for detailed quantities.

Table ES-2: Comparison of Impacts[a] (4 of 7)

Impact Category	**Alternative A** No Action	**Alternative B** Applicant's Proposed Action	**Alternative C** Inland Pads with Gravel Access Road	**Alternative D** Inland Pads with Seasonal Ice Access Road	**Alternative E** Coastal Pads with Seasonal Ice Roads
MARINE MAMMALS					
Barging	▪ No impact	▪ Noise from barge operations could affect bowhead whales and ringed seals.	▪ No impact	▪ No impact	▪ Noise from barge operations could affect bowhead whales and ringed seals.
Habitat loss and alteration from gravel and ice infrastructure	▪ No impact	▪ 390 acres of polar bear critical habitat lost to gravel infrastructure. ▪ 985 acres of polar bear critical habitat seasonally altered by ice infrastructure (impact would be reduced after drilling).	▪ 745 acres of polar bear critical habitat lost to gravel infrastructure. ▪ 1,140 acres of polar bear critical habitat seasonally altered by ice infrastructure (impact would end after drilling).	▪ 355 acres of polar bear critical habitat lost to gravel infrastructure. ▪ 895 acres of polar bear critical habitat seasonally lost to ice infrastructure (impact would occur annually for the life of the project).	▪ 205 acres of polar bear critical habitat lost to gravel infrastructure. ▪ 900 acres of polar bear critical habitat seasonally lost to ice infrastructure (impact would occur annually for the life of the project for infield roads, but would be reduced after drilling for the access road).
Disturbance from all project infrastructure (gravel roads, ice roads, pipelines, pads, airstrip)	▪ No impact	▪ 3,225 acres of polar bear disturbance zone around permanent project features.26,565 acres of polar bear disturbance zone around seasonal ice features (disturbance from ice access road would be reduced after drilling).	▪ 14,060 acres of polar bear disturbance zone around permanent project features. ▪ 15,645 acres of polar bear disturbance zone around seasonal ice features (disturbance from gravel access road would continue for the life of the project).	▪ 4,505 acres of polar bear disturbance zone around permanent project features. ▪ 21,610 acres of polar bear disturbance zone around seasonal ice features (disturbance from ice access road would continue for the life of the project).	▪ 1,500 acres of polar bear disturbance zone around permanent project features. ▪ 21,965 acres of polar bear disturbance zone around seasonal ice features (disturbance from ice access road would be reduced after drilling; disturbance from infield ice roads would continue for the life of the project).
Disturbance from air traffic	▪ Minimal impacts to polar bears and polar bear critical habitat from helicopter overflights to monitor wells.	17,310 acres of polar bear habitat potentially disturbed by overflights.			
FISH, ESSENTIAL FISH HABITAT, AND INVERTEBRATES					
Stream crossings	▪ No impact	▪ 4 streams crossed with bridges (all fish bearing, one anadromous downstream of the crossing site) ▪ 5 streams crossed with culverts/culvert batteries (2 fish bearing)	▪ 27 streams crossed with bridges (all fish bearing, 6 anadromous) ▪ 21 streams crossed with culverts/culvert batteries (many fish bearing) ▪ Some anadromous streams provide EFH.	▪ 2 streams crossed with bridges (both fish bearing, neither anadromous) ▪ 5 streams crossed with culverts/culvert batteries (2 fish bearing)	▪ One stream crossed with a bridge (fish bearing but not anadromous)
Water withdrawal from fish bearing lakes	▪ No impact	Moderate potential to affect overwintering fish habitat through water withdrawal.		Highest potential to affect overwintering fish because of the high annual water requirements for ice access roads (Alternative D) and infield ice roads (Alternative E).	
Diversion channel	No impact			▪ Diversion of water from Stream 24 to the gravel mine site under Alternative D could impact the ability of Dolly Varden to move up and downstream during spring runoff in the initial years when the reservoir is filling.	▪ No impacts
Essential Fish Habitat (EFH) Marine EFH in the study area is designated for arctic cod and five species of Pacific salmon (although salmon are uncommon in the Beaufort Sea). Freshwater EFH for pink and chum salmon occurs in the western portion of the study area.	▪ No impact	▪ Impacts to EFH from Alternative B would be a temporary occurrence in localized areas depending on the activity.	▪ Impacts to EFH from Alternative C would be long term, and could be adverse, because of construction of bridges and culverts over anadromous fish streams in the western portion of the study area.	Impacts to EFH from Alternatives D and E would be a temporary occurrence in localized areas depending on the activity.	

[a] The acreages in this table have been rounded to the nearest multiple of five. See Chapter 5 of Final EIS for detailed quantities.

Table ES-2: Comparison of Impacts[a] (5 of 7)

Impact Category	Alternative A No Action	Alternative B Applicant's Proposed Action	Alternative C Inland Pads with Gravel Access Road	Alternative D Inland Pads with Seasonal Ice Access Road	Alternative E Coastal Pads with Seasonal Ice Roads
LAND OWNERSHIP, USE, AND MANAGEMENT					
	▪ Would be counter to state and NSB management objectives for their lands.	▪ No change in underlying land ownership for state, federal (Arctic Refuge and Bullen Point lands), and holders of Native Allotment rights. The state would continue to manage land in the area for oil and gas leasing.	▪ Same as Alternative B, but is also most likely to contribute to other industrial uses in the future due to permanent gravel road accessing presently undeveloped project area.	Similar to Alternative B.	
ARCTIC NATIONAL WILDLIFE REFUGE					
	▪ No impact	Proximity of project to the Arctic Refuge may influence management in the Arctic Refuge due to potential impacts to polar bear movement, subsistence and traditional land use, recreation, wilderness perception, and research activities. Proximity of industrial facilities could lead to an increase in the national perception that wilderness qualities could be diminished.			
SOCIOECONOMICS					
Community characteristics and culture	▪ No impact	▪ Greater potential for displacement of subsistence resources along coast due to barge traffic and nearshore infrastructure.	▪ Fewer impacts to user access along the coast due to absence of barge traffic and nearshore infrastructure. Greater disruption as a result of the gravel access road.	▪ Fewer impacts to user access along the coast due to absence of barge traffic and nearshore infrastructure.	▪ Greater potential for displacement of subsistence resources along coast due to barge traffic and nearshore infrastructure.
Employment	▪ No impact	▪ Employment peaks at 1,100 in Year 5.	▪ Construction employment overall could be up to 50% higher than Alternative B due to gravel access road construction and transport and assembly from Deadhorse. Employment peaks at 1,500 workers in Year 6.	▪ Similar to Alternative C, but fewer workers due to construction of ice road rather than gravel access road. Employment peaks at 1,200 in Year 5.	▪ Similar to Alternative B. Employment peaks at 1,210 in Year 5. Additional construction crews would be needed each winter during operation for ice road construction.
Income and tax base	▪ No impact	▪ Increased income primarily through shareholder dividends and Alaska Permanent Fund for residents of NSB and state. Temporary increase in NSB operating budget and bonding ability during construction. Addition of approximately $1 billion to actual and true property value of NSB and could generate annual tax revenue of $47.45 million to the state.	Similar to Alternative B, but would require additional employment and contract opportunities due to increased amount of infrastructure resulting in slightly larger income and tax base revenue generation impacts.		▪ Similar to Alternative B
Utilities, community facilities, and services	▪ No impact	▪ Utility services would largely be onsite; NSB would not see large benefits nor demand on services.	Similar to Alternative B, however greater demand on material supply chains in Deadhorse and throughout Alaska for storage areas and facilities and other infrastructure. Possible adverse impacts on local and regional fuel and raw materials supplies due to competing needs for logistics of resupplying the facility during construction. Would require 60 temporary fuel trucks for construction and increased demand on tank fabrication shops in Fairbanks for over 2 years to accommodate storage of up to 6 million gallons of diesel fuel during construction. Likely to require expansion of Deadhorse fuel depot infrastructure.		▪ Similar to Alternative B

[a] The acreages in this table have been rounded to the nearest multiple of five. See Chapter 5 of Final EIS for detailed quantities.

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Table ES-2: Comparison of Impacts[a] (6 of 7)

Impact Category	Alternative A No Action	Alternative B Applicant's Proposed Action	Alternative C Inland Pads with Gravel Access Road	Alternative D Inland Pads with Seasonal Ice Access Road	Alternative E Coastal Pads with Seasonal Ice Roads
ENVIRONMENTAL JUSTICE					
Environmental Justice Finding	Potential impacts to subsistence resources, subsistence user access, and human health would not result in disproportionately high adverse impacts on the minority and low-income communities of Kaktovik and Nuiqsut.				
TRANSPORTATION					
Trips (land, water, and air)	▪ No impact	▪ Approximately 11,000 trips on ice roads; 300 coastal barge trips; and 1,500 trips by helicopter and fixed-wing aircraft.	▪ Approximately 20,000 trips on ice and gravel roads; and 7,500 trips by helicopter and fixed-wing aircraft. Reliance on winter ice roads to transport materials and supplies during construction. Greater potential for accidents due to increase in trucks operating in Deadhorse unloading barges and transporting contents.	▪ Approximately 20,000 trips on ice and gravel roads; and 7,500 trips by helicopter and fixed-wing aircraft. Similar to Alternative C.	▪ Approximately 15,500 trips on ice roads; 400 coastal barge trips; and 12,000 trips by helicopter and fixed-wing aircraft. Reliance on helicopters to move equipment or materials would be expensive, weather dependent, and increase potential safety issues.
RECREATION					
	▪ Occasional helicopter operations for site monitoring and the protective wellhead covers for the two wells and rig mats would be noticeable to recreationists.	▪ Approximately 280 acres lost for recreation at footprint. Limitations on usability for recreation on 16,600 acres at project site and 19,300 acres along export pipeline. Export pipeline location parallel to coastline would be visible from coastline and ocean. Coastal hunters and subsistence hunters would likely be inhibited from shooting in direction toward pipeline. Public access to facilities on coast would likely be restricted.	▪ Approximately 750 acres lost for recreation at footprint. Limitations on usability for recreation on 39,000 acres at project site and 47,400 acres along export pipeline and gravel access road. Activities on gravel road would likely inhibit recreational hunters from shooting in directions toward road and pipeline. Inland location of facilities would help protect existing coastline recreational experience. Limited public access at Central Well Pad, but not as great as Alternatives B and E.	▪ Approximately 350 acres lost for recreation at footprint. Limitations on usability for recreation on 22,700 acres at the project site and 20,000 acres along export pipeline. Other impacts similar to Alternative C, with exception of the gravel road.	▪ Approximately 200 acres lost for recreation at footprint. Limitations on usability for recreation on 10,000 acres at project site and 22,000 acres along the export pipeline. Other impacts similar to Alternative B, but increased use of helicopters between pads likely would be visible and audible to recreationists.
VISUAL AESTHETICS					
Viewshed	▪ Well covers, existing gravel pads, and rig mats would be visible during snow-free seasons from the coastline.	Project would contrast strongly with the surrounding viewshed from many different vantage points and distances; components would be visible during daytime and nighttime for a long time period; and components would be visible within the coastal corridor and from the north-west corner of the Arctic Refuge with weak to strong contrast, depending on the project phase and lighting conditions.			
Views from Key Observation Points	▪ Well covers are visible from coastline.	▪ Major project features (pads, facilities, export pipeline, and airport) would be visible from some or all key observation points due to location on coastline.	Pads and facilities set back further from the coastline, reducing visual impacts compared to B and E, but not substantially.		▪ Same as Alternative B

[a] The acreages in this table have been rounded to the nearest multiple of five. See Chapter 5 of Final EIS for detailed quantities.

Table ES-2: Comparison of Impacts[a] (7 of 7)

Impact Category	Alternative A No Action	Alternative B Applicant's Proposed Action	Alternative C Inland Pads with Gravel Access Road	Alternative D Inland Pads with Seasonal Ice Access Road	Alternative E Coastal Pads with Seasonal Ice Roads
NOISE					
Potential for project-related noise effect on Arctic Refuge	▪ Minor predicted increases in noise due to occasional helicopter flights.	Greatest predicted increase in noise in coastal environment during construction, drilling, and operations. Increase of less than 10 dBA predicted inside Arctic Refuge at a distance of 10 miles from the western border.			
Potential for project-related noise in study area during operations	▪ Infrequent helicopter flights would have minor effect, particularly in areas directly in the flight path.	▪ Distinguishing noises would be from barges, airplanes and helicopters traveling to and from Point Thomson.	▪ Distinguishing noises would be from vehicles traveling on the gravel access road.	▪ Distinguishing noises would be from airplanes and helicopters, and vehicles traveling on the annual ice road.	▪ On a long-term basis, operational noise from Alternative E is distinctly different from the other build alternatives due to the extensive use of helicopters for travel between pads.
CULTURAL RESOURCES					
Documented cultural resources sites	▪ No impact	▪ No direct impacts to cultural resources. ▪ 43 sites would be potentially indirectly affected.	▪ One cultural resource site potentially directly affected as a result of the all season gravel road. ▪ 44 sites potentially indirectly affected with construction of optional sea ice road; 12 without optional sea ice road.	▪ No cultural resource sites potentially directly affected as a result of the all season gravel road. ▪ 42 sites potentially indirectly affected with construction of optional sea ice road; 27 without optional sea ice road.	▪ 43 sites potentially indirectly affected with construction of optional sea ice road; 37 without optional sea ice road.
Unidentified cultural resources	▪ No impact	Low probability for discovering unidentified cultural resources in the Point Thomson area due to continuous alteration of coastal areas and barrier islands.			
SUBSISTENCE AND TRADITIONAL LAND USE					
Caribou harvest	▪ Minor impacts to the harvest amount of caribou for Kaktovik due to noise/traffic for monitoring activities; however, impacts are unlikely.	▪ Minor impacts to the harvest amount of caribou for Kaktovik are probable. User avoidance would likely be higher due to coastal infrastructure and barging activity.	▪ Impacts to Kaktovik caribou harvests would likely be higher due to more widespread disruption, increased caribou displacement, and decreased hunter success as a result of the gravel access road.	▪ Minor impacts to the harvest amount of caribou for Kaktovik are probable.	▪ Impacts to the harvest amount of caribou for Kaktovik are probable. Increased helicopter traffic could affect local caribou behavior and distribution and result in additional effects on hunter success. User avoidance would likely be higher due to coastal infrastructure and barging activity.
Fish and/or seal harvest	▪ No impact	▪ Impacts to fish and seal harvests for Kaktovik. User avoidance would likely be higher due to coastal infrastructure and barging activity.	▪ Impacts to fish harvest for Kaktovik.	▪ Impacts to fish harvest for Kaktovik.	▪ Impacts to fish and seal harvests for Kaktovik. User avoidance would likely be higher due to coastal infrastructure and barging activity.
HUMAN HEALTH					
	▪ No impact	▪ Negative impacts from exposure to hazardous materials and changes in anxiety/depression prevalence. ▪ Positive impacts from increased tax revenues to fund health care clinics and services.	▪ Negative impacts from exposure to hazardous materials, reduced dietary consumption of subsistence resources, increased roadway incidents and injuries, and an increase in utilizations/clinic burden from nonresident influx due to accidents and injuries. Positive impacts from increased tax revenues to fund health care clinics and services.	▪ Same as Alternative C, however, traffic and the number of employees will be lower, theoretically decreasing the burden on local clinics and emergency services.	▪ Similar to Alternative B

[a] The acreages in this table have been rounded to the nearest multiple of five. See Chapter 5 of Final EIS for detailed quantities.

ES 6. | MITIGATIVE MEASURES

Mitigation is considered by the Corps in two ways during the NEPA process: Applicant-proposed avoidance and minimization measures (identified in this EIS as Design Measures), and resource-specific mitigation measures intended to offset or compensate for unavoidable adverse impacts (referred to as Mitigation Measures).

Measures to avoid and minimize impacts to resources that are identified in this EIS include:

- Efforts made by the Applicant as part of project design or as standard procedures during operation;
- Best Management Practices (BMPs), industry standards, or standard permit requirements;
- Alternatives or modifications to the Applicant's proposed project;
- Additional measures being considered by the Corps that further reduce, off-set, or compensate for impacts; and
- Monitoring to ensure that mitigation is being performed and is achiev-ing the expected results or monitor-ing for adaptive management.

Chapter 4 of the EIS contains lists of design measures and mitigation measures being considered by the Corps. Individual resource sections within Chapter 5 of the EIS contain applicable mitigative measures.

ES 7. | NEXT STEPS

As stated earlier, the Corps initiated the NEPA process as part of its permit review process. As part of the review and consideration of the Point Thomson Project permit application, the Corps is required to consider the following:

1. compliance with NEPA and other relevant federal laws and regulations
2. compliance with the Section 404(b)(1) Guidelines, and
3. the Public Interest Review.

After the release of this Final EIS the Corps will finalize its decision whether or not to issue a permit. The Corps' decision will be documented in a Record of Decision (ROD) and will be based on information from public comments, this Final EIS, analysis of the proposed project's compliance with the 404(b)(1) Guidelines, and the Public Interest Review.

Final EIS - The Final EIS discloses potential impacts associated with the Applicant's proposed project and a range of alternatives. The Corps will consider the potential impacts disclosed in the Final EIS and associated mitigation to inform its permit decision. The alternatives and impact analysis in the Final EIS also provide a basis for determination of compliance with the 404(b)(1) Guidelines.

Compliance with 404(b)(1) Guidelines –
As stated in box 2, the Corps has four determinations or "tests" that are used to determine compliance with the 404(b)(1) Guidelines. One of the determinations results in the identification of the LEDPA. The importance of this determination is that the Corps can only

1

In evaluating a permit application, the Corps must determine if the project is in compliance with various related federal laws, regulations, and Executive Orders (e.g., NEPA, the Endangered Species Act, Section 401 of the Clean Water Act, and the National Historic Preservation Act). Most of the laws and regulations within this aspect of the permit process are discussed in this EIS.

2

The Corps will evaluate the Point Thomson Project to determine if it complies with the Section 404(b)(1) Guidelines (40 CFR 230.10). Steps A through D below describe "tests" that must be performed by the Corps.

A The first test in the Section 404(b)(1) Guidelines requires a full evaluation of the alternatives and requires that the Corps identify the least environmentally damaging practicable alternative (LEDPA). The development and evaluation of alternatives, as described in Chapter 2 of this EIS, was structured to facilitate the Corps' determination of the LEDPA. It is important to note that while this specific requirement of the 404(b)(1) Guidelines is focused on protecting aquatic resources, it also requires that the Corps, when identify-ing the LEDPA, consider "other significant adverse environmental consequences."

B The second test requires the Corps to determine that the project complies with certain federal laws concerning water quality, endangered species, and marine sanctuaries.

C The third test requires the Corps to determine that the project does not cause or contribute to significant degradation to the waters of the U.S.

D The fourth test in the Section 404(b)(1) Guidelines requires the Corps to determine that appropriate and practicable steps have been taken that would minimize potential adverse impacts of the discharge on the aquatic ecosystem.

In reaching its decision on these four tests, the Corps will utilize the information contained in this EIS to make factual determinations concerning the project's impact on the physical, chemical, and biological components of the aquatic environment.

3

Within the Public Interest Review (33 CFR 320.4 (a)) the Corps must determine if the proposed Point Thomson Project is contrary or not contrary to the public interest. To do this, the Corps evaluates and balances the benefits and detriments of the project on relevant public interest factors, as disclosed in this EIS. In addition, the Corps fully considers the public comments regarding the project's effects on the public interest factors.

permit the LEDPA. The documentation for 404(b)(1) Guidelines builds on the alternatives and impact analysis developed within the EIS, with a focus on the specific decision-making framework required by the 404(b)(1) Guidelines.

Public Interest Review - The Corps will evaluate public interest review factors. The importance of each factor and how much weight it is given are unique to each permit proposal. The Corps establishes the weight of each factor by its relevance to the proposal. The weighing of these factors allows the Corps to determine whether or not the proposed project is contrary to the public interest. In addition to the evaluation of the public interest factors, the Corps must also consider: the extent of the public/private need for the proposal; the practicability of using reasonable alternative locations and methods; and the extent and permanence of the beneficial and/or detrimental effects of the proposal.

The ROD will state if the permit is denied or granted, based on the findings of the three, above-mentioned processes. If the decision is to not issue a permit, the filling of wetlands would not be allowed. If the decision is to issue a permit, the permit would describe the project, conditions, and mitigation required. The Applicant will be given the opportunity to review the permit and conditions, should the decision be to issue a permit.

If a permit is issued, the Applicant would also finalize required permitting processes with the State of Alaska and the North Slope Borough.